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2023

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ctl.mit.edu

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Since 1963, the Council of Supply Chain Management Professionals (CSCMP) has been the leading worldwide professional association dedicated to education, research, and the advancement of the supply chain management profession. With more than 9,000 members globally, representing business, government, and academia from 62 countries, CSCMP members are the leading practitioners and authorities in the fields of logistics and supply chain management.
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CONTENTS

FIGURES AND TABLES

The past and present wilt—I have fill'd them, emptied them.
And proceed to fill my next fold of the future.

Listener up there! what have you to confide to me?
Look in my face while I snuff the sidle of evening,
(Talk honestly, no one else hears you, and I stay only a minute longer.)

Do I contradict myself?
Very well then I contradict myself,
(I am large, I contain multitudes.)

I concentrate toward them that are nigh, I wait on the door-slab.

Who has done his day's work? who will soonest be through with his supper?
Who wishes to walk with me?

Will you speak before I am gone? will you prove already too late?

Walt Whitman
Song of Myself, 51

INTRODUCTION

Four years is a long time. In the experience of many of us, it is the duration of both our secondary and tertiary education. In the United States, four years is the length of one presidential administration. Four years pass between Olympic Games and World Cup events. The expectation that over four years circumstances change, some positions reverse, and some problems are solved, is almost hard-wired into Western readers' systems.

This year's report marks the fourth year of the annual State of Supply Chain Sustainability report. Every year since 2020, the MIT Center for Transportation & Logistics and the Council of Supply Chain Management Professionals have been surveying supply chain professionals about their firms' supply chain sustainability efforts. Through this research, we have endeavored to learn which issues and practices have risen and fallen in the eyes of the global community of supply chain professionals over time. We have also studied how different sources of pressure have come to influence firms' sustainability journeys. More than anything, we have found that these topics are complex; some trends have changed over four years while others remain consistent. Echoing Walt Whitman, the supply chain sustainability journey is a long one, and it contains multitudes.

Our fourth installment shows that commitment to supply chain sustainability appears to be resilient to certain types of crises, but vulnerable to others. Large-scale network disruptions, like those precipitated by the Covid-19 crisis and Russia's invasion of Ukraine in 2022 are shown to actually result in increased commitment to supply chain sustainability among many firms. On the other hand, in 2023 many firms' sustainability efforts appear to be have been especially sensitive to this year's negative economic forecasts.

We also observe that sustainability commitments are not consistently distributed across supply chains and around the world. In particular, net-zero carbon emissions goals appear to be clustered in wealthier countries. This gives rise to concern about whether the global ambitions of net-zero goals can be achieved with only localized adoption.

In addition to these emergent concerns, we also see that over four consecutive years some things also stay the same. In this period, pressure on supply chain professionals to improve their firms' supply chain sustainability profile grows every year across every measure that we track. And every year, the path towards achieving those goals appears to cross supply chains. This year we see that collaboration across supply chains appears to be especially important as firms struggle to measure and to reduce their Scope 3 emissions.

> The value of this report to supply chain executives and practitioners alike cannot be overstated. Now in our fourth consecutive year, results are a must-read. Worldwide, the findings and supporting commentary found in this report continue to demonstrate the criticality of the supply chain "doing the right things right" for society. When companies speak of their contribution towards environmental and social responsibility, they speak to the work of the supply chain. CSCMP and MIT present to you the fourth edition of the most valuable tool in benchmarking your supply chain sustainability progress.
>
> –**Mark Baxa**, *President and CEO, CSCMP*

METHODOLOGY

Defining Supply Chain Sustainability

The study of supply chain sustainability presents a quandary at the very first step: What do we mean by "sustainability"? A central tenet of this report over the last four years has been that the research team should not prescribe too tight an answer to this question. Rather, we should ask the world, "What do you mean by sustainability?" and then report back the global answers that we collect on an annual basis. With each edition of the report, we have endeavored to better understand how the meaning and practice of supply chain sustainability are evolving around the world.

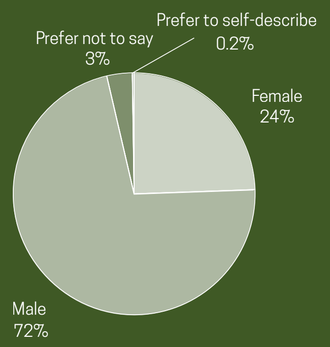
For this reason, we appeal to an especially broad definition of supply chain sustainability based on the United Nations Sustainable Development Goals. As defined in previous years:

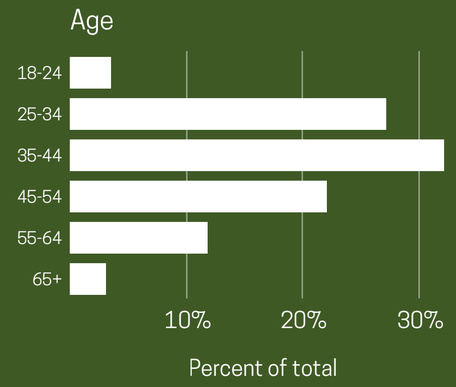
> ***We define supply chain sustainability as the management of environmental and social impacts within and across networks consisting of suppliers, manufacturers, distributors, and customers in line with the UN Sustainable Development Goals. This spans every phase of the supply chain, from raw material sourcing and extraction to product use and end of product life.***

