UST

Sustainable business transformation

The boundless impact of AI and technology

THINKING AHEAD SERIES

"Sustainable businesses attract and retain customers, investors, and talent, thriving in a changing world.

Let's use AI for sustainable transformation and create a brighter future."

Navigating sustainable business transformation with AI

Foreword by
Krishna Sudheendra
Chief Executive Officer, UST

The imperative for sustainable practices has become more pronounced in today's ever-evolving business landscape. Fueled by heightened societal expectations, regulatory demands, and the urgent need to address climate change, businesses are under increasing pressure to reduce their environmental impact and pioneer innovative solutions.

The rise of environmental, social, and governance (ESG) initiatives across industries underscores the recognition of sustainability as a fundamental component of successful business strategies. From mitigating climate risks to promoting ethical conduct, integrating sustainability principles has become paramount for organizations striving to address global challenges effectively.

Amidst these challenges, the emergence of green AI offers a promising avenue for leveraging technology to pursue sustainability. As companies navigate the complexities of sustainable transformation, they must remain vigilant of evolving regulations and actively engage with policymakers. Collaboration with industry peers and consultation with experts can provide invaluable guidance.

In our conversations with experts, we have explored the obstacles and the myriad opportunities that lie ahead for enterprises committed to sustainability. Beyond mere cost considerations, sustainable practices have the potential to yield significant long-term savings. Moreover, they can drive innovation, developing novel products and services that resonate with environmentally conscious consumers.

Sustainable businesses are better positioned to attract and retain customers, investors, and talent and thrive in a rapidly changing world. As we embark on this journey of sustainable business transformation with AI, let us seize the opportunity to create a brighter, more sustainable future for future generations. >

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The foundation of sustainable transformation

A UST survey* highlights that **92% of organizations prioritize sustainability and technology-driven transformations**, with executive leadership even more committed. 95% of leaders value sustainability, while 97% value technology transformations, showcasing a strong organizational alignment towards these strategic initiatives.

We asked leaders from various industries about the growing importance of sustainable business transformations. Some key trends and practices shaping sustainable business practices for enterprises include the adoption of Corporate Social Responsibility (CSR) to demonstrate their commitment to social and environmental responsibility. Experts also mention that enterprises increasingly focus on building sustainable supply chains by collaborating with suppliers to improve transparency, traceability, and ethical sourcing practices.

Other fast-evolving practices include embracing the principles of the circular economy — adopting circular business models, such as product-as-a-service and take-back programs, thus extending product lifecycles and reducing environmental impact.

There is an overall shift toward a more holistic and integrated approach to sustainability, where environmental, social, and economic considerations are seen as interconnected and essential for long-term business success and resilience.

But despite the progress, enterprises have many challenges to overcome, like the high cost of implementing sustainable practices, the need for more awareness about the benefits of sustainability, the increasingly complex regulatory landscape, and the constant pressure to focus on short-term profits rather than long-term sustainability.

The survey reveals a diversity in operational changes organizations pursue for sustainable transformation: 35% integrate sustainability practices, 34% emphasize data-driven decisions, 33% prioritize flexibility and adaptability, and 32% align strategies with business goals, underscoring varied approaches to achieving sustainability.

In this scenario, new technologies like AI, especially green AI, offer solutions for addressing sustainability challenges and creating new regulatory needs. >

*Unless labeled otherwise, all data is sourced from our Sustainable Business Transformation Survey Report

The rise of green AI

The rise of green AI and responsible development represents a pivotal shift in the technology landscape, where innovation is not only driven by performance and efficiency but also by sustainability and environmental stewardship. This emerging trend encompasses developing and deploying artificial intelligence (AI) solutions that prioritize energy efficiency, minimize carbon emissions, and contribute to overall carbon footprint reduction.

One significant aspect of the rise of green AI is acknowledging the substantial environmental impact of traditional IT infrastructure. Data centers are known for their high energy consumption and carbon emissions, leading to concerns about their environmental sustainability. However, advancements in AI-driven optimization and resource management techniques enable data centers to operate more efficiently, reducing their carbon footprint while maintaining performance and reliability.

In addition to optimizing IT infrastructure, green AI drives innovation in carbon reduction solutions. AI-powered algorithms and analytics are being used to identify opportunities for emissions reductions across various sectors, including transportation, manufacturing, energy production, and agriculture.

Keeping responsible development and environmental stewardship in mind, business leaders like Mike Herod discuss how technology will hold companies accountable and competitive in 2024 and beyond.

"As architects of the digital age, our mandate is clear: to integrate AI and generative AI at the core of every transformative endeavor, ensuring that the blueprint of tomorrow is as sustainable as it is groundbreaking. AI's role in our collective future transcends mere automation or efficiency; it's about crafting a legacy of sustainable and continuous business innovation."

DR. ADNAN MASOOD, CHIEF AI ARCHITECT, UST

KEY INSIGHTS

- **92% of organizations prioritize sustainability and technology transformations**, with even stronger executive support and leadership.
- Trends highlight **CSR adoption**, **sustainable supply chains**, and **circular economy practices**.
- **A holistic sustainability approach** integrates environmental, social, and economic aspects.
- **Green AI focuses on** energy efficiency, reducing carbon emissions, and innovating carbon reduction.

At a glance

State of sustainable transformation

Widespread commitment

92% of organizations now integrate sustainability into their technology-driven transformations, with strong support from executive leadership.

Efficiency gains

93% report operational efficiency improvements over the last five years, largely thanks to AI and emerging technologies.

AI's critical role

82% view AI as crucial for sustainable transformation, with 86% emphasizing the synergy of AI, data, and analytics.

Investment trends

Over the last three years, up to 75% of IT budgets have focused on digital transformations, a trend expected to increase in the coming years.

Barriers

Prevalent challenges

92% of organizations encounter obstacles like limited resources/expertise, insufficient data, and change resistance.

Resource and expertise gaps

32% report a lack of human resources or expertise.

Understanding digital transformation

30% struggle with grasping the technologies and their potential for transformation.

Complex barriers

Difficulties include cultural shifts, regulatory compliance, supply chain intricacies, and stakeholder engagement.

Leadership engagement

Active participation

76% of organizations report the active involvement of their president/CEO, and 72% of C-suite executives engage in sustainability discussions.

Strong support

93% of organizations are confident in their executive leadership's commitment to leading sustainable transformation initiatives.

Key trends

Crucial role of AI

82% of organizations identify AI as essential to sustainable transformation efforts.

Global IT adoption for sustainability

Emphasizing prioritization, advanced data utilization, and stakeholder involvement.

Upcoming training and upskilling

More than 99% are considering or planning to implement AI-focused training, with Canada and the US leading in preparedness.

Technological drivers

Key innovations include data analytics, machine learning, AI, IoT, and blockchain, supporting transparent, sustainable supply chains.

Holistic sustainability

Recognizes the blend of environmental, social, and economic considerations.

Energy-efficient green AI

Aims to enhance energy efficiency, cut carbon emissions, and encourage carbon reduction innovations.

Perspective: Navigating the ethical path to sustainable supply chains

Mike Herod, Director ESG and Sustainability, Fluence

Sustainability is an opportunity for significant positive change, particularly for future generations. It has a personal and multifaceted nature, aiming to leave a positive environmental, financial, and social impact.

Our driving force lies in leveraging our technology and influence for a positive impact throughout our supply chain. It's about ensuring fair practices, optimizing transparency and accountability, and holding our suppliers to high standards. This represents the next sustainability phase within our industry, building on our progress in other areas like our buildings. In the coming years, Fluence Energy will focus on improving sustainability within its supply chain, aiming for fair practices, transparency, and accountability.

Our greatest challenge, or opportunity, is prioritizing sustainability initiatives and overcoming data and systems sophistication hurdles. Determining where to focus our efforts first is paramount. With accurate data and robust systems in place, our initiatives can be effective. It's essential to have the necessary information to measure progress accurately and ensure alignment with our goals and key performance indicators (KPIs) shaped by national priorities and the complexity of our supply chain. >

Navigating these challenges effectively requires strong leadership support and a culture that drives sustainability. Of course, there is external resistance, particularly in resource constraints and varying levels of sustainability maturity among partners. However, engaging stakeholders and helping them understand the importance and benefits of sustainability initiatives is a great way to deal with resistance.

