4 Ways Procurement Teams Can Support
SUSTAINABILITY

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SUPPLY CHAIN **connect**™

4 Ways Procurement Teams Can Support Sustainability

Procurement departments are solidifying their roles as essential drivers of organizational ESG success.

Today's procurement departments do a lot more than just secure the best possible price and delivery times for goods and services. In fact, they're increasingly recognized as pivotal drivers of their organizations' sustainability and environmental, social and governance (ESG) initiatives.

"While the bottom line remains the main focus for procurement organizations," the Institute for Supply Management (ISM) states, "investments toward [ESG] goals are increasingly becoming key components of corporate strategies."

Smart companies are making their procurement teams a part of these conversations and enlisting their help in advancing their organizational sustainability goals. Decisions about which suppliers to engage, what materials to source and how goods are transported, for example, all directly influence a company's carbon emissions, waste generation and adherence to ethical labor practices.

4 Steps to ESG Success
By integrating sustainability criteria into the procurement process, organizations can make substantial strides towards their ESG goals. Here are four strategies procurement departments can use to champion and support sustainability within their own organizations:

1. Build a business case for sustainable procurement. Factor in your organization's needs, priorities, values, resources and stakeholder requirements. Next, procurement analytics provider Sievo recommends pinpointing specific focus areas and priorities. "Ensure that management, procurement, sustainability and compliance teams agree on the business case and benefits," it adds, and ask yourself these questions:

- Is sustainability a core company value and part of our DNA?
- Are we incorporating sustainable practices to please our target market or to satisfy our investors and stakeholders?
- Are we driving sustainable procurement initiatives to comply with government regulations?

2. Set tangible sustainability goals and targets. This not only helps provide direction, but it also bolsters commitment and helps you measure progress, according to Sievo, which offers these ESG goal examples as good pathways to a more sustainable procurement policy:

Environmental targets
- 100% compliance with environmental guidelines in your industry
- 100% of key suppliers' environmental impact assessed
- X% reduction in consumption of resources such as energy and water

Social targets
- 100% compliance with paying living wages and eliminating child labor
- 100% compliance with health and safety audit standards
- 100% compliance with the Modern Slavery Act

Governance targets
- 100% compliance with regulations and applicable laws
- 100% compliance with terms for anti-bribery and anti-money laundering
- X% of key suppliers engaged in joint sustainability program

3. Create a unified "source of truth" for all stakeholders to work from. ISM says the first step a procurement team should take toward effective ESG analytics is defining a single source of truth data set from which to track these metrics. "If different geographies or business units are operating with their own assumptions on how to calculate these figures, or are generally estimating where they might stand, it will be very difficult to get a concrete assessment of current behavior or track actual progress," it says. "Aligning on a standardized set of definitions, calculations, and data sources will establish an agreed upon baseline from which to track and improve progress over time."

4. Enlist suppliers and stakeholders in the effort. Collaborating with suppliers and stakeholders is essential for promoting sustainability, and procurement teams are well positioned to both identify and maximize these vital connections. "Manufacturers must work closely with their partners to exchange best practices, set sustainability goals, and drive continuous improvement," INCIT says in *3 essential strategies to boost electronics supply chain sustainability.* "[That way] they can create a network of like-minded organizations committed to sustainable supply chain management by fostering strong partnerships."
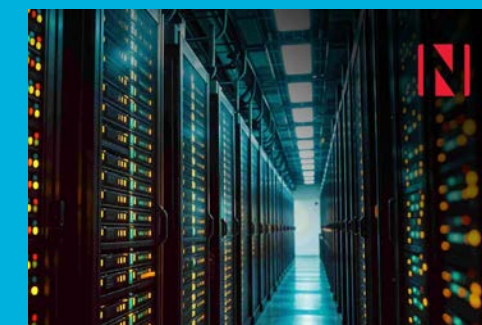
Procurement departments are no longer just cost-cutters; they're crucial agents of change. They're actively shaping their companies' sustainability narratives by strategically selecting suppliers, fostering collaboration and rigorously tracking progress—all of which solidify their roles as essential drivers of organizational ESG success.

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Green Bank Funds May be Rescinded

New EPA administrator demands the return of $20 billion in funds allocated to sustainability projects nationwide.

Approved under the 2022 Inflation Reduction Act, the Greenhouse Gas Reduction Fund (aka, the "green bank") is a $27 billion investment focused on mobilizing financing and private capital to address the climate crisis. According to the EPA, the green bank was also put in place to help ensure the country's economic competitiveness, promote energy independence and lower energy costs for communities that have historically been left behind.

In August, the EPA announced that the $27 billion in grants would be divided up as follows: $14 billion to the National Clean Investment Fund, $6 billion for the Clean Communities Investment Accelerator and $7 billion for the Solar for All program.

"Since they were selected in April, recipients have worked directly with the EPA to fulfill federal requirements and revise their work plans in order to receive their grants," the agency said in a press release at the time. "With funds now accessible to the recipients, programs that give communities access to the resources and investment capital to build cleaner, more sustainable economies can begin being implemented."

No Take Backs

As part of a broader mission to reduce government spending, the new presidential administration may now claw back $20 billion in green bank grant funds. According to AP, EPA Administrator Lee Zeldin announced on X that the agency was going to "revoke contracts for a still-emerging 'green bank' that is set to fund thousands of projects."

The news outlet says clean energy advocates denounced Zeldin's action as a political stunt and said he was illegally attempting to revoke spending approved by Congress for partisan reasons. They pledged to challenge the directive in court. "This is not just an attack on clean energy investments — it's a blatant violation of the Constitution," Lena Moffitt, executive director of Evergreen Action, told AP. "The Trump team is once again trying to illegally slash programs meant to help American families to fund tax cuts for billionaires."

Concern and Disbelief

News of this announcement spread quickly and was met with both concern and disbelief. PV Tech reported that former EPA officials condemned the agency's new leadership for trying to claw back billions from the fund. It says the $20 billion in question had already moved into grantees' accounts and was legally disbursed.

Recipients of the $20 billion from the National Clean Investment Fund and the Clean Communities Investment Accelerator have already been selected to receive the funds. The grants are meant to finance solar installations, energy-efficient retrofits and small-business sustainability upgrades. Some of the most significant investments were allocated to the U.S. agriculture sector.

