EXECUTIVE INSIGHTS

To Make Products More Sustainable, Incorporate Sustainability Fully Into R&D

Introduction

There is general agreement that sustainability is an essential consideration in research and development (R&D).

However, too many organizations fall short of what they might achieve had they fully integrated sustainability into the R&D process.

In many cases, companies incorporate sustainability into R&D largely at the level of the choice of tangible inputs. That falls well short of the bigger opportunity — which is to take advantage of the blank slate nature of R&D and build sustainability into the design process itself.

The upside opportunity — the opportunity to have a significant positive environmental impact instead of treating sustainability merely as a consideration — is striking. According to the U.S. Environmental Protection Agency, 70%-80% of a product's environmental impact is determined during the research and development phase.

For leaders and organizations, there are multiple reasons to act on this opportunity — reasons that include but also go beyond environmental impact.

- **Financial upsides:** There are significant financial upsides to a focus on sustainability, including the ability to raise capital and opportunities to collect premiums for differentiated products
- **Operational improvements:** Products designed for sustainability typically incorporate operational and cost efficiencies

- **Differentiation:** Organizations that focus holistically on sustainability have the potential to improve their environmental, social and governance (ESG) ratings; high ESG ratings are increasingly in demand in the value chain and are increasingly a source of competitive advantage
- **Attractive business fundamentals:** By designing for sustainability, organizations can have a greater impact on their reputation, their sustainability metrics and performance, and the quality of their products

Therefore, it is crucial to broaden the scope of sustainability and **better integrate it into the R&D phase of product development**, rather than addressing it as an afterthought.

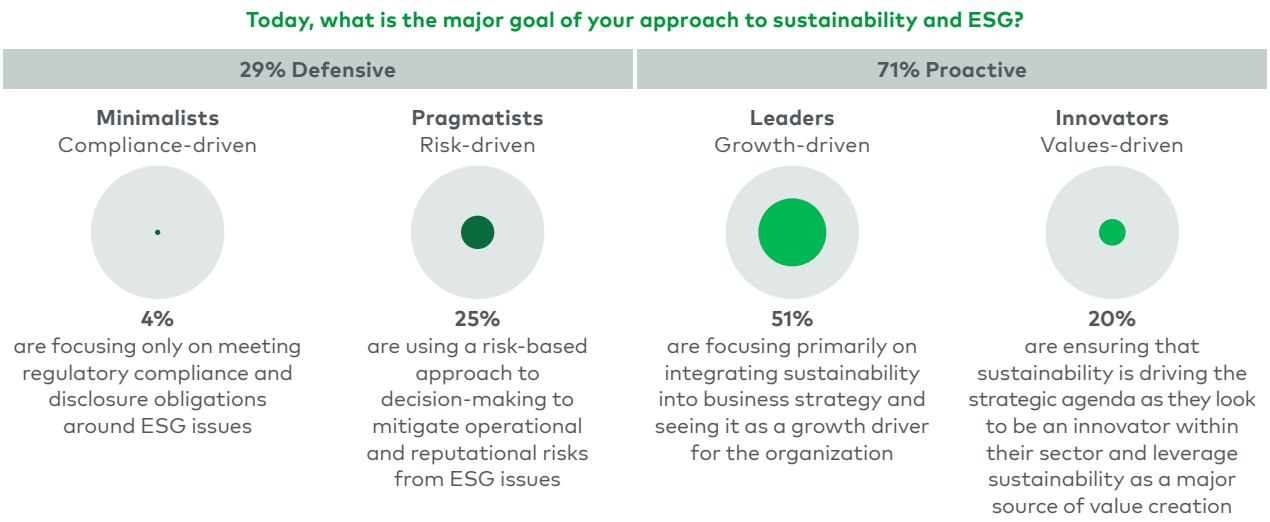
To accomplish this, leading organizations are taking steps to ensure that sustainability — along with features, performance and cost — is a central design goal from project inception. Those that do not integrate sustainability are at risk of falling behind.

Sustainability is a major priority for organizations — R&D will play a critical role

Leaders and organizations are increasingly focused on sustainability and see it as essential to strategy.