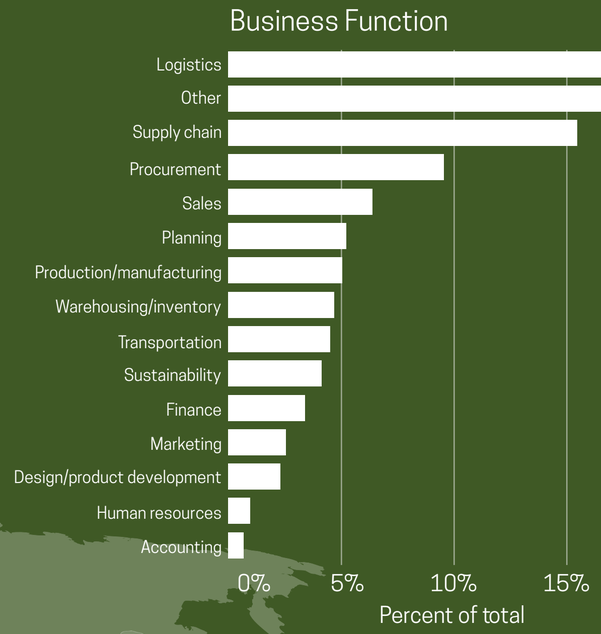
Research Approach

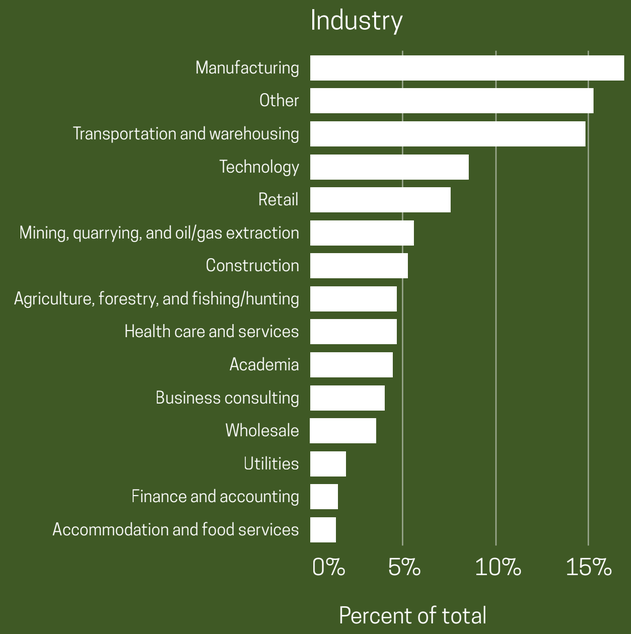
The 2023 survey was offered in four languages: English, Spanish, Portuguese, and Simplified Chinese. The survey was disseminated from January to March 2023 through the professional networks of both the MIT Center for Transportation & Logistics and the Council of Supply Chain Management Professionals. Approximately 2,300 anonymous responses were collected through this data collection effort. As in previous years, the professional and demographic profile of respondents was quite broad, including responses from all over the world and wide swaths of industries and job functions. See Figure 1 on next page.

Respondents









2,300+ Survey Respondents

4 Languages

10+ Executive Interviews

Figure 1: Respondents' age, gender, industry, and business function

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How Sustainability Efforts Respond to Crisis

Supply chain management is planning. It is a profession of anticipation and of careful coordination across suppliers and customers all over the world. But even the best-laid plans can be vulnerable to unforeseen disruptions. Four years of observation have afforded us the opportunity to study multiple global-scale supply chain disruptions and their effects on firms' commitments to supply chain sustainability. What we have found is that commitment to supply chain sustainability during times of crisis appears to depend strongly on the nature of the crisis.

Figure 2 shows respondents' answers to questions about how supply chain sustainability commitment responds to crisis in three different contexts: (1) Covid-19 in 2020 and 2021; (2) Russia's invasion of Ukraine (asked in 2023); and (3) economic conditions in 2023. If we consider that the first three instances of this question were asking about acute network disruptions—that is, existing flows of inputs and outputs to customers were upended by global shutdowns in the case of Covid-19, and warfare and embargo policies in the case of the Russia–Ukraine conflict , we see a generally similar and perhaps surprising response pattern. For the most part, if it changes, commitment to supply chain sustainability actually increases as networks suffer these acute disruptions. This counterintuitive phenomenon is something we have been observing and investigating for years now. It turns out that when circumstances compel firms to redraw their supply lines, many do so with a new emphasis on supply chain resiliency and sustainability. We have observed this to be true in two years of Covid-19 and now the first year of Russia's most recent invasion of Ukraine.

But the pattern fails to repeat when survey respondents were asked about "fears of economic contraction in 2023". In this case, the behavior is reversed. Whereas most firms report no change, among the change group, a higher proportion answered that their firm's commitment to supply chain sustainability declined as a result of pessimistic economic forecasts this year.

One way to interpret these results is to consider the difference between a network disruption and an economic crisis. The former demands a new network, whereas the latter demands a leaner, more cost-effective one. Arguably, some sustainability investments reduce measurable costs in the long run. But in times of projected economic malaise, the long run recedes from worried supply chain planners' field of vision. This appears to have had a chilling effect on many firms' supply chain sustainability efforts in 2023.