"All $20 billion is already out of the Treasury and in the hands of lending institutions," former EPA regional administrator David Cash told PV Tech. "What they're trying to do is claw back money that has already started flowing into clean energy investments. That's different from freezing funds that are still in federal accounts."

What's Next?

The proposed green bank funding freeze set off a chain of events and reactions. A senior federal prosecutor resigned in protest; Citibank—which holds the accounts for the National Clean Investment Fund and Clean Communities Investment Accelerator programs—got involved; and the new EPA head announced that the agency had "found $20 billion dollars parked at a financial institution by the Biden-Harris Administration to fund partisan pet projects."

"Questions remain as to whether or not the Trump administration can legally claw back funds that were already obligated under the previous administration," *Vision Times* adds, noting that this may just be in the tip of the iceberg when it comes to identifying established programs that don't align with the new administration's vision.

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By EMILY NEWTON

Supply Chains Deploy Real-Time Verification to Fight Fraud

Supply chain fraud is growing across the globe. Discover how real-time verification technologies can fight this crime in virtually all areas.

Fraud has been a concern for as long as supply chains have existed. However, as supplier and logistics networks have grown increasingly complex and demands for speed have risen, it's become a larger issue. There are more instances where various kinds of fraud can occur, and threats often happen quickly, making it difficult to spot them before it's too late.

Retailers, manufacturers, suppliers and logistics providers can all feel the effects of this crime. Consequently, fighting it and learning which tools can help is critical.

Rising Supply Chain Fraud

New technologies provide better ways of finding and preventing supply chain fraud. At the same time, they are often expensive, so organizations must approach them from an investment perspective. That starts with recognizing the true costs of fraud in today's supply chains.

According to the Federal Trade Commission (FTC), the U.S. lost $12.5 billion to fraud in 2024, a 25% increase compared to the prior year. While the FTC focuses on consumer-facing issues in such reports, the trend highlights how technological advances have made scammers more effective than ever.

Supply chain-specific challenges have likewise risen. A 2024 PWC survey found that 55% of global organizations say procurement fraud is a widespread problem in their countries, yet 42% lack a risk management program. Amid this trend, supply chain fraud has become one of the top three most disruptive economic crimes in the past two years, with only cybercrime and corruption ranking higher.

Given these considerable losses, businesses must do more to prevent supply chain fraud. Real-time verification is one of the best defenses across all forms of this crime, as it can spot and stop fraudulent activity as soon as it arises. Such technology comes in several forms, too.

AI Transaction Monitoring

One of the most impactful real-time anti-fraud measures is to monitor every transaction with AI. AI analyzes vast amounts of data in minimal time, making it the ideal tool to recognize when a supply chain transaction does not align with normal activity.

Organizations using AI to monitor for scams have already seen impressive returns. The U.S. Treasury Department credits the technology with preventing and recovering over $4 billion worth of fraud in fiscal year 2024 alone.

This technology can be applied at virtually any point in a supply chain. Businesses could use it to verify vendor transactions, protect end users, or watch dealings with 3PLs. Company leaders can immediately freeze funds when AI-backed monitoring alerts them to suspicious activity. AI also tends to reduce false positives in this application, ensuring supply chains remain efficient despite tighter security.

Authorized Account Protection

Some instances of supply chain fraud involve the compromise of legitimate accounts. These situations can be difficult because both parties in a transaction are authorized and trustworthy from the surface, so they may not stand out as suspicious at first. Real-time technologies like AI and multi-factor authentication (MFA) can help.

MFA provides an extra layer of verification at the point of login to ensure every user is who they say they are. As straightforward as it seems, it makes accounts 99% less likely to be hacked, significantly reducing the chance of impersonation schemes.

AI bolsters these protections through behavioral analytics. When ML models learn how authorized users tend to behave on a network, they can spot unusual patterns that may suggest someone else has taken over the account. They can freeze and flag the account before fraudsters cause too much damage.

Location Tracking

Supply chain organizations can also fight fraud by tracking shipment locations in real time. This practice has grown increasingly common since it boosts transparency and ensures efficiency, but it can also play a role in preventing theft and cargo scams.

Cargo theft led to $330 million in losses in 2023 alone. This recent growth stems from items passing through so many hands and a lack of visibility around these stops. Real-time location tracking through the IoT provides the assurance necessary to catch and stop these incidents.

When manufacturers can trace a shipment's location at all times, they can verify that each product is where it should be at any point. Any deviation will be immediately noticeable, enabling timely responses.

Blockchain Transactions

Some companies have implemented blockchains to foster a more transparent supply chain. Blockchain—the underlying technology behind cryptocurrency—enables secure transactions because every action is visible to all users and records are unchangeable.

Creating an immutable record of each product's origin and every time it has changed hands leaves little room for theft or fraud. Blockchains also do so without delaying operations. Walmart uses the technology to trace produce to its original farm within just 2.2 seconds, highlighting the speed at which these systems can operate.

Another benefit of blockchain technology is the possibility of smart contracts, which automatically execute operations based on pre-determined conditions. A smart contract could withhold payment until both parties' identities are verified, ensuring security and efficiency simultaneously.

Proactive Risk Monitoring

Real-time verification can enable broader prevention measures, too. Applying additional scrutiny and authenticating a supplier or 3PL's trustworthiness before doing business with them is a critical anti-fraud step. However, it can be slow and expensive. AI can perform this analysis in real time to remove that barrier.

AI can review a company's history and legal documentation to verify whether it's a trustworthy partner without extensive delays. In some cases, ML models may be able to compare multiple parties to find the ideal supplier or 3PL. Despite the closer analysis, these inspections take less time than manual methods, helping justify them to stakeholders.

Choosing supply chain partners more carefully will make fraud far less likely. Scams are still possible through impersonation and malicious insiders, but the other applications of real-time technology can address these areas.

Real-Time Technologies Fight Supply Chain Fraud

AI, IoT, blockchain and related innovations offer the speed and accuracy today's businesses need to overcome supply chain fraud. Where they cannot prevent crime, they can uncover it for faster response and recovery. Organizations cannot overlook this potential as the supply chain fraud threat grows.

