



CREATING AN ENTERPRISE CAPABILITY FOR DIGITAL SUSTAINABILITY

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Regulators, customers, investors, and employees are requiring companies to reduce their environmental impact and become a positive force in reducing carbon emissions.¹ As digital technologies are necessary to accomplish this mandate,² technology leaders have an opportunity to build an essential enterprise capability and add to their portfolio of expertise. A 2022 MIT CISR survey showed that technology leaders in companies that are top performing on profitability (those in the top quartile) spend significantly more time on building a complementary enterprise capability than their peers (22 percent of their time, versus 14 percent by companies in the bottom quartile).³

In 2023, we studied how large companies were addressing the challenges of sustainability.⁴ Carbon emission reduction was a top concern, and to address that concern, technology leaders in our study and their teams were developing an enterprise capability around tracking carbon emissions. In this briefing, we describe three emerging opportunities for technology leaders to build and leverage this capability, and illustrate technology leadership in carbon emission reduction with examples from Bupa, Clariant, and Cemex.

THREE OPPORTUNITIES TO SCALE CARBON EMISSION REDUCTION WITH DIGITAL

Many companies set emission reduction goals based on three categories defined by the Greenhouse Gas Protocol: scope 1 emissions, from company-owned and controlled sources; scope 2 emissions, from purchased energy; and scope 3 emissions, from the company's suppliers, partners, and customers (the largest and most complex category).⁵ To track and optimize these emissions requires that technology leaders consolidate data about their company's carbon emissions, combine it with data from their suppliers, partners, and customers, and make the data available to and actionable by the company. Ideally, the ability to track and optimize will also be used to show value. In another MIT CISR survey, top-performing companies on profitable growth were significantly more effective at using dashboards to measure how sustainability contributes to the business.⁶

For maximum impact on this shared problem of carbon emission reduction, transparency should extend all the way to end consumers.

One of the reasons we don't see accelerated decarbonization is that we do not yet have the means of systematically communicating the differences in the carbon emissions of products for the end consumer. You can buy a shampoo that will be almost climate-neutral and one that contains several kilos of CO₂ without spotting the difference. We need to convey the value proposition from the source to the end consumer more clearly. A digital platform can link our products, the end consumer

1 Examples include the Corporate Sustainability Reporting Directive from the European Union (CSRD) and the Inflation Reduction Act (IRA) in the US.

2 For example, see "Digital Solutions Can Reduce Global Emissions by Up to 20%. Here's How," Davos Agenda, World Economic Forum, May 23, 2022.

3 MIT CISR 2022 Executive Time Survey (N=434), from a CIO/CDO/CTO subset of the data (N=95). For more, see P. Weill, S. L. Woerner, and G. Evans, "How Tech Leaders of Top-Performing Companies Spend Their Time," MIT CISR Research Briefing, Vol. XXIV, No. 1, January 2024, .

4 In 2023, we hosted a discussion with 36 executives of the MIT CISR Data Research Advisory Board and conducted 36 interviews with 39 executives from ten countries (the US, the UK, Mexico, Australia, Switzerland, Germany, Turkey, Finland, and France) in industries including financial services, manufacturing, pharma, agriculture, supply chains, automotive, high tech, and government. Interviewee roles included CIO, chief technology officer, chief digital officer, chief sustainability officer, chief data officer, and executives in their teams. The Bupa, Clariant, and Cemex case examples are based on 2023 interviews with one executive, five executives, and seven executives, respectively.

5 The Greenhouse Gas Protocol is a set of greenhouse gas accounting and reporting standards for companies. "The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)," World Business Council for Sustainable Development, March 2004, 25.

6 MIT CISR 2022 Future Ready Survey (N=721). Profitable growth is an average of industry-adjusted net profit margin and industry-adjusted revenue growth. Top/bottom quartile effectiveness = 65 percent/50 percent.

stores, and all the information we're generating and gathering along the value chain.

RICHARD HALDIMANN, CHIEF TECHNOLOGY AND SUSTAINABILITY OFFICER, CLARIANT

In our study, technology leaders were working to build a tracking capability that relies on digital technologies and accurate, granular data. They were using this capability to pursue three opportunities for scaling reduction of carbon emissions at their companies:

1. Tracking and optimizing technology emissions, to replace carbon-intensive technologies
2. Tracking and optimizing product emissions, to decarbonize products
3. Opening up the tracking capability for use in digital offerings, to track and optimize emissions for suppliers, partners, and customers

Tracking and Optimizing Technology Emissions

Green IT is the practice of developing and using environmentally sustainable technology. This includes adopting more energy efficient data centers, using renewables to power data centers, and replacing inefficient and old IT equipment with new, less carbon-intensive equipment. Technology leaders in our study were building and leveraging an enterprise capability for digital sustainability by optimizing emission reduction related to IT and defining KPIs to engage people across the company and influence technology suppliers.

