

2023 STATE OF DESIGN & MAKE

Sustainability drives
business value



ABOUT THIS STUDY

The *State of Design & Make* report is a global, annual study for leaders who design and make places, objects, and experiences.

It identifies the most pressing drivers of change that are shaping today's business decisions and helps leaders make informed, strategic decisions about how to prioritize and invest in the future.

The industries that design and make comprise a unique category that connects the digital to the physical. Architecture, engineering, construction, product design, manufacturing, gaming, and filmmaking all require complex human collaboration throughout a digital design process and delivery of a physical result. Executives in these industries share their approaches and points of view on the challenges unique to their organizations and the opportunities they are identifying.

Key areas of focus for this research include: a macro view of the industries; staying resilient and relevant in an ever-changing world;

attracting, training, and retaining a skilled workforce; and achieving sustainable outcomes.

Autodesk partnered with **Ipsos**, a leader in global research and insights, to survey and interview 2,565 industry leaders, futurists, and experts in the architecture, engineering, construction, and owners (AECO); design and manufacturing (D&M); and media and entertainment (M&E) industries from countries around the globe.

Survey data has been broken down by global region: Asia-Pacific (APAC), which includes responses from Australia, China, India, Japan, and South Korea; Europe, with responses

from France, Germany, Italy, the Netherlands, Sweden, and the United Kingdom; and the Americas, with responses from Canada and the United States.

This report contains key findings from this research, including details at the sector and regional level. In certain instances, responses have been compared by country, but only countries with 200 or more respondents are included in these comparisons: Australia, China, France, Germany, Japan, the United Kingdom, and the United States.

The quantitative data (n= 2,489) was collected between October and December 2022, through a 20-minute online survey. In addition, 76 qualitative interviews with business leaders and futurists were conducted between September and December 2022. In some instances, Autodesk references analysis of its aggregated and anonymized data.

Full report

[Click here to access the full *State of Design & Make* report](#)

SUSTAINABILITY DRIVES BUSINESS VALUE

Insights in Action

A consensus emerges on the importance of sustainability, and customers and employees pressure companies to act.

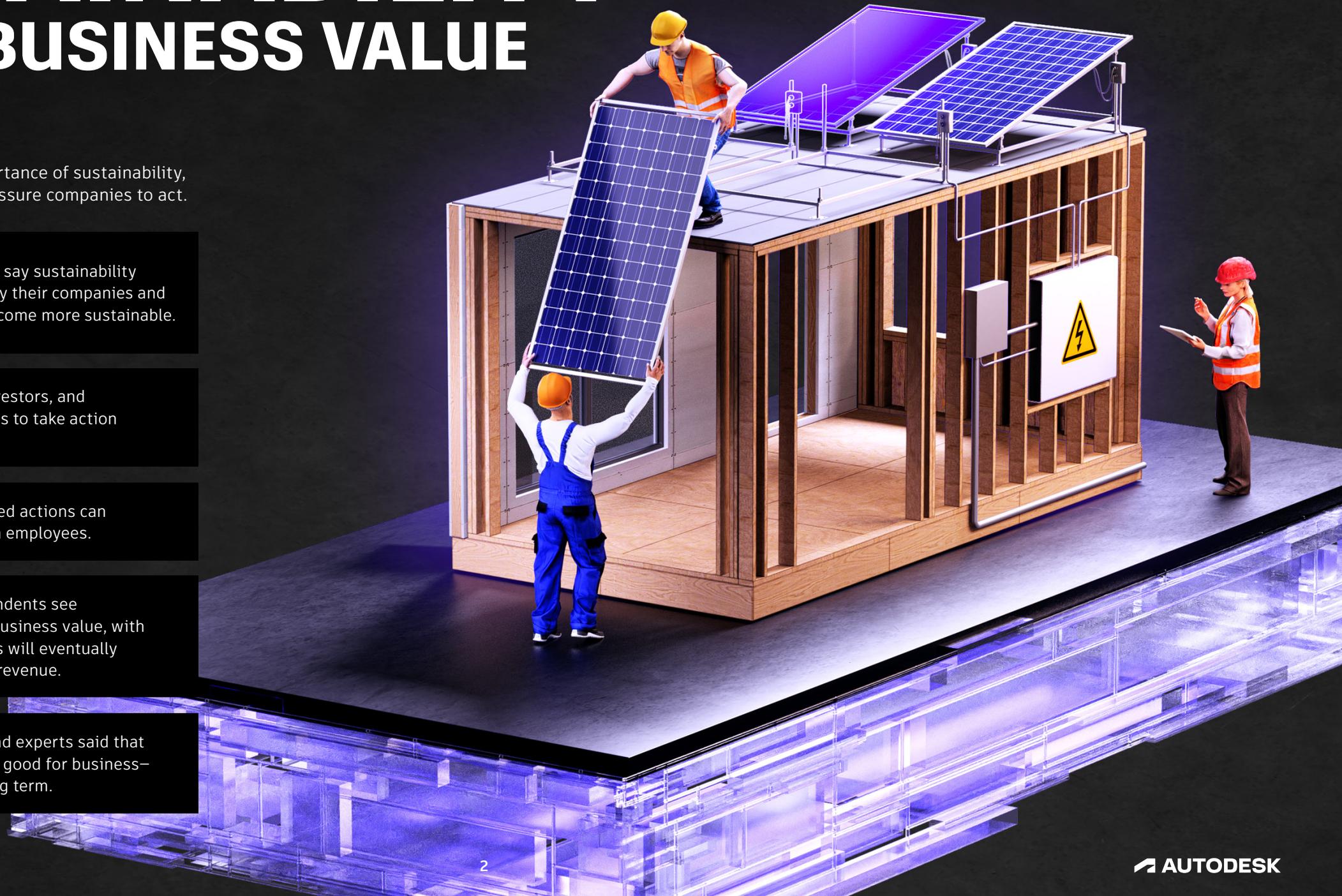
Taking action – Leaders and experts say sustainability goals are important. The majority say their companies and industries have made changes to become more sustainable.