We have a significant opportunity to drive positive change within our supply chain. Given the scale and complexity of supply chains, unfortunate incidents can occur, but they also present opportunities for us to make a difference. Child labor and forced labor have no place in our supply chain, and we are unwavering in our commitment to eradicate them.

In terms of government policies and regulations, European and Indian governments demonstrate a more progressive stance compared to the United States. However, despite potentially more relaxed regulations, the demands from investors and customers for sustainability are becoming increasingly influential in propelling change.

As I embark on my 21st year driving sustainability initiatives for major corporations, I find myself in an organization that provides the ideal environment for success. Reporting directly to the CFO, enjoying full support from the executive leadership team (ELT) and the board, we've cultivated a culture prioritizing sustainability at every level.

"Sustainability isn't just about some lofty goal for me; it's deeply personal. It's about taking what we have — our resources, opportunities, and lives — and striving to leave them better than we found them. Not just environmentally but financially and socially — the whole package. We're at a point where change isn't a suggestion; it's a necessity. Big, good change. That's what drives me — for my kids, my family, and all of us. It's a simple plea: **Let's clear the mess we've made and do better.** Because we can, and we must."

ADVICE FOR LEADERS

Companies should embrace sustainability through IT adoption, emphasizing the need for prioritization, data sophistication, and engagement with stakeholders. **Sustainability is a moral imperative and a competitive advantage in today's market.**

Navigating the challenges and opportunities in sustainable business transformation

Sustainable business transformation has emerged as a critical imperative for organizations seeking to address environmental, social, and economic challenges while driving long-term success. However, this journey has its challenges and opportunities.

Business leaders tell us how businesses can navigate these complexities and leverage the opportunities presented by sustainable business transformation.

First, by addressing the challenges:

- **Cultural shift:** Implementing sustainable practices often requires a fundamental cultural shift within organizations. It entails challenging existing norms and beliefs, fostering a culture of innovation and sustainability, and aligning stakeholders around a shared vision for change.
- **Regulatory compliance:** Compliance with evolving environmental and social regulations poses a significant challenge for businesses. Navigating complex regulatory landscapes requires a deep understanding of legal requirements, proactive risk management strategies, and ongoing monitoring and reporting mechanisms.
- **Supply chain complexity:** Globalized supply chains present inherent challenges in ensuring transparency, ethical sourcing, and environmental stewardship. Addressing supply chain complexities involves collaborating with suppliers, implementing robust traceability systems, and promoting responsible sourcing practices throughout the value chain.
- **Stakeholder engagement:** Engaging diverse stakeholders, including employees, customers, investors, and communities, is essential for sustainable business transformation. Building trust, fostering open dialogue, and addressing stakeholder concerns require effective communication, transparency, and accountability.

Then, by understanding the opportunities:

- **Competitive edge:** Sustainable business transformation becomes a differentiator, offering strategic market advantages.
- **Innovation leadership:** Fosters eco-innovation, creating new markets and establishing businesses as sustainability leaders.
- **Cost efficiency:** Sustainable practices reduce waste and optimize resources, leading to cost savings and efficiency.
- **Risk management:** Enhances resilience against environmental, regulatory, and resource-related risks, ensuring long-term adaptability.

In line with this, half of companies are fostering innovation regarding sustainability and technology through incorporating sustainability goals into their mission and values (57%), utilizing technology to drive sustainable practices (54%), and dedicating teams and processes to test and evaluate new sustainable technologies (51%). At least two-thirds of organizations are considering all training/upskilling initiatives listed in the survey.

Navigating the challenges and opportunities in sustainable business transformation requires a strategic and holistic approach that integrates environmental, social, and economic considerations into core business strategies and operations. Above all, it means embracing advanced technologies like AI to create value for society, the environment, and future generations while securing long-term success and business resilience in a rapidly changing world. >

Widespread challenges

92% of organizations report significant obstacles in achieving transformation goals, with barriers varying across entities.

Resource and knowledge shortfalls

A third faces shortages in human resources/expertise (32%) **and data** (30%), reflecting a general resource gap.

Understanding and strategy lapses

Similarly, **31% need more training in sustainability**, and **30% need a clear strategic direction**, highlighting deficiencies in digital transformation knowledge.

Size-related hurdles

Larger organizations encounter more resistance to change than smaller ones, suggesting scale impacts the nature of transformation challenges.

AI and IT

AI and IT networks are at the forefront of this change. AI analytics help transform data into sustainable insights by leveraging advanced algorithms to extract valuable information, identify patterns, and make predictions. Information technology (IT) networks are crucial in building sustainable supply chains by enabling stakeholder communication, collaboration, and transparency. But there are challenges to be overcome here as well.

- **Data quality and bias**
  AI models are only as good as the data they are trained on. Data quality and mitigating bias are crucial for generating reliable and trustworthy insights.
- **Transparency and explainability**
  Understanding how AI models arrive at their conclusions is essential for building trust and ensuring responsible use of the technology.
- **Accessibility and affordability**
  Small and medium-sized enterprises may struggle to access or afford advanced AI tools, requiring wider dissemination and affordable solutions.
- **Data security and privacy**
  Ensuring data security and privacy throughout the network is crucial, especially when dealing with sensitive information and collaborating with multiple partners.
- **Standardization and interoperability**
  Different systems and data formats across the supply chain can hinder seamless information flow and data integration. Standardization efforts are needed.

KEY INSIGHTS

- **Barriers:** 92% encounter resource/expertise shortages, data inadequacy, and change resistance.
- **Challenges:** Include cultural shifts, regulatory hurdles, supply chain complexity, and stakeholder engagement.
- **Opportunities:** Offer competitive edge, innovation, cost efficiency, and improved risk resilience.
- **The role of tech:** AI analytics and IT networks are essential for sustainable insights and transparent supply chains.

By strategically leveraging these advanced technologies, organizations can gain valuable insights, optimize operations, and foster collaboration across the supply chain, ultimately building a more sustainable and responsible future.

Andy and Kat talk about how we can accelerate our transition toward a more sustainable future for all by leveraging AI, data, and IT networks. They also touch upon the democratization of AI and the importance of change management in the face of disruptive technologies.

"Those that are data-rich already have an advantage and will continue to leverage it. And that will continue paying dividends for them."

Perspective: Data-rich industries will be ahead of the curve

Andy McMahon, Head of MLOps at NatWest Group

Many of us have embarked on the digital transformation journey, integrating technology into various aspects of our industries. We are transitioning from a digital-first mindset to one where AI and machine learning can enhance nearly every area, provided that organizations possess the necessary foundational elements.

To fully grasp the advantages of AI and machine learning (AI/ML), it is essential to establish some shared understanding of these capabilities across your organization. Collaboration between technology and business teams is crucial so that appropriate business processes can be targeted for improvement. To do this successfully, you must encourage that dialogue so everyone understands how your business functions work, the value they create, and the challenges they face. If technologists and domain experts can work together in this way, this will foster buy-in and build a shared vision of how technology can drive positive change. >

Organizations must consider several important strategic initiatives to take full advantage of the next wave of technological advancement and innovation. This includes, among many other things, recruiting the right talent, providing adequate training to existing staff, and establishing robust processes and technology platforms to maximize the utilization of AI/ML across any aspect of your operations.

NatWest Group encompasses diverse businesses, each facing unique challenges. Consequently, the impact of AI and ML can vary across different organizational functions. We have deployed AI/ML across various functions, business domains, and problem areas. This has ranged from detecting fraudulent activities in transaction data to optimizing customer offerings for enhanced personalization. Additionally, significant strides have been made in assisting customers in making climate-conscious decisions, aligning with our sustainability agenda. We continue to work on targeted use cases across the group and have done this in a way that carefully considers how we do this sustainably while still driving operational efficiency, value generation, and better customer outcomes.

“In my role, however, scalability is one of the biggest challenges.”

In recent years, we have developed a series of internal technological and operational capabilities that means we can go after these use cases more efficiently and effectively. Our collaboration with AWS has been instrumental in this regard, leading to the development of our enterprise-scale MLOps platform. This has allowed us to create a streamlined approach to swiftly deploy the infrastructure and technology our scientists and engineers require to transform ideas into deployable software. This has enhanced our ability to meet the growing demand for innovative solutions across the organization.

This journey has not been without its challenges. At times, we have naturally faced some resistance to change, we have had to work hard to acquire the right talent, and we have had to build out the right training to develop our existing staff. Then, operational risks come from deploying machine learning at scale, such as systems drifting out of tolerance or entirely new security considerations. It is essential to mitigate these risks to maintain trust, and we have prioritized building the capability to do so.

