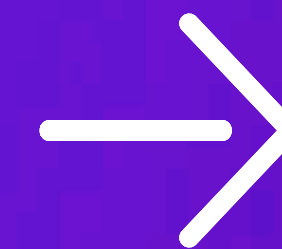


MANUFACTURING A SUSTAINABLE FUTURE



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AUTHOR

Jonas Vestlund, *Consulting Director, Government & Manufacturing*

INTRODUCTION AND DEMOGRAPHICS

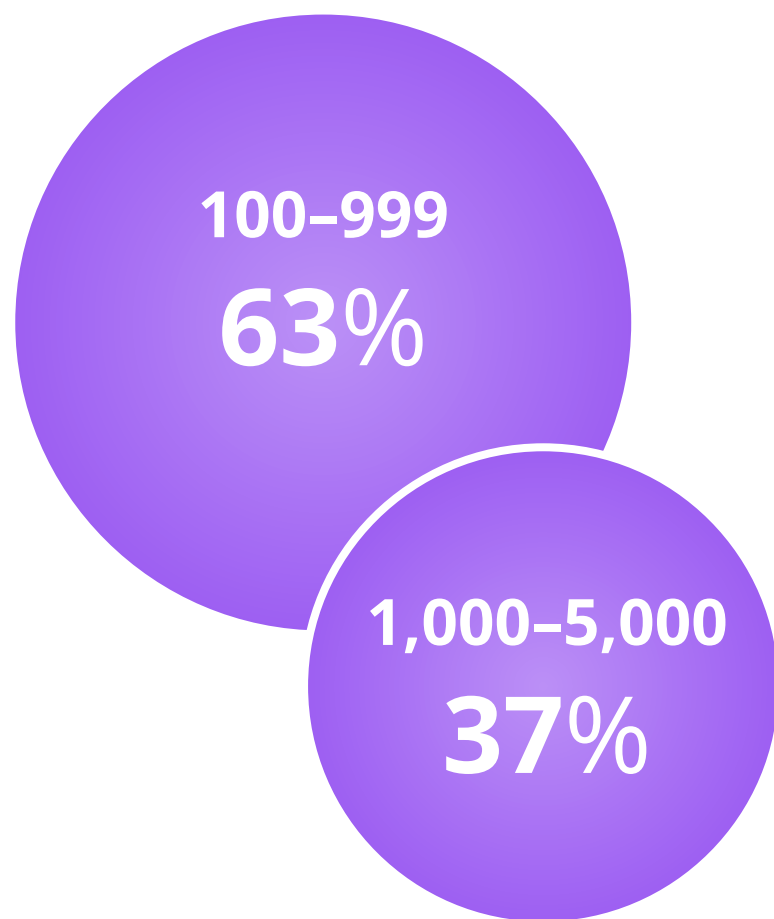
IN 2021, IFS AND OMDIA CONDUCTED AN ONLINE SURVEY WITH MANUFACTURING COMPANIES TO BETTER UNDERSTAND INDUSTRY VIEWS AND IDEAS AROUND SUSTAINABILITY AND THE CONCEPT OF THE CIRCULAR ECONOMY.

In total, the survey targeted **117** respondents using the following segmentation:

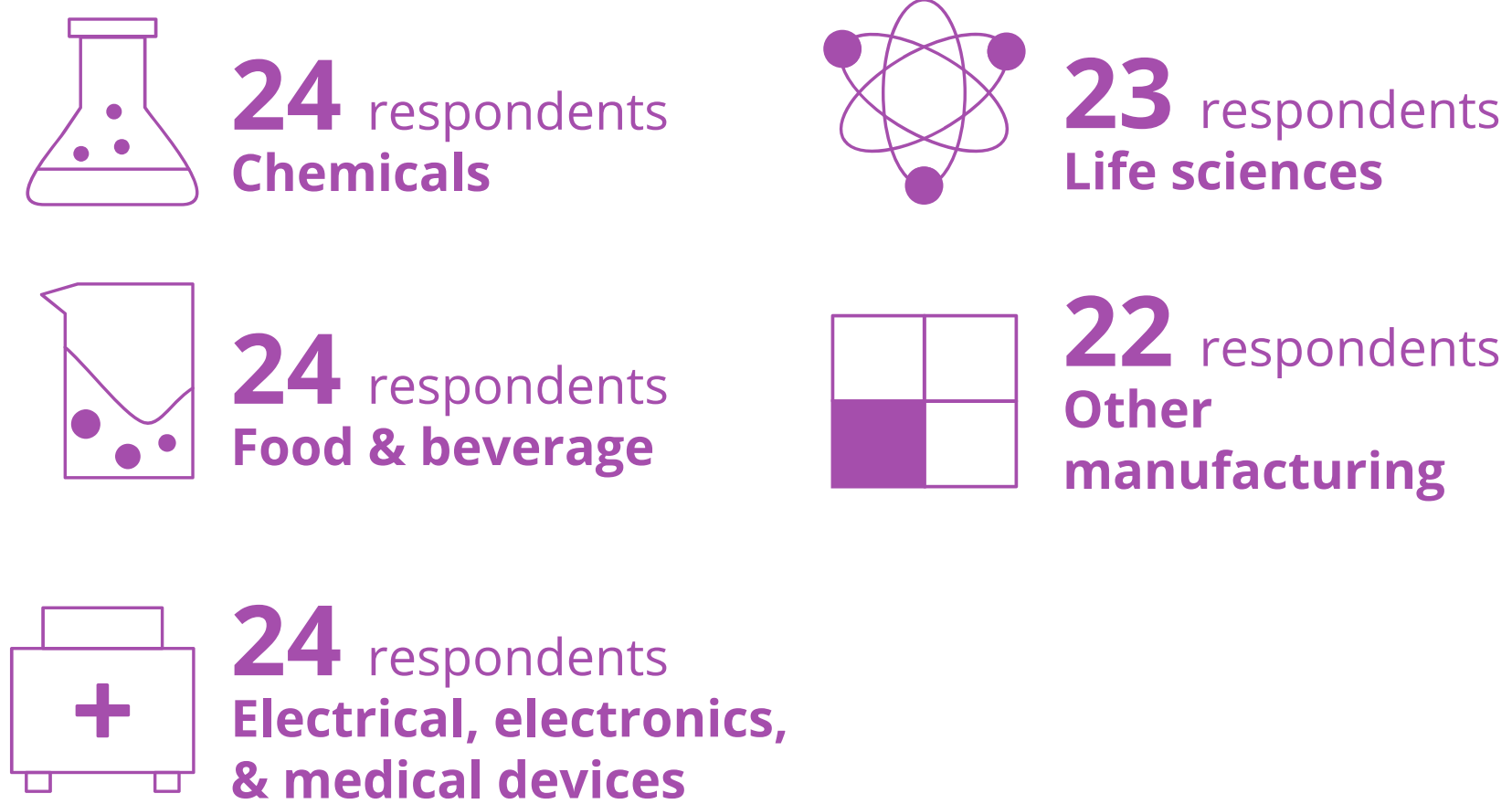
BY REGION



BY COMPANY SIZE



BY INDUSTRY SECTOR



EXECUTIVE SUMMARY

1

Manufacturing impact on the environment

- In 2020, 35 billion tonnes of carbon dioxide emissions were produced; one-third was from manufacturing and construction.
- Less than 10% of industrial energy consumption is from renewable energy sources.