Pressure to change – Customers, investors, and employees are influencing companies to take action on their sustainability goals.

Link to talent – Sustainability-focused actions can help businesses to recruit and retain employees.

Sustainability and revenue – Respondents see sustainability as driving long-term business value, with some saying sustainability measures will eventually account for a substantial portion of revenue.

The business case – Most leaders and experts said that improving sustainability practices is good for business—both over the short term and the long term.



Business leaders and experts say that corporate sustainability goals are important, even though most say that sustainability is not among the top challenges facing their company.

The majority of companies and industries already engage in sustainability-focused activities, and respondents say that their industries and organizations plan to take more steps in the near future, driven in part by pressure from customers, investors, and employees.

Sustainability goals are important for most

The survey data contains both good news and bad news for those concerned about environmental sustainability.

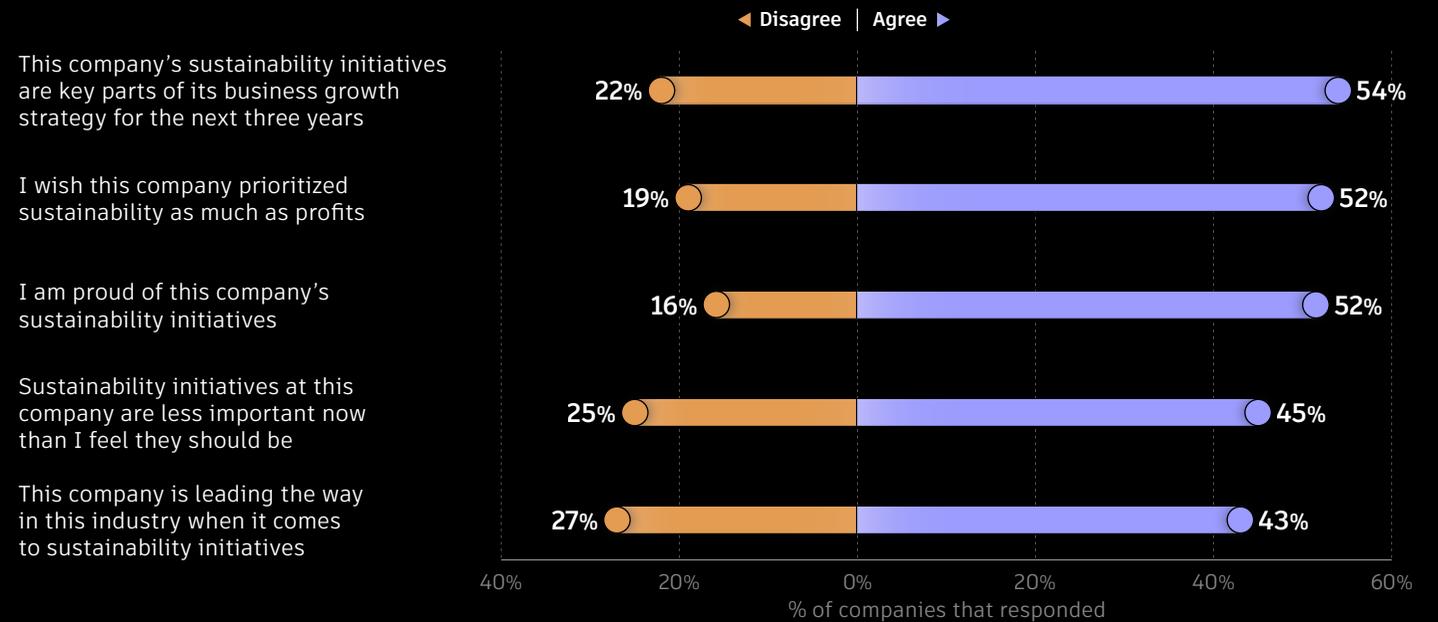
Eighty-three percent of respondents said that it was important that their companies achieve their sustainability goals, and only 7% perceived that their industry/organization is doing nothing in this area. Fifty-four percent also said that their company's sustainability initiatives are a key part of their business growth plan, 52% said that they wish their companies prioritized sustainability as much as profits, and 52% said that they are proud of their company's sustainability initiatives. In an interview, one industry expert contrasted the status of sustainability in the business world a decade ago with how the topic is viewed today: "It's no longer a 'nice-to-have,'" said Leonard DiChiara, senior director of design