In my role, however, scalability is one of the biggest challenges. The focus here is on taking initial concepts that may live on a laptop and transforming them into impactful software products that can work effectively at the scale required by the business as we serve our 19 million customers. It would be best if you remembered some core principles to do this repeatedly while taking advantage of the latest capabilities like generative AI. One way I often do this is by using what I call **the "four Ps"**:

People

Are we adequately training and hiring the right talent? Do we have effective models for organizing teams and scaling capabilities rapidly to new areas of the organization?

Product

Are we consistently aligning our efforts with the business problems we aim to solve? Are we standardizing processes and providing tools to expedite problem-solving?

Pattern

To scale effectively, we must establish standardized technology architectures and patterns. Are we doing this?

Defining and adapting these patterns becomes crucial for organizational scalability as the field evolves, particularly with emerging technologies like generative AI.

Process

Are we developing robust operating models?

This is essential for deploying and maintaining machine learning models at scale and is a core part of effective MLOps. This includes resource allocation, performance monitoring, cost management, and ensuring compliance with regulations without sacrificing agility.

Balancing governance and risk management while maintaining agility is paramount in regulated industries like financial services. Addressing these challenges will be instrumental in sustaining the upward trajectory of AI and ML adoption and leveraging the latest innovations effectively. There is a need for continual questioning, validation, and evolution in AI/ML adoption to stay ahead in this rapidly changing landscape.

ADVICE FOR LEADERS

In 2024, **leaders should prioritize two significant trends**: the operationalization of large language models (LLM OPS) and the democratization of AI, leading to increased demand across diverse industries.

"A clearly articulated strategy seamlessly integrating AI into the fabric of the company's culture, operations, and broader ecosystem is paramount for achieving AI readiness. While implementing AI technology is crucial, the true value emerges from successfully managing the change process, ensuring that individuals within the organization adapt to and embrace transformative technological initiatives."

Perspective: Are we AI-ready?

Karenann "Kat" Terrell, Former CIO, Walmart; CDTO, GSK; and UST Advisor

We're in a dynamic era where AI and technology promise to propel transformation efforts to sustain enterprises and institutions in the long run. However, it's important to note that AI isn't merely a subset of technology. AI quite simply changes everything — from day-to-day improvements, beyond how email and the internet did, to full automation, which will make new business models possible.

For a company to thrive sustainably, it must establish a robust internal perspective on how technology, particularly AI, will contribute to its value proposition. AI must be integrated into the company's core strategy, allowing people to utilize it to enhance customer service, embrace new capabilities, and boost productivity.

Unlike traditional technologies with discrete and predictable outcomes, AI operates probabilistically, so it's critical to think its implementation through carefully. Not every problem needs to be solved with AI. Crucial to this future world will be strong internal data governance and management processes, decisions on software usage, and a data-first approach.

Given the stochastic nature of AI, especially as generative AI is programmed by English language commands, its role in business sustainability becomes indispensable. While technology strategies and digital transformations were once a long-term mission or even optional, AI is now mandatory for companies seeking sustainable success. >

The ubiquitous integration of AI within organizations

In planning for the pervasive integration of AI, I employ a **three-pronged strategy** complemented by ensuring a clear and robust process to manage the challenges and opportunities that arise over time.

1 Cultural alignment

The company's culture plays a pivotal role in shaping the approach to AI adoption. Whether the culture leans toward top-down directives or fosters grassroots innovation, a well-defined process for AI management is essential. This process must be widely understood across the organization, given AI's inherently accessible and highly media-hyped nature. If business leaders and individual employees are expected to adopt AI, there must be a decision-making process and a proof of concept to scale implementation that aligns with the values, risk, and decision authority that the culture of a company reinforces.

2 Ecosystem thinking

Effective AI implementation necessitates focusing on a broader ecosystem for development. Never is it more important for technology in an enterprise to determine what and who will be doing the work, whose data and models will be used in AI solutions, and the architecture and platforms used to generate value for productivity and new business models. Small new AI companies, scaling AI foundation companies, big tech, and big services companies are all a part of your ecosystem choices in AI portfolio development and deployment. This entails carefully considering the internal maturity of your data organization, establishing platform capabilities to support ongoing model development and maintenance, and curating highly specialized AI models from external sources. Adopting an ecosystem curator mindset, akin to managing APIs, becomes crucial.

"We are fostering a culture of innovation around AI."

3 Change management and HR leadership

Accelerating AI deployment to realize its full potential requires business leaders and individual employees to adopt enterprise-level organizational change management. Interestingly, many companies entrust HR leaders with co-sponsorship or even spearheading AI initiatives, a departure from conventional high-technology leadership roles. The experience gained by HR leaders during the COVID era, where they navigated significant operational changes, could serve as a valuable precursor to effectively managing AI integration within the company. This shift marks a crucial evolution in how organizations approach the adoption of transformative technologies like AI, shifting the focus from risk mitigation to maximizing the company's value proposition.

Fostering a culture of innovation around AI within organizations and the critical role of adoption (beyond change management) in preparing the workforce for AI will define the speed and success of embracing AI. The preparation for the workforce for AI needs to start immediately to avoid FOMO (fear of missing out) among employees.

Sustainable enterprises must consider the competitive capability that AI will drive in their industry and across the broader work world. Without a strategy that is communicated to the financial markets and to the talent market where employees will decide where they want to work, an enterprise will be behind the fast-moving opportunities of digitally driven enterprises embracing AI proactively.

The evolving role of the CIO in change management is familiar yet distinctly elevated

The traditional approach of associating change management solely with program or project implementations is no longer tenable. Instead, there is a growing recognition that organizations must embark on adoption initiatives that delineate the implications of AI for their workforce comprehensively and proactively. Initiating these discussions promptly is paramount. It is imperative to dispel uncertainties and provide clarity regarding the role of AI within the organization to alleviate concerns and foster a culture of readiness. The transformation of software development capabilities has been moving to scale rapidly, which is critical for a CIO to embrace for tech employees.

Furthermore, the role of the CIO in data analytics has undergone a notable transformation. Formerly focused on overseeing data platform creation and security measures, CIOs are now tasked with more strategic data management, architecture, and stewardship responsibilities. The emphasis has shifted towards ensuring data availability, accessibility, and governance, underscoring the importance of collaboration with business stakeholders to determine data access protocols.

While CIOs play a pivotal role in data management strategy, their approach is increasingly characterized by a federated model, wherein data knowledge is dispersed across the organization, reflecting a more collaborative and inclusive leadership paradigm. This is a leading indicator and capability for a CIO role in driving an effective AI strategy for companies.

ADVICE FOR LEADERS

We need to address the democratization of AI, its transformative power, and the need for organizations to prepare for its widespread adoption and effectively manage associated risks. We should not underestimate the impact of AI democratization and the importance of governance tied to company culture.

Technological innovations driving sustainability

Our business leaders have emphasized that various technological innovations drive sustainable business transformation across sectors.

Here are some key examples:

1. **Technological insights and predictions:**

- **Data Analytics, ML, and AI**
  These tools gather insights from diverse data sources to optimize resource use, track emissions, and identify opportunities for sustainability improvements. AI and machine learning algorithms are being used to optimize various processes, from supply chain management to product design. These technologies can identify inefficiencies, predict consumer demand, and recommend sustainable alternatives. For instance, AI-powered algorithms can optimize transportation routes to minimize fuel consumption or suggest eco-friendly materials for product manufacturing. >

- **AI analytics**

  AI analytics can facilitate sustainable insights by integrating disparate data sources and identifying patterns and anomalies within datasets that indicate opportunities for sustainability improvements or areas of concern. It can optimize resource allocation and decision-making processes to maximize sustainability outcomes, analyze individual behavior patterns and preferences to personalize sustainability initiatives and encourage behavior change. AI algorithms can forecast future outcomes based on historical data and current trends, enabling organizations to anticipate sustainability challenges and opportunities.

2. Networks and real-time monitoring:

- **IT networks**

  IT networks play a crucial role in building sustainable supply chains by connecting diverse data sources across the supply chain, providing real-time visibility into material flows, emissions, and resource usage. This transparency helps identify inefficiencies and opportunities for improvement.

