White Paper

The state of the Circular Economy report

Manufacturers and distributors seek sustainable change

In association with:

Sage

CIO

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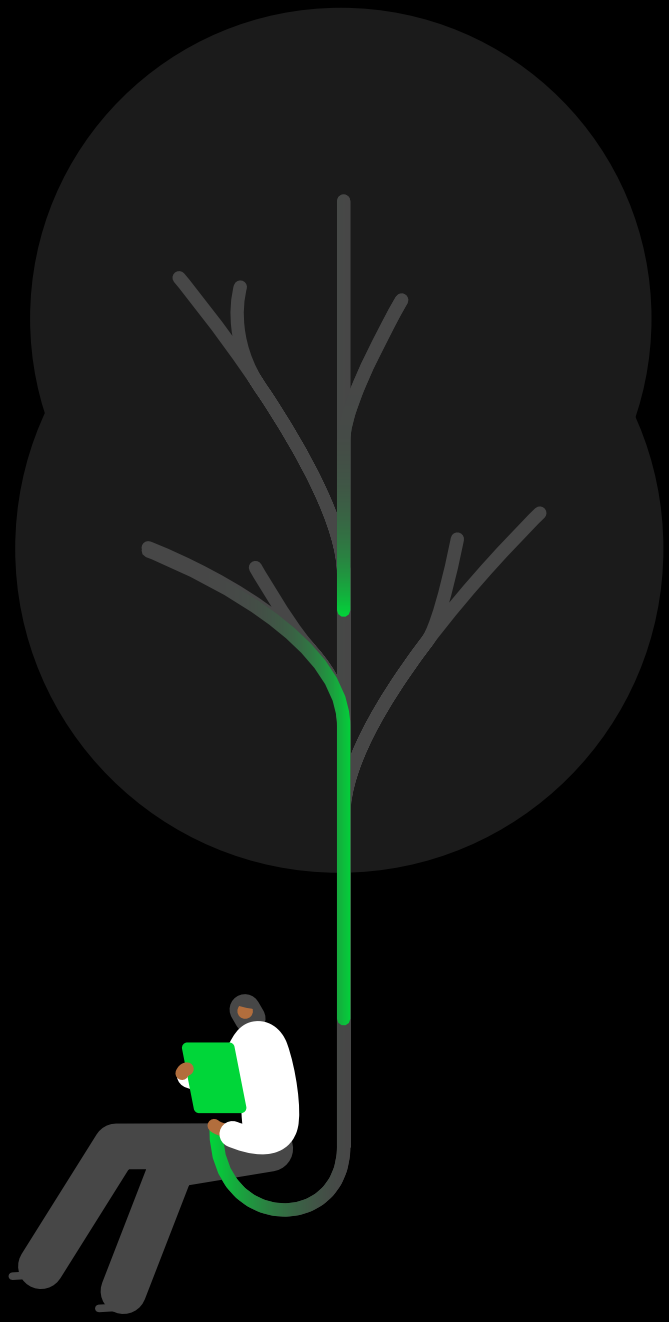
The need for sustainable change

Research demonstrates that organizations want to take advantage of sustainability and Circular Economy benefits, yet face some significant hurdles.



Businesses across industry sectors are recognizing they must advance their Circular Economy and sustainability strategies.

Manufacturers and Distributors (M&Ds) in particular stand to gain from implementing sustainable processes and practices. Doing so drives down waste, pollution, and energy use, and makes operations more cost-efficient in the long run.

Additionally, a Circular Economy and sustainability strategy enables organizations to minimize resource consumption. It can also increase the security of the supply chain by reducing dependence on global raw material supplies. And it holds the potential to create new business models from renting or leasing used machines.

In fact, some M&Ds are already making changes and seeing the benefits as they pursue what has been termed the four Rs: reduce, refurbish/reuse, recycle, and recover.

However, in order to fully benefit from the Circular Economy, M&Ds need to further transform so they can overcome the challenges hindering their pursuit of greater sustainability. Obstacles range from higher costs and managing disruptions in the supply chain to cybersecurity and maintaining profitability.

Organizations are behind the Circular Economy curve
Greater sustainability is being driven by advances in technology; changing customer behavior; pressure from employees, shareholders, and industry partners; shifts in materials sourcing; supply chain disruption; and environmental goals and regulations.

Meanwhile, the cost to M&Ds of their inaction includes reduced competitiveness, reputational damage, and supply chain inflexibility. Businesses have little choice but to up their game and become more environmentally sustainable.

Digital transformation is providing the means to do this, through powerful technologies and innovations such as cloud apps, the internet of things (IoT) and artificial intelligence (AI)-powered data analytics.

The problem is the majority of M&Ds appear to be behind the curve when it comes to modernizing and digitizing processes and operations, gathering and analyzing data effectively, or taking full advantage of the cloud. As a result, proper implementation of Circular Economy strategies across their value chains is largely lacking.

In this report, we examine the findings of an extensive survey conducted by Foundry, and sponsored by Sage, among IT and business leaders in the manufacturing and distribution industries (see About the Research box). The results are further amplified by expert perspectives from Isaac Sacolick, president and founder of **StarCIO**, as well as **former CIO** at Greenwich Associates, McGraw-Hill Construction, and *Businessweek*.

About the Research

- **859 respondents** from Canada, France, Germany, Ireland, Spain, South Africa, United Kingdom, and United States.
- Job function: C-suite, head of IT or business department, senior executives and directors, and general/managing partners.
- Industries represented: Construction, manufacturing and distribution across retail and ecommerce; wholesale distribution; technology and equipment; discrete manufacturing; process manufacturing and chemicals; services (business, financial, professional, non-profit).
- Company size by number of employees: **25%** with **1,000 to 2,499** employees; **33%** with **500 to 999** employees; and **42%** with **50 to 499** employees.

Key research findings

The research uncovered numerous datapoints and trends around how M&Ds are addressing the Circular Economy. Some of the most notable findings include:

32% are currently experiencing significant benefits from their Circular Economy strategy. These benefits include: Improved brand image/ reputation; energy efficiency; increased productivity, efficiency, and resilience; and improved environmental impact.