at HCP Packaging, a designer and manufacturer of cosmetic packaging containers. "It's a mandate."

Nevertheless, only 20% of respondents ranked sustainability among the top challenges facing their organizations. This is significant, as those who cited sustainability as a top challenge were nearly three times as likely as others to report that their companies are engaged in sustainability-centered activities.

In the United States—the world's largest economy—19% of respondents said that their companies and industries aren't engaged in any sustainability-related activities at all, a far higher portion than any other country. Also, just 70% of American respondents said that it is important for their companies to achieve their sustainability goals, lower than the rest of the world.

Around half of leaders and experts are proud of their company's sustainability initiatives



Survey question: To what extent do you agree or disagree with the following statements? 5-point scale. Top two, bottom two = agree. Note: The category "Neither agree nor disagree" was omitted from this visualization.

Perspective on sustainability inaction

Although US respondents reported that their companies are taking no sustainability actions at rates more than twice as high as other respondents, additional research conducted by Autodesk provides additional context. It is possible that some respondents were reluctant to overstate their company's efforts in self-reported data.

In a review of the sustainability commitments of nearly 11,000 companies (primarily in AECO and D&M), **Autodesk found that the United States ranks near worldwide averages on tangible measures related to corporate sustainability.** Twelve percent of US companies in the review were categorized as having a demonstrable commitment to sustainability based on their activities or memberships. That number puts the United States ahead of Australia (6%) and on par with Germany (11%) and the UK (18%) but further behind Japan, which leads this category (26%).

LEADERS AND EXPERTS SPEAK:

What are some of the top drivers of sustainability in your industry?

“You can never go wrong when you’re doing the right thing. For AAF, **the right thing is to offer a product that lasts longer, that uses less energy**, and delivers the performance that improves air quality and ultimately has a positive impact on human health. We must also focus on delivering true value for money in terms of total cost of ownership. Educating the customer is our daily work—there is an old expression, ‘you buy cheap, you buy twice,’ which is as true for the air filter industry as it is in many others.”

—Sean O’Reilly, Global VP HP Sales & Innovation, AAF Flanders Inc., a manufacturer and provider of air filtration products

“**You need to have that use case that is scalable, where people can leverage resources and data around repeatable opportunities.**

Encouraging our partners in academia and small business to share data allows us to learn from and explore the possibility of printing with more sustainable and recycled materials. Seeing waste not as garbage, but instead as a resource is going to continue to be a focus for many groups. And I think we’ll see some real upsides in the next year to 10 years that will help recruit others into the conversation.”

—Samantha Snabes, Co-founder & Catalyst, re:3D Inc., a large-scale 3D printer and services company

“**We’re starting to measure sustainability in terms of equity.** Whatever you’re going to build, you need to be thinking about how it impacts your community. Are the things that you are doing good for your company, good for your community, and ultimately good for the world?”

—Paul Makovsky, Editor in Chief, *ARCHITECT* magazine





Companies take aim at decreasing waste, increasing energy efficiency, and improving product design

Although most respondents said that their industry or organization has made changes to improve sustainability, these efforts are spread across a wide variety of activities. No single sustainability initiative was cited by a majority of respondents.

Among the top sustainability changes that companies and industries have already made, 35% of respondents cited decreasing waste from production or using more recycled materials, 30% said companies and industries were designing products with sustainability impacts in mind, and 30% mentioned the application of sustainable design principles.