2

Sustainability investment drivers and barriers

- Environmental responsibility is the most important driver of sustainability investment. Other key factors for investment include regulatory compliance, business risk, and financial incentives and tax reductions.
- The most important investment restraints are organizational barriers / no centralized responsibility, legacy assets and infrastructure, and perceived upfront cost.

3

Sustainability implementation status

- Areas where companies are currently focusing their sustainability initiatives are:
 - Waste and water treatment processes (43%)
 - Tracking/reducing carbon emissions across supply chain operations (40%)
 - Tracking/reducing carbon for internal operations (38%)

4

The case for the circular economy

- Manufacturing companies see clear benefits to the circular economy concept across business functions such as marketing/sales and product development.
- The most important benefits a circular economy model will deliver are the support of a sustainable strategy, increased customer engagement, and improved environmental protection.

¹ Martinich, J., Crimmins, A. (2019) "Climate damages and adaptation potential across diverse sectors of the United States," Nat. Clim. Chang. 9:397-404, www.nature.com/articles/s41558-019-0444-6

² UNFCCC (2019) "International Labour Organization Warns of Heat-Related Job Losses," unfccc.int/news/international-labour-organization-warns-of-heat-related-job-losses

THE SUSTAINABILITY CHALLENGE FOR MANUFACTURING

Aside from the environmental damage associated with climate change, it can also be a serious threat to society and the global economy. The UN's International Labour Organization has reported that 80 million jobs would be at risk if rising temperature predictions materialize, with productivity affected by challenging working environments.¹ Another study shows that the US alone could lose \$520bn across 22 sectors as a result of the impact of global temperature rises on labor, extreme-temperature mortality, and coastal property.²

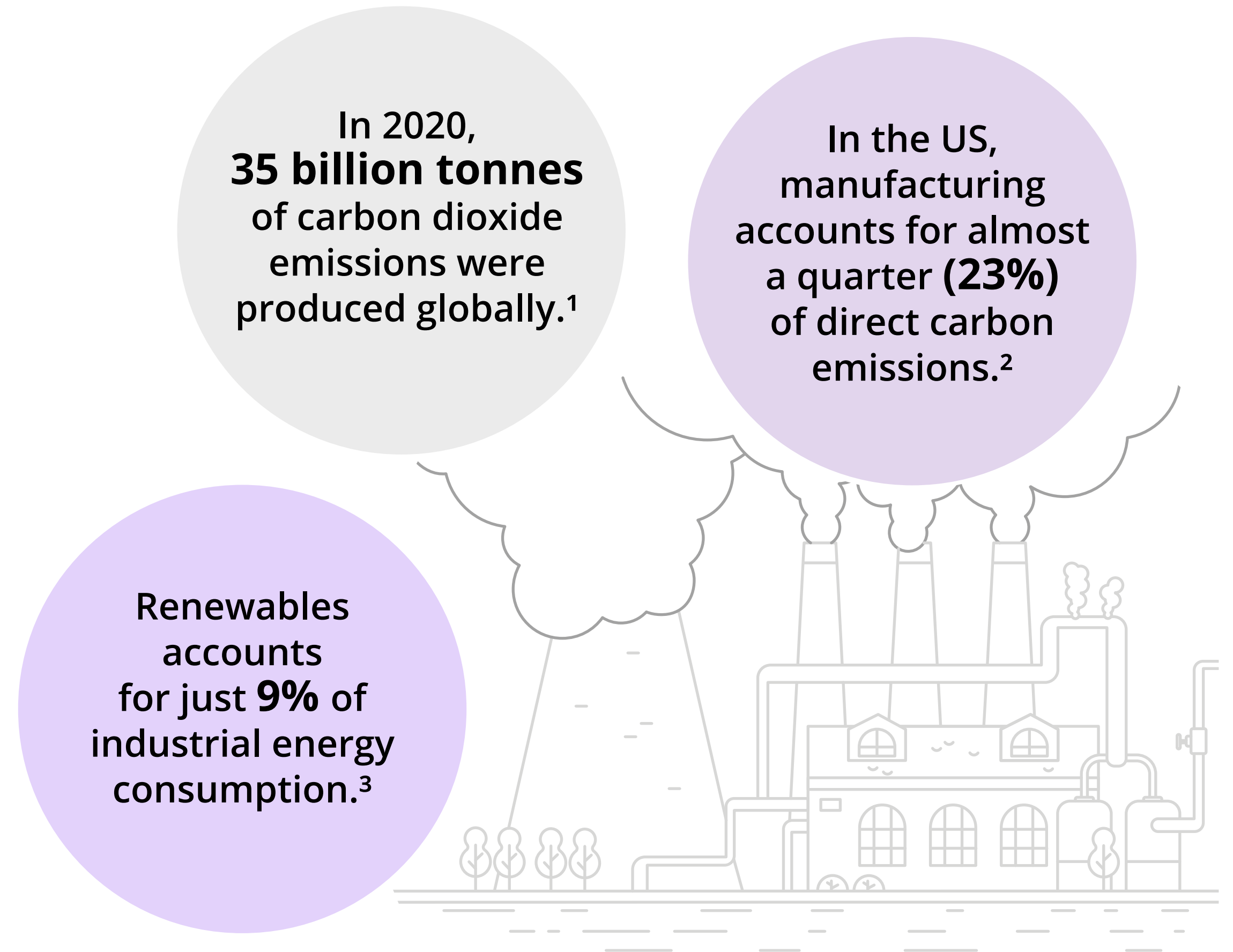
There is a growing acceptance that governments cannot address global warming targets without the input of the private sector, which means there will be increased pressure on businesses and corporations to adopt new environmental practices. Manufacturers will need to address risks and costs associated with the introduction of policy, laws, and other regulations while managing the liability arising from a failure to mitigate risks or comply with changes to legal and regulatory expectations.

¹ Global Carbon Project 2021 (via ICOS) (2021) "Global Carbon Emissions," www.co2.earth/global-co2-emissions

² EPA, "Sources of Greenhouse Gas Emissions," www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

³ US Energy Information Administration, "Use of energy explained," www.eia.gov/energyexplained/use-of-energy/industry.php

Did you know?