An additional **32%** expect to achieve benefits in one to three years.

The top external forces causing challenges: Higher costs and disruptions in the supply chain.

The top internal forces creating challenges: Cybersecurity, cost and profitability, and supply chain management.

The primary drivers for pursuing a Circular Economy strategy: Technology and innovation advances and changing consumer preferences.

The greatest barriers to Circular Economy adoption: People, technology, and investment.

Sage

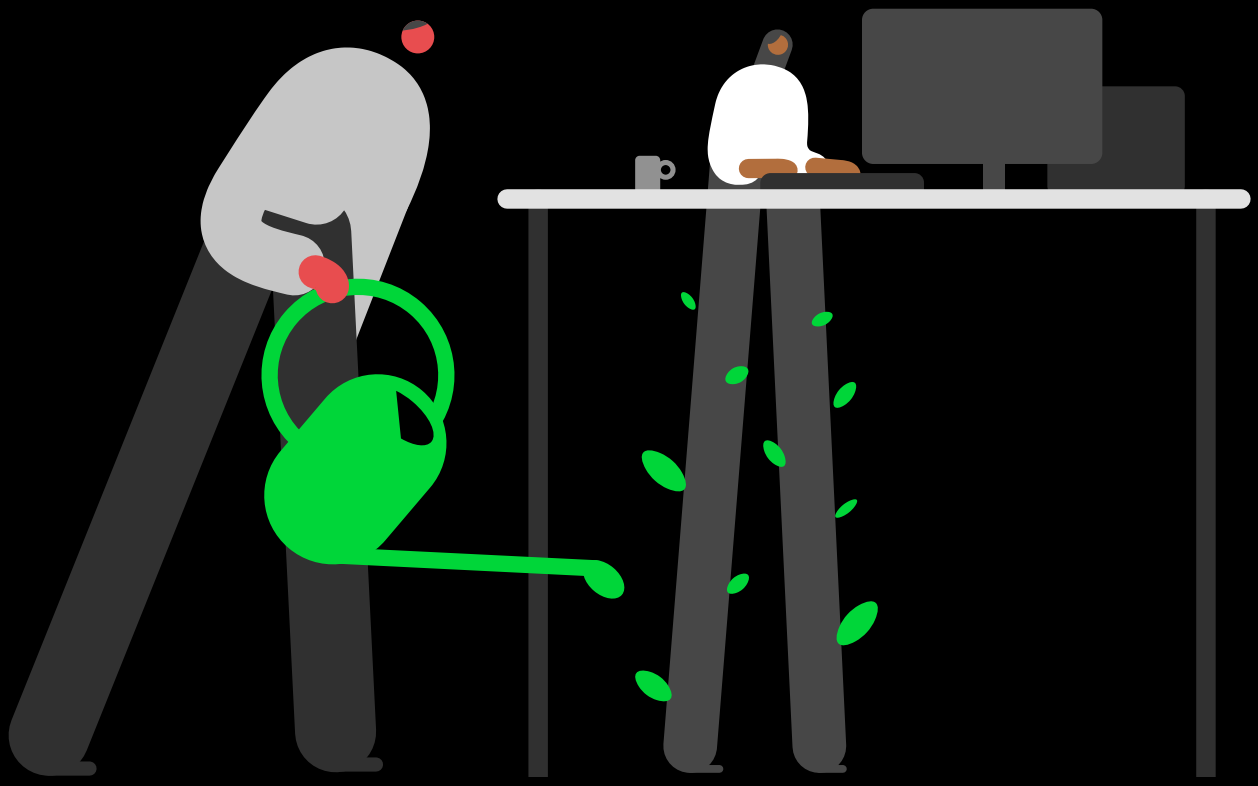
The growing Circular Economy

Business and technology leaders across industry sectors are paying greater attention to the principles and benefits of the Circular Economy (CE). The majority of survey respondents (84%) said they have a role in their company's CE and sustainability strategy, with 32% saying it is central to their job.

Indeed, in recent years, M&Ds across the world have been investing in CE initiatives and more sustainable practices and processes, while developing their knowledge and expertise. Three in five senior business and technology leaders have said they now hold advanced knowledge of CE and sustainability.

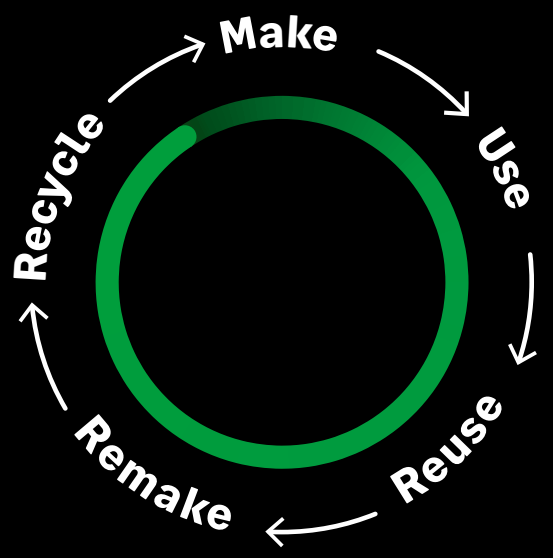
Meanwhile, sustainable business practices have grown in importance and are now a critical concern for customers, employees, shareholders, and supply chain partners.

At its core, the Circular Economy is based on the principles of designing out waste and pollution, keeping products and materials in use, regenerating natural systems, and supporting environmental sustainability.



Circular Economy eliminates waste through a cyclical model of “make, use, return, recycle, reuse, make,” which contrasts with the traditional linear economy approach of “take, make, dispose.”

Circular Economy



Among the greatest benefits of the CE and sustainability is greater profitability. Yet, the rewards go beyond financial gains. For example, greater sustainability can facilitate improved resource usage and operational efficiency, as well as enhanced brand image and reputation. M&Ds naturally have a lot to gain from transitioning to sustainable practices, although the road to implementation can be challenging, which we will explore in sections 4 and 5.

About one-third (32%) of the total respondent base said their organizations are already seeing the benefits of adopting CE-related processes. Breaking that down by region:

- **43%** in North America.
- **30%** of European M&Ds.
- **20%** in South Africa.

