An aerial photograph of a multi-lane highway bridge spanning a large, clear blue lake. The bridge is supported by several concrete pillars. The surrounding landscape is lush with green trees and forested mountains in the background. The sky is clear and blue.

How industrial leaders can use sustainability to create value

Global Advanced
Manufacturing & Mobility

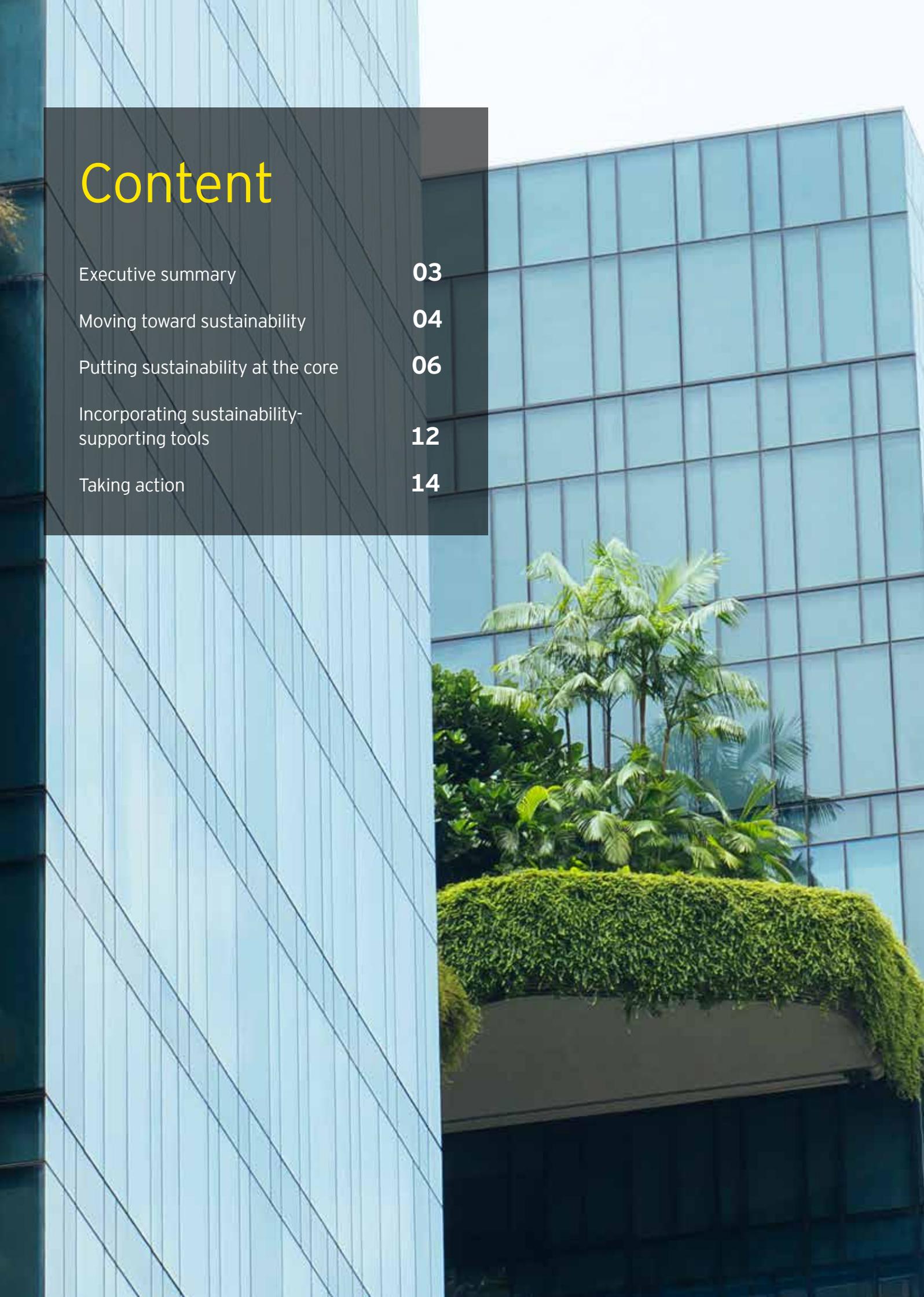
The EY logo, consisting of the letters 'EY' in a bold, white, sans-serif font. A yellow chevron shape is positioned above the 'Y' and extends to the right.