According to the 2022 L.E.K. Global Corporate Sustainability Survey of 400 C-suite and senior executives of organizations around the world,[1] 71% of companies are taking a proactive approach to sustainability and 51% are focused on sustainability as a growth driver, but only **20%** report that they are currently taking an **innovation-led approach to sustainability** (see Figure 1).

Figure 1
Executive responses to L.E.K. Consulting's Global Corporate Sustainability Survey (2022)



Note: ESG=environmental, social and governance
L.E.K. research and analysis

Multiple factors are driving the increased corporate focus on sustainability:

- **Stakeholder pressure and reputational upside:** Fifty-nine percent of the executives surveyed said customers and employees are putting increasing pressure on companies to do more on ESG issues.
- **Investor pressure:** Eighty-seven percent feel pressure from investors to increase ESG reporting. Forty-nine percent feel that an advantage of tying executive pay to ESG goals is showing investors they are focused on meeting ESG expectations.
- **Regulatory pressure:** Regulatory scrutiny on the sustainability practices of companies is increasing significantly globally; products and services of companies are part of the scope.
- **Performance:** The survey found that "organizations today see a strong sustainability strategy and ESG program as a growth and innovation play — focusing on the 'offense' of value creation rather than the 'defense' of compliance."
- **Consumer pressure:** Pressures from increasing consumer awareness of sustainability trends and resulting selectivity with respect to which products and services to purchase are being transmitted up the value chain.

Specific to **R&D**, there are additional critical factors to consider. One is that, as part of the drive toward sustainability, the responsibility for the emissions of a given product is being shifted from consumers to producers. A case in point: Electric vehicles require less energy, but they contain carbon-intensive rare earth materials. Emissions used in production make up the majority of their lifetime emissions.

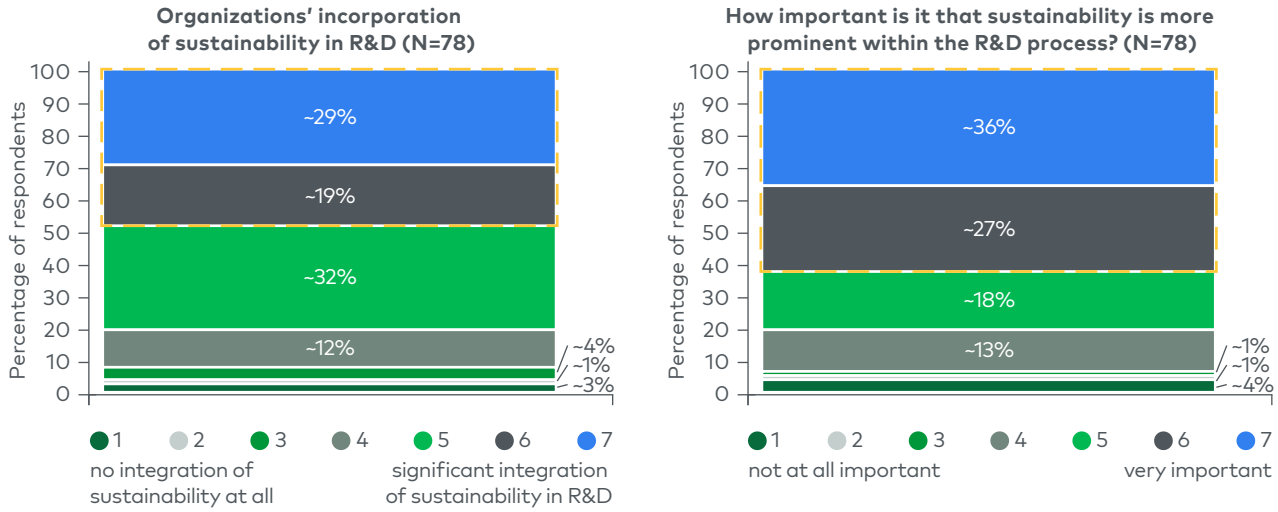
What this means in practice is that the sustainability of the entire supply and production chain is now the focus of measurement and, accordingly, of regulatory scrutiny. Scope 1 and Scope 2 (direct and indirect) emissions are already under scrutiny, and Scope 3 emissions, which include upstream and downstream emissions, are increasingly at the center of attention.