There was significant overlap when respondents were asked what steps they expect their companies and industries to take over the next three years. Here, applying sustainable design principles took the top spot, cited by 34% of respondents. Thirty-two percent said they expected their companies and industries to decrease waste from production or use more recycled materials, and 31% said they expected their companies and industries to develop or invest in more energy-efficient processes or machinery. Overall, 94% of respondents said they

expect their industry/organization to make sustainability-focused changes in the coming years.

In interviews, various leaders and experts mentioned that their companies are paying more attention to the sustainability of the materials they use. Several cited the ability to improve sustainability by reducing the portion of embodied carbon in projects. Jeremy Smith, chief technology officer for VFX firm Jellyfish Pictures, mentioned working

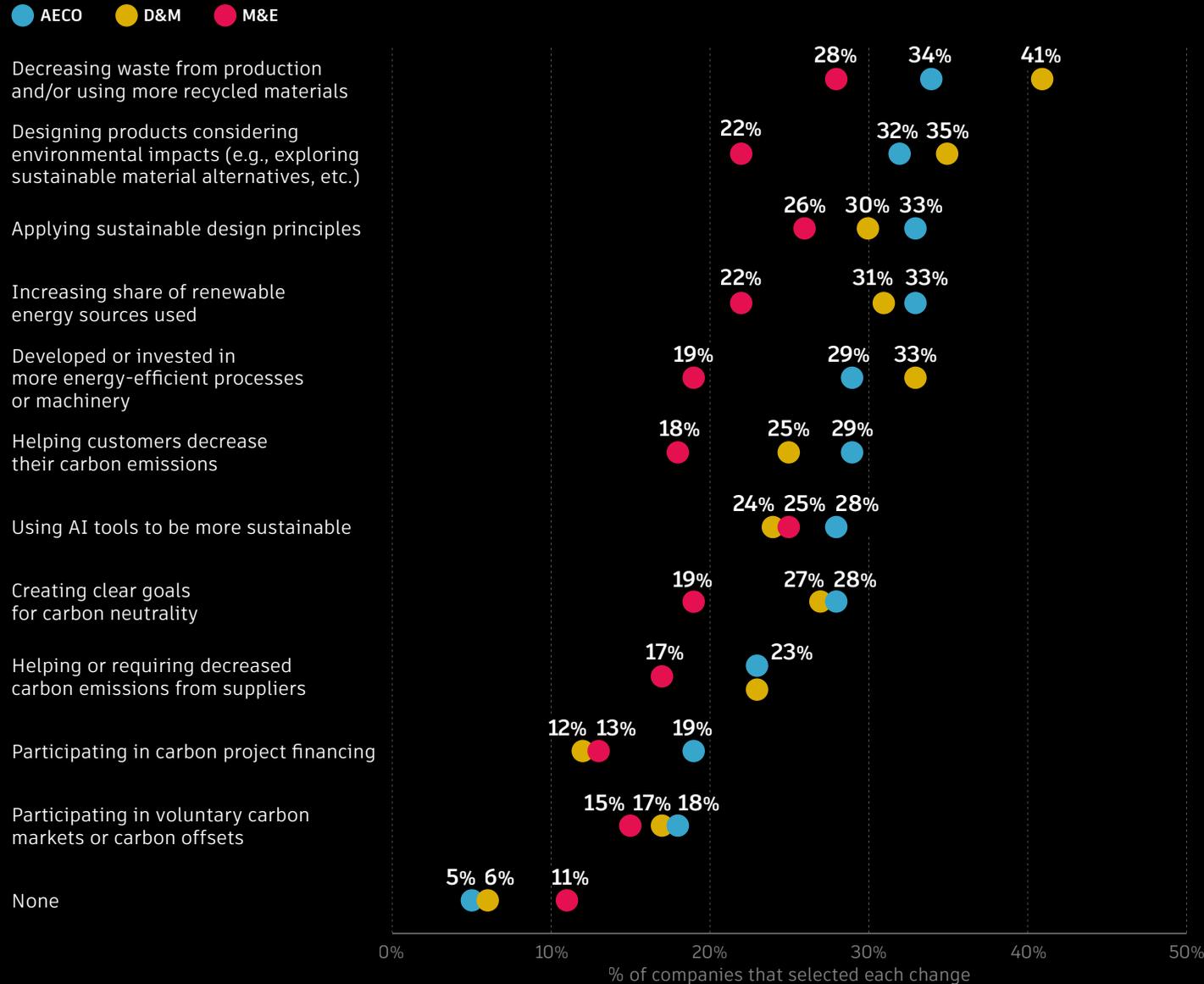
with technology vendors to reduce the amount of energy used by computing hardware. “We’re making sure that our workflows are as optimized as they can be so that we’re not wasting computing cycles,” he said. “That is one of the easiest things you can do to be greener and more sustainable in our area.”