Another **32%** of the global base said they expect to achieve gains from their CE investments in the next one to three years.

Interestingly, the vast majority of businesses (80%) believe their organizations are either slightly or significantly ahead of the curve in terms of having the necessary characteristics to implement their CE and sustainability strategy. These attributes include: strategic vision, culture of innovation, know-how and intellectual property, digital capabilities, strategic alignment, and technology assets.

The issue of greenwashing

Companies in North America give themselves high marks for their CE capabilities, with **67%** saying they need minimal or no transformation to their operations, and only **7%** saying major changes are required. European (30%) and South African (52%) companies, on the other hand, said their organizations require moderate to major transformational changes to support a CE and sustainability strategy.

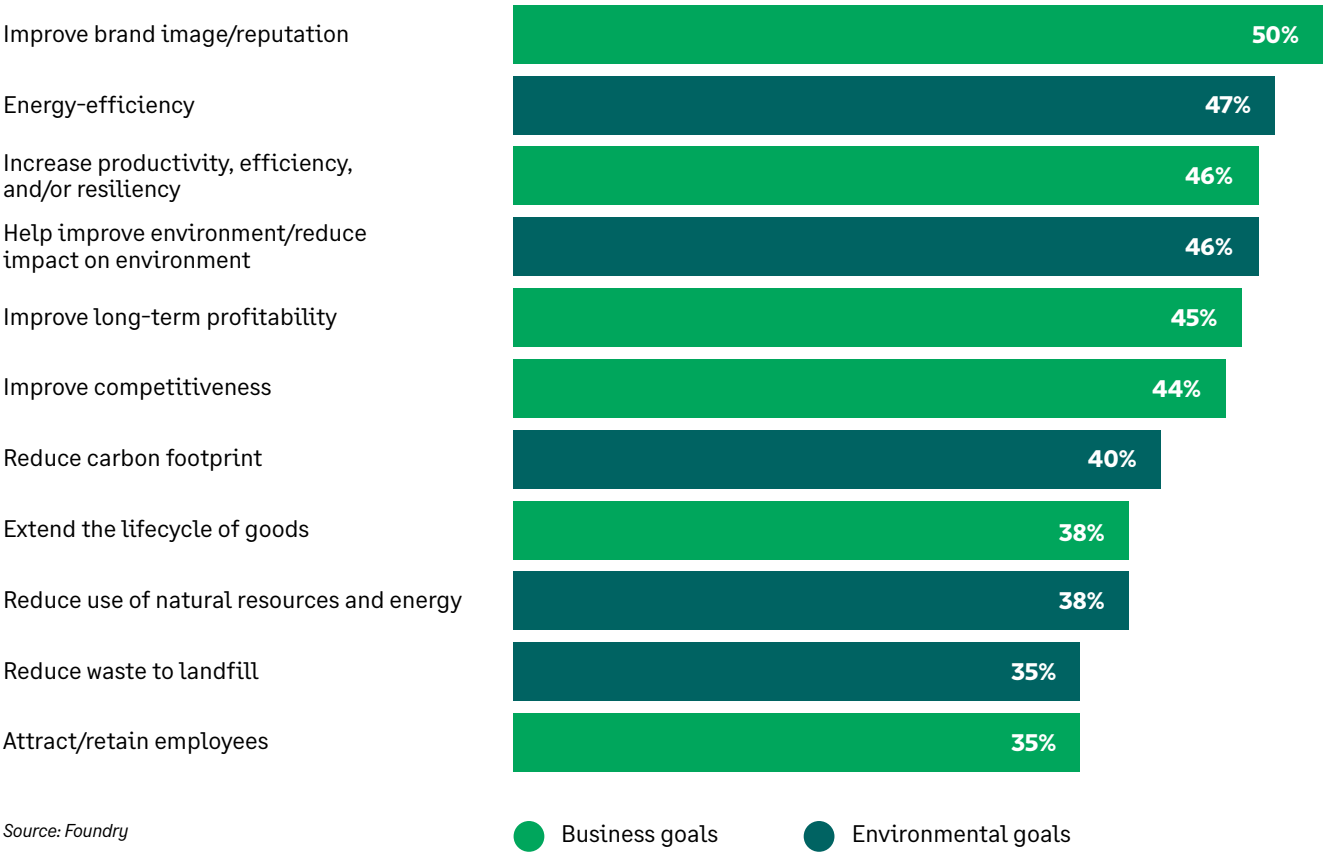
Greenwashing occurs when a business says they are environmentally or sustainability focused, yet it’s only for the sake of appearances, and greenwashing may be behind some of the reported confidence around CE strategy. The survey found that improved brand image and reputation was the number one motivation among the total global base for pursuing CE strategies.

Consulting CIO and tech expert **Isaac Sacolick** said that if greenwashing is occurring, it may not be all bad.

“It’s really hard to get a C-suite motivated to do something,” he said. “For example, if the chief marketing officer promotes sustainability efforts that could ultimately cost the company more money or require more difficult decisions—while still being part of the company’s personality—I can only think it’s a good thing. Sometimes, it takes a leader to step up and pave the path and then help other executives to catch up.”

Greenwashing aside, M&Ds recognize there’s an intersection between environmental and business goals (*see Figure 1*). For example, in line with the former, companies are motivated to gain energy efficiencies and to reduce their impact on the environment and their carbon footprint. In terms of business objectives, they’re pursuing increased productivity, efficiency and resilience, as well as improving their long-term profitability and competitiveness.

Figure 1. *Motivations for pursuing a circular economy/sustainability strategy.*



Source: Foundry

Mission and values

"Boards of directors, CEOs, marketers, and some lines of business recognize the need to pay attention to and promote the Circular Economy and sustainability strategies," Sacolick said.

"It goes to the business' mission and values," he said. "It brings companies back to the core of what they're doing for social good and for wellness."

"Innovation is also an important part of the growing CE", he added. When businesses explore more sustainable processes and practices, they can gain a competitive advantage, as well as business and environmental benefits.