Bupa is a global healthcare company that in 2023 had revenues of £15.1 billion and more than 50 million customers in the Asia-Pacific, Europe and Latin America, the UK, and Saudi Arabia.⁷ The company offers health insurance, health provision, and aged care (respectively, 71 percent, 21 percent, and 8 percent of revenue in 2022).⁸ In 2021, Bupa made sustainability part of its purpose⁹ and added it as a pillar to the company strategy. One year later, the company set a target to be a net zero business¹⁰—cutting greenhouse gas emissions to as close to zero as possible—by 2040. Leaders of the Technology division made it a priority to address scope 1, 2, and 3 emissions that are associated with technology. Scope 3, including emissions by technology suppliers, is 98 percent of Bupa's emissions footprint.

The team started with a two-part KPI as the key focus for technology sustainability: by end of 2023, to have 90 percent of company systems on flexible cloud platforms and 60 percent of IT spend with suppliers that were aligned with Bupa's net zero ambitions. Technology worked with the Procurement and Sustainability teams to define the KPI and encourage people to use it in their decision-making when choosing a supplier. The metric enabled the team to track progress despite the lack of supplier emission data from current suppliers. At the end of 2023, 66 percent of IT spend was aligned with Bupa's net zero targets, so the company increased its target to 75 percent by the end of 2024. As of Q4 2023, suppliers that did not set decarbonization targets were only 4.5 percent of the company's IT spend.

Tracking and Optimizing Product Emissions

Regulations and customer demand have driven the automation and scaling of processes that create transparency around product development and manufacturing emissions. Technology leaders in our study were building and leveraging an enterprise capability for digital sustainability by tracking and making data-driven decisions on all product-related carbon emissions within and outside the organization's boundaries.

Clariant AG is a global specialty chemicals company headquartered in Switzerland with 2022 revenues of US \$5.44 billion in three core business areas: Care Chemicals, Natural Resources, and Catalysts.¹¹ In 2021, Clariant experienced a substantial increase in requests for product carbon footprint certificates from customers¹²—from 10 requests per year (calculating a certificate took 2–3 weeks) to 400–500 requests in the first quarter of 2021. This motivated a turn in Clariant's digital sustainability efforts.

To address the accelerating sustainability needs and anchor sustainability goals in the business units, in 2022 the company's CEO appointed Dr. Richard Haldimann, once the head of Clariant's New Business Development unit, and the head of Sustainability Transformation from 2020, to be chief technology and sustainability officer and an executive team member.¹³ Haldimann focuses his efforts on creating sustainable operations and products, enabled by a digital and data enterprise capability for carbon emission reduction.

For reducing carbon emissions in operations, the Sustainable Operations team developed Sustainable Operation Cockpit,

7 "Bupa Group Full Year Financial Results 2023," Bupa News, March 7, 2024,

8 Bupa Group, *Annual Report 2022*, March 16, 2023, 1–3, from the Bupa website.

9 Bupa's purpose is "helping people live longer, healthier, happier lives and making a better world." "About Us," Bupa, access March 7, 2023.

10 Bupa, "Carbon Neutral and Net Zero," Bupa News, 21 October 21, 2022.

11 *Company Summary*, D&B Hoovers, retrieved March 8, 2024.

12 A Product Carbon Footprint (PCF) certificate combines all emissions arising from the manufacturing processes and the raw materials used to produce a product into a single, harmonized value.

13 "Clariant re-designs set-up to accelerate sustainability-driven innovation," Clariant News, February 18, 2022.

a dashboard that tracks monthly energy data from eighty manufacturing sites via sensors and harmonizes it in a central data repository. In 2021, the dashboard showed an increase in the company's emissions from 0.69 million tons to 0.71 million tons of CO₂. Through data-driven decisions that have initiated 175 emissions reduction projects, Clariant has reduced scope 1 and 2 emissions each year since.