- **Sensor networks and Internet of Things (IoT)**

  Connecting physical assets with sensors and networks allows real-time monitoring of environmental parameters, enabling interventions like energy usage, resource consumption, waste reduction, or preventive maintenance. By analyzing this data, companies can optimize their operations, reduce waste, and improve efficiency. Imagine smart factory sensors detecting water leaks or optimizing energy usage based on real-time production needs.

3. Innovative production and supply chain management:

- **Blockchain technology**

  Secure, distributed ledger technology like blockchain enhances transparency and traceability in supply chains, enabling businesses to track the origin and journey of products from raw materials to end consumers. This helps ensure ethical sourcing, fair labor practices, and environmental sustainability. Blockchain can also enable trading renewable energy certificates and carbon credits, incentivizing businesses to invest in clean energy and reduce emissions.

- **3D printing/additive manufacturing**

  Additive manufacturing technologies are revolutionizing how products are designed and produced, offering opportunities for sustainable manufacturing. 3D printing can reduce material waste by only using the necessary amount of raw materials, enable on-demand production to minimize inventory and transportation emissions and facilitate the design of lighter and more efficient products.

- **Sustainable supply chain management software**

  Software solutions help businesses manage and optimize their supply chains for sustainability. These platforms provide tools for tracking suppliers' environmental and social performance, assessing risks, and implementing sustainability initiatives throughout the supply chain. By ensuring transparency and accountability, these technologies help companies make informed decisions to minimize their environmental impact and improve social responsibility.

4. Engaging stakeholders and customers:

- **Digital platforms and communication**
  Online platforms connect businesses with stakeholders, enabling transparent reporting, sharing sustainability initiatives, and collecting feedback. Companies can share sustainability goals and progress reports and engage in collaborative problem-solving through these platforms.
- **Virtual reality (VR) and augmented reality (AR)**
  Immerse customers and employees in sustainability challenges, fostering understanding and engagement. Imagine experiencing deforestation impacts through VR or virtually touring recycling facilities to understand the waste management process.
- **Gamification**
  Gamified applications and challenges can motivate employees and customers to adopt sustainable practices. Points, rewards, and recognition systems can encourage participation in energy-saving programs or sustainable product choices.

5. Designing for sustainability:

- **Circular economy solutions**
  Technologies like 3D printing and advanced materials manufacturing promote resource efficiency and waste reduction. Businesses can design products for disassembly and reuse, minimizing end-of-life waste and extending product lifecycles.
- **Biomimicry**
  Drawing inspiration from nature, biomimicry leads to innovative solutions that optimize functionality while minimizing environmental impact. Products inspired by nature's efficient structures and processes can help reduce material use and energy consumption.
- **Life Cycle Assessment (LCA)**
  Tools and technologies analyze the environmental impact of products and services throughout their entire life cycle, informing sustainable design and production decisions. Businesses can identify hotspots within their value chain and prioritize areas for improvement based on LCA results.

More than half of organizations foster innovation **through** sustainability goals in:

Mission and values (57%)

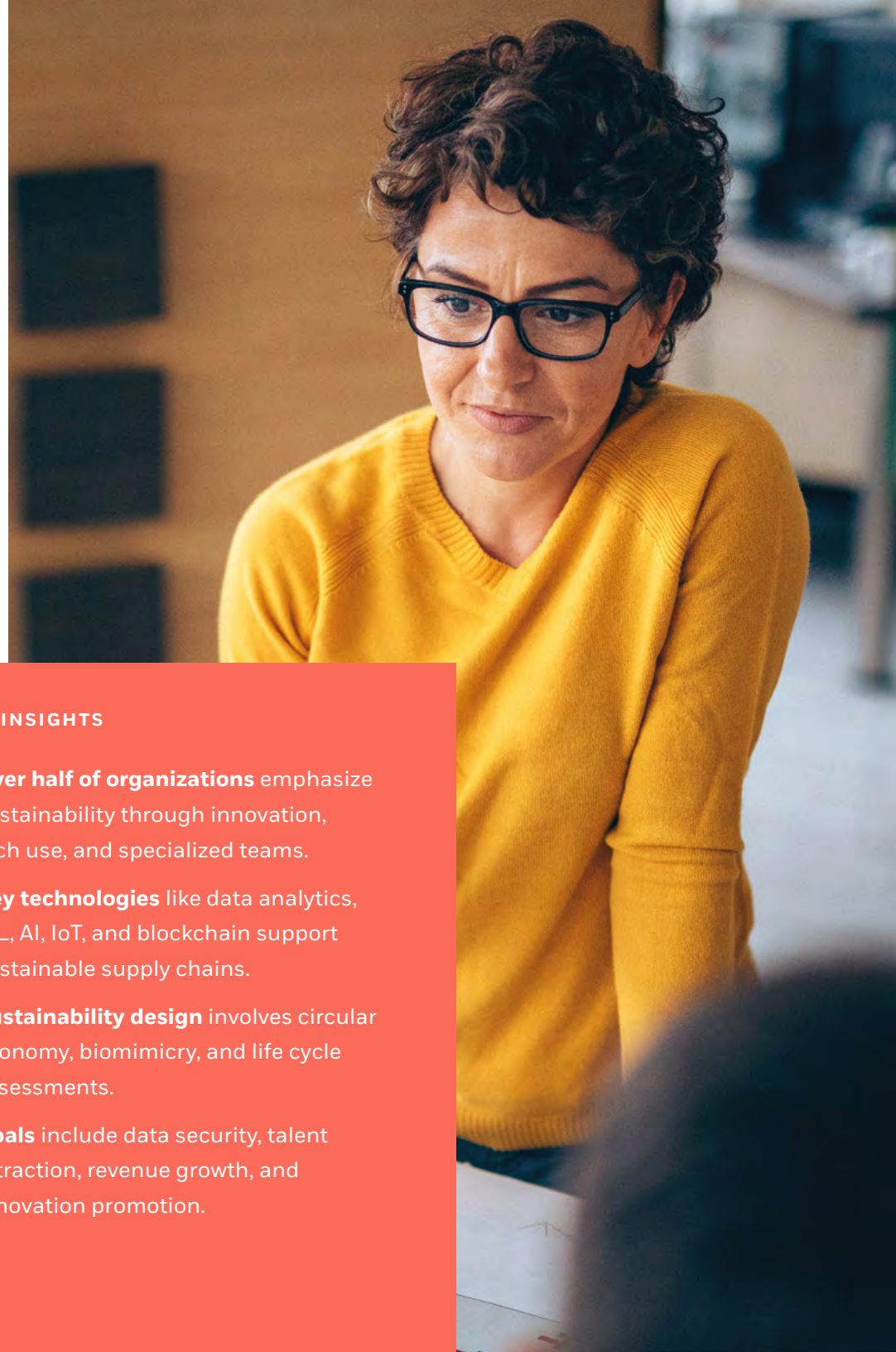
Utilizing technology to drive sustainable practices (54%)

Dedicated teams to test new technologies (51%)

We are in an age of convergence of advanced technologies and sustainable business practices. Their alignment with change management and profitability marks organizational objectives for 2024.

30% of organizations want to enhance their data security and privacy, while 28% focus on attracting and retaining top talent and 27% on increasing revenue and profitability. Increasing innovation and creativity (26%) is also ranked high among business objectives.

While technology offers powerful tools, successful sustainable business transformation requires a holistic approach, combining technological advancements with organizational culture change, leadership commitment, and stakeholder collaboration. The technological innovation landscape for sustainability constantly evolves, as Jon Clay and Maneet Singh shed light on. By harnessing these advancements and adopting a forward-thinking approach, businesses can become more sustainable, resilient, and future-ready. At the helm of these changes is the CIO that Kat touched upon and Bill highlights.



KEY INSIGHTS

- **Over half of organizations** emphasize sustainability through innovation, tech use, and specialized teams.
- **Key technologies** like data analytics, ML, AI, IoT, and blockchain support sustainable supply chains.
- **Sustainability design** involves circular economy, biomimicry, and life cycle assessments.
- **Goals** include data security, talent attraction, revenue growth, and innovation promotion.

"AI holds immense promise for our business operations and is viewed as part of a continuum of technological progress. Unlike fleeting trends of the past, AI is expected to endure and become integral to our business strategies in multiple ways."

Perspective: CIOs are uniquely positioned to facilitate AI adoption

William "Bill" H. Miller, Jr., former SVP and Head of Business Process Transformation, NetApp; CIO, Two Oceans Insights LLC; and UST Advisor

AI represents the latest technological evolution, with vast potential to drive sustainable transformation in companies. It offers internal efficiency gains and external customer-facing applications, ensuring long-term relevance and value for businesses. The need of the hour is for AI to be integrated pervasively, internally and externally, to maximize its impact on operations and customer engagement.