Some interviewees mentioned the link between digitization and sustainability. One cited the ability of software tools to immediately show the sustainability impact of proposed design changes. Another noted the potential for free and open data to reduce cost barriers that currently prevent some organizations from measuring and managing carbon emissions of projects and products.

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Sustainability activity by industry

Respondents say their companies and industries have already made these changes.



Survey question: What changes are you aware of that this industry/organization has already made to be more sustainable?

An analysis of the application of generative design in anonymized data from Autodesk customer projects shows that customers are using generative design to achieve sustainability outcomes such as waste reduction. Also, some companies are using generative design to decrease the weight of materials when designing airplanes or vehicles.

Survey data showed several differences in sustainability actions by company size and geography. Most consistently, respondents from large companies reported that their industry/organization had made sustainability-focused changes at higher rates than respondents from small and medium-sized companies. This may be explained by capacity, as small companies typically lack the resources needed to maintain a dedicated sustainability team that can implement ambitious initiatives and track them over time. Nineteen percent of US respondents—double the portion of any other country—said their industry/organization had not undertaken any sustainability initiatives. Japan took

second place with 9%. Among Chinese respondents, only 1% reported that their industry/organization had done nothing to improve sustainability. However, the United States did rank near the middle of the pack for several specific sustainability initiatives.

Respondents from large companies reported that their industry/organization had made **sustainability-focused changes** at higher rates than respondents from small and medium-sized companies

Generally, European respondents reported the highest levels of sustainability-centered activity. Thirty-seven percent of German respondents said their industry/organization had designed products while considering environmental impacts, 42% said they had increased renewable energy use, 36% said they had developed or invested in more energy-efficient processes or machinery), and 30% said they had helped customers decrease their carbon emissions. France led the way in the portion of respondents whose industry/organization had decreased waste from production or increased the use of recycled materials, with 47%, and the portion that said their industry/organization had participated in carbon project financing, with 23%.

LEADERS AND EXPERTS SPEAK:

What do the economics of sustainability look like for your industry?

“If we can improve energy efficiency, we can see returns immediately.

Our data center consumes a lot of energy, and if we can improve our energy efficiency by even 1%, we'll save a lot of electricity. This is good both for our customers and our planet.”

—Kunyueh Lin, General Manager, Building Automation Solution Business Unit, Delta Electronics, a global power and thermal management solutions provider

“In the long run, the share of renewable energy will exceed that of fossil fuels, but I’m concerned about the acceleration of the transition to new energy. It’s easier to use energy from fossil fuels, and the cost of green energy is still high. We need more technical advances to make green energy more affordable.”

—GuoJin Zhu, Chief Engineer, Kunming Engineering Corporation Limited, Power China Group, a design institute for hydropower projects

“The pressure to change and grow sustainably is coming from everywhere—shareholders, employees, clients, governments. When you have more constraints, you are more inventive. It’s a good thing for us, but we have to implement sustainability practices without excluding ourselves from society’s building and infrastructure needs.”

—Frédéric Gal, Head of Business Modernisation Project, Bouygues Construction



Belief in the business value of sustainability drives action

Respondents' attitudes toward sustainability were a significant predictor of how likely their companies were to engage in sustainability-focused activities. For instance, respondents were asked to estimate how much business value, as a percentage of annual revenue, sustainability measures could generate long-term for their companies. Among the 18% who said that sustainability initiatives would likely account for more than 10% of their company's revenues, respondents were much more likely to say their companies had already undertaken sustainability measures.

This difference was most pronounced for questions about helping customers decrease their carbon emissions (39%, compared with 21% of other respondents), designing products considering environmental impact (44% vs. 27%), and creating carbon neutrality goals (36% vs. 22%).