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Director of Communication & Marketing at Lokad
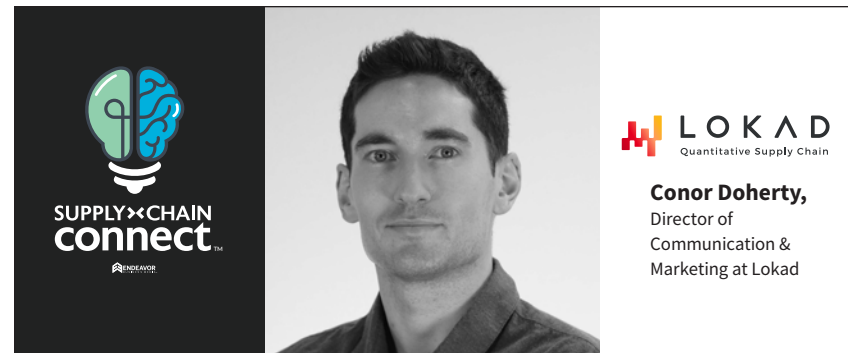
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Mark Bollinger,
Chief Globalization Officer at Smith

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James Fu,
Vice President of Global Market Development at Win Source
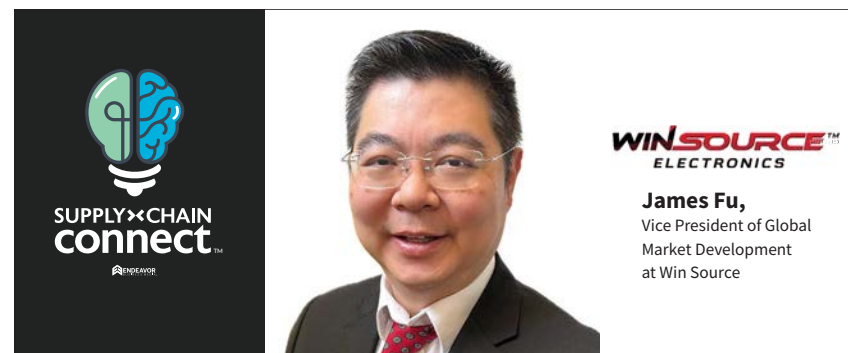
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James Fu of Win Source offers insight into the top risks posed against today's supply chains and how companies can best navigate tariffs and other disruptions.

Don Akery,
CEO of Waldom Electronics

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Sustainability in the Electronics Distribution Industry

What is being done on the sustainability front in the electronics distribution industry? In this episode, Don Akery, CEO of Waldom Electronics, shares the sustainability initiatives that his company is driving forward with. From planting trees for every order placed to installing enough solar panels on its American facilities to reach a point of not having to purchase any electricity, Waldom is striving for a greener future.

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Decoding Supply Chain Headwinds: Inflation, Labor and the Quest for Resilience

A new report uncovers the top challenges supply chain operators are facing in 2025 and how technology can help them address some or all of these headwinds.

The world's supply chains continue to face their fair share of challenges as everything from tariffs to rising business costs to ongoing disruptions impact these critical networks. There are also pockets of opportunity out there for enterprising organizations that focus on building resilient, customer-centric supply chains in the face of uncertainty.

Technology is proving to be a great facilitator in the race to improve supply chain resilience and competitive advantage in this environment. The *2025 MHI Annual Industry Report* highlights the top challenges that organizations are facing on the supply chain front right now and discusses how artificial intelligence (AI), machine learning, digital twins and the Internet of Things (IoT)— among other technologies—are being used to orchestrate end-to-end global supply chains.

What's Keeping Supply Chain Leaders up at Night?

But first, the challenges. According to MHI, supply chain organizations are facing a collective basket of headwinds this year. According to the survey, companies' biggest concerns are inflation (38% of them cite this as a primary challenge); economic uncertainty (36%); workforce and talent shortages (35%); supply chain agility and resiliency (28%); and inventory challenges (25%).

"These trends are affecting supply chains today, and their impact could persist well into the future," MHI says. For example, ongoing geopolitical tensions and recent political shocks, both domestically and globally, have increased uncertainty for global trade. "Trade restrictions will require policy revisions that contribute to economic uncertainty and will have an impact on supply chains," it says.

Companies are increasingly turning to automation for help addressing the persistent workforce and talent shortage. "A major impetus for companies to automate and implement AI is the ongoing decline in supply chain labor force participation—a trend that seems likely to continue for the foreseeable future," MHI reports. "Also, automated facilities with end-to-end orchestration require worker reskilling for work in digital supply chain environments."

More Potential Points of Failure

Companies are also logically worried that their supply chains are agile and resilient enough. This isn't a "new" problem (it surfaced prominently during the pandemic and has yet to wane), but MHI says continued expansion of product portfolios and supplier networks across manufacturers is making supply chains more complex and more vulnerable than ever.

"This creates more potential points of failure and ripple effects across the supply network," it explains. "This has made supply chain resiliency and agility a top priority that will likely remain for years to come. Technology is driving this resiliency by providing real-time visibility and actionable data for operations."

Five Tech Trends

Here are five more tech-specific trends that MHI says is shaping supply chains in 2025:

1. **Cybersecurity and data security.** Citing IMF estimates, MHI says the size of losses due to cyberthreats has more than quadrupled since 2017 to $2.5 billion.
2. **Demand for real-time data.** Lack of access to accurate, real-time data is an ongoing barrier to achieving the vision and benefits of supply chain digitization and end-to-end orchestration.
3. **Digitization and the pace of technology adoption.** "The dizzying pace of technological change in supply chains can be daunting for supply chain leaders and professionals alike," MHI says.
4. **E-commerce growth.** This is driving companies to find new and better ways to anticipate changes in demand and fulfill orders more quickly and accurately.
5. **Supply chain sustainability.** It remains a high priority and strategic differentiator for many firms—with technology being both a critical enabler and potential source of new problems. "Technology advances are helping operations around the world become more sustainable," MHI says, "however, many firms are still wrestling with data issues that make it hard for them to accurately report Scope 3 emissions."

Taking Action Steps

As emerging technologies continue to reshape supply chain operations, MHI says organizations must adapt to stay competitive. Many of them are taking technology- or innovation-focused steps right now like digital transformation (49%); piloting new technologies (39%); and building a culture of collaboration and innovation (33%). "These results highlight the importance of prioritizing and investing in technology as a key pillar of supply chain success," MHI concludes.