Sacolick cited a **construction business** that developed the ability to recycle earth at the building site and convert it into materials used in the construction process. In doing so, the company drastically reduced its transportation costs, fuel use, and the time it takes to level and prepare a site.

In another example, ARA Foods was able to reduce it's raw materials waste by **1.5%** within six months by simplifying workflows. The snack food manufacturer, which is a make-to-order enterprise, deployed an enterprise resource planning (ERP) system that has enabled them to better track processes in real time. It allows ARA to optimize raw material use, better manage seasonal variations, and reduce the time from order to shipment.

"Modular design is another example of how manufacturers and construction companies can change the traditional paradigm by building off-site in a controlled and energy efficient environment, then bringing the parts, or complete buildings, on-site," Sacolick said.

One of the more significant changes that manufacturing and distribution has seen in recent years, driven by the CE and sustainability, is a faster lifecycle for manufactured products and services. "The last two years have demonstrated that companies can accelerate those cycles and look at these things more frequently," Sacolick said. "Technology is changing, and the expectations of manufacturers are changing."

Multiple challenges to overcome

Sustainability is increasingly becoming a non-negotiable approach for modern M&Ds. They understand the risks of failing to adopt CE principles, and the impact these strategies have on people, process, and money (*see Figure 2*).

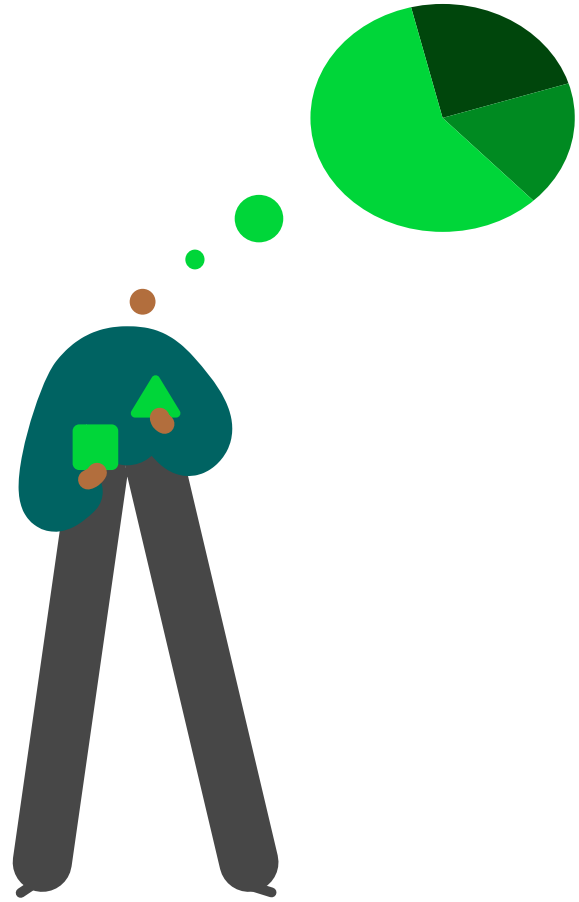
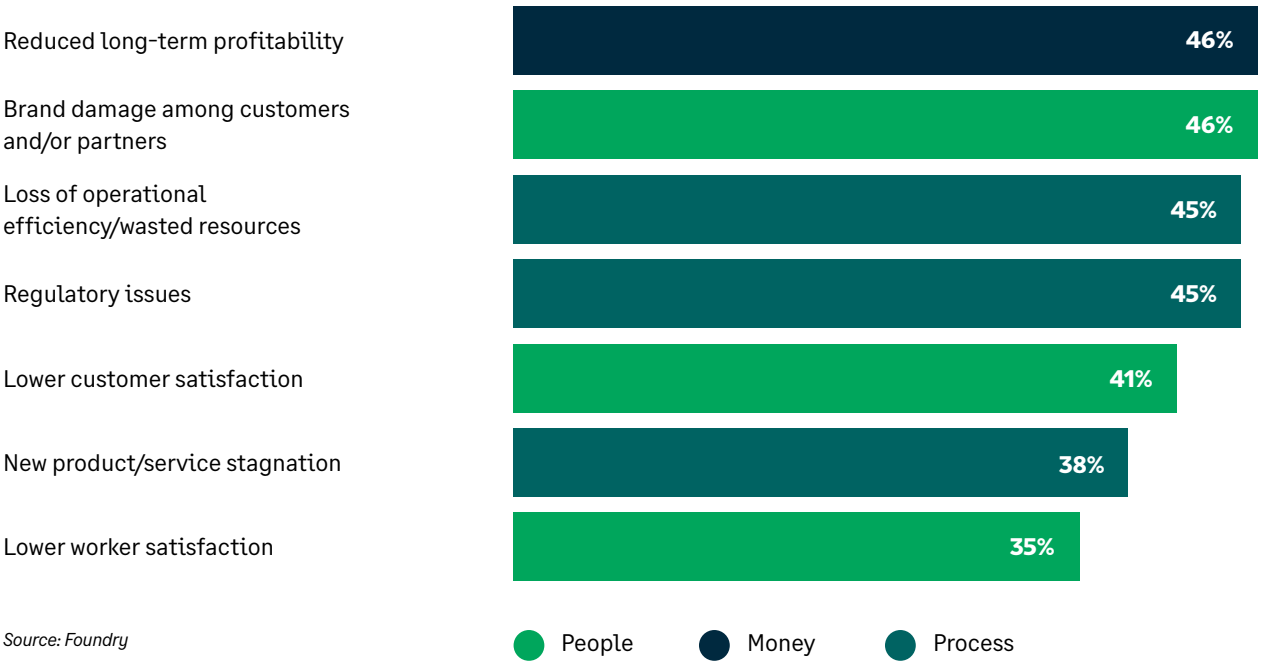


Figure 2. *The risks of not adopting circular economy strategies.*



Source: Foundry

However, while there are many risks that spring from inaction, moving to the CE also has its difficulties. M&Ds are facing considerable obstacles in the day-to-day running of their operations, let alone thinking about how they'll address sustainability. For example, respondents were asked to rank on a scale of 1 (not a challenge) to 5 (major challenge) sets of 14 external and 14 internal forces. Figure 3 reflects the combination of rankings 4 and 5. It's worth noting that all the factors are presenting high levels of concern.