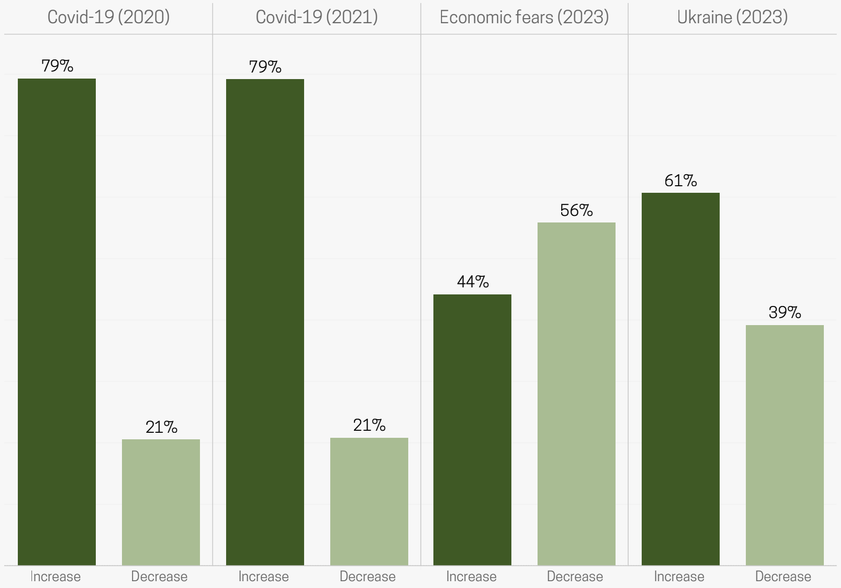

Figure 2: When commitment to supply chain sustainability changes during crisis

> Supply chain sustainability strategies that are driven by short-term thinking are susceptible to many different types of disruptions, from government regulations and economic conditions to other global influences. When our customers experience unexpected disruptions, we see that their strategies tend be steadied by their long-term sustainability aspirations and a continued focus on those future milestones.
>
> **—Brittany Brama**
> *Sustainability Manager, C.H. Robinson*

Sustainability Pressure: Creditors and Customers Show No Quarter

But why do firms engage in supply chain sustainability in the first place? This is a deeper question than survey results alone can answer. However, in four consecutive years of data collection, we have observed consistent patterns in the responses to questions about the pressures that firms feel to increase supply chain sustainability.

Firstly, firms certainly report feeling pressure to make their supply chains more sustainable—and that pressure appears to be growing over time from each of the 10 potential sources that we measure. Notably, none of the pressure sources show meaningful decline over time. That is, across 10 different possible types of pressure, each one appears to have increased over four years of observation. In 2023, pressures appear to have plateaued at the 2022 level, but not fallen (see Figure 3).

Figure 3 also shows that, far and away, investors are the fastest growing source of pressure, with a 25% increase in average respondent score over the period of observation.* In terms of growth, investors are followed by corporate buyers, with a 15% increase in average pressure ranking over the same time period. We have consistently observed this outsized and growing role of investor pressure over four years. In the modern environment, commercial interests—be it access to capital gated by sustainability-minded investors or sales opportunities gated by sustainability-minded procurement teams—represents supply chain managers' fastest-growing source of pressure to improve supply chain sustainability.

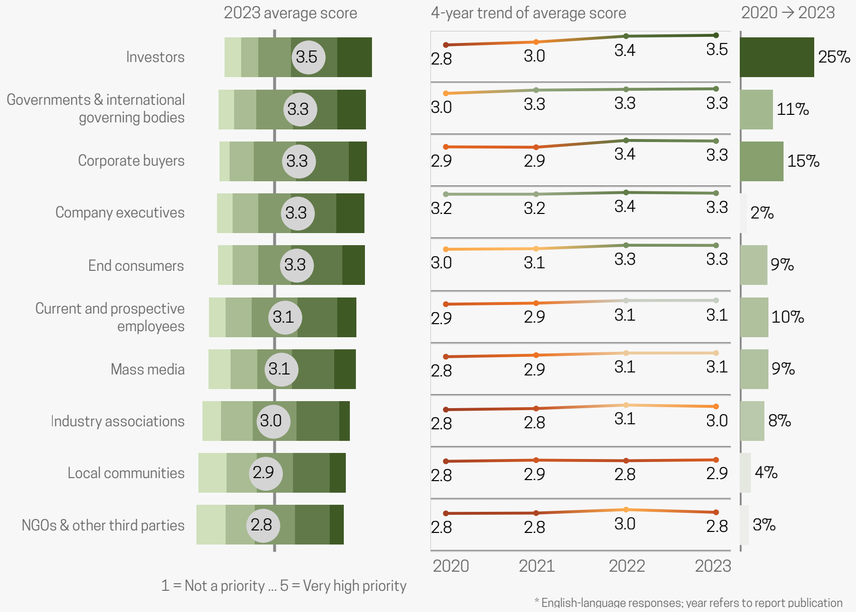

Figure 3: Level of pressure from top 2023 sources year over year

> Companies say, "Hey, as a supplier of ours, here's what our expectations are of you.... You need to hit X, Y, and Z when it comes to ESG." That is happing more and more often. But another piece is on the value creation side, where the shippers will say, "Not only do we require this of you as a bare minimum of what you're doing with your own work, but how can you help us? What are some of the basic things we can do together to reduce emissions?"
>
> **—Rachel Schwalbach**
> *Vice President for Environmental, Social, and Governance, C.H. Robinson*

*Because Likert scales are ordinal measurements, using mean as a measure of central tendency is a methodologically controversial choice. We present means here only to draw attention to largest changes observed over time. Readers are urged not to read too much into small changes in mean presented here. For more, see Spencer E. Harpe (2015), "How to Analyze Likert and Other Rating Scale Data," *Currents in Pharmacy Teaching and Learning* vol. 7, no. 6, pp. 836–850; and Susan Jamieson (2004), "Likert Scales: How to (Ab)Use Them?" *Medical Education* vol. 38, no. 12, pp. 1217–1218.