EY

Building a better
working world

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A large yellow double quote icon.

Industrial companies must put sustainability at the core of their innovation and business model strategies.

Claudio Knizek
EY-Parthenon Global Advanced
Manufacturing & Mobility Leader

Executive summary

Environmental, social and governance (ESG) issues are now on every organization's radar – but the need to align ESG with financial performance poses an urgent challenge for the industrial sector in particular.

The U.S. Securities and Exchange Commission (SEC) recently proposed rules that will require detailed climate-related disclosures in annual filings. This impacts the industrial sector significantly. According to the World Resources Institute¹, three industrial subsectors are the fastest-growing sources of greenhouse gas (GHG) emissions: since 1990, emissions from industrial processes grew by 187%, followed by transportation (+79%) and manufacturing and construction (+56%). The indirect impact is even larger.

Despite these warning signs, the industrial sector appears to be falling behind in terms of sustainability performance. Many actions individual firms have taken, such as increasing environmental reporting and setting emissions reduction targets, are increasingly seen as minimum requirements. Companies not making additional efforts in the short term are unlikely to meet stakeholder expectations in the medium or long term.

So how can companies transform their strategies to continue long-term performance while also reducing risk and creating new opportunities around environmental sustainability? Based on our experience and research, we offer clear advice on how to move swiftly from sustainability-related promises to clear action plans that can help organizations to create value for their business, people and the planet.

¹ <https://www.wri.org/insights/decarbonize-us-industry>



1

Moving toward sustainability

Why the industrials sector is lagging — and why companies need to catch up

Outside of certain subsectors with higher public profiles (e.g., automotive or chemicals), many industrial companies have been able to fly below the radar and avoid engaging meaningfully on sustainability issues. However, the massive environmental “handprint” of industrial products and processes over their lifespans means the imperative – and opportunity – related to more sustainable solutions is clear. Simply embracing the status quo is, for lack of a better term, increasingly unsustainable.

Considering the business characteristics of many industrial companies, this lower prioritization of environmental initiatives is perhaps understandable. Longer product life cycles, complex manufacturing processes, demanding customer requirements and mission-critical applications make implementing sustainability programs highly complex. To date, industrial companies have had higher hurdles and fewer incentives to choose a greener path.

Yet, for firms that make the effort, the benefits can be significant. Companies with high ESG marks are securing valuation premiums, with chemicals and materials firms reflecting the greatest impact – a 116% valuation premium in the US and 229% in the EU² – and industrial products manufacturers are seeing modest benefits as well. In addition, other institutional sources of capital and capital markets gatekeepers are increasingly factoring ESG metrics into their decision-making.

Some companies that have realized the benefit of sustainability leadership to their commercial and market performance are prioritizing further investment to stay ahead. Carrier, a leader in building and cold chain solutions, recognized an opportunity to win business and improve environmental outcomes by helping customers achieve their aggressive ESG commitments with a broader array of offerings. Boosting R&D significantly, the company launched more than 80 new products and services over the course of a year to help maintain its sustainability-driven advantage.

According to a Source Global Research 2021 survey, 56% of public sector and state-owned entities planned to invest >US\$51m on sustainability efforts vs. 37% of manufacturing companies, and 33% of public sector and state-owned entities planned to invest >US\$100m on sustainability efforts vs. 8% of manufacturing companies.