Therefore, it is not sufficient for organizations to develop products whose sole sustainability pitch is that they are more sustainable when in use. Organizations must also improve the sustainability of how they source, manufacture, distribute and sell products.

This is why R&D has emerged as an essential element of sustainability initiatives: designed-in attributes have become a central sustainability consideration.

Leaders understand and agree. In a separate L.E.K. Consulting survey of 78 professionals across multiple industries, just 48% rated their organization a 6 or 7 (on a scale of 1-7, with 7 as the highest) in their integration of sustainability in R&D. Approximately 63% reported it is important to them that sustainability is embedded within the R&D process (see Figure 2).

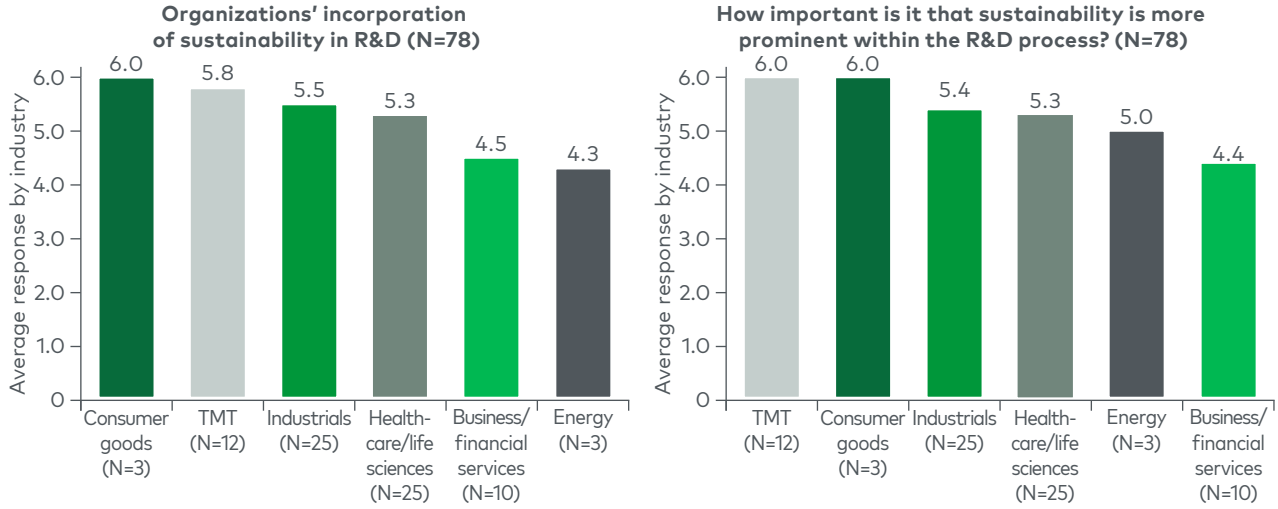
Figure 2
Integrating sustainability into R&D matters to leaders



Note: Numbers may not add to 100 due to rounding
Source: L.E.K. research and analysis

Consumer goods companies and technology, media and telecommunications (TMT) companies rated their sustainability integration the highest, closely followed by industrial companies, and the highest number of executives in those industries felt sustainability integration was most important. The energy and business/financial services sectors lagged others on both measures (see Figure 3).