Figure 3. *Severity of challenges currently facing manufacturing/distribution companies.* *Source: Foundry*

External forces		Internal forces	
Rising costs and market erosion	**72%**	Cybersecurity	**76%**
Supply chain disruptions	**71%**	Cost and profitability management	**73%**
Increased competition	**70%**	Supply chain visibility/tracking	**73%**
Pandemic-related disruptions to frontline workforce	**70%**	Meeting corporate sustainability goals	**72%**
Changing customer behaviors, needs and expectations	**68%**	Pricing	**70%**
Rapid advances in technology	**67%**	Innovation	**70%**
Meeting governmental sustainability requirements	**66%**	Fulfillment/delivery	**70%**
Unpredictable/fluctuating customer demand	**66%**	Data analysis/insights/business intelligence	**69%**
Regulations/legislation/compliance	**65%**	Sales/demand forecasting	**69%**
Labor shortages	**65%**	Efficiency/productivity	**69%**
New and emerging online competitors (e.g., Amazon, eBay)	**65%**	Legacy systems/technology	**68%**
Globalization	**64%**	Customer service/experience	**67%**
Commoditization	**59%**	E-commerce	**67%**
Disintermediation (direct to consumer)	**59%**	Workforce safety and wellness	**66%**

All of these existing challenges are enough for any business. Yet, M&D organizations are also facing difficulties adopting CE and sustainability principles. Their issues tend to fall into four categories: people, process, money, and technology. For example, respondents cited problems finding individuals with the right expertise in CE (people); supply chain integration issues (process); costs and budget limitations (money); and tech integration and legacy systems (technology).

Sacolick advises companies to recruit and encourage people who are inquisitive and provocative, who will help them overcome barriers with innovative thinking.

"We need people who ask questions, who are able to look at how issues are solved today and then challenge assumptions," he said. "They should be able to do their own research and see how other people are doing things, but not only within the manufacturing or distribution space. They should be looking at tangential sectors to see how industries are using AI or how they're processing water in their plants, for example. What kinds of materials could they look at to build their parts? How can you find more generic materials in manufacturing so you don't have this tightly coupled supply chain?"

"Organizations also need people with data and analytics skillsets", Sacolick said. "I want to know what my manufacturing costs are; what the risks are; and what is the newest expression of risk beyond just quality and cost. For example, if I put more capabilities into my product, what does that say about what I can charge for it? What is the elasticity of my pricing if I start marketing against something that I couldn't do before?"

He added that it's also important to seek individuals who can look at the overall transformation picture. "Any time I'm trying to transform, I am looking for somebody who can do a full end-to-end analysis of the entire manufacturing process."

"Having people with a Six Sigma background is helpful here," Sacolick said. "They have the training to decouple existing processes to discover how to do them more sustainably, with lower risk, less costly, or with greater or new value."

The need to be proactive

"I think it's really important, whether you are a CEO, CFO or a CIO to 'read the tea leaves,'" Sacolick said, because this helps businesses to get out in front of challenges and prepare for larger global issues such as pandemics, geopolitical conflict, supply chain instability, and materials/services price fluctuations.

"Agility is critical; it's how fast organizations can sense the tea leaves have changed, and that they need to do something different," he said. It could mean buying laptops so core people can work from home as shutdowns emerge or being proactive in shutting down operations in a particular region in response to potential supply chain or resource difficulties.

"Risk is at the top of the business conversation," Sacolick said. Boards of directors are increasingly asking how customer experiences, supply chain, and political and financial risks are changing and affecting the organization.

That's why the ability to look ahead is essential. "What I'm doing today is likely to be something I have to transform over the next three to five years," he said. "Where do we want to be in 10 years? How do we want to think about this differently? It's very hard to do that."

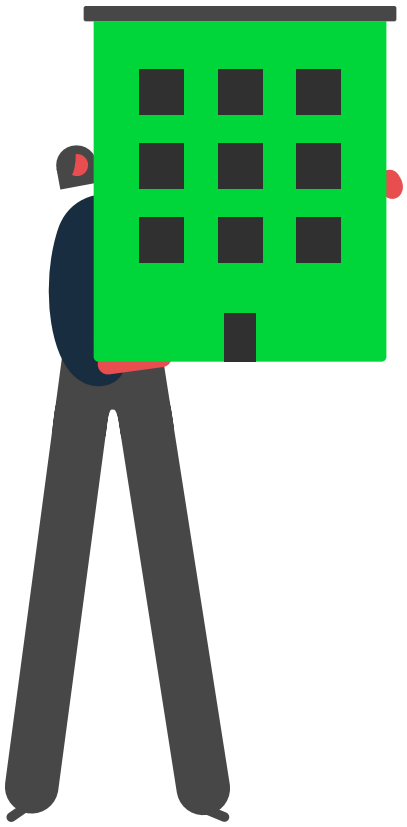
The need to be future-focused

How do you start looking ahead? It goes back to the need to find individuals with the talent to think innovatively. Solutions may end up being straightforward—such as putting solar panels on building rooftops—or they may require detailed planning, such as a commitment to net-zero energy emissions. "Boards and companies need to look where they want to be in five to ten years and start building backwards," Sacolick said.

At the same time, organizations should broaden their thinking on agility, he advised. "How do you make faster decisions when there's a crisis in front of you? I was a CIO in New York during 9/11 and then during Hurricane Sandy in 2012. These are micro and macro crises that affect businesses. We used to think of agility in terms of disaster recovery and business continuity; it was a bit black and white. Today, we have many shades of gray."

These gray areas mean that businesses need to address change in a more granular way—through data. Sacolick explains, "What does the data tell me in terms of what the new demand is for my product and service? Where do I need to ship things differently than before because of that new demand? Are those customers asking for different types of products? With this data in hand, I can evolve my manufacturing process to support necessary changes."