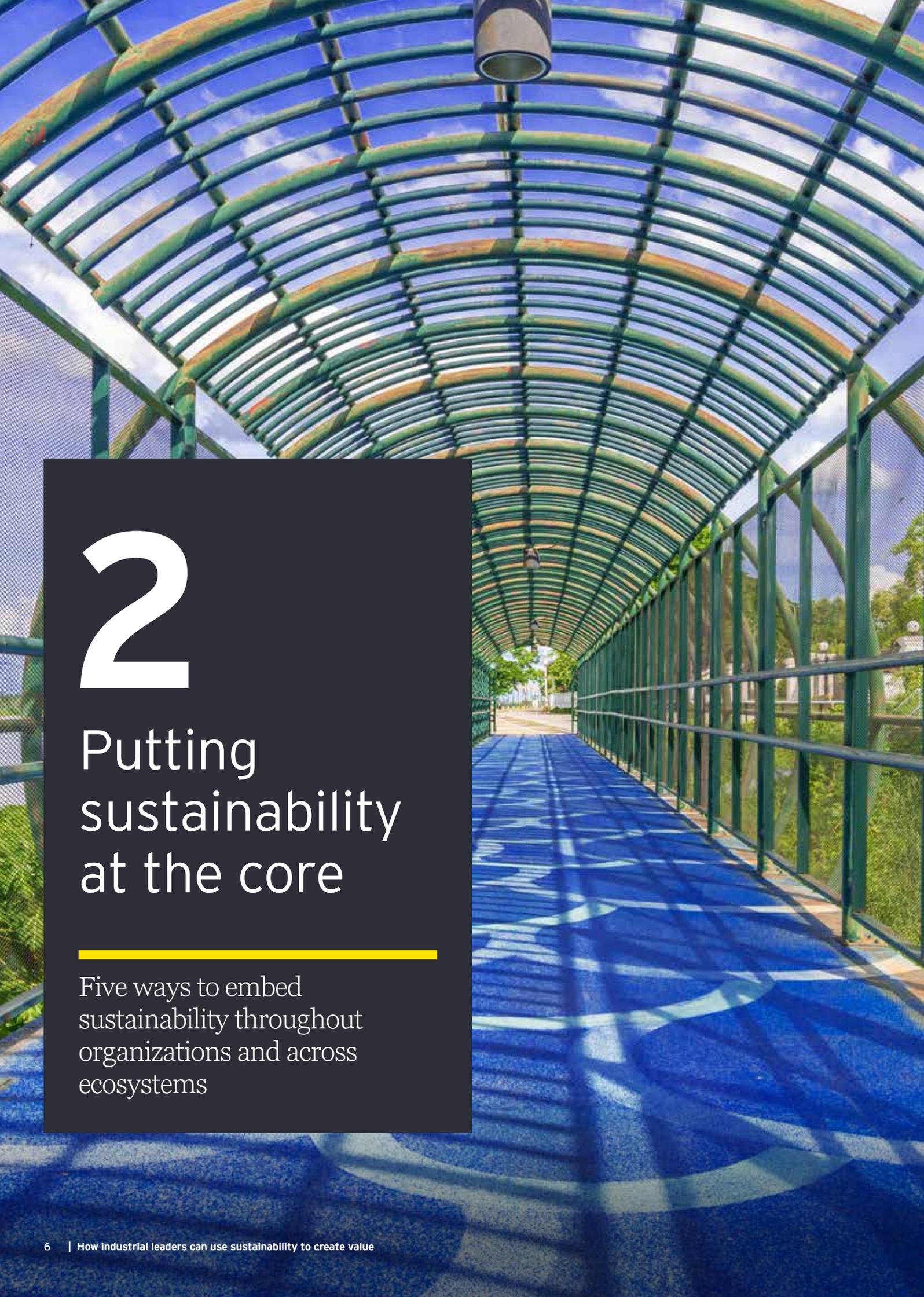
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Leaders are anchoring sustainability principles into their commercial and functional operations with an end goal to achieve long-term sustainability targets.