Supply Chain Sustainability Has No Canon

This growing pressure to invest in supply chain sustainability manifests itself in firms' goals and investments among the many focal areas within the umbrella term of supply chain sustainability. For our report, we identify 10 issue areas (five environmental, five social). See Figures 4 and 5.

Supply chain sustainability appears to have no canonical priorities. That is, there appears to be no central core of environmental or social issues that always take clear precedence over the others. Rather, over four years of observation, we see some surges and plateaus in importance. These dynamics are evident among both environmental and social issues. As examples, supplier diversity, equity, and inclusion (DEI) and natural resource protection stand out as especially ascendant over the last four years, while supply chain circularity and fair pay/fair trade programs have been comparatively stagnant in our observation.

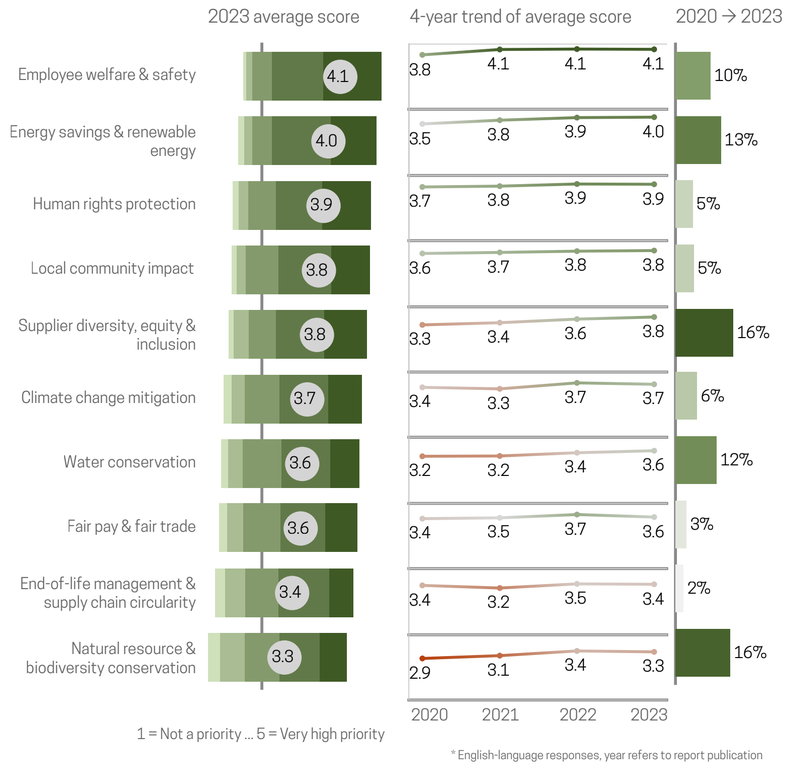

Figure 4: Goal change from 2020–2023

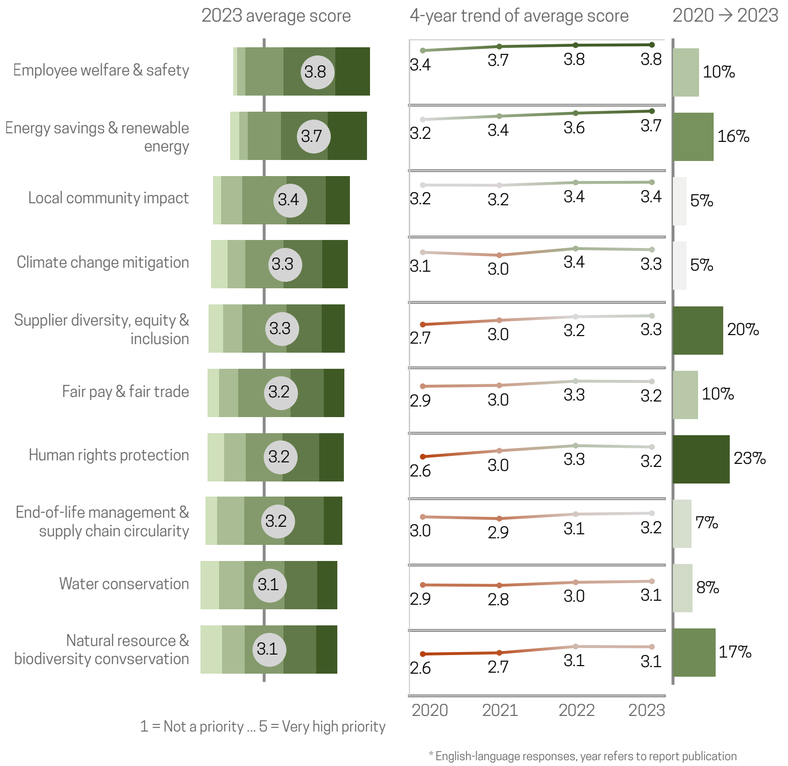

Figure 5: Investment change from 2020–2023

But where environmental and social dimensions of sustainability do show different patterns from one another is in the gap between firms' self-reported goals and their investments in achieving them. Figure 6 compares the average difference each year between all respondents' goals and investments grouped into environmental and social issues. Positive scores along the *y*-axis of Figure 6 would indicate that respondents' aggregated self-reported investment evaluations exceed their self-reported goal estimates for grouped sustainability topics. Conversely, negative scores along the *y*-axis of Figure 6 indicate that self-reported goals exceed self-reported investments. In all issues, goals exceed investment, which is to be expected. But in the early years of our survey, the gap between goals and investments was wider for social issues than for environmental issues. That difference appears to have narrowed to a similar magnitude over the last four years.