INVESTMENT DRIVERS AND BARRIERS

DRIVERS FOR SUSTAINABILITY INVESTMENT

Companies highlight *environmental responsibility* as the most frequently mentioned key driver to investment (ranked top-five by 56% of respondents). Investment drivers ranked number one by most respondents are as follows:

- Regulatory compliance (18%)
- Business risk (15%)
- Financial incentives and tax reductions (15%)

Regulatory compliance and business risk.

Notably, regulatory compliance and business risk are both highlighted as critically important. Companies and nations have faced legal action as a result of reported delays, deceptive marketing, or insufficient efforts in addressing their environmental impact and commitment. Furthermore, not only does compliance indicate commitment to certain sustainability outcomes, but it also informs an organization's ability

and eligibility to do business in a sustainable way with channel players and customers. The ability to monitor, measure, and report will be a key component of companies' efforts to reduce environmental impact. Many industrial companies, besides not knowing the energy usage of assets, often do not have a clear understanding of assets deployed. Even when they do, there is limited information on asset health, let alone data on its environmental impact.

Financial incentives and tax reductions.

With environmental issues high on the global agenda, governments are directly targeting businesses in their drive toward sustainability. Incentives and penalties are being introduced both regionally and domestically, creating a challenging landscape with which businesses must contend. The tax and finance function can play a major strategic role in the broader business by helping to reduce risk and make the most of opportunity.

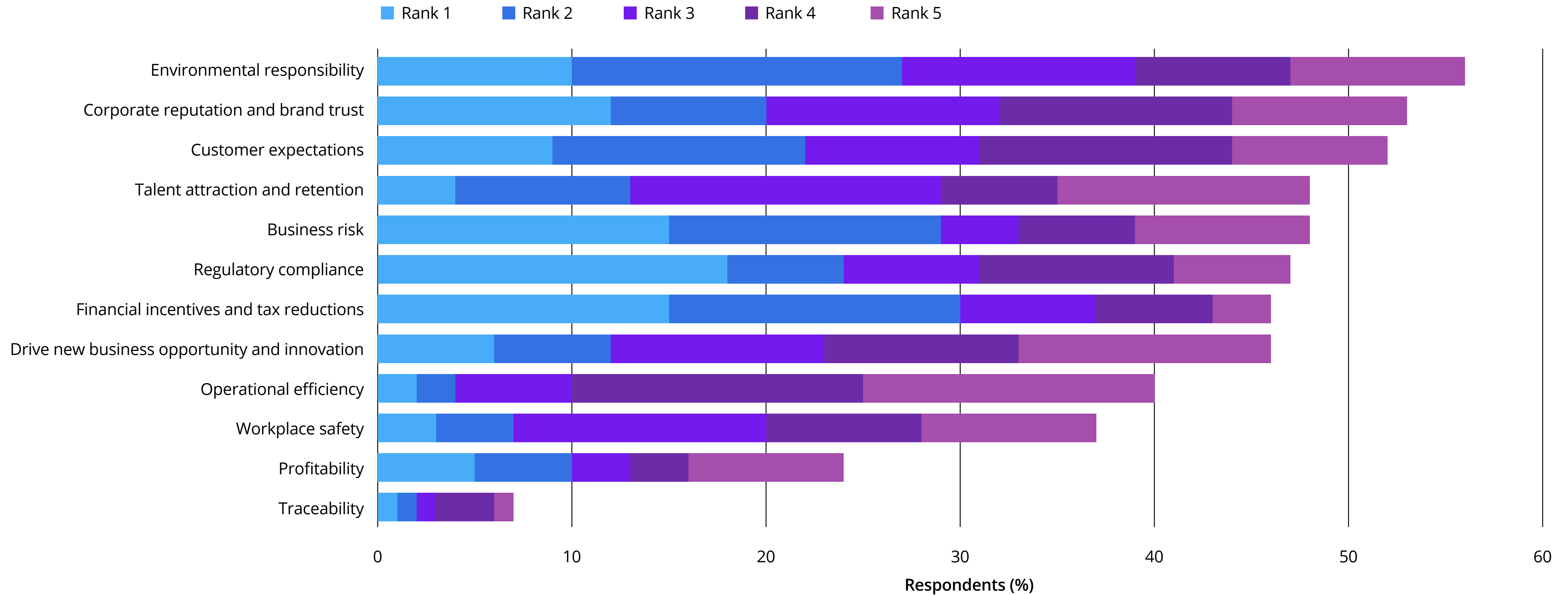
There are two important wide-scale factors that are influencing governments' actions;

Signed in 2016, the Paris Agreement forms part of the United Nations Framework Convention on Climate Change (UNFCCC). As of May 2021, 197 jurisdictions had signed on to its terms, which include limiting global warming to below 2°C higher than preindustrial levels, and preferably to 1.5°C.

The second factor is the impact of COVID-19. Some economies and governments are looking at the pandemic as an opportunity to hit the reset button on the environment with some jurisdictions having added investments in climate and environment to their COVID-19 recovery packages. Business sentiment also indicates that the pandemic may drive an investment shift toward environmentally sustainable businesses.¹

¹ BBC News (2021) "Blackrock chief: 'How Covid could help save the planet'," www.bbc.com/news/business-55811332

Rank the driving factors for sustainability initiatives in your organization (rank top five, where 1=top driver)



Note: n=117
Source: Omdia

BARRIERS TO SUSTAINABILITY INVESTMENT

Manufacturers looking to transition to a more environmentally sustainable approach must address a variety of challenges that include processes, people, and products. According to our survey, the most important barriers to investment in sustainability are the following:

- Organizational barriers / no centralized responsibility (21%)
- Legacy assets and infrastructure (18%)
- Upfront cost (17%)

Organizational barriers / no centralized responsibility. There is growing awareness and acceptance of sustainability's importance in the C-suite. Indeed, chief sustainability officer (CSO) positions are being implemented to drive sustainability strategy and assume broader social responsibilities. However, beyond the introduction of executive-level positions, the success of initiatives will also depend on how well technologies and new approaches to change management can be executed across the organization. Sustainability needs to be

built into an organization's DNA to encourage and enable employees to support corporate sustainability efforts without being constrained by organizational barriers.

Legacy assets and infrastructure. Many manufacturing companies have fleets of aging assets, infrastructure, and processes that are not easily or inexpensively upgraded. These are often less efficient than newer products, but the cost and impact of upgrading these assets can be difficult to justify. With the rate of replacement of some pieces of equipment measured in decades, dealing with upgrading processes and products is a considerable task.

Upfront cost. There is a perception that sustainability initiatives incur an upfront cost. This is considered a barrier and does not align well with pressures for short-term earnings performance. Often, sustainability efforts must compete directly with other investment demands, which means that the ability to show

financial impact and ROI for sustainability investment remains important.