Randall J. Miller

EY Global Advanced Manufacturing & Mobility Leader

² As of 29 November 2021, per MSCI and EY ESG analysis.

A long, covered walkway with a blue patterned floor and a green metal arched roof structure. The walkway is flanked by green metal railings and a chain-link fence. The floor has a repeating geometric pattern in shades of blue. The roof is made of green metal beams forming a series of arches. The sky is visible through the roof structure.

2

Putting sustainability at the core

Five ways to embed sustainability throughout organizations and across ecosystems

Yesterday's sustainability-related innovations rapidly become today's minimum standards. Forward-thinking firms in the industrial sector are raising the bar, putting sustainability at the core of their commercial and operational strategies, and increasingly demanding that partners across their ecosystems do the same.

Here are five areas where industrial sustainability leaders are leapfrogging their competitors:

1. Driving deep organizational commitment

Industrial leaders are moving beyond aspirational decarbonization objectives and rudimentary environmental disclosures which have become table stakes. Instead, they are anchoring sustainability principles across their operations. This often includes developing and executing road maps that detail technology and infrastructure investments contributing to long-term sustainability targets. They are also embedding sustainability in core decision-making and incentive structures, such as KPIs, ROI assessments, product road maps and design principles.

Sustainability leaders are actively pursuing M&A and developing alliances to add advanced capabilities more rapidly. In addition, they are carefully assessing the importance of sustainability to acquisition candidates. Companies' environmental footprints and handprints are increasingly becoming value drivers – not just another set of questions on a confirmatory due diligence checklist.

According to the 2022 EY CEO Outlook Survey, 40% of industrial sector CEOs believe that becoming a sustainability leader reduces capital cost or provides competitive advantage, and 22% believe that environmental sustainability ratings are important to attract investors.

Case study

Sustainability push makes automaker an EV first mover

A global automaker has deeply anchored sustainability principles in its commercial and functional operations, and it achieved first-mover status by aligning its product road map accordingly. Company leadership wanted to implement an emissions reduction strategy but also recognized an opportunity to differentiate itself in the market with more aggressive action. The first phase of the company's sustainability strategy was developed with input from external advisors and NGOs, as well as various internal stakeholders. By including critical constituencies like its product managers and engineers, management was able to clarify how the high-level strategy would be operationalized. The broad organizational buy-in resulting from phase one laid the groundwork for a more rapid transformation of the company's product lines. With a clear understanding of the opportunities and challenges, the company became the first original equipment manufacturer (OEM) in its country to announce a full transition to electric vehicles (EVs) and a firm end date for its development of internal combustion engines.



2. Putting sustainability at the core of innovation and business models

Rather than bolting it on as an afterthought, sustainability leaders are putting environmental considerations at the center of their innovation, product design and life cycle planning, and even commercial models. Taking sustainability into account from the outset, designers can create products specifically crafted to use fewer and greener materials. Firms are also seeking longer-term benefits as they reimagine production lines or even entire factories to reduce waste and increase energy efficiency. Leaders are dedicating portions of their R&D budgets to developing more sustainable materials and technologies. They are also building innovation hubs

and incubators to make sure that there are always internal stakeholders with sustainability-related advances as their top priority.

Forward-thinking firms are also increasingly focused externally as well as internally, recognizing that some of the most significant advances can be realized via increased collaboration with ecosystem partners. This can include working with customers to introduce new commercial models – improving financial outcomes for both parties, as well as the environment.

Case study

A sustainability boost from business model innovation

As part of its sustainability-centric strategy, a lubricants manufacturer sought to address a long-standing issue: waste from unused or inefficiently used products. While waste reduction risked lowering sales volumes, the company identified an opportunity to bridge the gap via business model innovation: a “lubricant-as-a-service” model to maintain the lubrication of conveyor belts in customers’ facilities. By deploying a service focused on delivering better performance rather than more product, the firm was able to deliver a superior outcome for its customers and offset slightly lower product volumes via stickier service revenues – while also reducing waste and improving sustainability.