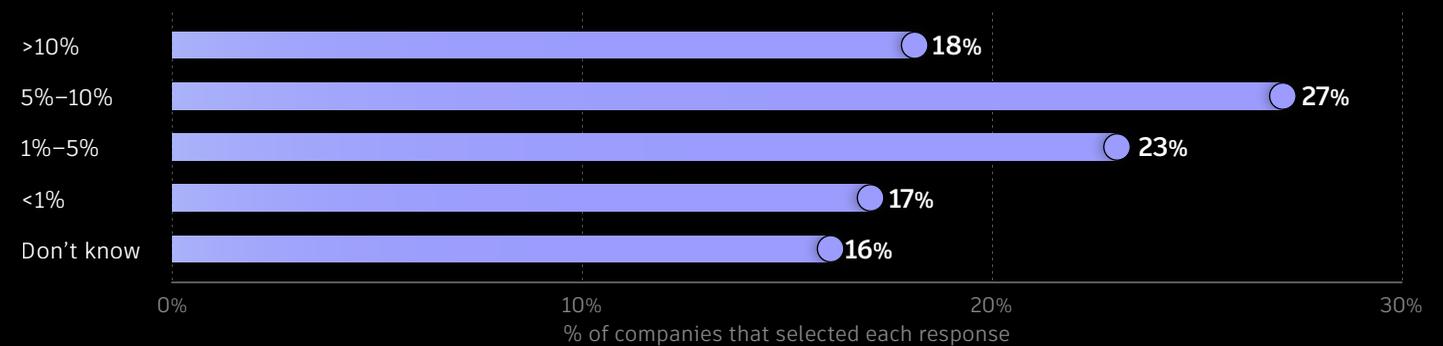
A majority of respondents view sustainability as being good for

business. Fifty-five percent said that improving sustainability practices is a good short-term business decision, and 80% said that it is also a good long-term business decision. Eighty-four percent of respondents from large companies saw sustainability improvements as a good long-term business decision, compared to 77% of those from smaller companies.

Digitally mature companies appear to be more likely to apply technology solutions to their sustainability challenges. Thirty-three percent of respondents at such companies said their organizations are using artificial intelligence solutions to become more sustainable, compared with 21% of those at less digitally mature companies. Also, respondents from companies that are very effective at leveraging data were the most likely to say they were proud of their company's sustainability initiatives (60%, compared to 44% of others) and to say that their company is "leading the way" in sustainability for their industry (52% vs. 35%).

Companies see sustainability driving long-term revenue

Portion of annual long-term revenue expected to be generated by sustainability



Survey question: To the best of your knowledge, how much business value (as a % of annual revenue) can sustainability measures generate in the long term for this company?

55%

said that improving sustainability practices is a good short-term business decision

&

80%

said that it is also a good long-term business decision

“One of the biggest challenges for sustainable materials is making them work commercially. There

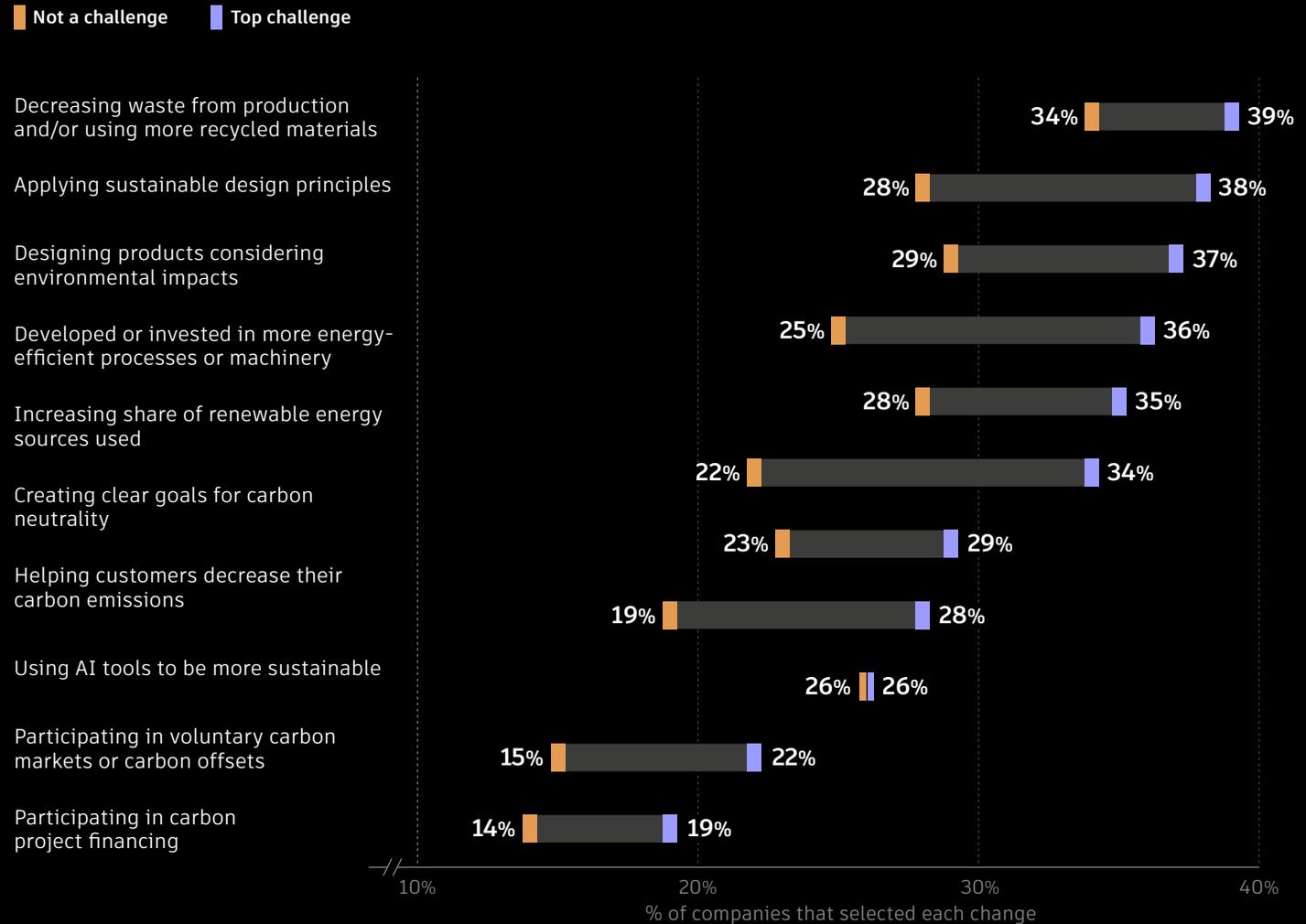
are examples in aviation where sustainable products were released too early, and they couldn’t stay in the marketplace or keep their competitive advantage.