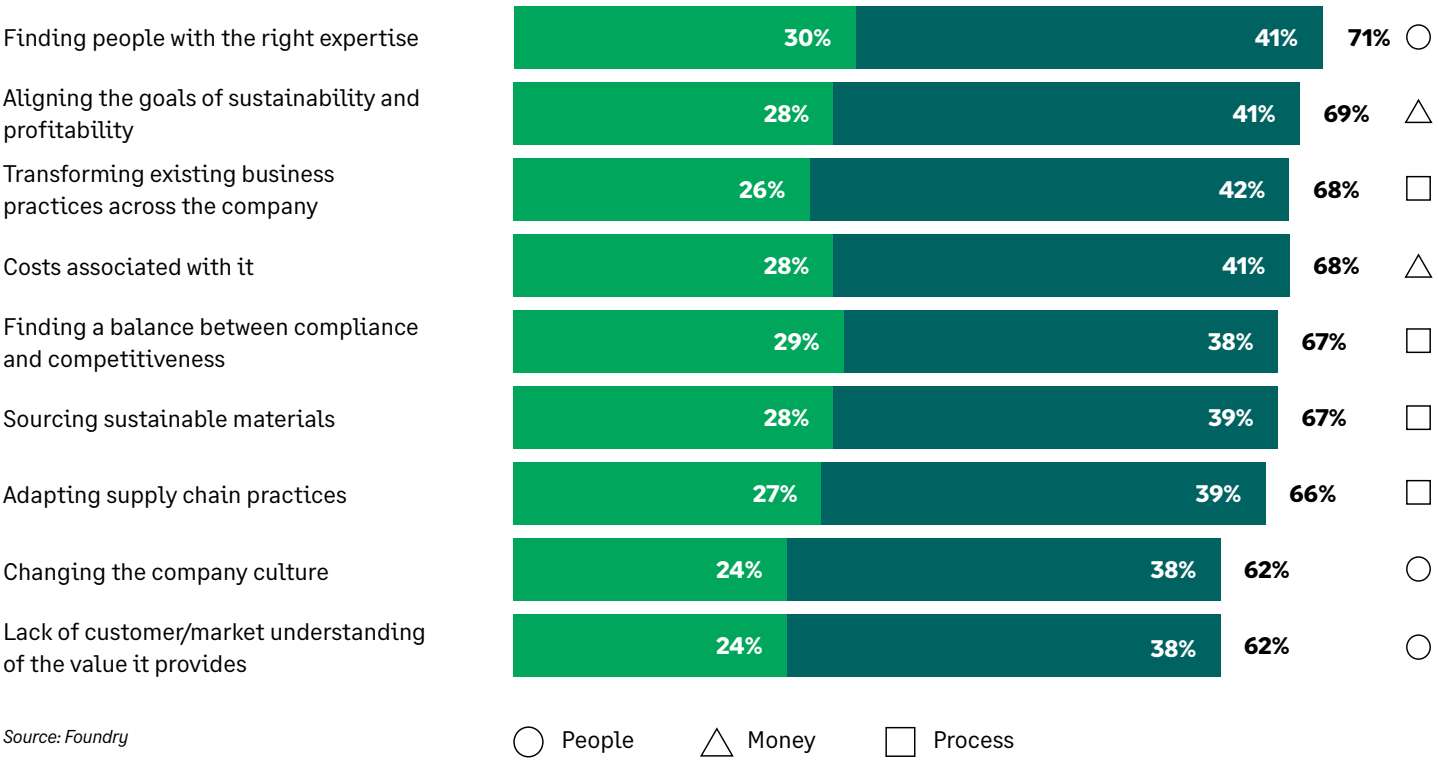
Transformation is operationally challenging



In the same way that external and internal factors are creating business challenges for M&Ds, so too are they resulting in barriers toward advancing their Circular Economy and sustainability strategies.

The CE and sustainability also present operational challenges. Organizations cited a mix of people, process, and money issues (*see Figure 4*).

Figure 4. *Operational transformation challenges with implementing circular economy/sustainability strategies.*



Source: Foundry

Why is operational transformation so difficult for today's M&Ds to achieve? And is this sector alone in this struggle?

Sacolick suggested it's an industry-agnostic problem. "Any time you have an institutionalized process that has been built up over time—and it's considered core to how the business is operating—it's very hard to unwind that and rebuild back some of its parts to reflect a new future."

He reflected on his past experience in publishing to demonstrate the scale of the issue. "It was very difficult to say to publishing executives: 'Over the next five to 10 years, you're going to have to change your entire model to a digital model. You are going to have to think about digital subscribers, digital advertisers, digital distribution, and a cost margin that is one-tenth of what you're doing now.' Back in the 1990s, they could not fathom those levels of change."

Some of the difficulty of operational transformation lies in deep-rooted institutionalized processes that are difficult to change. Another issue is the investments already made. "If I manufacture HVAC systems, I can't reinvent my entire manufacturing process and R&D every three years," Sacolick said, "There's a stark cost factor."

Margins also play a role. If a business manufactures a product and sells it at a 15% profit margin, it's difficult to recoup upfront costs, let alone try to reinvent the product and its manufacturing process.

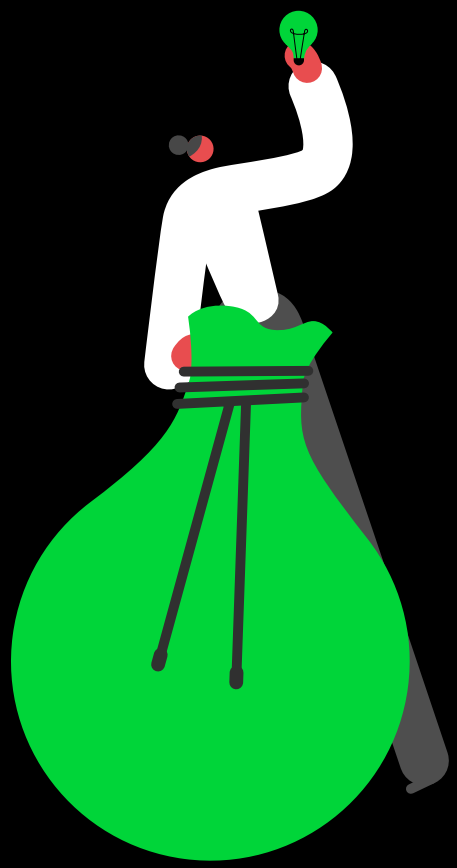
"Consider if a competitor builds a zero-energy building from the ground up and their costs are 15% lower than yours," Sacolick posited. "Also, imagine that they can already outbid you on price, capability, and sustainability. Now you've been disrupted. Now you are five years behind."