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Building Agile Supply Chains through Advanced-Data Synchronization

In the fast-paced and ever-evolving electronics industry, timely access to accurate data is critical for survival. It informs decision-making and supports agile, adaptable supply chains. In an automated society where data feeds progress, advanced synchronization bridges the gap between real-time insights and actionable outcomes, enabling companies to anticipate challenges and respond proactively.

Supply chain disruption is no longer an anomaly—it's the new normal. Thus, technologies that support data synchronization are indispensable for building resilience and ensuring continuity in an increasingly interconnected global marketplace.

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By EMILY NEWTON

Waste Not, Want Not: Eliminating Waste in the Renewable Energy Supply Chain

Solar panels and wind turbines raise serious concerns about e-waste and supply chain emissions. Discover how supply chains can restructure to address this issue.

The renewable energy industry is booming. While that's an important shift for the future of the environment, a few problems have started to emerge as this sector has grown. Most notably, while solar and wind power themselves are low-waste energy sources, their supply chains are far from waste-free.

Minimizing supply chain waste and emissions is a critical goal for many industries. However, it's all the more pressing in a field where sustainability is the most important factor.

The Problem with Renewable Energy Supply Chain Waste

Like many electronics, solar panels and wind turbines rely on mined materials. As the clean energy market expands, demand for many of these resources could surge by 400% in the coming decades. Some—like lithium and graphite—could jump as high as 4,000%.

All this resource consumption raises questions about mining's ecological impact. Worsening the issue is the fact that renewable technologies have a limited life span. Over time, the infrastructure will need replacement, requiring additional mining and contributing to the already monumental e-waste epidemic.

The sourcing, manufacturing and end-of-life processing of renewable energy technologies must improve if this sector is to become truly sustainable. Such a shift will require drastic changes, but there are opportunities on the horizon. Some organizations have already made important strides in enabling a less wasteful renewable supply chain.

Recycling-Friendly Design

Eliminating renewable energy supply chain waste starts with designing more recyclable hardware. One of the reasons why e-waste is such an issue is because current devices make it difficult to extract and reuse critical materials. Accounting for this in the design stage could ease the burden on downstream recycling centers.

More than 85% of solar panel materials are already recyclable with today's methods. Consequently, a few redesigns could yield dramatic improvements in how much downstream supply chain partners could reclaim to use in new products.

One option is to make components easier to separate through physical or gentle chemical means. Alternatively, manufacturers could redesign equipment to require fewer critical minerals in the first place. This method wouldn't necessarily improve recyclability, but it would reduce mining-related emissions and toxic leakage.

Responsible Sourcing

Renewable supply chains should also consider where they source their materials from. Even at low volumes, mining rare earth minerals can be wasteful and destructive. A worrying 97% of mining waste in the U.S. goes untreated or unrecycled.

Manufacturers must ensure their resources come from more careful, reliable sources. On-site renewables and electrification can lower mining emissions, while automation minimizes errors and ensures compliance with environmental regulations. Supply chains can implement blockchain tracking solutions to verify these qualities and promote greater transparency.

Of course, the renewable energy sector should also consider sources outside of conventional mines. Partnering with other electronics producers to reclaim and reuse their e-waste is the best path forward. The more material businesses can source from existing products, the less they'll need to worry about mining-related ecological impacts.

Low-Waste Manufacturing

Once raw materials reach production facilities, process improvements can ensure more resources lead to actual value. Precision manufacturing will reduce waste from both excess energy withdrawals and physical material loss.

Automation is one of the most important steps in this stage of the supply chain. Robotic solutions are less likely to make mistakes and can work in tighter parameters, leading to less scrap. 3D printing is particularly valuable, as it uses less material to begin with as an additive rather than a subtractive process. Studies have already proved how 3D printing reduces waste in solar cell production.

Manufacturers should also capitalize on artificial intelligence (AI) and the Internet of Things (IoT). These Industry 4.0 technologies can provide insights into potential inefficiencies to address or adjust processes in real time to minimize energy consumption.

End-of-Life Recycling

In a conventional supply chain, most optimizations would end here. However, renewable technologies must address their end-of-life processes, too. Solar panels last for only a few decades on average, so the industry needs a way to reuse materials to avoid a cycle of destructive mining and e-waste.

Thankfully, much research has focused on how to improve renewable technology recycling methods. Some facilities have recovered 95% of critical materials from retired solar panels. As more waste processing organizations achieve such standards, they could provide recycled cobalt, lithium and other metals to solar panel and wind turbine manufacturers.

Other projects have focused on recovering resources from historical mines. Early research suggests new technologies can extract up to 50 needed minerals from mine sites that are no longer operating, providing low-emissions, low-waste supplies to supplement recycled e-waste.

Supply Chain Collaboration

All of these strategies require close collaboration with other supply chain partners. A circular economy is only possible when manufacturers, suppliers, downstream partners, logistics providers and end users can all work together. Such cooperation requires improved supply chain transparency.

Many organizations are already moving in this direction. A promising 67% of supply chain leaders have implemented digital dashboards for end-to-end transparency. While these investments are usually intended to reduce disruption, they can also promote better communication with other stakeholders to build a circular economy.

Other technologies like blockchain or IoT tracking may also be necessary to achieve full visibility. Such investment will be expensive, but industry-wide collaboration and a slow, targeted approach can ease the financial burden while maximizing the benefits.

Solar and wind technology manufacturers may need to look outside their own industries. Companies producing other types of electronics may have e-waste that includes critical materials like lithium and cobalt that renewables need. Partnering with such outside sources will provide additional supplies of needed resources while lowering waste in another sector.

Renewable Technologies Need Sustainable Supply Chains

The energy industry must switch to renewable sources of power to avoid the worst effects of climate change. At the same time, if this transition does not include broader supply chain restructuring, the environmental benefits will be limited. Attention to waste and third-party carbon footprints is critical.

Building a circular economy is complicated but not impossible. Many of today's existing technologies are enough to get started in this important endeavor. Understanding the need for change is the first step toward long-term sustainability.

By PATRICK HANNON

Revolutionizing Supply Chain Sustainability: Strategies & Innovations

As companies continue to innovate and adopt green technologies, they not only contribute to the health of the planet but also enhance supply chain sustainability.