The aircraft cabin is currently responsible for approximately 5% to 10% of an aircraft’s CO2 emissions. However, the latest research and technology developments and cabin innovations we are currently working on will contribute to reducing these figures, for example, by weight reduction or circular materials.”

–Stefan List, Head of Cabin Market Insights, Airbus, a designer, manufacturer, and seller of aircraft, helicopters and space vehicles

Up to the challenge

Those who identified sustainability as a top challenge for their companies also reported that they had undertaken sustainability initiatives at higher rates than others. This suggests that respondents who cited sustainability as a challenge also see it as a priority.



Survey questions:
 What changes are you aware of that this industry/organization has already made to be more sustainable?
 What are the top three challenges this company faces today? Please select up to three. Selection = sustainability (related to the environment).

Cost center or cost saver?

Depending on the context, audience, and speaker, sustainability is alternately discussed as a financial burden on—or a boon for—businesses. This is also reflected in the survey data, with more respondents seeing sustainability as a good business decision over the long term than the short term.

At Autodesk's annual conference (Autodesk University) in October 2022, a group of industry leaders and experts met to discuss challenges and opportunities related to decarbonization, with much of the discussion centering on costs. Among the takeaways from that conversation:

Short-term thinking limits action. The prospect of increased short-term costs plays a role in the lack of client demand for change. Often, companies measure sustainable approaches against the least expensive possible baseline, rather than calculating the overall return on these investments.

Opportunities exist in financing. Discussion participants said that clients currently lack the will to aggressively pursue sustainability in their projects. However, lower lending rates for carbon-responsible construction could be a “carrot” that helps to spur change, they said.

Sustainability strengthens brands. Participants cited the potential for sustainability-focused actions to lead to benefits like an improved reputation, which may ultimately improve revenue and profits. By pursuing sustainable products and projects, companies may increase their appeal to future customers, particularly younger people who will pay a premium for sustainable products.

Companies are missing chances to reduce costs. Although opportunities already exist to achieve a positive return on investment through decarbonization, these opportunities are not being maximized. Politics is one reason, with oil-producing countries largely against decarbonization, as is an individualistic mindset that often takes precedence over collective action.

Affordability drives adoption. Environmental advocates point to the long-term savings of sustainable products and projects, but these often still carry higher up-front price tags. Unless business leaders prioritize sustainability, it may be difficult for design teams to secure the budget for the often-higher cost of green materials.





Customers, investors, and employees apply sustainability pressure

A majority of respondents reported receiving pressure from internal stakeholders and outside forces to create and meet sustainability goals. Notably, 82% of respondents said their companies feel pressure from customers to pursue and achieve sustainability goals, and 74% said their companies feel this pressure from investors.

By the end of 2021, market watchers reported, sustainable investments accounted for more than one-third of global assets*—with investors pouring twice as much money into sustainable investments that year than the year before.** If this trend continues, it could accelerate sustainability-focused efforts at companies that rely on outside investors.