The answer, in broad terms, is technology and innovation. With the right approach and tools, M&Ds can transform their operations through the agility, efficiency and scalability that, for example, cloud, IoT, and a data-driven approach can enable.

The challenge is knowing how to apply the right technologies and how to integrate them together.

The promise of technology and innovation

Considering that technology and innovation advances are the number one factor that is driving pursuit of a CE and sustainability strategy, which digital transformation technologies did respondents rank as most important? Four areas stood out in the research.



1. **Cloud** applications and infrastructure (74%). Cloud is already impacting nearly every aspect of modern manufacturing—from ERP and workforce training to machine monitoring apps. Manufacturers can use cloud solutions to research, design, and develop products more efficiently and cost-effectively; to fabricate, manufacture, and analyze products and processes; and in innovative areas that support sustainable practices, such as additive manufacturing (3D printing) and digital twin solutions.
2. **Data analytics** for predictive intelligence (68%). The technology can be applied across M&D processes to refine product development, but also to optimize supply chains, logistics, and distribution; improve product scheduling; and monitor machine usage and reliability to make equipment more resource efficient and sustainable.
3. **Automation** (67%). Automated processes speed workflows, boost productivity, reduce human error, and yield valuable data that can be analyzed to improve production performance.
4. **IoT** (48%). Adopting IoT technology for machinery, endpoints in the field, or consumer products and parts, businesses can carry out predictive monitoring and maintenance, and increase efficiency in support of greater CE and sustainability.

In addition to these four technology areas, M&D respondents included—to a lesser degree—AI and machine learning (30%), robotics (26%), wearables (25%), digital twin (19%), and blockchain (15%).

The long road to transformation

The M&D respondents recognized, amid all the existing world and operational challenges, that they still have much work to do in terms of technology adoption. Taking cloud apps as an example, only a minority of the respondents said public cloud is used for core apps such as supply chain (39%), CRM (38%), business intelligence (35%), human resources management (34%), ERP (32%), and payroll (29%).

Indeed, public cloud usage is far from universal among M&Ds and may impede execution of their CE and sustainability strategies —especially considering that 61% said cloud apps are helpful in collecting, analyzing, and reporting their CE capabilities.

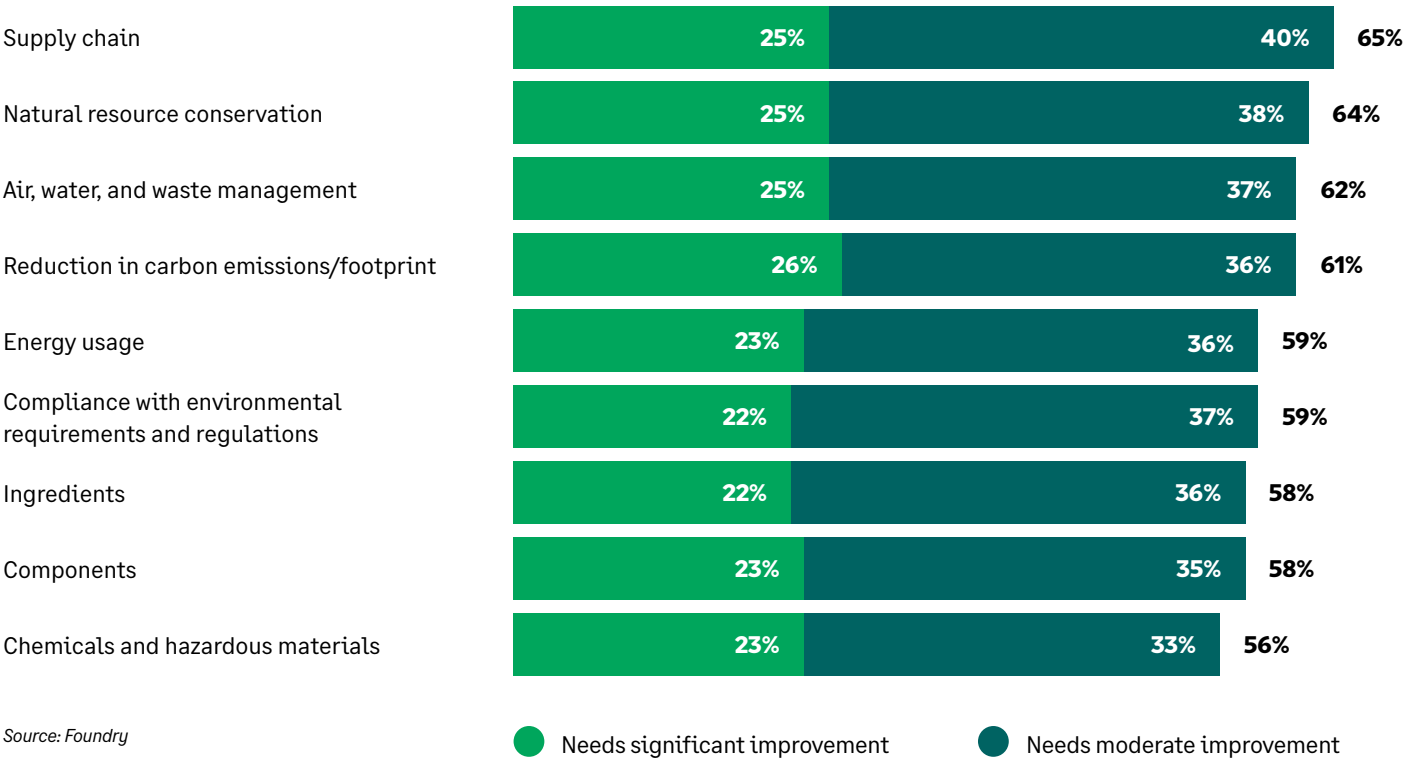
Similarly, respondents also reported widespread issues with their data capabilities in terms of understanding how they're aligning with CE and sustainability objectives. Asked to rank their abilities on a scale of 1 (no improvement needed) to 4 (significant improvement needed), they said most areas need significant or moderate transformational help (*see Figure 5*).