Nevertheless, the benefits and potential cost savings over time of investing in sustainability initiatives are evident and supportive of reductions in waste, energy, and water:

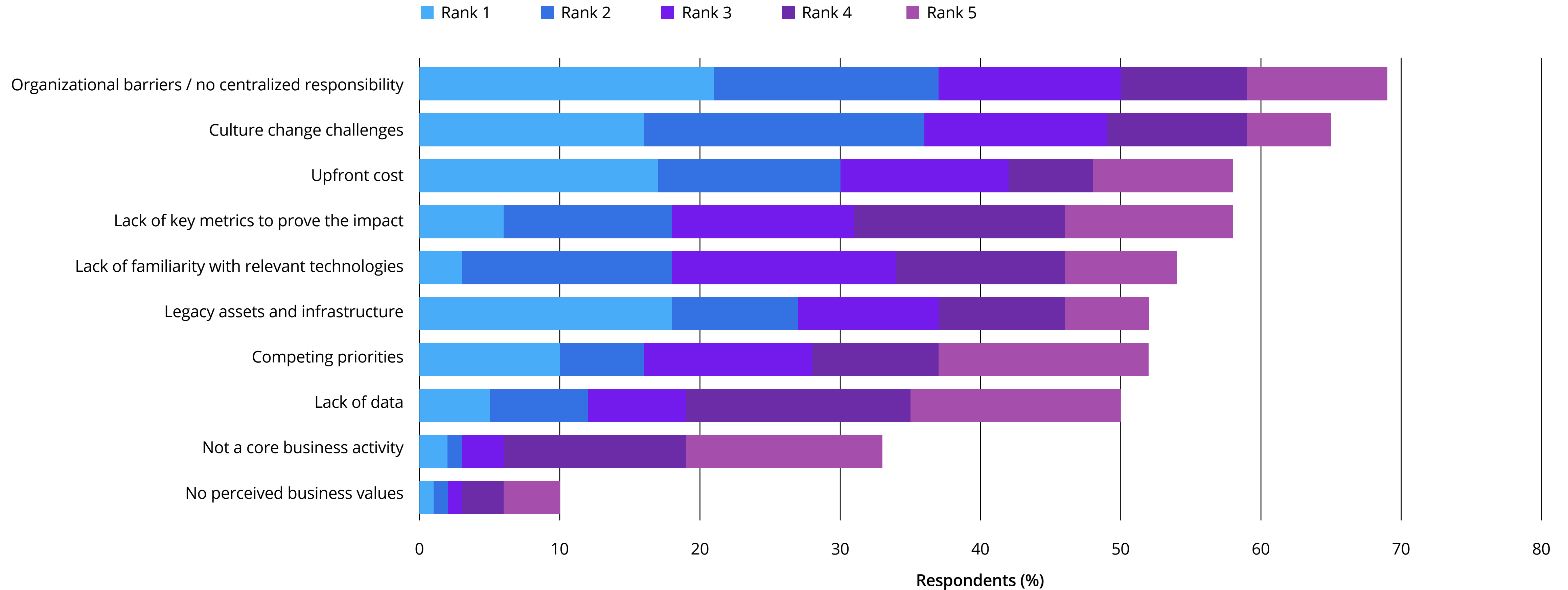
- Unilever claims that by incorporating sustainability in its operations, it has avoided costs in excess of \$800m through energy savings, \$125m in water efficiency, and \$250m through waste management in its factories over the past 10 years.¹
- In the automotive industry, sustainability generates material cost savings:
 - Fourteen percent decrease in waste generated per car produced over the last 10 years²
 - Twenty percent reduction in energy for Daimler Chrysler to paint its cars³

¹ <https://www.unilever.com>

² ACEA, "Environmental impact of car production strongly reduced over last decade" (2018) www.acea.auto/press-release-ec/environmental-impact-of-car-production-strongly-reduced-over-last-decade/

³ Automotive Crossing, "Environmental Sustainability: How it Affects the Auto Industry," www.automotivecrossing.com/article/1250005/Environmental-Sustainability-How-it-Affects-the-Auto-Industry/

Rank the leading barriers to investment in sustainability initiatives at your company (rank top five, where 1=top barrier)



Note: n=117
Source: Omdia

IMPLEMENTATION STATUS OF SUSTAINABILITY PROJECTS IN MANUFACTURING

Although considerable progress on environmental sustainability has been made to date, much more remains to be done, particularly if organizations hope to meet the time limits set for achieving net-zero outcomes.

Areas that have been prioritized by manufacturers to date include waste and water treatment and carbon emission tracking. Early investments have been driven by regulations on water use and disposal (e.g., US Clean Water Act, EU Water Framework Directive, EU Urban Waste Water Directive). More-recently introduced regulations on industrial emissions (US Clean Air Act, EU Industrial Emissions Directive) have also had a positive impact in encouraging companies to prioritize investment in technologies supporting the monitoring of carbon emissions. The urgency of the need for an action plan is evident given that emissions from the industry sector account for around 20% of total carbon emissions in the US and EU.

Areas showing most maturity:

We have already implemented sustainability projects¹

- Waste and water treatment processes (43%)
- Tracking/reducing carbon emissions across supply chain operations (40%)
- Tracking/reducing carbon for internal operations (38%)

Over the next few years, manufacturing companies will increasingly focus on implementing sustainable business models. Whereas traditional business models aim to create value for shareholders, often at the expense of other stakeholders, sustainable businesses are redefining the corporate ecosystem by designing models that create value for all stakeholders, including employees, shareholders, and supply chains, while also increasing environmental and social benefits.

Areas showing most maturity:

We will implement these sustainability projects in two to three years¹

- Sustainable business models (58%)
- Design and simulation (46%)
- Tracking/reducing carbon emissions across supply chain (43%)

Respondents also highlight the importance over the short to medium term of sustainable materials and packaging as investment areas. Large amounts of packaging produced today cannot be recycled in existing recycling systems. This is especially true for multimaterial packaging, which poses a significant and unresolved challenge in recycling. Consequently, widespread use of disposable packaging containers has resulted in a significant impact on the environment, and the management of packaging waste is facing increased challenges. Indeed, regulatory and public concerns around disposable packaging waste is driving major changes