While we've previously delved into cloud computing and prioritized data analytics, AI's reliance on vast datasets underscores the ongoing importance of data in shaping our businesses.

Internally, AI stands to revolutionize our operations by enhancing productivity and efficiency across various departments, from HR and finance to marketing and engineering. AI's potential to automate software generation is particularly compelling, thereby reducing the costly investment of engineering time. Integrating AI into our internal processes reflects our commitment to sustainability and long-term operational effectiveness. >

> "We can harness the power of vast data sets to gain actionable insights."

Moreover, AI offers significant opportunities for customer-facing applications. By embedding AI capabilities into our products and continuously evolving them based on richer datasets, we can deliver enhanced value to our customers over time.

In essence, sustainability in AI implementation transcends a one-time endeavor; it must become ingrained in how we operate our enterprises and interact with our customers for the foreseeable future. At the same time, data analytics is crucial in sustainably driving companies into the future.

We've been immersed in data and analytics for quite a while now, and several factors have brought it into sharper focus over the past seven or eight years. One significant factor is the exponential growth of data sets within enterprises. With sensors omnipresent, we're now collecting data from an array of sources, leading to databases expanding from gigabytes to terabytes to petabytes.

This data isn't just about monitoring our company's operations and delving into customer relationships. Take, for instance, manufacturers selling equipment equipped with sensors that relay data from customers' environments. We analyze this data to optimize their usage, enhance efficiency, and determine when upgrades or software updates are needed. Essentially, we're leveraging data and analytics to provide customers with deeper insights into maximizing the value of our offerings.

Data and analytics also play a pivotal role in optimizing our internal operations. By scrutinizing data, we can assess our business performance, identify areas for improvement, and ensure we're taking advantage of potential opportunities. This data also serves as valuable fodder for training AI models, showcasing the overlap between data analytics and AI.

The advent of cloud technology has transformed the data analytics landscape. With many analytical tools and platforms now residing in the cloud, we can harness the power of vast data sets to gain actionable insights into our or customers' businesses.

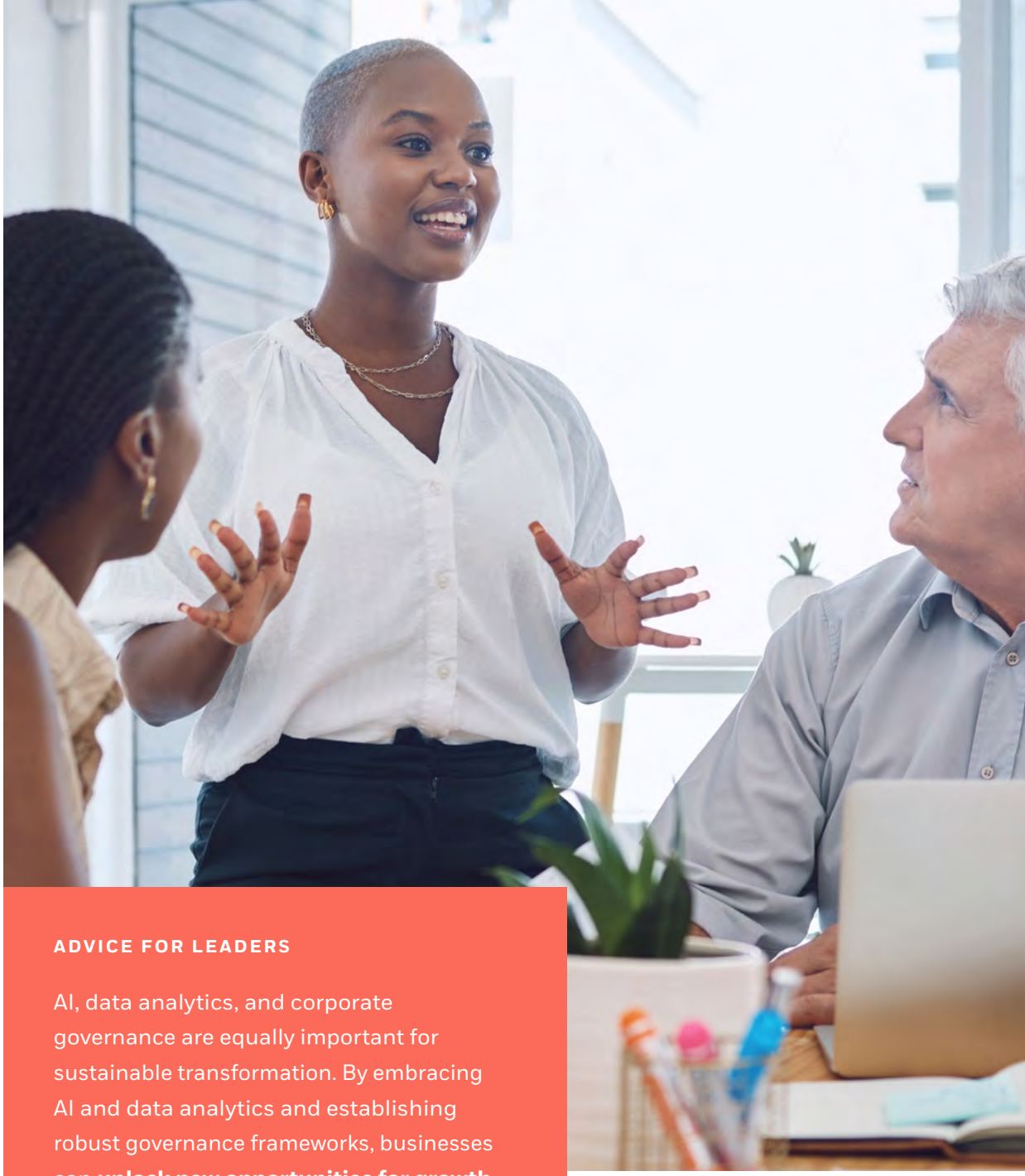
Corporations face challenges in harnessing and securing data effectively. Compartmentalizing and refactoring large volumes of data for usability is a complex task, especially with the diverse nature of data sources. Data security is paramount, considering the sensitive nature of customer information and intellectual property.

Role of CIOs in AI adoption

Chief Information Officers (CIOs) are pivotal in integrating AI into business operations. With their cross-functional expertise, CIOs can drive collaboration across departments and establish governance structures for AI adoption. Finding early wins and documenting savings is essential for demonstrating the value of AI initiatives to the business.

I am very excited and enthusiastic about the transformative potential of AI across industries. Its dual applications of driving internal efficiency and enhancing customer engagement will impact businesses. Balancing these aspects is critical for companies to maintain competitiveness and deliver value to shareholders.

CIOs are uniquely positioned to facilitate AI adoption and governance within organizations, leveraging their technology expertise and cross-functional relationships.



ADVICE FOR LEADERS

AI, data analytics, and corporate governance are equally important for sustainable transformation. By embracing AI and data analytics and establishing robust governance frameworks, businesses can **unlock new opportunities for growth** and innovation in the digital era.

"AI, ML, and data will be essential in fostering sustainable outcomes by empowering businesses to make environmentally conscious decisions regarding emissions."

Perspective: Data and analytics are crucial in driving sustainable transformation in the automotive industry

Jon Clay, Data Director, Solera, Inc.

Data and analytics are indispensable in fostering sustainable transformation initiatives. You need to measure it to improve it. By integrating data with artificial and human intelligence, organizations can pinpoint their sustainable transformation priorities, shaping their strategic approach. Utilizing data to establish performance benchmarks and develop quantitative metrics for monitoring progress is essential. These metrics enable organizations to adjust their strategies as needed during implementation.

At Solera, we play a pivotal role in promoting sustainability within the automotive sector through technology. Collecting data on vehicles throughout their lifecycle fuels data-driven intelligence and AI solutions spanning vehicle acquisition, insurance claims, repairs, and fleet management. Solera's solutions are meticulously crafted to enhance lifecycle efficiency, ultimately reducing carbon emissions for our clients.

IT, machine learning and AI play pivotal roles in facilitating the large-scale sustainable transformation demanded by the world. Our Sustainable Estimatics solution exemplifies this. It leverages our proprietary algorithm seamlessly integrated with our extensive global parts database, comprising over

8.9 million unique reference points covering 99% of vehicles worldwide. This empowers us to estimate and compare the carbon dioxide equivalent (CO_2e) impact of vehicle repairs using new or recycled parts, encompassing Scope 3 emissions.