Technology integration among systems and applications can aid the collection, analysis, and reporting of data to demonstrate how organizations are aligning with CE and sustainability goals. That's easier said than done.

"Historically, manufacturers and distributors are not technology builders," Sacolick said. "They buy a lot of their technology and then they go and customize the heck out of it. And sitting in between these platforms is a swivel chair, somebody moving from one system to another because they don't have technologists who can integrate workflows or datasets."

Although ERP systems have certainly helped M&D organizations better understand business operations, they're not sufficient for forward-looking CE and sustainability strategies. "Whether you think transformation is happening now or is in its early or late stages, my sense is that the further you lag in the industry, the more steps you have to take to become modernized," said Sacolick.

Figure 5. *Areas where companies need to improve data capabilities for circular economy/sustainability strategies.*



Source: Foundry

A change in mindset

"Modernization and movement toward a sustainable approach to business requires a change in mindset," Sacolick suggested. "How can we put a new set of building blocks in place that are nimble and agile, that can evolve, and that can make a team that may be less technically astute reflect stronger technical capabilities? It's about creating an end-to-end cycle that enables workflows to be completed symbiotically; automation where it's possible, and faster access to data."

At this point, he emphasized again the importance of agility. "I want to be able to do experiments, learn from them, and evolve how we are operating."

That could mean, for example, disruption at the coding level, with developers experimenting through weekly sprints. Or it might be quarterly or yearly macro investments in emerging technologies to evolve aspects of the supply chain.

"That agile mindset is really important, and it needs to permeate outside the walls of IT," Sacolick said.

Bottom-up, top-down

For businesses that want to evolve their technology to become more CE-focused and sustainable, Sacolick advised: "Whenever you look at transforming technology, you have to look at it bottom-up and top-down. From the bottom, look at the core infrastructure—whether it's ERP, your networks, or end-user computing models—and rethink how to mature it. And then supplement it with platforms that enable efficiency and innovation."

There are multiple potential elements, depending on your business's unique needs. "Automation could be a piece of this," Sacolick said. "It may also be the ability to do low code and data science. Another possibility is business intelligence technologies that can bring data from five or six platforms into dashboards without individuals having to create spreadsheets."

These are the next level of building blocks. The underlying and unifying trend is the issue of how to make massive, yet rapid changes to the environment while also being able to experiment and evolve.

"You can really get stuck on your ability to test the impact of what you're changing," Sacolick said. "Again, turn to technology for answers. For example, digital twins. If you're running a complete digital environment, you can throw a bunch of what-if scenarios at it and see what the impact is."

Case study: Realizing Circular Economy benefits

Skagit Horticulture is a US-based wholesale grower and distributor of plants and flowers, with operations in the states of California and Washington. Its business requires predictability across the supply chain, as well as visibility into any product fluctuations during a relatively short selling season.

"We work within a 20-week growing period," said Jeremy Myrick, IT manager, Skagit Horticulture. "If we don't have product ready to sell during that time, it's game over."

To compete in a seasonal market industry, the company needed more efficient demand planning and wanted to minimize any raw material waste. In addition, Skagit sought to optimize processes for greater supply-chain accuracy and logistics.

"Our sales teams depend on accurate information," Myrick said. "Without it, we risk overpromising, or could be left with excess stock that goes to waste."

The company decided to implement a cloud-based ERP system that offers real-time visibility into its inventory, shipments, and sales. The solution also integrates with Skagit's e-commerce site, so customers can obtain accurate availability and pricing data.

Now Skagit knows "What we have on hand and when it's ready to go. It gives us confidence in our decisions, allowing us to better serve our customers and maximize revenues," Myrick said.

Skagit achieves a successful growth pattern

- Minimized material and product waste.
- Optimized short selling season with real-time inventory visibility.
- Streamlined supply chain processes and business operations.

Summary:
Advancing your Circular Economy strategy

The importance of the CE and sustainability has greatly increased in manufacturing and distribution, with many businesses already making changes and seeing some benefits.

However, considering the significant levels of legacy equipment and inflexible processes, M&D organizations have their work cut out for them as they pursue greener and modernized strategies.

“Nevertheless, technologies such as cloud, analytics, automation, and IoT, can help. The way forward lies in assembling the tech building blocks to transform your operations and make processes more nimble, open, and agile,” Sacolick said.

It also requires experimentation, real-time decision making, and having a long-term view. It also means asking important questions about current processes and practices in order to advance the company’s CE strategy.

The bottom line is to keep your eyes on the prize. The benefits of sustainable manufacturing and distribution outweigh the barriers. And with the right mindset and building blocks in place, M&D leaders can change the industry for good.

4 steps toward advancing your CE and sustainability strategy

Isaac Sacolick, president and founder of StarCIO, offered four ways to build and transform your organization to meet today's requirements for the Circular Economy and sustainability.

1. A transformational mindset
"You need people who are willing to ask questions and ask: Why are we doing things this way? A lot of manufacturers that I work with think: 'We have sustainable margins and a steady income; we are doing well'. But you need to create a culture that continues to challenge what you're doing. For example, consider the processes, the reasoning, where the materials are coming from, and how transparency is being built in."

2. Generate more data
"I work with organizational leaders who say: 'I only want to measure things that come into and go out of the factory floor.' They don't look at what's happening in the middle. That's understandable; it's hard to get data out of a system and correlate it. IT or business leaders tend to rely on the floor manager to verbally give them the information. But you really need data. It's data that runs businesses and gives you flexibility and agility."

3. Embed IoT
"When I think about innovation in manufacturing and distribution, I think about IoT. What happens when I stick data and devices into my processes? It's going to make the business more efficient and smarter, giving you more information about shelf life, for example."

4. Choose tech that enables efficiency and innovation
"To become more focused on the Circular Economy and sustainability, adopt technology platforms that enable efficiency and innovation. Seek building blocks that make your processes more nimble, open, agile."

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