Figure 3
Responses segmented by industry*



*Survey questions: How would you rate your organization with regard to pursuing sustainability within the R&D process on a scale of 1 to 7 (e.g., completing life cycle assessments, calculating related greenhouse gas emissions, using sustainable materials)? How important is it to you personally that sustainability is more prominent within the R&D process at your company on a scale of 1 to 7 (e.g., completing life cycle assessments, calculating related greenhouse gas emissions, using sustainable materials)?
Note: TMT=technology, media and telecommunications
Source: L.E.K. research and analysis

Sustainability performance can be designed in

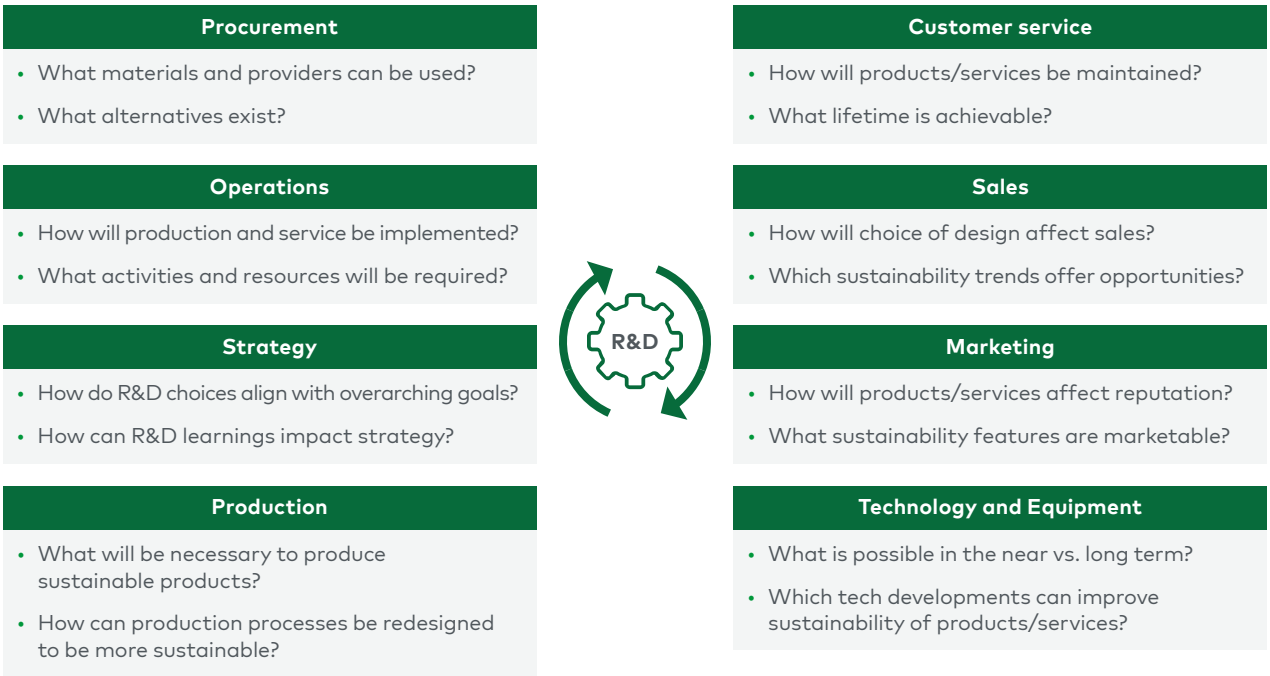
Although sustainability is important, it is difficult to implement.

The L.E.K. Global Corporate Sustainability Survey 2022 shows the difficulty of turning sustainability intentions into action. The same executives who registered a strong commitment to sustainability also reported that they struggle with implementation. Less than half of the surveyed companies (45%) have an executive team and board that are strongly aligned on ESG priorities, and almost half (47%) struggle to balance the interests of different groups, such as communities and shareholders.

Especially in R&D, successful integration of sustainability is often compromised by a fragmented approach. While it has become more common to incorporate some sustainability considerations, **sustainability is often still not incorporated holistically in R&D**.

Figure 4 illustrates the interaction of R&D with other business units — and the interdependency among them. There are key questions related to R&D that are best answered with input from relevant departments across the enterprise. Relationships between R&D and other business units have a critical impact on the success of sustainability integration that should be at the root of a product or service.

Figure 4
Integrating R&D with business units



Source: L.E.K. research and analysis

R&D is most successful when there is strong collaboration with other business units, such as marketing, procurement and customer service. It is urgently important for these functions to have vital — and early — input into R&D. This will ensure that R&D understands the implications of its design choices and thus can better evaluate trade-offs. For example, a software product can be designed with self-help features that enable users to problem-solve more quickly, which could reduce demand for tech support when the most common and/or time-consuming user issues are identified by customer service teams and addressed during R&D.