As environmental awareness increasingly shapes consumer preferences and regulatory policies, the demand for sustainable supply chain practices has become more urgent. Integrating environmentally and socially responsible practices throughout the product lifecycle—from raw material extraction through to disposal—helps mitigate environmental impact and can also reduce costs and enhance company reputation.

Today, there are several strategies and technologies that are making supply chains greener, more efficient and more responsible.

Exploring the Escalating Need for Sustainability

Before learning how to address these changing conditions, it's important to understand what's driving us toward greener supply chains. Generally speaking, this push is being motivated by factors including climate change, resource depletion and heightened consumer awareness. Furthermore, governments worldwide are enforcing stricter environmental regulations and setting ambitious carbon reduction targets. As a result, investors and consumers are more frequently supporting companies committed to ecofriendly practices, making sustainability a key competitive advantage.

Innovations Shaping More Sustainable Supply Chains

There are numerous advancements spearheading the evolution of green supply chains. Examples include:

Advanced Green Technologies in Logistics
The logistics sector is benefiting from innovations such as autonomous electric vehicles and hydrogen fuel cell technology, which offer an alternative to traditional combustion engines and considerably lower emissions. Additionally, integrated AI systems are enhancing the efficiency of logistics operations by predicting demand patterns and optimizing stock levels.

Sustainable Materials and Manufacturing Processes
Beyond recycling, there is an increasing emphasis on the upcycling of materials and zero-waste manufacturing. These processes transform waste into higher value products and materials, reducing the need for virgin resources and minimizing industrial waste.

Digital Twins for Enhanced Efficiency
Beyond mere simulation, digital twins are being used for real-time monitoring and control, allowing companies to respond instantly to changes in the supply chain environment. This real-time capability significantly enhances the agility and responsiveness of supply chains.

Energy Management Systems
New developments in energy management include the use of machine learning algorithms that predict energy needs and automatically adjust power consumption to optimize energy use across facilities, substantially lowering operational costs and environmental impact.

3D Printing
Advancements in 3D printing include the ability to print with a wider range of materials—including metals and biocomposites—expanding its use beyond prototyping to full-scale production parts, which reduces waste and energy use in manufacturing. Such versatility in printing materials allows for the customization of products to exact specifications, thereby decreasing the overproduction and resource inefficiency typically seen in mass manufacturing processes.

Blockchain for Enhanced Transparency
Blockchain is being expanded beyond transactional transparency to include smart contracts that automatically execute when certain conditions are met, such as environmental compliance. This helps maintain improved sustainability throughout the supply chain.

Robotics and Automation
These days, robotics technology often incorporates advanced machine learning algorithms, enabling robots to learn and adapt to new tasks on their own, which increases efficiency and reduces the energy and waste associated with human training and errors.

Renewable Energy Integration
The focus has shifted from merely incorporating renewable energy to using smart grids within supply chain operations that intelligently balance energy supply from various sources to reduce costs and improve energy reliability and quality.

Ecofriendly Packaging Solutions
Innovative packaging includes the use of nanotechnology to improve the barrier properties of biodegradable packaging, which enhances the shelf life of products without the use of synthetic materials. Additionally, this approach supports the reduction of plastic pollution, aligning with global sustainability targets and consumer demands for environmentally responsible products.

Water Resource Management
New technologies in water management include the use of IoT sensors for precise irrigation and water use in agricultural settings, drastically reducing water wastage and improving crop yields. Furthermore, these smart systems facilitate real-time data analysis, enabling farmers and businesses to make informed decisions that further optimize water usage and support greener agricultural practices.

Enhancing Supply Chain Sustainability Through Cold Chain Innovations
Building on the theme of technological innovation, cold chain monitoring is increasingly recognized as a crucial component of sustainable supply chain management. It is particularly vital in industries that handle perishable goods such as food and pharmaceuticals. By implementing effective cold chain practices, companies can promote better product safety and quality while also contributing to environmental sustainability by minimizing waste and optimizing resource use.

Several advancements in cold chain technology are further modernizing the practice. Examples include:

- **Advanced refrigeration technologies:** New developments include magnetic refrigeration, which offers an energy-efficient cooling option that eliminates the need for refrigerants that can harm the environment.
- **IoT for real-time monitoring:** Recent advancements have introduced more robust sensors that provide detailed data analytics, enhancing the ability to monitor and respond to temperature changes more accurately and efficiently.
- **Predictive analytics:** AI models have become more sophisticated, now capable of integrating more complex datasets to predict potential issues in the cold chain with greater accuracy and speed.
- **Sustainable packaging:** There is a growing focus on intelligent packaging that includes sensors to monitor the freshness of food products, which can reduce waste by providing accurate, real-time data on product quality.

These advancements in cold chain monitoring exemplify how specialized technologies can be integrated within broader supply chain operations to achieve significant environmental benefits.

Future Directions and Challenges

The journey toward sustainable supply chains is ongoing and fraught with challenges. It requires a fundamental shift in thinking and operations, which can be resource intensive. What's more, the initial costs associated with implementing new technologies can be prohibitive for some companies.

Still, the long-term benefits of sustainable supply chains—such as reduced costs, compliance with regulations, enhanced customer loyalty and the contribution to a healthier planet—far outweigh the initial investments. As technology continues to advance and more companies adopt sustainable practices, the scalability of these solutions will improve, making sustainable supply chains the norm rather than the exception.

Securing a Sustainable Future Through Innovative Supply Chains

Revolutionizing supply chain sustainability is not just an environmental need but a business imperative. As companies continue to innovate and adopt green technologies, ecofriendlier materials and circular economy principles, they not only contribute to the health of the planet but also build robust, resilient and competitive businesses. Going forward, the future of supply chain management hinges on the successful integration of these strategies as they transform challenges into opportunities for growth and innovation.

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The Future of Supply Chain Sustainability

Understanding ESG principles and expectations—as well as how to keep pace with them—not only helps companies adapt and thrive but also contributes to a healthier planet.

The supply chain is undergoing a significant transformation, influenced heavily by the growing emphasis on sustainability. This shift is framed around Environmental, Social and Governance (ESG) principles, which aim to foster a more responsible and sustainable economic environment. Understanding these changing expectations—as well as how to keep pace with them—not only helps companies adapt and thrive but also contributes to a healthier planet.