3. Reimagining entire value chains – not just individual parts

As companies increasingly pursue incremental product and process improvements to boost sustainability, leaders are also rigorously evaluating all elements of their value chains for more differentiated gains. These firms are assessing all aspects of their supply chains and manufacturing processes, as well as the environmental handprint of their products post-sale.

Depending on the nature of the offering, this may be relatively straightforward (e.g., creating circular material loops for packaging or other low-complexity offerings) or much more

complicated. In the case of capital equipment, the lifetime environmental impact from inefficient utilization or improper maintenance can be considerable. By deploying digital technologies and connected devices, leaders are analyzing performance in the field to help customers increase efficiency and reduce waste. The insights generated from this sort of ongoing customer interaction can be invaluable in identifying areas for future innovation while creating immediate value as an ongoing revenue stream.

Case study

Aero engine OEM uses data analytics to cut emissions

An aircraft engine OEM focusing only on its traditional position in the aerospace value chain might limit its environmental efforts to designing more efficient engines. However, one leading manufacturer recognized an opportunity to add economic and sustainability-related value outside this lane by using sophisticated data analytics and machine learning. In partnership with a cloud computing provider, the company helps airlines analyze data collected by hundreds of engine sensors during each flight. The resulting insights help them operate their aircraft more efficiently and minimize downtime via more targeted preventive maintenance. The firm estimates that this program has helped avoid over 22 million tons of carbon emissions to date – while also providing an important recurring revenue stream.



4. Reinventing supply chains

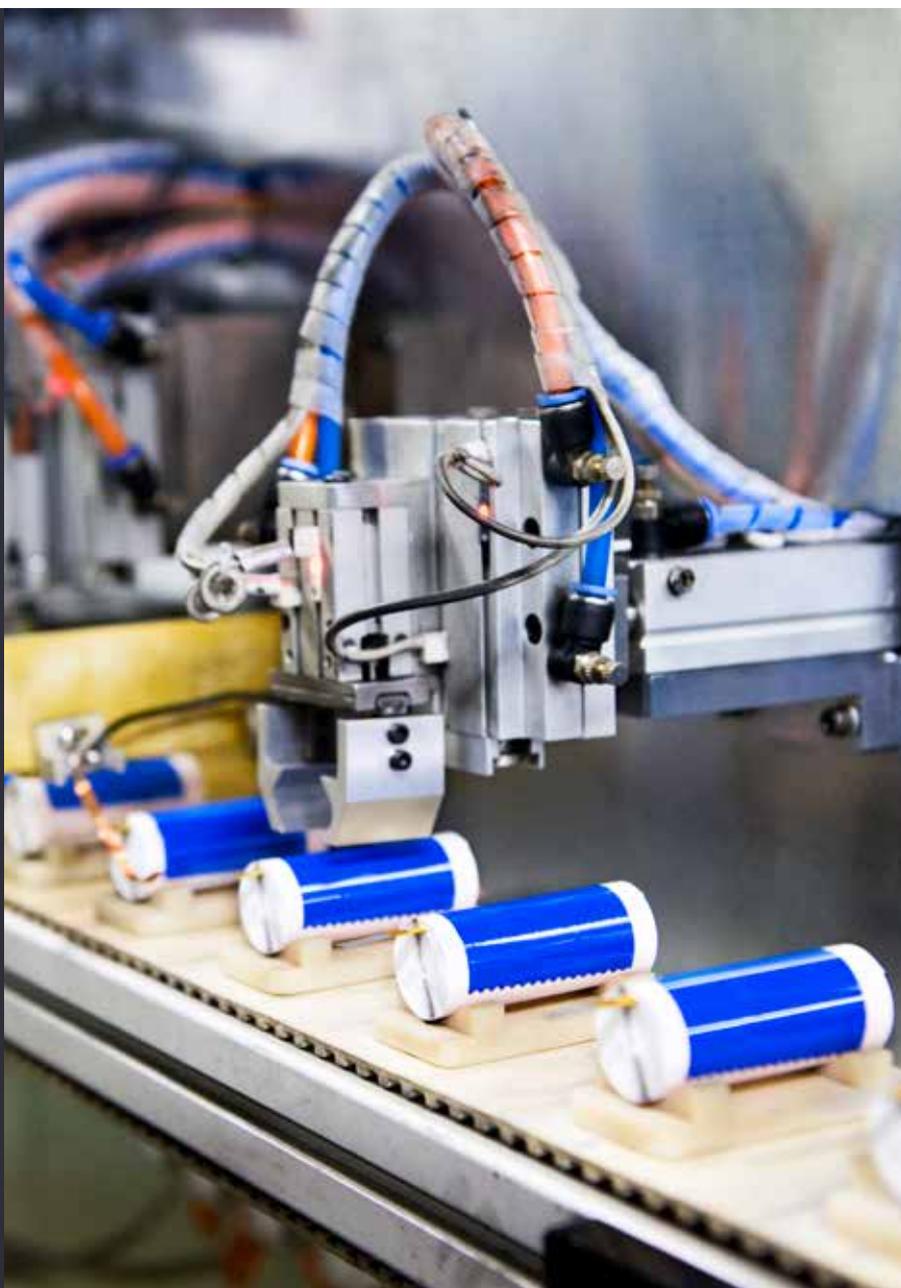
Given their complexity, one of the greatest areas of environmental vulnerability – and opportunity – facing firms is their supply chains. To minimize risk, leaders are moving beyond superficial sustainability assessments and are instead engaging deeply with their entire supply chains, mapping direct suppliers down to the initial sources of basic commodities. Equipped with a more comprehensive view, firms can better align their supply chains with their overall sustainability strategies.