Examples like these can have significant impact on the sustainability rating of a product or service and, at scale, for the whole organization. AstraZeneca has published a comprehensive report on its integration of sustainability into its complex R&D process[2] — integration that encompasses the entire product development life cycle.

Prioritizing sustainability in R&D and innovation is a way to maximize the sustainability of products and offerings while minimizing costs, resources and labor.

To maximize the probability of success, firms should take these critical considerations into account:

- Assess sustainability in the **concept design phase** — not after
- Establish harmonized processes to optimize the product simultaneously for **function, usability, value and sustainability**

An upstream approach is considerably more efficient and effective than the alternative — having to address deficiencies at the end of production or mitigating environmental impact instead of minimizing it. The design phase is the most efficacious and cost-effective point at which to incorporate sustainability considerations — it is the stage when flexibility and the ability to innovate are at their highest. In a software engineering example, the Systems Sciences Institute at IBM has reported[3] that the **cost to fix an error found after a product's release was four to five times higher than to fix an error uncovered during design**, and up to 100 times higher than one identified in the maintenance phase.

What level of cost-effectiveness can be achieved? R&D usually accounts for 5% or less of the total cost of a product. But because R&D sits at the very beginning of the development process, accounting for sustainability in R&D can lead to cost savings throughout the entire value chain — not only in materials and resources, but also in reduced costs of environmental mitigation down the line (for example, via the purchase of carbon offsets for emissions that could have been "designed out").

According to a director we interviewed at a major automobile manufacturer, "It is cheaper to make decisions early in the process, rather than in the late stages; manufacturers need to prioritize exploring what-if scenarios and testing cost impact."

A number of organizations are integrating sustainability into design

Some organizations are already working actively to integrate sustainability into design.

- **AstraZeneca** incorporates environmental protection into four areas of R&D — the pipeline, sites, lab operations and discovery, and the development and production of medicines.
- As part of its initiative to reduce greenhouse gas (GHG) emissions throughout the value chain, **Pfizer** is incorporating environmental risk assessments into R&D as it looks to reduce the environmental impact of producing medicines.
- In May 2022, **Intel** announced its intention to invest $700 million in a new R&D lab focused on developing sustainable data center technologies.
- **Nestle** incorporates sustainability across R&D with a focus on carbon footprint, ingredients, process technologies and sustainable packaging.
- **Danone** is centering its R&D processes around sustainability — for example, by producing yogurt with upcycled fruit.
- **ExxonMobil** has invested $10 billion over the past 20 years to research and develop biofuels and to advance carbon capture and storage.
- **Shell** aims to spend $2 billion to $3 billion per year on its New Energies Solution division, which is focused on developing decarbonization and clean energy solutions.
- **Ford** implemented a Sustainable Materials Strategy, which calls for 20% sustainable materials in new vehicles by 2025. "Nowadays, more than half of our R&D hours are related to sustainability," a Ford executive told us.

Barriers remain to successful sustainability/R&D integration

Not all companies are at the same stage of sustainability integration as the examples above. For these companies, the question is: What are the main barriers to embracing sustainability in R&D?

The L.E.K. Global Corporate Sustainability Survey 2022 found that the major barriers to sustainable strategy were lack of alignment within management, between leadership and the board, and between the company and stakeholders.