Key Drivers of Supply Chain Sustainability

Sustainability has shifted from being an ancillary concern to a core strategic element for companies seeking to diminish risks and seize new opportunities. Influenced by ESG criteria, businesses are thoroughly revising their processes, from how raw materials are sourced to the ways products are delivered. Now, concerns about the environment, social ethics and robust governance are increasingly critical in formulating corporate strategies.

These initiatives are propelled by several key factors such as:

- **Consumer Demand:** With greater access to information, consumers are increasingly opting for brands that prioritize environmental and social responsibility. This heightened awareness has led to a surge in demand for products that are not only environmentally sustainable but also ethically produced, prompting companies to adopt more responsible business practices.
- **Regulatory Requirements:** Stricter global regulations are compelling businesses to adhere to rigorous environmental and social standards. For example, the European Union's Green Deal sets ambitious targets for climate neutrality by 2050, pushing companies to reduce emissions, increase recycling efforts and source more

sustainably to comply legally and continue their operations smoothly.
- **Economic Benefits:** Environmentally sound practices, while initially costly, often result in substantial long-term savings. Investments in energy efficiency, waste management and resilient supply chains support operational cost reduction while helping to foster innovation, thus boosting productivity and efficiency.
- **Reputational Gains:** Early adoption of green initiatives can significantly enhance a company's brand reputation. Consumers and investors alike favor brands viewed as responsible, resulting in heightened loyalty, talent attraction and investor confidence. In today's non-stop online environment, a company's conservation efforts are highly visible, enhancing its reputation or exposing faults more rapidly.

Emerging Trends in Supply Chain Sustainability

As the landscape of supply chain management continues to evolve, a variety of emerging trends are steering it towards greater sustainability, collectively enhancing the resilience and environmental consciousness of supply chains. These trends include:

Ethical Sourcing
Companies are intensifying their focus on the ethical dimensions of their supply chains. This involves rigorous scrutiny of how materials are sourced, upholding the rights and welfare of workers and keeping sourcing practices environmentally benign. Ethical sourcing also extends to partnering with suppliers who adhere to similar values, thus expanding the impact of these practices throughout the supply chain network.

Carbon Footprint Reduction
Reducing greenhouse gas emissions is fundamental in supply chains sustainability, with logistics modernizations (route

optimization, alternative fuel vehicles and improved fleet management) playing a pivotal role. Up-to-date platforms (such as RevenovaTMS for carriers) enhance these efforts by facilitating more efficient transportation through advanced logistics management as well as via carbon offsets and by virtue of the fact that the application runs on Salesforce's cloud. Integration of such platforms not only optimizes delivery routes but also cuts idle times, further decreasing carbon emissions and aligning operational efficiency with ecological goals.

Circular Economy Practices
There is a growing shift towards circular economy models that challenge the traditional take-make-dispose approach. By designing waste out of the system, companies are focusing on the longevity of materials through reuse, repair and recycling. Circular practices help reduce waste while also conserving resources and creating less dependency on raw material extraction.

Responsible Waste Management
Enriched waste management practices are becoming vital in sectors like manufacturing and packaging. This trend focuses on improving waste segregation, promoting recycling and even repurposing waste as raw material for other processes. Companies are adopting zero-waste policies and aiming for significant reductions in landfill contributions.

Transparency and Traceability
Technological advancements—such as blockchain—are revolutionizing transparency within supply chains. These technologies enable impeccable traceability of products from origin to end consumer, providing verifiable data on the sustainability of each product. This transparency is essential for companies to maintain credibility with consumers and regulatory bodies alike.

Integration of Advanced Technologies
The deployment of advanced technologies including Artificial Intelligence (AI) and the Internet of Things (IoT) is transforming supply chain operations. AI algorithms can predict demand more accurately, optimize inventory and boost delivery efficiencies, while IoT devices monitor and manage resource use in real-time, significantly improving overall sustainability.

Renewable Energy Adoption
More and more companies are integrating renewable energy sources into their operations. In fact, renewable energy technologies—such as solar and wind power—are increasingly used in warehouses and transportation networks. This shift

reduces reliance on fossil fuels and decreases operational costs in the long term.

Water Stewardship
As water scarcity becomes a pressing global issue, companies are also focusing on sustainable water use within their supply chains. This includes decreasing water consumption, treating wastewater and implementing water recycling measures in operations, especially in water-intensive industries.

Sustainable Packaging
In response to consumer demand and regulatory pressures, companies are innovating in the area of sustainable packaging. This involves using materials that are either biodegradable or easier to recycle, reducing the overall environmental impact of packaging.

Strategic Implications for Supply Chain Professionals

These trends don't just represent challenges but rather opportunities for supply chain and purchasing professionals. By integrating sustainable practices into their strategies, companies can align with global sustainability goals while working to enhance operational efficiency and market competitiveness along the way. What's more, professionals equipped with an understanding of these trends can drive significant changes within their organizations, leading to more resilient and future-ready business models.

Envisioning a Sustainable Future

The journey towards sustainable supply chains is complex but crucial for the long-term viability of businesses and the health of our planet. The trends discussed reflect a growing consensus on the need for responsible business practices that respect both people and the environment. As supply chain and purchasing professionals leverage these insights, they can lead the way in creating more eco-conscious, efficient and ethical supply chains.

Looking ahead, the future of supply chains will likely be marked by increased innovation and cooperation across industries and sectors. The goal will be not just to minimize negative impacts but to actively contribute to environmental and social well-being. In this evolving landscape, the companies that anticipate and adapt to these changes will be the ones to thrive, reaching greater heights and setting new standards for sustainability in the decades to come.

Extended Producer Responsibility: What It Means for the Electronic Components Industry

As global sustainability regulations continue to evolve, Extended Producer Responsibility (EPR) is becoming increasingly relevant, even for sectors traditionally viewed as upstream, like the electronic components industry. While much of the conversation around EPR focuses on consumer-facing electronics, the reality is that components themselves are now part of the sustainability equation, carrying direct and indirect implications for manufacturers, distributors and the entire supply chain.