Leaders are also pursuing supply chain transformations by raising sustainability requirements for vendors and instituting accountability measures. These may include third-party certifications or more technology-driven solutions, such as the use of blockchain and advanced analytics to track input attributes from raw materials, all the way to the final product. When paired with ongoing diligence measures such as audits and on-site inspections, these measures can reduce risks and costs while improving quality and transparency.

Case study

Manufacturer uses blockchain to add accountability

A chemical company sought to differentiate itself by providing customers and other stakeholders with evidence of accountability for its sustainability goals. Using blockchain technology to trace inputs, the company was able to analyze its renewable materials consumption, energy efficiency and overall carbon footprint across the entire production cycle. Evidence of recycled feedstock and renewable energy use, as well as targeted GHG emissions and water usage reductions, enabled the company to achieve a fungible sustainability certification. The record on the blockchain verifies the sourcing and distribution of a specific product and can be shared with the company's customers for their own use farther down the value chain.



5. Deploying and partnering around innovative energy technologies

Increasing the use of renewable energy sources is clearly a table stakes action for industrial companies. True leaders, however, are currently exploring emerging sources and technologies to reduce their energy consumption and carbon footprints even further. Some of these technologies are sector-specific (e.g., sustainable aviation fuels), while others have broader applications. For example, green hydrogen is seen by some as having the potential to accelerate decarbonization across heavy industry, long haul freight, shipping and aviation.

Beyond alternative fuels, industrial firms are also focusing on electrification of factories and equipment to reduce costs and emissions, as well as deploying carbon capture, usage and storage (CCUS) technologies to help meet net-zero targets.

Some companies have recognized an opportunity to stay on the cutting edge via “collaborative innovation” through partnerships and alliances with universities, industry associations and advanced research institutes. Organizations such as these have played key roles in exponential technologies such as carbon sequestration³ and carbon capture while driving⁴. While investing in such emerging technologies may be outside the comfort zone for many industrial firms, some leaders believe the potential economic and environmental payoff from successful commercialization is worth the risk.