For sustainable products, the Product Stewardship and Sustainability Transformation teams and a development partner developed CliMate, a product carbon footprint platform. The platform incorporates a database for emission tracking of product substances and access to primary processing data (e.g., energy usage), with a tool that calculates total emission factors for product compositions based on the product recipe and creates certificates for customers in minutes. The team prototyped CliMate in three months, expanded it to the full product portfolio (over 10,000 products) in two months, and in another ten months added simulation functionality that allows Clariant's product development teams to anticipate emissions as a design factor in the development process. The teams work with Procurement to train suppliers on how to measure their emissions, and Clariant participates in Together for Sustainability, an industry initiative with fifty-one member companies, that provides guidelines on how to measure carbon emissions and promotes data sharing.¹⁴

Opening Up the Tracking Capability as Digital Offerings

As technology leaders in our study were progressing on developing digital and data capabilities for carbon emission reduction, they were starting to provide the capabilities as digital offerings to customers and suppliers to help them achieve emission reduction targets and comply with regulations.

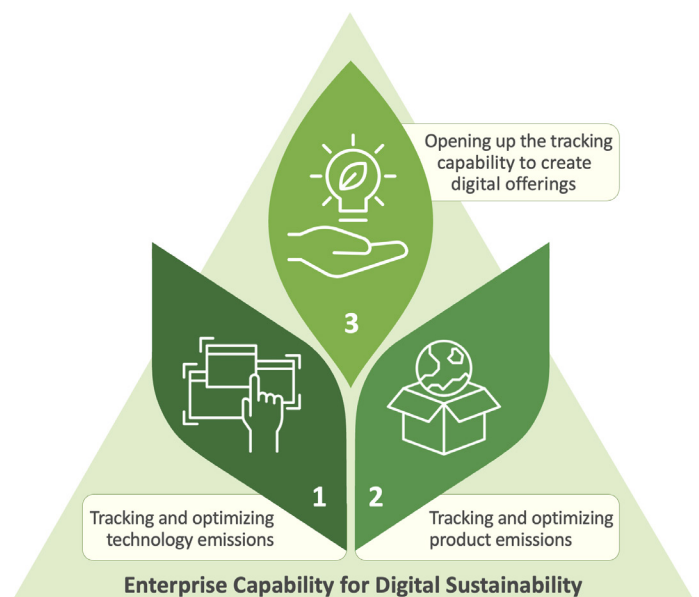
Cemex is a global building materials company with 2023 revenues of US \$17.4 billion¹⁵ from four core businesses: cement, ready-mix concrete, aggregates, and urbanization solutions. In a recent interview with MIT CISR, Cemex CEO Fernando González said that digital technologies have the highest power of transformation because they enable a superior customer experience.¹⁶ Leaders from Cemex's digital and sustainability units apply this philosophy as they collaborate to create digital offerings that help customers and suppliers reduce their carbon emissions.

For example, in January 2023, Cemex launched a digital initiative named Cemex Go Acceleration, which focuses on increasing the customer adoption of the company's Cemex Go customer app and measuring the value it generates, such as by reducing the cost to serve, increasing the speed of managing day-to-day requirements of construction sites, and reducing carbon emissions. As part of Cemex Go Acceleration, the Digital team leads proofs of concept and collaborates with Sustainability leaders to embed carbon emission goals. One pilot initiative in Mexico that is expanding currently to the US and soon to Europe uses AI to optimize drivers' travel distance and make immediate changes to delivery plans, which also reduces customers' CO₂ emissions.

THE ROLE OF TECHNOLOGY LEADERS IN ACHIEVING SUSTAINABILITY

Companies need to leverage digital technologies and data if they are going to make significant progress in reducing carbon emissions. An enterprise capability for digital sustainability, specifically for carbon emission reduction, that can be used and reused will be a must-have for companies. Technology leaders need to play a leading role in the design and development of the platform, managing the cross-functional internal collaboration and buy-in, and engaging with suppliers and industry consortia. We recommend that you assess your progress on building an enterprise capability for digital sustainability, and set objectives for each of the three opportunities for scaling carbon emission reduction, focusing particularly on enabling suppliers, partners, and customers to track and optimize their emissions.

Figure 1: Three Opportunities for Scaling Reduction of Carbon Emissions



14 "Scope 3 GHG Emissions Programme," Together for Sustainability (TfS), accessed March 7, 2024.

15 Cemex, "Fourth Quarter Results 2023," February 8, 2024.

16 Peter Weill and Fernando González, "Becoming Future Ready: Lessons from Fernando González, CEO of Cemex," MIT CISR video, September 27, 2023.

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