Understanding EPR: Beyond Finished Products

At its core, EPR is an environmental policy requiring producers to take responsibility—financial, organizational or both—for the post-consumer stage of their products. Initially designed for sectors like packaging, batteries and consumer electronics, EPR is quickly expanding its scope, affecting not only end-products but also upstream players whose components ultimately shape product lifecycles.

EPR aims to:

- Promote circularity
- Improve recyclability
- Reduce environmental impacts across the full value chain

While traditional EPR programs focused on branded consumer goods, the role of component manufacturers, distributors, and intermediaries is gaining more attention, especially when their products are placed on regulated markets or contribute to the EPR compliance of downstream producers.

Why Components Matter in EPR

Electronic components may not carry logos or be featured in advertising campaigns, but they are essential to the performance, sustainability and recyclability of every finished electronic device.

Components influence:

- Material composition: affecting recyclability and safe dismantling
- Product durability: determining the usable life of devices
- Supply chain transparency: enabling or limiting traceability of critical raw materials

Yet, component producers often operate behind the scenes, and the role of components in pre-consumer waste, excess inventory and early obsolescence is rarely acknowledged in EPR discussions. However, these issues are central to the functioning—and environmental footprint—of the electronics industry.

Fragmentation: A Unique Challenge to the Components Sector

Unlike many industries, the electronic components supply chain is highly fragmented. There are multiple tiers of suppliers, brokers and distributors. There are complex procurement channels, as well as variations in packaging, logistics and documentation. This fragmentation creates significant challenges for EPR compliance, including:

- Who is the "producer" in a multi-tiered supply chain?
- How do you track components through distribution to end-products?
- How can upstream actors ensure their products meet evolving take-back, reporting and recyclability requirements?

As regulations expand, stakeholders across the component supply chain will increasingly need to collaborate to address these challenges collectively.

EPR Requirements Now Reaching Upstream

Key EPR obligations that are beginning to affect component producers and distributors include:

- Registration with national producer responsibility organizations (PROs)
- Transparent reporting on component quantities and materials
- Contributions to financing recycling, collection or recovery schemes
- Implementation of take-back systems (where applicable)
- Integration of design-for-recycling principles

In the European Union, EPR is embedded within the WEEE Directive, the Packaging and Packaging Waste Directive, and now complements broader initiatives like the EU Green Deal and Circular Economy Action Plan. As part of this trend, scope expansion is expected, particularly in sectors critical to Europe's digital and green transitions electronics being one of them.

The Overlooked Impact of Pre-Consumer Waste

An important but under-discussed topic is the role of pre-consumer waste—components that never even reach an OEM or end-user due to:

- Slow-moving and excess inventory
- Engineering changes
- Forecast errors
- Product obsolescence

These components, often scrapped or stored indefinitely, contribute silently to the global e-waste problem without making headlines. Yet, pre-consumer waste is likely to face increased attention as regulators recognize its contribution to environmental burdens.

Forward-thinking companies are already exploring circular distribution models to reduce, redistribute or recover value from excess and obsolete components—actions that align naturally with the objectives of EPR, even where not yet legally mandated.

Implications for the Electronic Components Industry

The industry now faces a critical question: How can upstream actors proactively integrate EPR principles ahead of regulatory requirements?

Component manufacturers, distributors and supply chain partners can proactively:

- Assess recyclability and material composition of products
- Improve data transparency and documentation for downstream partners
- Reduce excess inventory and implement reuse or resale programs
- Collaborate on take-back or recovery initiatives
- Support customers in meeting their own EPR obligations

Such actions not only reduce regulatory risks but also position companies as valuable partners in a market increasingly shaped by sustainability and circularity.

Connecting the Dots: EPR and the Broader Regulatory Landscape

EPR is not a stand-alone policy. Its principles are deeply interwoven with other key frameworks, including:

- Corporate Sustainability Due Diligence Directive (CSDDD)
- Corporate Sustainability Reporting Directive (CSRD)
- EU Batteries Regulation
- Eco-Design for Sustainable Products Regulation

For the electronic components industry, this means sustainability can no longer be confined to CSR reports or final product design. Compliance, resilience and competitiveness will depend on embedding sustainability—and circularity—throughout the component lifecycle.

Looking Ahead

EPR is already reshaping the electronics sector, and the expectations of upstream actors will continue to rise.
While enforcement varies by region, the direction is clear:

- More responsibility across the full value chain
- Increased attention to pre-consumer waste
- Growing expectations for data transparency and circularity

For the electronic components industry, this shift is not just a regulatory issue, it is an opportunity to drive meaningful change within supply chains and contribute to a more responsible and resource-efficient electronics ecosystem.

Waldom's Perspective on EPR and Circularity

At Waldom, our operations naturally intersect with many of the themes discussed in this article through initiatives focused on:

- Managing slow-moving and excess inventory
- Extending the life of electronic components
- Supporting circular distribution models

We actively contribute to reducing pre-consumer waste and promoting circularity within the electronic component value chain. As regulations continue to evolve, we remain committed to supporting responsible practices and collaborating with partners across the industry.

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How Procurement Departments Can be Sustainability Champions

Here are some steps that procurement departments can take to help their organizations achieve their sustainability goals.

t's no secret that sustainability has become a corporate imperative for many organizations. Sustainability first surfaced as a corporate strategy a couple of decades ago, EY reports. At the time, it didn't consistently translate into tangible corporate action. "Business leaders were skeptical about incorporating sustainability into the core of their strategy," the consultancy says.

That sentiment has shifted dramatically within just a short period of time. As the global economy evolves, and as governments introduce more stringent regulations, organizations are looking for ways to bring more transparency to their operations. This not only includes the activities that take place in and around the company itself, but also what's taking place beyond its four walls.

Procurement teams are uniquely positioned to help with the part of ESG responsibility that's not always easy to address or harness. Where Scope 1 and 2 emissions either come from or are caused by sources that a company controls directly, Scope 3 emissions aren't produced by the company itself, but by those that the organization is indirectly responsible for up and down its value chain.

"To an extent, we can choose whether our fleet is low or zero emissions, we can determine how our buildings are warmed and a manufacturer can look at ways to reduce the carbon cost of its production processes," nationalgrid explains. "However, a soft drink maker can't control how we will dispose of its plastic bottles, nor can an appliance manufacturer decree whether we use the most or least eco-friendly settings on our laundry machines."