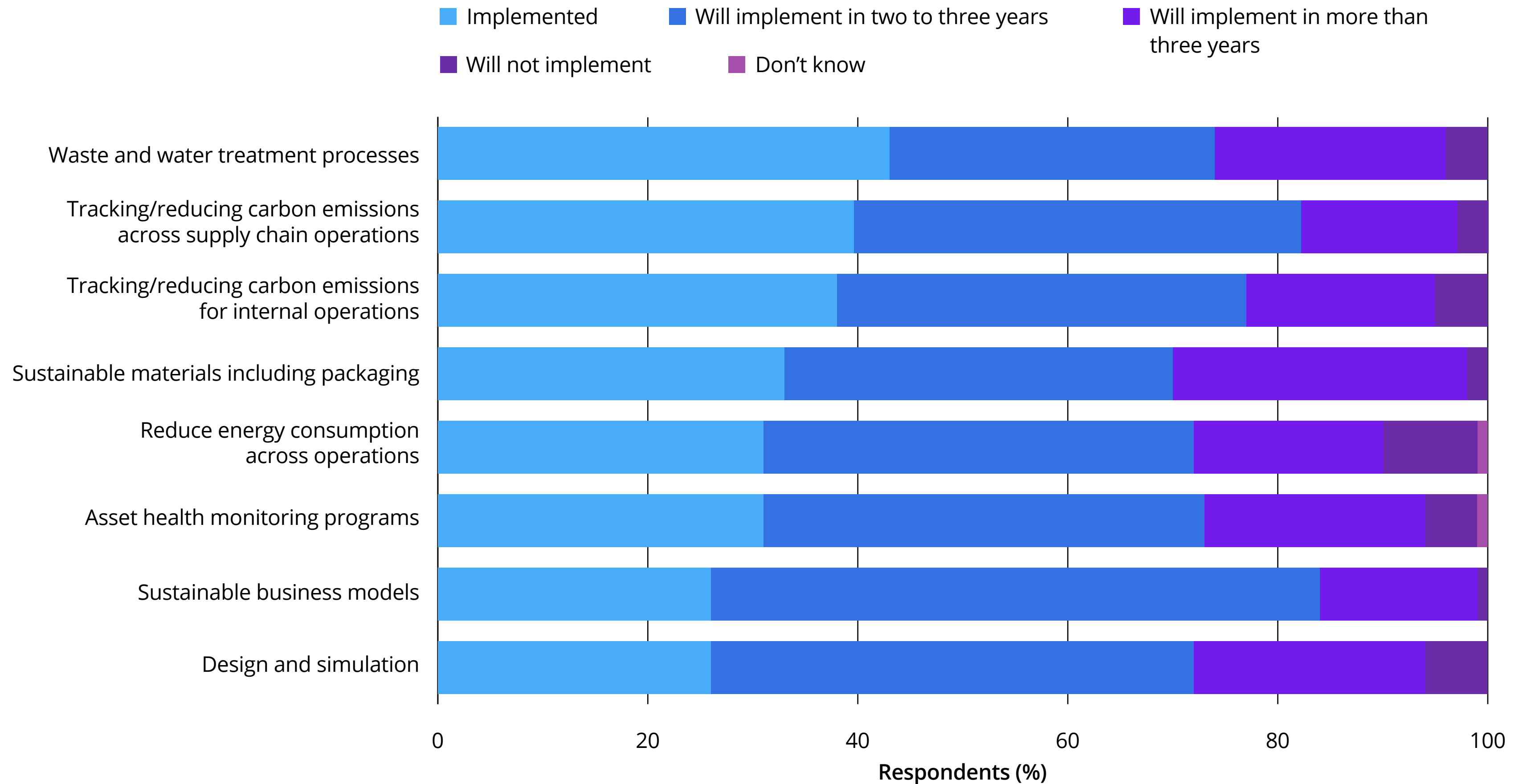
¹ Q: What is the implementation status of the following sustainability projects at your company?

in packaged goods. Regulators are tightening legislation on the issue, and many businesses including CPG are increasingly looking to commit to both improving the sustainability of their packaging and fundamentally rethinking their packaging systems.

Areas showing most maturity:
 We will implement these sustainability projects in more than three years¹

- Sustainable materials including packaging (28%)
- Waste and water treatment process (22%)
- Design and simulation (22%)

What is the implementation status of the following sustainability projects at your company?



¹ Q: What is the implementation status of the following sustainability projects at your company?