The automotive industry faces sustainability challenges, with road transportation contributing 12% of global CO_2 emissions*. Our research* indicates that 75% of vehicle drivers are willing to switch to insurers offering more environmentally friendly policies. Addressing emissions requires concerted efforts across the value chain. Leveraging our extensive reach, we support clients in various ways: Our groundbreaking Sustainable Estimatics solution is an industry-first carbon tracking tool, empowering insurers to monitor and offset carbon emissions associated with the entire customer claims process.

Additionally, we provide various solutions for fleet operators, facilitating greener operating decisions regarding routing, dispatching, telematics, and driver behavior. Moreover, through our global consulting division, we harness our vast data resources to assist organizations in designing and assessing strategies for reducing emissions from their owned and leased fleet assets. These represent just a few examples of our comprehensive approach — we have many more solutions in our portfolio!

Every country worldwide is at a unique stage in its sustainable transformation journey, posing challenges for global organizations with ambitious net-zero targets. Achieving a balance between corporate aspirations and market constraints is essential. This equilibrium must preserve the sense of urgency for change without sacrificing feasibility.

*Source: Statista
https://www.statista.com/topics/7476/transportation-emissions-worldwide/#topicOverview

As technological capabilities grow exponentially, we expect unprecedented opportunities for sustainable transformations in the coming years. This advancement will play a significant role in achieving net-zero goals. However, a challenge arises as the increased use of AI generates substantial amounts of data, necessitating storage in energy-intensive data centers. Consequently, organizations will face mounting pressure to prioritize “sustainable AI” to ensure the responsible deployment of these technologies.

AI-powered sustainability trends in 2024

In 2023, the global landscape witnessed a rapid surge in AI enthusiasm, propelled mainly by the introduction of ChatGPT. However, as we progress into 2024, I anticipate a shift in focus among organizations. Many will recognize the importance of establishing foundational solid elements to unlock the full potential of AI for value creation.

This entails addressing crucial questions: Is the data readily accessible and of high quality? Do contractual agreements with suppliers and customers support AI utilization? Is the organizational culture prepared for the necessary changes?

I foresee increased investment in initiatives to address these fundamental aspects as organizations strive to harness the true power of AI in sustainability efforts.

ADVICE FOR LEADERS

By addressing issues like data quality, contractual permissions, and cultural readiness for change rather than chasing AI hype, leaders will successfully **lay the correct foundations** for AI-driven sustainability.

"We will see exponential boosts in insight and optimization. Supply chains will benefit significantly from AI and machine learning due to complex data generation and the comparatively slow adoption of supportive technology."

Perspective: AI will have a transformative role in sustainability goals over the next five years

Maneet Singh, CIO, Odyssey Logistics

Information technology (IT), particularly AI and advanced tech, is mission-critical in driving sustainable transformation efforts within organizations. The role of IT is paramount. A robust IT strategy forms the backbone of sustainable transformation, providing the necessary benchmarks and efficacy.

For supply chain companies like ours, embracing sustainability is imperative. This goes beyond greenwashing for consumer appeal; Environmental, Social, and Governance (ESG) frameworks increasingly carry substantial weight. Excelling in sustainability benefits the environment and offers a competitive edge by shielding against regulatory repercussions. Hence, selecting the right tools to monitor sustainability performance is a strategic decision with far-reaching implications.

Artificial intelligence (AI) represents the frontier. Its prowess lies in harnessing the vast troves of data generated by companies daily, particularly concerning sustainability, to derive fresh insights and analyses. Enterprises generate substantial unstructured data relevant to sustainability, often overwhelming and disorganized for manual processing. Here, AI and machine learning offer immense potential, enabling organizations to gain deeper insights from their

> “We are committed to harnessing the full capabilities of AI to drive sustainability within our supply chain.”

data repositories. AI can illuminate a company’s sustainability profile and suggest actionable pathways for improvement.

Data forms the cornerstone of practical, sustainable transformation endeavors. High-quality data allows companies to construct accurate profiles of their sustainability performance and hold themselves accountable for set goals. Without robust data, sustainability initiatives remain subjective and lack substance. Conversely, with comprehensive data, sustainable transformation becomes quantifiable and catalyzes operational efficiency today and a cleaner future tomorrow.

Alignment of vision between the board and executive personnel is crucial. I am fortunate to belong to an organization with a unified grasp of sustainability’s true essence and potential. However, numerous companies still view sustainability as merely a marketing tactic to engage customers or a regulatory hurdle to overcome without genuine integration into organizational goals. This misconception hinders progress for many. In truth, sustainability acts as a driver for improved efficiency and overall business success.

The role of AI in our sustainable transformation goals over the next five years is dynamic and unpredictable. The AI landscape constantly evolves, as evidenced by the recent prominence of large language models. As AI continues to revolutionize various sectors, it’s reasonable to expect its integration into sustainability initiatives. The potential benefits include significant insights and optimizations that can bolster sustainability efforts. This is particularly advantageous for sustainability teams, which often face resource constraints. In our organization, we are committed to harnessing the full capabilities of AI to drive sustainability within our supply chain.

The supply chain is one area that stands to benefit significantly from AI and machine learning. Historically, the supply chain industry has slowly adopted supportive technology, creating ample opportunities for AI-driven efficiencies. No single intervention holds the key to transforming supply chains. Given their inherent complexity, addressing sustainability requires a multifaceted approach that acknowledges and respects this complexity. This entails delving deeper into initiatives such as vehicle electrification and meticulously scrutinizing transportation networks to enhance efficiency across every facet.

Take trucking, for example. Imagine a large language model trained on extensive data sets that can optimize routes, manage storage capacity, and adjust real-time variables based on live data. This level of optimization has the potential to unlock significant efficiencies across the supply chain, minimizing waste and maximizing productivity. >

"Disseminating technology and fostering a culture of innovation are critical."

As a company well-versed in multimodal operations, we approach challenges comprehensively, ensuring that our solutions deliver optimal customer outcomes. Sustainability demands a similar multifaceted strategy, necessitating the simultaneous consideration and implementation of various approaches to achieve meaningful progress.

Adopting AI and new technologies over the past five years has undoubtedly positively impacted our company's operational efficiency. However, progress is dynamic, and effective technology deployment requires careful planning and implementation. It's not just about adopting new technology but also ensuring its widespread adoption throughout the organization. Disseminating technology and fostering a culture of innovation are critical components of maximizing efficiency gains. Despite the challenges, embracing new technologies like AI has proven instrumental in enhancing efficiency, especially in industries with significant technological gaps like ours.

As a leading multimodal logistics provider, Odyssey has a comprehensive understanding of the significant impact of supply chains on sustainability. Our primary sustainability initiative, Cloverleaf, capitalizes on the insights garnered from our extensive operational experience. Technology is a cornerstone of this program, aligning with the notion that sustainability efforts must be data-driven to be effective. Through Cloverleaf, we leverage a diverse range of real-time data collection tools and AI technologies to assist our clients in enhancing efficiency throughout their supply chains. By adopting this data-centric approach, we aim to demonstrate that sustainability aligns with ethical principles and yields improved financial performance for businesses.

ADVICE FOR LEADERS

We are amidst **a significant technological revolution** wherein AI reshapes the business landscape. As this transformation unfolds, inevitably, sustainability initiatives will also be impacted. Leaders should be prepared for the potential benefits, such as exponential increases in insights and optimization, which are anticipated to extend to sustainability efforts.

The role of AI and machine learning in future sustainability

AI is considered as important to organizations as their broader data analytics and IT capabilities.

Our survey stated that 82% of organizations believe AI is important for driving sustainable transformation efforts. The similar importance levels of AI, data, and analytics (86%) and IT (87%) highlight the growing influence of this capability. It is interesting to note the alignment between this trend and leadership buy-in. 89% of executive leadership find data and analytics important, while 87% believe AI will be paramount for business in the coming years.

As global business leaders have pointed out, the role of artificial intelligence (AI) and machine learning (ML) in future sustainability is significant and multifaceted. These technologies can potentially revolutionize how we address environmental, social, and economic challenges.

However, as we harness the power of AI and ML to enhance decision-making processes and streamline operations, it is imperative to navigate the ethical considerations inherent in their deployment. We must consider the three critical dimensions of ethical concern: data privacy, bias, and the digital divide.