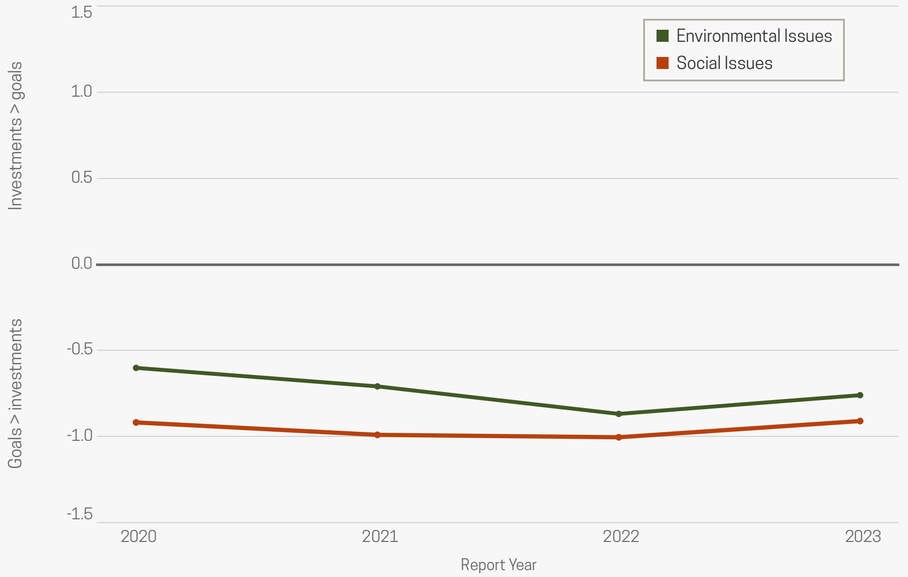

Figure 6: Supply chain sustainability goals versus investment, 2020–2023

Social policies have grown significantly over the past few years driven by societal movements that have driven focus on diversity, equity, inclusion, individual health, and well-being. Company executives, investors and HR teams are focused on implementing social programs to ensure happier and healthier employees to meet this growing societal demand. People also wish to work in environments that focus on the whole person, and not just the well-being of the company.

—Taylor Allis
Chief Product and Marketing Officer, Avetta

A Closer Look at Net-Zero Goals

This year's report takes a closer look at firms' net-zero goals.* We chose to focus on this particular topic because of its pressing consequences of climate change mitigation, as well as the approaching net-zero deadlines that many firms have made for themselves. Figure 7 below shows (1) the proportion of firms with and without net-zero goals; (2) the overall timeline in which firms intend to reach their net-zero goals; and (3) firms' readiness to reduce Scope 1, 2, and 3 emissions.

Overall, across all global respondents we can see that only a large minority (35%) report their firm having net-zero goals at all. We can also observe that among respondents who reported having net-zero goals, many appear to be unprepared for their coming deadlines. Almost half of the respondents who had net-zero goals report that their firm will not begin measuring or reducing Scope 3 emissions for five years or more. At the same time, roughly half of responses show net-zero deadlines of 2040 or earlier. Scope 3 reporting appears to be especially vexing, and how to collect reliable data across firm boundaries is still tricky.