Case study

Partnership produces carbon-capture innovation

An industrial products company, seeking solutions for both its own and its customers' emissions, partnered with a university to license its patented solvent technology. This technology enabled a new carbon-capture offering for power and manufacturing plants. For a typical power plant with a 650 MW capacity, applying the carbon-capture technology enables the capture of ~3.4 million tons of CO₂ annually, equivalent to removing more than 700,000 cars from the road annually. The company's installed base currently has the capacity to capture 40 million tons per year.



³ Climate change: IBM boosts materials discovery to improve carbon capture, separation and storage, IBM Research Blog, 16 May 2021.

⁴ This device captures the carbon from trucks as they drive, fastcompany.com, 26 March 2021.



3

Incorporating sustainability-supporting tools

Digital transformation is paving the way for value-led sustainability

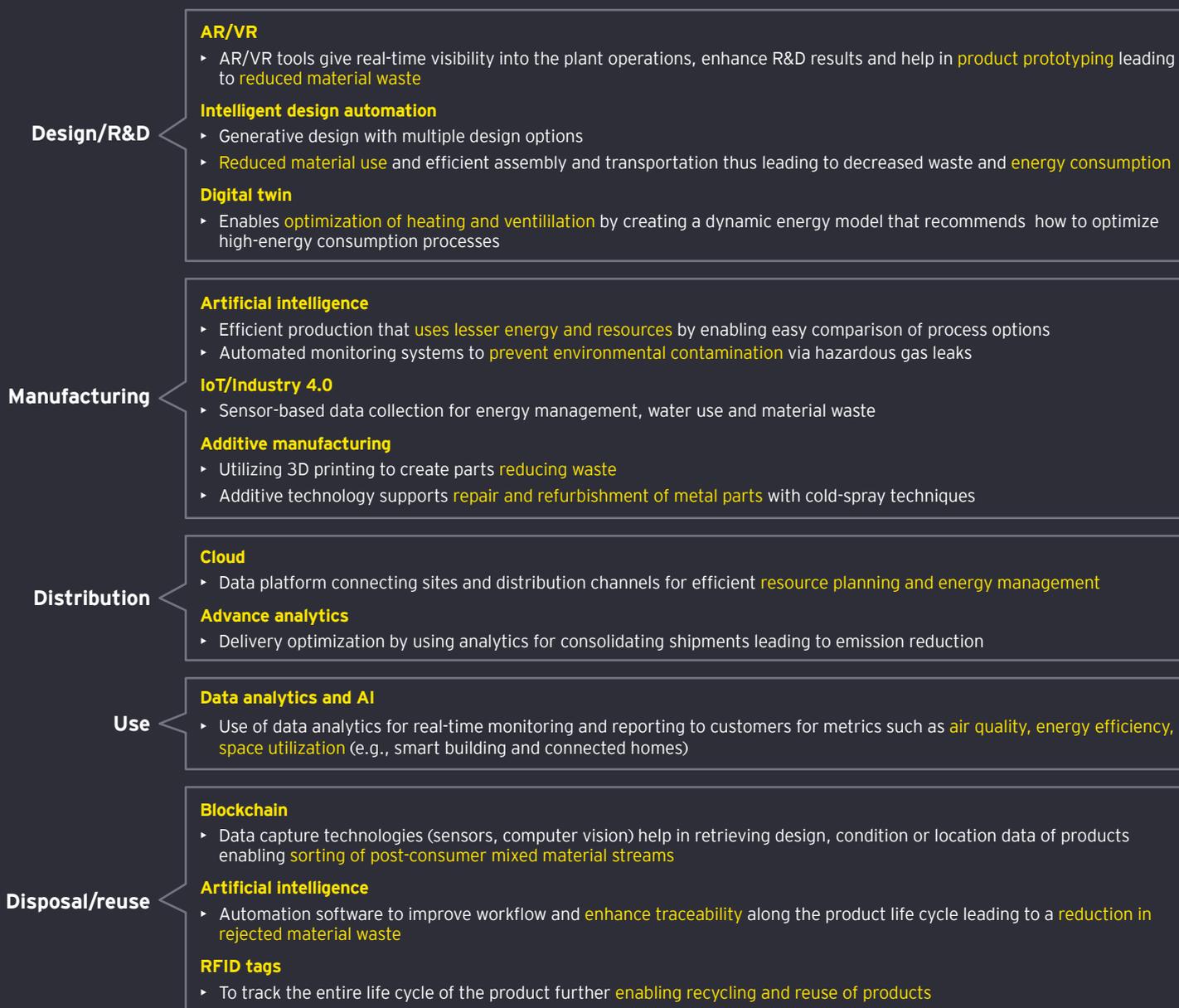
As industrial firms pursue a sustainability transformation, the ability to identify, collect and analyze data generated by their businesses is critical to informed decision-making and improved performance. Many companies have already begun their digital transformations, so incorporating environmental-related requirements into these efforts may prove to be the fastest and most powerful way to accelerate value-led sustainability across the sector.