Note: n=117
 Source: Omdia

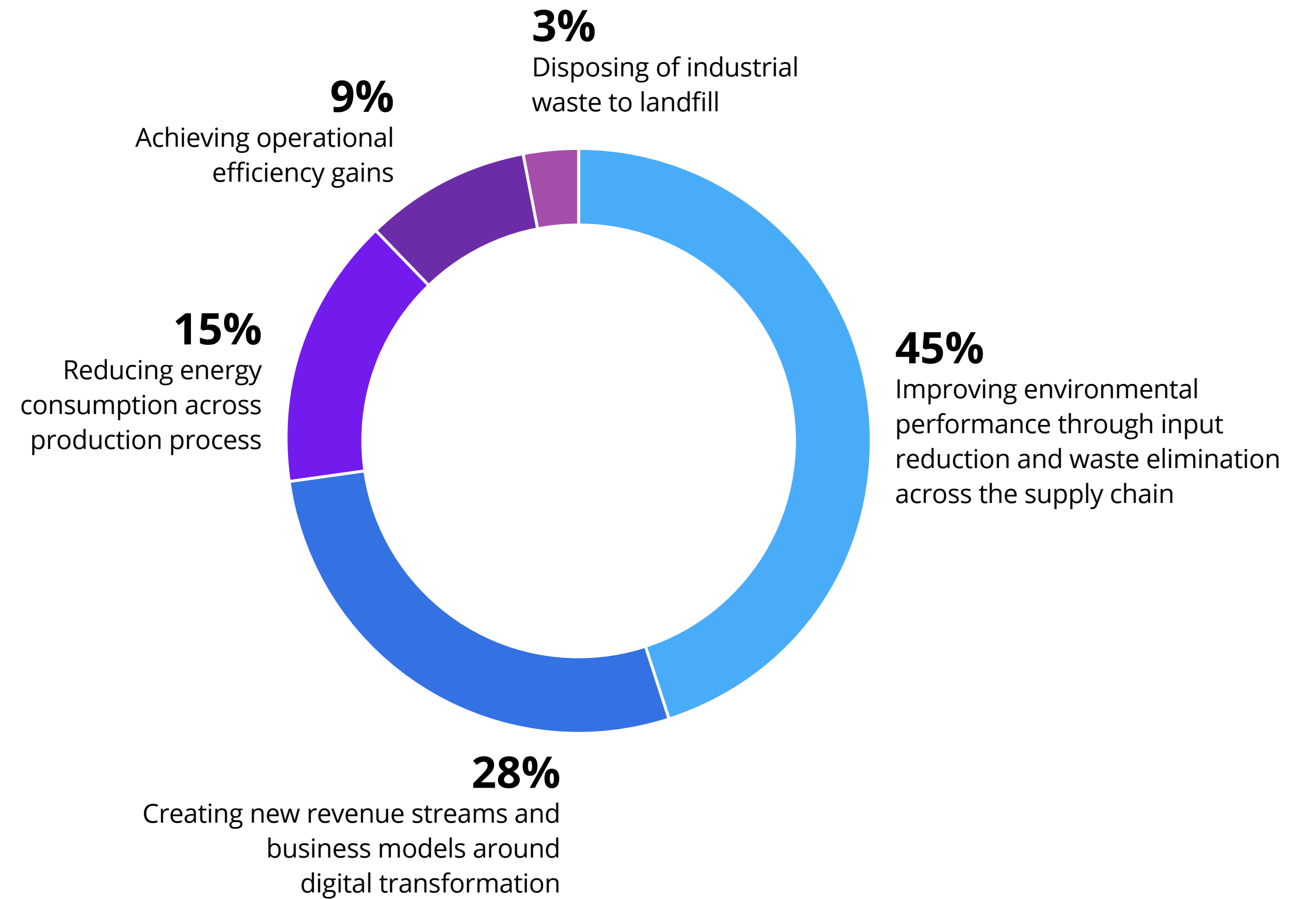
THE CASE FOR CIRCULAR ECONOMY

WHAT IS CIRCULAR ECONOMY?

- Improving environmental performance through input reduction and waste elimination across the supply chain is at the core of the circular economy concept (45% of respondents). For those companies just at the start of adopting circular economy, it can start with small steps toward replacing existing materials with more sustainable and economically viable alternatives. For companies that are further along the journey, it is increasingly moving away from a sustainability strategy driven by a specific function within the company and toward setting out company- and supply-chain driven ambitions and commitments.
- Traditional business models developed and employed to be successful in the linear economy will likely not be viable in an economy with scarce natural resources and increased costs for environmental and social impact. A significant share (28%) of respondents see the creation of revenue streams and business models as a key element of circular economy, because this opens opportunities to organize business activities to deliver value from resource-efficient and circular resource flows to the market.

EMF and McKinsey estimate that circular economy could potentially increase Europe’s resource productivity by up to 3% per year, generating a primary net resource benefit of €0.6tn and €1.2tn annually in nonresource and externality benefits by 2030. In terms of emissions, it may lead to a reduction of 48% in CO2 emissions in 2030 and up to 83% in 2050.¹

Which best reflect your understanding of what the circular economy is focused on?

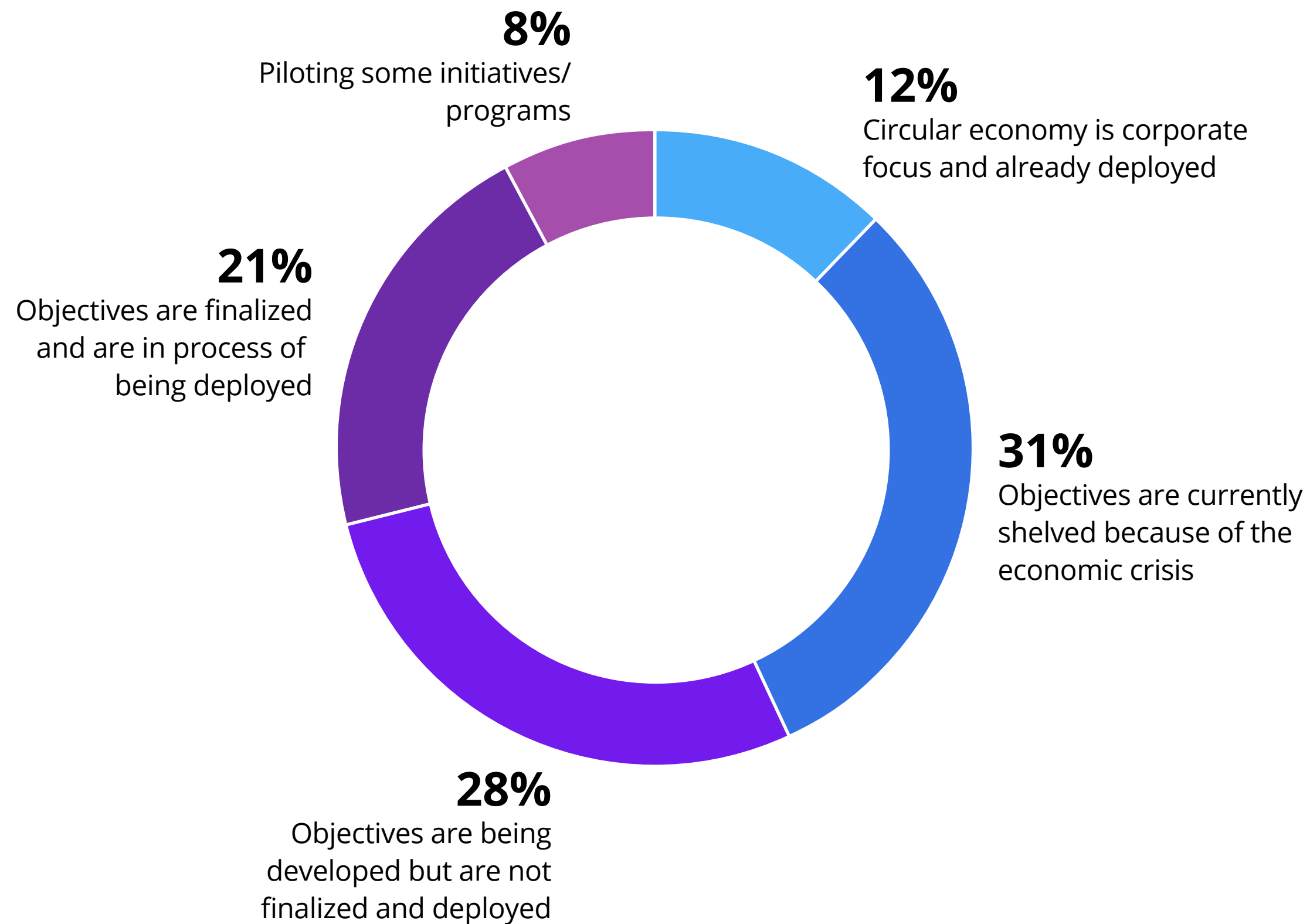


Source: Omdia

¹ EMF and McKinsey (2015) “Growth within: a circular economy vision for a competitive Europe,” Ellen MacArthur Foundation and McKinsey Center for Business and Environment

STATUS OF COMPANY INVESTMENT IN CIRCULAR ECONOMY TODAY

Which best describes your company's focus on investing in circular economy programs?



- Only 12% of respondents highlighted that circular economy is a corporate focus and is already deployed. Nevertheless, circular economy is growing in focus among manufacturers, with 80% of respondents either in the process of piloting circular economy initiatives, having finalized circular economy objectives, or in the process of developing objectives around circular economy.
- Innovation is central to circular economy, and it can both drive and facilitate implementation. In order to enable the transition from a linear to a circular approach, companies will need to rethink and innovate their business models and how they add value to customers.