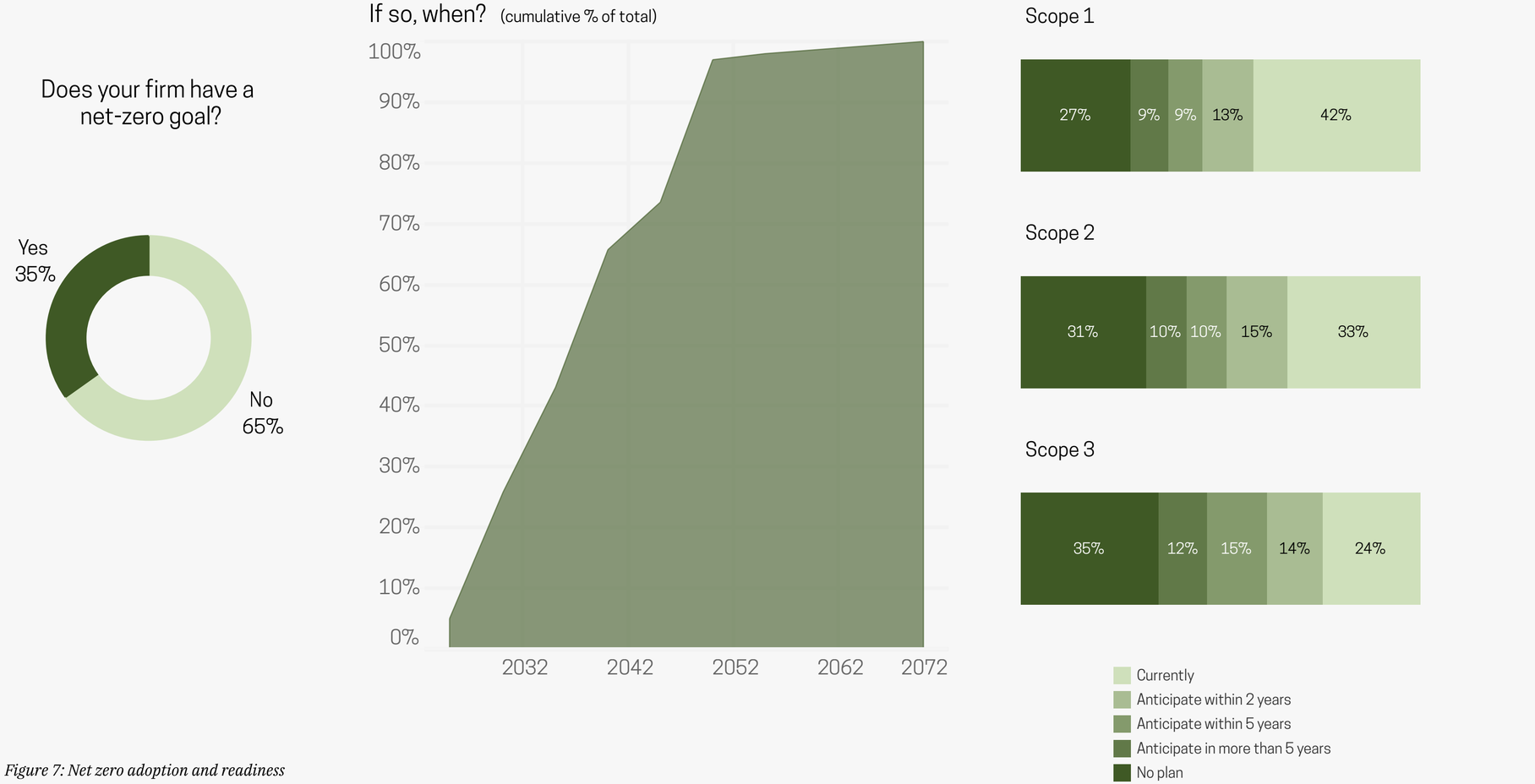

Figure 7: Net zero adoption and readiness

*The United Nations defines net zero as "cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance."

> Scope 3 continues to be elusive at scale because of still evolving definitional boundaries that vary by region and vertical, as well as the sheer complexity of managing and monitoring the supply chain where much of Scope 3 lies. Many businesses are forced to use estimations, which open risk to green-washing, or set their own scope, which opens risk to shifting metrics year over year.
>
> **—Katie Martin**
> *Principal Lead, Sustainability & ESG, Avetta*

Figure 8 shows the adoption percentage of net-zero goals by supply chain position: that is, upstream, midstream and downstream. (See Appendix A for industry groupings in each position). We observe fewer firms in the midstream show net-zero goals compared to the upstream and downstream respondents. This missing midstream—which, crucially, includes transportation and warehousing—may also contribute to the challenges that firms face when attempting to measure and reduce their Scope 3 emissions. Said one executive interview respondent, "Scope 3 is by far the hardest because you don't directly own it. You are relying on others to give you that information. I also think there's not a lot of standardization across how different suppliers are measuring."

Net Zero Around the World

Net-zero goals also appear to be adopted differently around the world depending on economic development. Figure 9 shows estimates of net-zero adoption in different regions. The *y*-axis represents the percentage of respondents from that region that have adopted net-zero goals, with error bars based on our survey sample size. The *x*-axis represents the region's 2022 gross domestic product (GDP) per capita measured in US dollars, based on 2022 World Bank estimates. The gray vertical line represents the world per capita GDP, which stands at $13,000.

Figure 9 shows that both global wealth and the adoption of net-zero goals are skewed heavily towards Europe and the United States. Based on our sample, approximately 53% of European firms have adopted net-zero goals, as have 44% of American firms. Comparatively, in our sample, Asia shows 36% adoption and Latin America 22%. (Note: Regions of the world with fewer than 30 total responses were excluded from this analysis).