In the context of R&D, we can draw several conclusions:

- Boards are not pushing sustainability hard enough — or at all — as an R&D priority

- Supply problems, not just of materials but also of talent and resources, limit the scope of initiatives
- In too many cases, leadership sees sustainability as separate from fundamental design

These steps can help ensure that sustainability becomes a central R&D consideration

To overcome these challenges and ensure that sustainability is embedded in R&D, leaders and boards should:

- **Design for function over form.** A multidisciplinary team should consider the functionalities that a product delivers in terms of the services it provides to customers, as opposed to just its form. The team should then identify sustainability goals up front, such as prolonging product life cycles by increasing durability and reparability or reducing the complexity of product design in order to make it easier to separate product components and repair or recycle them.
- **Evaluate the options.** Map out the impacts and the sustainability performance of production options throughout their life cycle, including resource use and circularity, GHG emissions, and overall impact on the ecosystem.
- **Take the full life cycle into account** and select the most sustainable product options.
- **Factor in marketing and distribution.** Select the most sustainable way of selling and delivering the product. Assess the sustainability of delivery logistics, ensure that consumers are educated on the sustainability of the product, and make the support processes more user-friendly and reliant on self-service. User education is key. "If you want a truly sustainable product," as a director at a major global food company told us, "you have to educate the consumer so they can use it properly and safely. For example, it doesn't matter if your product is recyclable if the consumer doesn't know how to properly recycle it."

Conclusion: Make the case to leadership

At the end of the day, the lesson is this: Successful integration of sustainability into R&D requires buy-in at senior leadership levels — from the C-suite and the board.

To secure that leadership approval:

- **Make the case for — and quantify — the role of design** in product performance and value (including but not limited to sustainability)
- **Don't limit your lens to materials;** look at the full supply chain and the product's complete distribution and use case
- **Make R&D more visible** throughout the organization
- **Establish — and quantify the impact of — sustainability as a design objective**

Fully integrating sustainability into R&D is no simple task. It fundamentally changes the definition of what constitutes an optimal design. But the gains — in environmental mitigation and corporate benefits — are more than worth the effort. Leading companies are those that will address sustainability from the concept and design stages all the way through to the final sale.

A global food and nutrition company takes on the sustainability R&D challenge

We interviewed a former director of global innovation at a major global food and nutrition company. Here is what he told us:

"Sustainability has become an increasingly important focus, from sourcing ingredients to how to convert products.

"Packaging is huge in sustainability, but it is not easy. Sometimes we come up with a sustainable packaging structure, but there may not be a stream to accept it; sometimes the recycling icon on the box means nothing because the product can't actually be recycled; the most recyclable option is glass — but then consumers are worried about breaking it. If you want a truly sustainable package, you have to educate the consumer so they can use it properly and safely.

"Customers want sustainability but don't understand what that means. They may think organic products are sustainable, but that isn't true because it takes three times more energy to produce an organic product than a conventional one.

"The true definition of sustainability is to make everything circular — but that is not a cheap thing to do.

"Consumers are most likely to pay the price for sustainable products if they recognize and have confidence in the company."

An automotive industry R&D leader discusses sustainability

"Sustainability is very important in R&D — more than half of our R&D hours are related to sustainability. In the automobile industry, examples include power train propulsion tech, trying to lower carbon dioxide emissions, researching renewable fuels, electric cars, etc.

"Sustainability is now included in material selection, system design, advanced tech … the full scope of R&D.

"The biggest area for assessment is life cycle impact. Among the KPIs used to track success are: Were recommendations adopted or considered by downstream engineering? Were materials adopted and used? Did the company get IP they could use and monetize?

"There are many benefits of sustainable R&D, but perhaps the main one is that it's cheaper to make decisions earlier in the process than in the late stage. Early on, you can explore what-if scenarios and test cost impact.

"I think we can safely say that sustainability is now integral to our R&D process."

For more information, please contact strategy@lek.com.

Endnotes

[1]Lek.com, "Global Corporate Sustainability Survey 2022." https://info.lek.com/sustainability-strategy

[2]Astrazeneca.com, "How R&D is helping drive a greener future." https://www.astrazeneca.com/what-science-can-do/topics/sustainability/how-rd-is-helping-drive-a-greener-future.html

[3]Isixsigma.com, "Defect Prevention: Reducing Costs and Enhancing Quality." https://www.isixsigma.com/software/defect-prevention-reducing-costs-and-enhancing-quality/#:~:text=The%20Systems%20Sciences%20Institute%20at%20IBM%20has%20reported,Fix%20Software%2-0Defects%20%28Source%3A%20IBM%20Systems%20Sciences%20Institute%29

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