Source: Omdia

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Hinrika Droege, Andrea Raggi, and Tomás B. Ramos, "Overcoming Current Challenges for Circular Economy Assessment Implementation in Public Sector Organisations," *Sustainability* 2021; 13(3):1182, <https://doi.org/10.3390/su13031182>

SUPPORTING A SUSTAINABLE STRATEGY

- The circular economy model is one part of a company's sustainability program and is perceived as important in supporting the company's sustainability strategy.
- Circular economy is also perceived as an important process that supports companies in improving environmental protection while offering a positive contribution toward customer engagement. Indeed, understanding the customer value of circular economy is crucial, not just in terms of the economic aspect but also of other dimensions such as emotional value (e.g., positive attitudes or feelings toward sustainable businesses or products) or functional value in terms of more resource efficient functions and practices).
- The most significant benefits a circular economy model will deliver for an organization are seen as¹
 - Support sustainable strategy (78%)
 - Increase customer engagement (74%)
 - Improve environmental protection (74%)

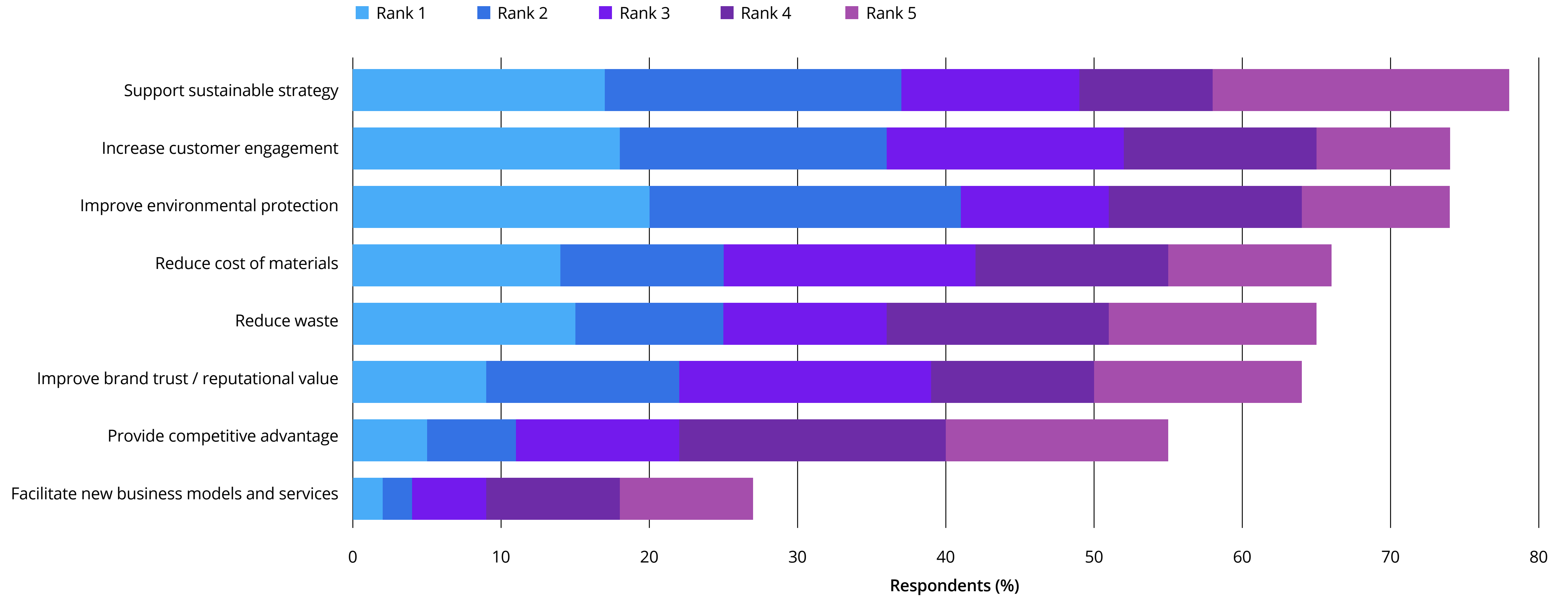


Source: Omdia

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¹ Q: Rank the benefits a circular economy model will deliver for your organization

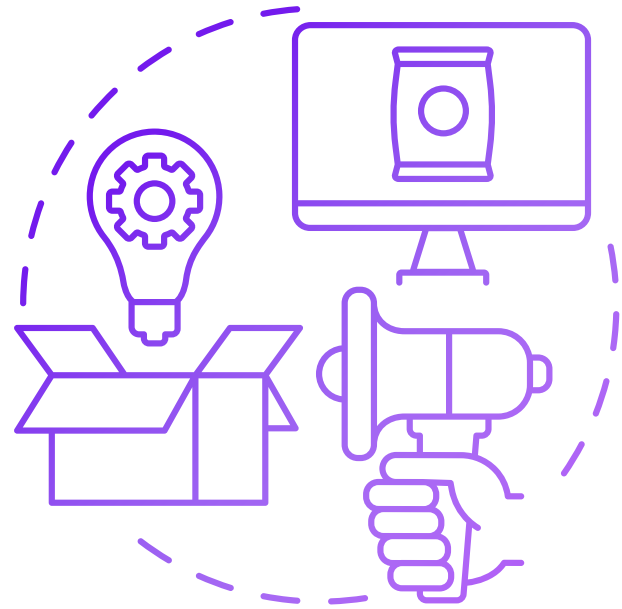
Rank the benefits a circular economy model will deliver for your organization (rank top five, where 1=highest benefit)



Note: n=117
Source: Omdia

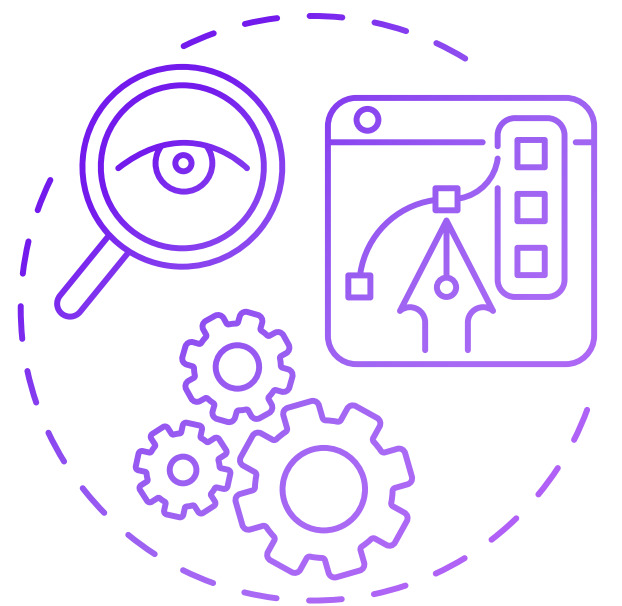
BUSINESS AREAS PERCEIVED TO BEST SUPPORT A CIRCULAR ECONOMY