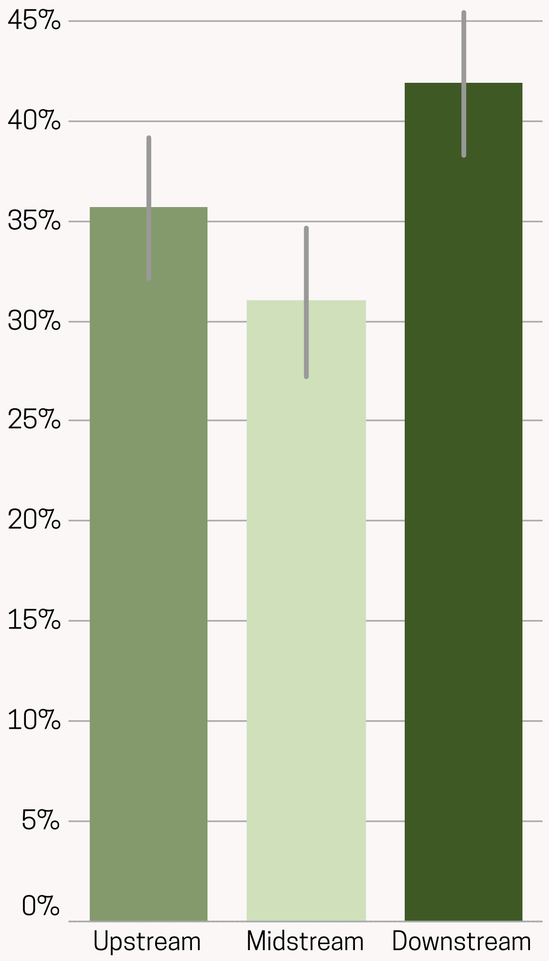

Figure 8: Net zero adoption by supply chain position

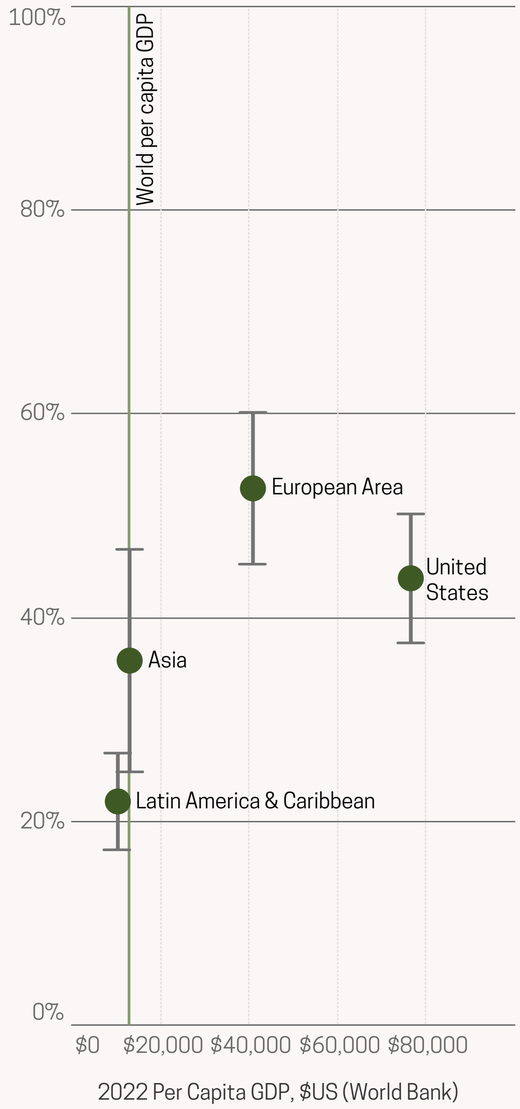

Figure 9: Net zero adoption around the world

Practices: There Is Still Only One Way to the Top

In Figure 10, we've organized global responses to questions about which practices respondents' firms employ as part of their supply chain sustainability efforts. The bars represent the percentage of respondents who reported that their firm employs each practice.

At the bottom of the staircase are the most prevalent practices, including audits, supply chain mapping, codes of conduct, and certification requests. These frequently applied in-house efforts are, in some sense, table stakes for global supply chain sustainability. The stairway of sustainability practices ascends toward collaboration across the supply chain. As a firm endeavors to ascend the ladder of practices, the focus moves to more sophisticated solutions, like visibility solutions and environmental remediation technologies. Even higher still are active engagements with suppliers and environmental watchdogs in the forms of collaboration and training.