4 Ways Procurement Can Support Sustainability

According to SAP's Baber Farooq, environmental, social and governance (ESG) initiatives have become a priority for procurement teams in recent years, but buyers don't always get the accurate or complete sustainability information that they need sellers to provide.

"This lack of transparency can increase the potential for regulatory violations, especially as climate-focused laws like the European Green Deal come to fruition," says Farooq, who sees software playing a role in helping organizations increase regulatory compliance, reduce costs and develop healthy relationships with sellers.

"Of course, there are limitations as suppliers can be reluctant to share information – like financial statements or internal regulatory policies," he adds. "However, software that is augmented with predictive analytics can deliver metrics and insights into supplier emissions and energy usage that enable organizations to evaluate suppliers against their sustainability objectives."

Here are four more ways procurement teams can support or even lead their organizations' sustainability initiatives:

1. Put artificial intelligence to work. As procurement teams take on more responsibility in increasing transparency across the supply chain, they should be courageous but vigilant in efforts to uncover supplier insights. Consequently, many CPOs have opted for strategies involving AI. "AI can provide procurement teams with intelligent business data that can lead to more informed purchase decisions," Farooq writes.

2. Keep close tabs on the data. Chief procurement officers (CPOs) should also take steps to maintain rigorous data privacy policies to build trust with suppliers. "Procurement teams should only implement AI technologies that are relevant, responsible and reliable, ensuring that the implementation of AI follows guiding principles and protects the privacy of all users," Farooq adds.

3. Set clear expectations for suppliers regarding emissions reduction, renewable energy adoption and sustainable sourcing. Then, incorporate those climate performance metrics into some of your biggest suppliers' evaluation criteria. This is something that Mars, Inc., does as part of its "Net Zero Roadmap." According to Sustainability Magazine, the partnership allows procurement partners to take proactive steps in their organizations and strategies to address their emissions, and be part of a collective responsibility to finding both a sustainable future and a productive business relationship.

4. Embed sustainable procurement throughout the organization. Get an interdisciplinary team (logistics, plant/property management, human resources, accounting, etc.) involved in the process, Tony Klimas suggests in "Practical Strategies to Design an Effective Sustainable Procurement Program." "This interdisciplinary team will create a clear roadmap that identifies material issues that impact sustainable procurement, but also establishes and oversees the strategy, tactics, key performance indicators and process improvement initiatives," Klimas adds, "to proactively identify and anticipate risks that could impede the achievement of these objectives."

Wired to Procure: What Engineers Wish Procurement Teams Knew

Find success through engineering and procurement collaboration.

In this video, technology correspondent Ana Berry discusses how engineering and procurement collaboration is essential for business success.

WIRED TO PROCURE

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Five Tips for Procurement

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8 Things You Should Know About the Growing E-Waste Problem

As the global e-waste problem continues to accelerate, existing recycling programs can't keep up with demand.

A a global community, we generate a lot of electronic waste (e-waste). In fact, the United Nations Institute for Training and Research's (UNITAR) latest Global E-waste Monitor says the escalating e-waste problem vastly outstrips the rate at which we're recycling those materials. Defined as any discarded product with a plug or battery, e-waste harbors toxic additives and hazardous substances (including mercury) that could threaten human health and environmental well-being.

According to UNITAR, the world is experiencing "significant electronification," including a digital transformation, with technologies profoundly changing the way we live, work, learn, socialize and do business. This growth has created a surge in the amount of waste from electrical and electronic equipment (EEE) and e-waste. The e-waste generated in 2022 contained 31 billion kilograms (63 billion pounds) of metals, 17 billion kilograms (37 billion pounds) of plastics and 14 billion kilograms (31 billion pounds) of other materials (minerals, glass, composite materials, etc.)

Did You Know?

Here are eight more things to know about the mounting, global e-waste problem:

1. The 62 million tons of e-waste generated in 2022 could fill a line of 40-ton trucks encircling the earth's equator, according to earth.com.

2. Just 22.3% of this e-waste was documented to have been recycled properly, spotlighting the vast amount of valuable resources—worth an estimated $62 billion—that remain untapped, and highlighting the increased pollution and health risks to communities across the globe.

3. The annual rise of 2.6 million tons in e-waste production—with predictions set to soar to 82 million tons by 2030—"underscores a pressing need to amplify recycling endeavors to prevent further environmental degradation and safeguard human health," earth.com states.

4. Managing e-waste has become big business. *DataHorizzon Research* says the e-waste management market is on track to reach $207.1 billion by 2032. The market is experiencing a compound annual growth rate (CAGR) of 13.4% right now.

5. Disposing of electronic devices carefully is necessary because they contain heavy metals that can harm the nervous system, bloodstream, and vital organs. "Companies invest in e-waste management and recycling systems to achieve zero waste and reduce the use of raw materials in their manufacturing processes," the research firm states.

6. An estimated 19 billion kilograms (42 billion pounds) of e-waste, mainly from metals like iron which is present in high quantities and has high recycling rates in almost all e-waste management routes, were turned into secondary resources, according to UNITAR's most recent report.

7. Platinum-group metals and precious metals were among the most valuable metals but present in much lower quantities; nonetheless, an estimated 300,000 kilograms (661,000 pounds) were turned into secondary resources through formal and informal recycling practices.

8. The share of patent applications for e-waste management rose from 148 per million in 2010 to 787 per million in 2022. Most of those applications were related to technologies for cable recycling, "with hardly any signs of an increase in the number of patents filed for technologies related to critical raw materials recovery," UNITAR reports.

The Pile is Growing

Looking ahead, *Statista* expects annual, global e-waste generation to hit 82 million metric tons by 2030—up from 62 million in 2022.

"Rapidly advancing technologies, rising consumer demand for electronics, and shorter product life cycles have made e-waste a growing source of environmental concern," the company reports. "With only 81 countries worldwide covered by electronic waste legislation, policy, and regulation, increasing collection and recycling rates will be one of the biggest challenges of the coming decade."

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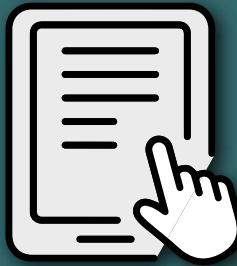
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