BUSINESS MODEL



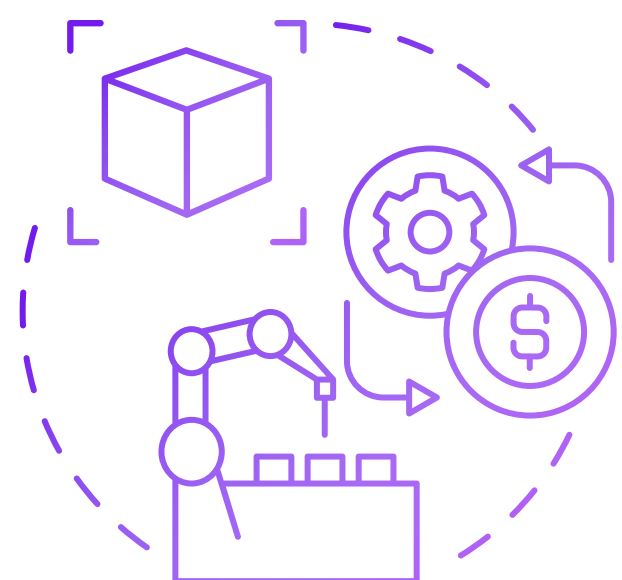
Marketing/sales

Respondents see clear benefits of circular economy in driving value in marketing/sales. With heightened customer awareness and demand for more sustainable products and solutions, circular economy will play an increasingly important role in the buying decision process. The introduction of circular economy also opens new ways of consuming goods and services while effectively strengthening the relationship between producer and consumer. From a marketing perspective, it will be critically important to educate consumers about the benefits of circular economy in order to boost demand for circular economy industry investment, particularly in the short term.



Product development

Decisions made in the design phase of manufacturing strongly influence the use and after-use phases of a product's life. A product design strategy will need to address how to provide value to consumers by using the minimum amount of material and keeping products and materials in use. Consequently, the focus of product development is on improving resource efficiency as well as considering new services and business models that contribute to the adaptability of the product and extend its shelf life.



Manufacturing

Manufacturing is also perceived to have a great impact on the circular economy. Notably, materials usage can constitute up to 45% of total production cost: a reduction in materials use would therefore have a direct impact on savings. Further savings can also be achieved through reducing waste and energy and through operating the production process more effectively and in a sustainable manner.

CASE STUDIES

HOLLAND CFL GROUP

Following the merger of Dutch companies Itho and Daalderop in 2010, the group's management took a bold strategic decision to change direction. "We realized our mission was really about creating a more comfortable, healthier, and energy-efficient indoor climate for everyone," says Kerst Algera, operations director. "We wanted to see how we could redirect our expertise in traditional domestic heating and ventilation systems toward reducing CO2 emissions and making homes more energy neutral."

A four-point strategic plan emerged: begin transitioning from producing gas condensing boilers to heat pumps, develop products and services that reduced emissions, make the company's production processes as energy neutral as possible, and make all new products increasingly recyclable. The strategy was cemented by a commitment to only develop new products and services that served a new mission tagline for the group: "Climate for life." As a result, Itho Daalderop became the first company to develop systems to deliver and control a complete, integrated offer for indoor climate spanning heating, ventilation, cooling, and domestic hot water.

"In Holland, new-build houses are generally energy neutral, but the real challenge now will be developing viable solutions to adapt existing dwellings to achieve energy-neutral housing Europe-wide by the 2050 target," says Algera.



https://info.ifs.com/rs/782-QCG-656/images/IFS_changeforgoodwinners_climateforlife.pdf

CASE STUDIES

ECO SPINDLES

Sri Lanka generates 2.62 million tons of plastic waste per year. Of this, 82% is mismanaged or inadequately disposed of and ends up in rivers and waterways, according to UNDP Sri Lanka. Sri Lanka is also among the top five sources of plastic bags, bottles, and other rubbish polluting global waters.

Faced with a compelling environmental and business case, in 2018 Eco Spindles launched Sri Lanka's first ever polyester yarn plant. "As a group, our single-minded mission is simple: to reduce the carbon footprint we make on our world," explains MD Anush Amarasinghe. "To do this, we have embarked on a holistic strategy that spans both collection and advanced processing of waste PET bottles, allowing manufacture of value-added products using the recycled plastic we recover."

Eco Spindles' parent company BPPL currently recycles just over 15% of the 15,000 tons per year of PET imported by Sri Lanka, with a goal of increasing this to 26% over the next three years. Polypropylene from bottle lids and fabric offcuts are also in the company's sights for future recycling projects, providing material for tire and glove products. In addition to its own biomass power plant and a solar plant generating electricity, two further solar power plants are currently under construction. Together, these will provide approximately 50% of the group's power requirements for production.



https://info.ifs.com/rs/782-QCG-656/images/IFS_changeforgoodwinners_Eco%20Spindles.pdf

CONCLUSION

RECOMMENDATIONS FOR MANUFACTURERS



Commit to the future. The need for action on climate change is becoming increasingly urgent. Consequently, investment in sustainability and responsible business practices now constitutes a requirement rather than an option. Therefore, be ready to accept the short-term pain and cost of initiatives for the sake of long-term success.

Have a data-led approach. Collect data to measure your performance for metrics such as energy usage, material consumption, and waste across different parts of your process and products. This will highlight the main contributors to your carbon footprint and will enable the tracking of improvements and developments to targets.

Break down internal barriers. Develop sustainability goals that are strategically integrated across business functions, and review how to connect solutions and systems that may currently be unconnected or siloed.

Consider return on value rather than return on investment. With industrial sustainability projects still relatively new in many cases, the benefits that can be realized by the business will continue to evolve over time and will extend beyond direct returns to intangibles such as brand management, adherence to future legislations, lower insurance costs, and so on.

Hold your ecosystem to account. The footprint of a company's supply chain, including upstream purchase of goods and downstream usage by customers, will need to be considered. Manufacturers will increasingly be held accountable for the sustainability credentials of the companies they choose to partner with. A review of partners' plans and their commitment to sustainability (and their ability to report on it) is needed to ensure alignment. Companies should also be ready to share data with partners in the creation of sustainable ecosystems.

Communicate your vision (internally and externally). Initiatives should have C-suite backing and need to be supported by the communication of a clear vision of goals and activities and the soliciting of buy-in from the workforce and from business partners. This is both for the success of project deployments and to encourage employee feedback and suggestions for other plans and improvements.



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