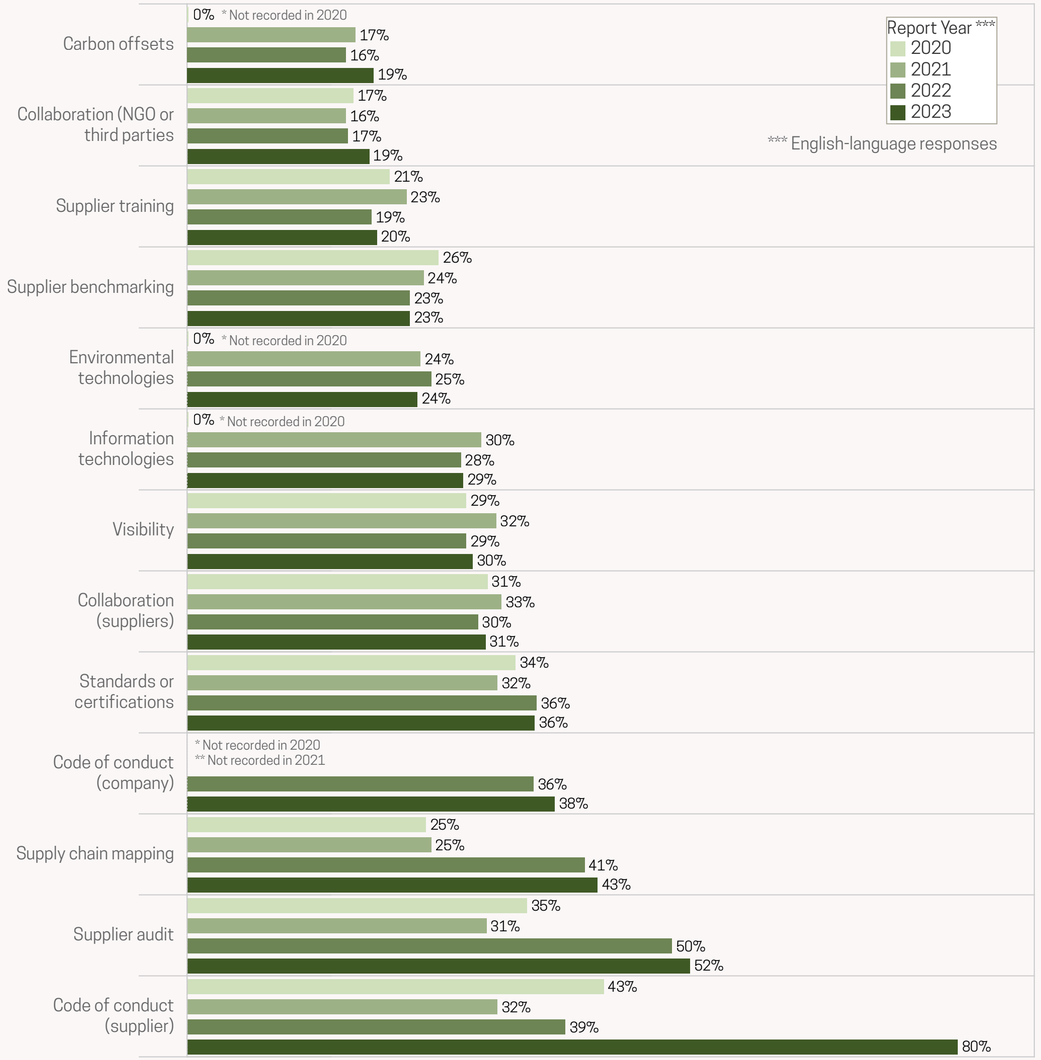

Figure 10: "Staircase" of supply chain sustainability practices

> Supply chains inherently require a significant amount of collaboration between partners, but just communicating regularly about your sustainability goals is not enough. You can't manage what you can't measure. In order to start moving the needle, supply chain partners need to leverage shared technology that can serve as a single source of truth for them to collectively measure the results of their sustainability efforts.
>
> **—Brian Cristol**
> *CEO and Co-Founder, Isometric Technologies*

Implications of the State of Supply Chain Sustainability 2023

In some cases, how supply chain sustainability is understood and how it is practiced differed greatly across our respondent bases. We observe differences in the answers to certain questions depending on when the data was collected, the prevailing global circumstances, a respondent's industry position, and their geographic location. At the same time, however, other questions elicited remarkably consistent trends over time. Indeed, sustainable supply chain management contains multitudes.

In our observation, commitment to supply chain sustainability endured the difficult supply chain upheavals presented by Covid-19 and Russia's invasion of Ukraine. In fact, commitment to supply chain sustainability appears to sometimes thrive when supply networks are unexpectedly broken. But fears of economic contraction in 2023 turned out to be a more pernicious kind of supply chain disruption. Commitment to supply chain sustainability appears to wither when overall economic health seems to be in jeopardy.

Nevertheless, the pressure that firms feel to improve their supply chain sustainability does not abate, even when economic circumstances change for the worse. All the sources of pressure that we track show year-over-year increases compared to 2019, even when facing the economic headwinds of 2023. For the most part, sustainability-conscious creditors and B2B customers appear to give no quarter to supply chain managers during these economic hard times. Documented sustainability efforts continue to be an important part of doing business.

This year, we chose to focus on one particular type of supply chain sustainability effort: net-zero goals. We found net-zero goals to be widely adopted among firms in rich countries but less so in comparatively lower-income regions of the world. This reveals a concerning disconnect ; net-zero goals reflect the commitment to address the global climate crisis. But in modern practice, net-zero goals appear to be applied with a much more limited scope, and mostly in very wealthy countries.

Some net zero reticence may reflect the particular challenges of measuring and reducing Scope 3 emissions. We see in our data that Scope 3 emissions are the hardest to measure and to reduce. A current lack of clarity around methods for measurement, policy requirements, and how to incentivize supply chain partners to share greenhouse gas emissions data may all be slowing down greater adoption of net-zero goals and Scope 3 emissions reduction targets around the world.

At the end of four years, a student graduates, an old administration leaves office, and a new one comes in. Past achievements are tallied—and so too is what is left to be done in the next four years. In the words of Walt Whitman, one looks ahead to filling one's "next fold of the future."

We submit these observations to this readership precisely because supply chain management is at its core a planning exercise. Supply chain managers must anticipate the needs of their firms, and adapt the flows of goods, information and currency to meet those needs given the sometimes unpredictable exigencies of the changing world around them. Such plans require timelines that cross calendar years, myriad global crises, and international borders. As a domain, supply chain management was already large. The challenge of supply chain sustainability expands this already broad field of vision even further. Sustainable supply chain management indeed contains multitudes.

APPENDICES

A. Industry Groupings by Upstream, Midstream, and Downstream Sectors

Group	Sectors in Group
Upstream	Agriculture, forestry, and fishing/ hunting Mining, quarrying, and oil/gas extraction Manufacturing Utilities
Midstream	Transportation/warehousing Construction Wholesale
Downstream	Finance and accounting Accommodation and food services Business consulting Academia Health care and services Retail Technology

For more analysis on this subject, see Julia Fernandez del Valle y Rivera and Samara Vilar da Costa, "Do Companies' Environmental Commitments Differ According to their Supply Chain Position?" (master's capstone project, Massachusetts Institute of Technology, 2023)

B. Contributors

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