1. **Data privacy**

   The proliferation of AI and ML relies heavily on vast amounts of data, often sourced from individuals. Safeguarding data privacy is paramount to maintaining trust and upholding individual rights. Organizations must adopt robust data protection measures, ensuring data collection, processing, and usage transparency. Implementing stringent security protocols and adhering to regulatory frameworks such as GDPR and CCPA are fundamental to safeguarding individuals' privacy rights.

2. **Bias**

   One of the most pressing ethical challenges in AI and ML deployment is the risk of bias. Biased algorithms can perpetuate discrimination, amplify existing societal inequalities, and compromise the fairness and integrity of decision-making processes. Organizations must proactively identify and mitigate biases in data sources, algorithm design, and model training. Employing diverse and inclusive datasets, conducting thorough bias assessments, and fostering interdisciplinary collaborations are crucial strategies to mitigate bias and promote algorithmic fairness. >

87% of executive leadership believe AI will be paramount for business in the coming years

3. Digital divide

As AI and ML technologies become increasingly pervasive, addressing the digital divide is paramount to ensuring equitable access and opportunity. Disparities in access to technology, digital literacy, and resources exacerbate existing inequalities, hindering marginalized communities' ability to benefit from AI and ML advancements. Bridging the digital divide requires concerted efforts to provide affordable access to technology, promote digital literacy initiatives, and prioritize inclusive design principles in AI and ML development. Collaboration between governments, businesses, and civil society is essential to fostering an inclusive digital ecosystem that empowers all individuals to thrive in the digital age.

We can leverage the tremendous potential of these technologies to drive innovation and accelerate progress by harnessing the power of data and advanced analytics and considering ethical considerations. They empower individuals, organizations, and societies to address pressing sustainability challenges and build a more resilient and equitable future.

Embracing advancements in sustainable business transformation

By adopting a proactive approach to sustainable business transformation, businesses can achieve significant positive impacts on the environment and society, while securing long-term success.

Organizations are most likely to use AI/IT to support the implementation of circular economy practices (47%) and facilitate better decision-making through data analytics (47%).

Several key trends are shaping the landscape of sustainable business transformation with AI and technology. These trends reflect the increasing integration of innovative technologies to address environmental, social, and economic challenges.

Here are some key trends in sustainable business transformation with AI and technology:

1. Democratizing sustainability solutions:

- **Cloud-based AI**
  Enables cost-effective sustainability for all businesses.
- **Low-code/no-code**
  Empowers anyone to create AI solutions for sustainability.
- **Open-source tools**
  Facilitate collaborative, sustainable innovation.

2. Enhancing life cycle sustainability:

- **AI-powered assessments**
  Identifies environmental improvement areas across product lifecycles.
- **Circular economy AI**
  Maximizes resource use and product longevity.
- **Blockchain for transparency**
  Ensures sustainability throughout the supply chain.

3. Hyper-personalization for engagement:

- **AI-driven behavior change**
  Customizes sustainability nudges for individuals.
- **Gamification**
  Engages users in sustainability through interactive experiences.
- **Data-driven storytelling**
  Connects emotionally to motivate sustainable actions.

4. AI in risk management and resilience:

- **Predictive climate analytics**
  Forecasts environmental risks for timely responses.
- **Climate-resilient infrastructure**
  AI designs to endure extreme weather.
- **Supply chain monitoring**
  AI ensures ethical, resilient sourcing practices.

5. Promoting social sustainability and equity:

- **AI for social good**
  Tackles inequality with tech-driven solutions.
- **AI ethics**
  Prioritizes fairness and bias reduction in sustainable AI applications.
- **Community collaboration**
  AI tools enhance business-community sustainable projects.

KEY INSIGHTS

- **AI's role:** 82% of organizations deem AI essential for sustainability efforts.
- **Transformation trends:** Emphasizes accessible sustainability, life cycle approaches, personalized engagement, and AI-driven risk management for climate resilience and supply chain robustness.
- **Impact:** Adopting these trends enhances environmental and societal benefits, securing organizational resilience and success.

What business functions will benefit most from AI and machine learning in the future?

In the future, several business functions will benefit significantly from AI and machine learning, improving operational efficiency, reducing costs, and enhancing overall performance. Here are some key business functions that stand to gain the most from AI and machine learning:

1. **Operations management**
   AI/ML can optimize various operational processes, including production planning, inventory management, scheduling, and resource allocation. These technologies analyze data from sensors, production logs, and supply chain systems to identify inefficiencies, predict demand, and optimize workflows, improving operational efficiency and reducing costs.

2. **Supply chain management**
   AI and machine learning enable more accurate demand forecasting, inventory optimization, and logistics planning in supply chain management. By analyzing historical data, market trends, and external factors, these technologies help organizations reduce excess inventory, minimize stockouts, and optimize transportation routes, resulting in cost savings and improved supply chain resilience. All organizations use IT or AI to create a more sustainable supply chain, with all methods used by around two-fifths to half of organizations.

3. **Customer relationship management (CRM)**
   Machine learning models enhance CRM systems by providing personalized customer insights, predictive analytics, and automated customer interactions. These technologies analyze customer data, behavior patterns, and preferences to segment customers, predict future buying behavior, and recommend tailored marketing strategies, ultimately driving sales and improving customer satisfaction.

4. **Marketing and advertising**
   Smart algorithms optimize marketing and advertising campaigns by targeting the right audience, delivering personalized content, and optimizing ad spend. These technologies analyze vast amounts of data from social media, web browsing behavior, and purchase history to identify high-value customers, optimize messaging, and maximize ROI on marketing investments.

5. **Human resources (HR)**
   AI and machine learning streamline HR processes such as recruitment, talent management, and employee engagement. These technologies automate repetitive tasks, analyze resumes, assess candidate fit, and provide personalized training recommendations, enabling HR departments to attract, retain, and develop top talent more efficiently and cost-effectively.

6. Predictive maintenance

AI and machine learning enable predictive maintenance of equipment and assets by analyzing sensor data, equipment logs, and maintenance records to detect anomalies and predict failures before they occur. Organizations can minimize downtime, extend asset lifespan, and reduce maintenance costs by proactively addressing maintenance needs.

7. Risk management and compliance

Data-driven learning technologies improve risk management and compliance by analyzing data patterns, detecting anomalies, and providing predictive insights. These technologies help organizations identify and mitigate various risks, including cybersecurity threats, regulatory compliance issues, and operational risks, reducing potential financial losses and legal liabilities.

Overall, these adaptive systems have the potential to transform numerous business functions by driving operational efficiency, reducing costs, and improving overall performance. By leveraging these technologies effectively, organizations can gain a competitive edge, enhance customer satisfaction, and achieve sustainable growth in the future. All organizations evaluate and manage risks related to implementing new technologies, with most methods used by around two-fifths of businesses.

By leveraging AI and machine learning strategically within these critical functions, businesses can achieve significant operational efficiency gains, cost reductions, and competitive advantages in the future.

KEY INSIGHTS

- AI and machine learning **significantly enhance efficiency** and reduce costs in critical business functions.
- **These technologies are pivotal** in operations, supply chain, CRM, marketing, HR, predictive maintenance, compliance, optimizing processes and enabling better decisions.
- Their strategic application promises **substantial operational improvements** and cost efficiencies, driving sustainable growth and competitive advantage.

Envisioning the future of sustainability and technology

Our survey unveils a compelling trend: an overwhelming **91% of businesses are gearing up for an uptick in IT budgets dedicated to sustainable transformation** over the next three years. This investment reflects a broad consensus on the evolving role of artificial intelligence (AI) in navigating the challenges and opportunities of sustainability.

The landscape of AI in sustainable business transformation is poised for change, as nearly all organizations anticipate a shift in how AI contributes to their sustainability goals. Notably, **70% of respondents envision AI as a pivotal tool** in forecasting and mitigating sustainability risks. Beyond risk management, businesses expect AI to drive significant gains in operational efficiency and productivity (36%) and enhance data security and compliance (35%).

The impact of AI and new technologies on operational efficiency is undeniable, with 93% of organizations acknowledging improvements in the last five years. The perception of AI's benefits varies by region, with 47% of U.S. organizations highlighting its role in enhancing efficiency and productivity — a sentiment less shared by their counterparts in Canada (31%) and the UK (28%).