Firms are deploying sensors across their factory floors for improved workflow efficiency, inventory management and safety. Adding sensors to power generation and transmission systems in a facility can allow for improved energy efficiency.

Once these systems are in place, the data they generate enable additional opportunities, such as using blockchain to match emissions with carbon offsets. Data can also be integrated with more sophisticated sustainability reporting platforms that will make third-party validation of sustainability metrics less costly and time-consuming.

Overall, a thoughtfully implemented digital strategy must integrate sustainability considerations at the outset. Failure to do so potentially puts a company behind its peers, increases risk exposure and reduces opportunities to improve both environmental and financial performance.

Digital technology enhancing sustainability across the value chain



Source: AWIN, web search, EYK analysis



4

Taking action

The path forward for industrial companies pursuing sustainability transformation

With stakeholder pressure rising and regulators raising the stakes, industrial companies should not be asking whether a sustainability transformation should be pursued, but how to best leverage sustainability for competitive advantage. What approach will enable better decision-making, improving not only environmental sustainability but also increasing value for all stakeholders? Firms that successfully move from promises into action while defending and creating value will distinguish themselves as leaders.

Here are five concrete actions senior leaders in industrial companies should take as part of a proactive, forward-looking sustainability transformation:

- 1. Harness digital technology to advance value-led sustainability.** Leaders use increased data collection and analysis to improve energy and resource efficiency, and rapidly design and launch greener products. They also embrace tools like digital twins and blockchain to generate a range of sustainability and value creation benefits.
- 2. Integrate sustainability goals with ongoing transformation efforts.** Leaders recognize the necessity of continuous transformation and that sustainability goals should be integrated and aligned with these efforts – from digital transformation to portfolio management and beyond. Leaders are using sustainability as an offense.
- 3. Incentivize corporate leadership commitment to sustainability.** Leaders link executive compensation to sustainability goals and embed sustainability principles into organizational culture and principles from the bottom up.
- 4. Collaborate with suppliers and customers on sustainability performance.** Leaders prioritize sustainability criteria for supplier selection and create incentives for customers to use their offerings in ways that improve environmental outcomes.
- 5. Communicate sustainability goals and performance to external stakeholders.** Leaders create accountability by being transparent about sustainability goals and subsequent progress with external stakeholders. The payoff from successfully assuming this risk may come not only from customers, but also from the capital markets, as investors increasingly seek out companies differentiating themselves on a variety of ESG-related metrics.

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Digital technologies can accelerate sustainability efforts, chart progress and demonstrate sustainability successes across the entire value chain and product life cycle.

Craig Coulter

EY Global Advanced Manufacturing & Mobility, Strategy & Operations and Sustainability Leader

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