This survey portrays the future where **AI is not just a tool but a transformative force** in pursuing sustainable business practices, backed by strategic IT investments and a keen awareness of its potential to address some of the most pressing challenges of our time.

The future outlook for the unbounded potential of AI, technology, and sustainability is both promising and transformative. As these fields continue to evolve and intersect, they hold the potential to address some of the most pressing challenges facing humanity, including climate change, resource depletion, social inequality, and economic instability. >

Here are some key implications of this convergence:

Transformation of industries

Integrating AI, technology, and sustainability will lead to the transformation of industries across the board. Traditional sectors such as energy, transportation, manufacturing, agriculture, and finance will undergo significant changes as organizations adopt innovative technologies to optimize operations, reduce environmental impact, and meet evolving consumer demands for sustainability.

Innovation and disruption

The convergence of AI, technology, and sustainability will drive innovation and disruption, creating new business models, products, and services that deliver value while addressing societal and environmental needs. Startups and established companies will capitalize on opportunities to develop innovative solutions that leverage AI and technology to achieve sustainability goals, leading to disruptive innovation across various sectors.

Global collaboration and partnerships

Addressing complex sustainability challenges requires global collaboration and partnerships among governments, businesses, academia, and civil society. AI and technology enable collaboration by facilitating data sharing, knowledge exchange, and joint action across geographic boundaries. Collaborative initiatives and platforms will emerge to foster collective efforts to address global sustainability challenges effectively.

Ethical considerations and governance

As AI and technology play an increasingly central role in shaping the future of sustainability, ethical considerations and governance mechanisms become paramount. Organizations must ensure that AI systems are developed and deployed responsibly, considering ethical principles, fairness, transparency, and accountability. Regulatory frameworks and industry standards will evolve to address emerging ethical challenges and ensure that AI serves the common good.

Resilience and adaptation

AI and technology can enhance resilience and adaptation to climate change and other environmental risks by providing early warning systems, predictive analytics, and decision support tools. Organizations and communities will leverage these technologies to build resilience, anticipate and mitigate risks, and adapt to environmental conditions, ultimately enhancing their capacity to thrive in a rapidly changing world.

Empowerment and inclusivity

AI and technology can empower individuals and communities, democratize access to information and resources, and promote inclusivity and social equity. By providing access to education, healthcare, financial services, and other essential resources, these technologies can help bridge the digital divide and create opportunities for economic and social empowerment, particularly in underserved communities.

Cultural shift and mindset change

Achieving a sustainable future requires a cultural shift and mindset change at individual, organizational, and societal levels. AI and technology can catalyze this shift by raising awareness, changing behaviors, and fostering a collective responsibility toward the planet and future generations. As people become more conscious of the interconnectedness of environmental, social, and economic systems, they will demand more sustainable practices and solutions from businesses and governments.

Overall, the unbounded potential of AI, technology, and sustainability offers a vision of a future where innovation, collaboration, and responsible stewardship of resources converge to create a more prosperous, equitable, and sustainable world for all. By harnessing the transformative power of AI and technology, humanity can address the grand challenges of the 21st century and build a thriving future for generations to come.

Positive outlooks

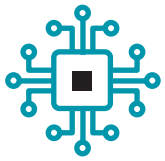
Climate change mitigation: AI can optimize renewable energy integration, predict weather patterns for better grid management, and support carbon capture and storage solutions.

Resource efficiency: AI can optimize resource use in agriculture, manufacturing, and other sectors, minimizing waste and promoting circular economy practices.

Sustainable development: AI can accelerate progress toward the UN Sustainable Development Goals by analyzing data, identifying challenges, and suggesting solutions.

Social equity and inclusion: AI can address social inequalities, analyze biases in systems, and develop solutions for a more equitable future.

Personalized sustainability: AI can personalize sustainability actions and behavior change, encouraging individuals and communities to contribute positively.



Emerging innovations

Biomimicry and AI-powered design: Nature-inspired solutions combined with AI optimization can produce revolutionary sustainable products and processes.

Quantum computing and advanced modeling: Solving complex sustainability challenges like climate modeling and material science could become possible with advancements in quantum computing.

Decentralized and autonomous systems: Blockchain and AI integration can enable data-driven, transparent, and efficient local solutions for energy, waste management, and resource sharing.

Challenges and considerations

Ethical concerns: Bias in AI algorithms, responsible data use, and potential job displacement due to automation require careful consideration and mitigation strategies.

Accessibility and affordability: Ensuring equitable access to technology and bridging the digital divide is crucial for inclusive and sustainable development.

Governance and regulations: Developing responsible governance frameworks and regulations for AI development and deployment is essential to ensure its positive impact.

Unveiling the potential

A collaborative approach is essential to unlock the full potential of AI, technology, and sustainability. Collaboration between governments, businesses, academia, and civil society is critical to:

Investing in research and development: Fostering innovation in green AI solutions through targeted funding and public-private partnerships.

Developing ethical guidelines and standards: Establishing frameworks for responsible AI development and deployment that prioritizes sustainability and societal well-being.

Building capacity and skills: Equipping individuals and communities with the necessary skills and knowledge to thrive in a technology-driven and sustainable future.

KEY INSIGHTS

- **Budget growth:** 91% of businesses foresee increased IT spending for sustainability within three years.
- **AI evolution:** Organizations leverage AI to forecast and address sustainability risks.
- **Optimistic futures:** Emphasizes climate action, resource efficiency, social equity, and customized sustainability strategies.
- **Innovative frontiers:** Highlights biomimicry, AI design, quantum computing, and decentralized systems as emerging tools.

The future of AI, technology, and sustainability is brimming with both immense potential and significant challenges. By proactively addressing these challenges and fostering responsible development, we can harness the power of technology to create a more just, equitable, and sustainable world for all.

The report highlights how AI and technology can optimize operations, enhance efficiency, and drive innovation while addressing critical environmental and social challenges. However, realizing these benefits requires more than technological implementation; it necessitates a cultural shift, ethical considerations, strategic alignment, and collaborative efforts across various stakeholders.

"Enterprise AI is here to stay. The key for organizations is to understand how best to use it to impact their business, be it increasing the top-line revenue by greater market reach or decreasing the bottom-line cost by higher efficiency in operations, or both. There is no one-size-fits-all execution strategy, but there is the positive impact of AI spreading across the industry.

Organizations need to self-evaluate to determine their AI starting point. Based on their digital maturity in terms of the type and amount of data available, the different projects that are amenable to AI interventions, enterprises can start small and easy with AI transformation. They can integrate AI into existing business workflow with measurable outcomes. Get (relatively) fast success or fail fast and move to the next AI project. Trust is an important factor that is key to enterprise adoption. Start AI transformation with quick proven wins to gain trust in the enterprise. Once AI momentum builds with wins, businesses that were not the first movers may start knocking on the AI door sooner than anticipated. Such demonstrated business success can have a snowball effect on enterprise AI."

Arnab Bose, PhD,
Chief Scientific Officer, UST AIphaAI

About the survey

Sustainable business transformation

The boundless impact of AI and technology

As a component of UST's 2024 Thinking Ahead Series, UST conducted a comprehensive survey to gather quantifiable insights from diverse business leaders across select industries. These leaders are pivotal in shaping technology solution decisions within their organizations.

The primary aim of this study is to aid UST in comprehending the landscape of sustainable business transformation within organizations and elucidate the role of AI and IT in facilitating this journey. The survey was conducted online in December 2023, with a meticulous data cleaning and quality control process resulting in a dataset comprising 751 respondents.

To learn more about the survey findings – visit us online.

About UST

UST offers cutting-edge computing and digital services to Global 1000 enterprises across the globe. With a track record spanning more than 24 years, we have collaborated with leading companies worldwide to effect tangible transformation. Guided by our overarching mission of "Transforming Lives" and the ethos of "Select Clients, More Attention," we embody an entrepreneurial spirit dedicated to delivering rapid value in today's digital landscape.

Fueled by technology, driven by our people, and guided by our mission, we engage with our clients comprehensively, from initial design to ongoing operation. Our agile approach allows us to pinpoint their key challenges and devise innovative solutions that bring their vision to fruition. With extensive domain knowledge and a forward-thinking mindset, we embed innovation and adaptability into our clients' operations — delivering tangible results and enduring change across diverse industries and global markets. Together, with a workforce of over 30,000 professionals spanning 30+ countries, we strive for boundless impact, touching the lives of billions along the way. Visit us at ust.com for more information.

Acknowledgements

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Together, we build for boundless impact.