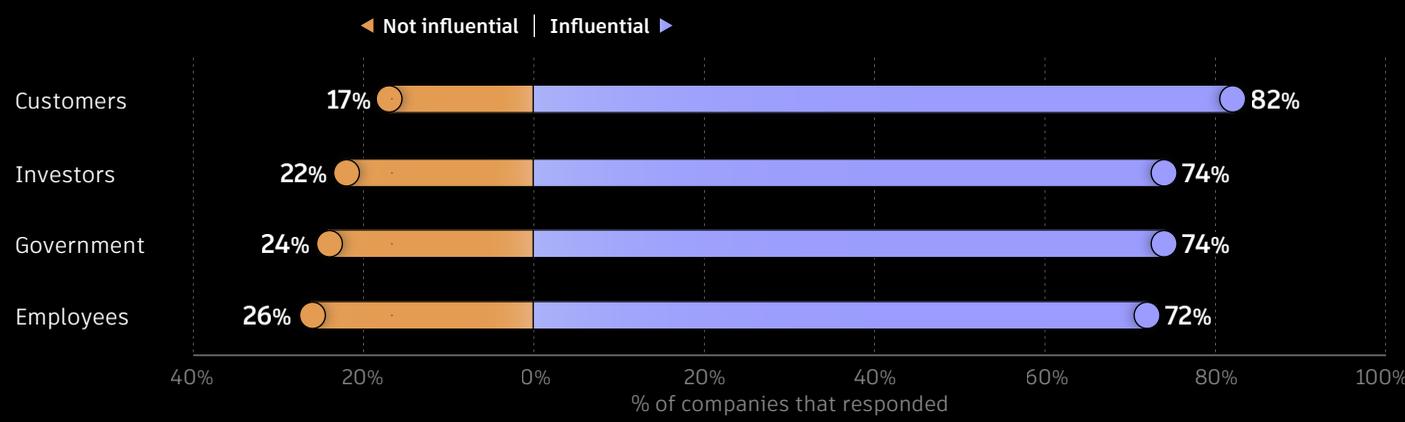
82%
of respondents said their companies feel pressure from customers to pursue and achieve sustainability goals

In discussions about corporate sustainability, it is common to hear observers question whether customers truly care about the issue. According to the survey data, the answer to this question seems to be yes. Anyone who has listened in on a sustainability discussion has also, no doubt, heard some participants say that companies will not be moved to take real action in this area until it affects their bottom line. If investors begin to direct their dollars away from companies that refuse to implement sustainability-focused actions, that would represent a real threat to laggards in this area.

Seventy-two percent of respondents said that employees are influential in pressuring their companies to pursue sustainability goals. Non-decision makers are more likely, compared with decision makers, to say that sustainability is a top challenge, and companies that are committed to sustainability are less likely to cite talent as one of their top challenges. This connection mirrors what a number of business leaders said during interviews conducted for this report: that many workers are demanding that their employers prioritize sustainability.

Under pressure

More than any other group, customers are putting more pressure on companies to pursue sustainability goals.



Survey question: How influential are the following groups in pressuring this organization to create and meet sustainability goals? 4-point scale. Top two, bottom two = influential.

*<https://www.reuters.com/business/sustainable-business/sustainable-investments-account-more-than-third-global-assets-2021-07-18/>

**<https://www.fastcompany.com/90706552/esg-investing-continued-to-soar-in-2021-the-government-could-boost-it-even-more>

GLOSSARY

Company size:

- **Small:** 1–19 employees
- **Medium:** 20–4,999 employees
- **Large:** 5,000+ employees

Digital maturity:

Respondents were asked how far their companies were in their transformation journeys. Organizations that respondents said are in the “early stage” or “right in the middle” of their digital transformation journeys are considered **less digitally mature companies**. Those that respondents identified as “approaching the goal” or having “achieved the goal” of digital transformation are considered **more digitally mature companies**.

Industry:

AECO: Architecture, Engineering, Construction, and Owners

- Architecture services
- Buildings (owner/operator)
- Civil infrastructure (owner/operator)
- Construction services
- Energy and natural resources
- Engineering service providers

D&M: Design and Manufacturing

- Aerospace and defense equipment
- Automotive and other transportation
- Building products and fabrication
- Consumer products
- Education
- Industrial machinery
- Life sciences manufacturing
- Manufacturing (other)

M&E: Media and Entertainment

- Advertising, publishing, and graphic design
- Film and TV design/development
- Game development

Leaders and Experts:

- **Leaders:** Sixty-nine percent of survey participants are decision makers in their companies. In this report, this group is referred to as “leaders.” Job roles for the leaders group include director, industry consultant, president or CEO, senior executive, senior vice president, and vice president.
- **Experts:** The remaining 31% of respondents are referred to as “experts.” This group includes managers, senior managers, mid-level employees, and a small number of educators and entry-level employees.

Leveraging data:

Respondents were asked how effective their company is at leveraging data for a number of uses. Forty-nine percent of respondents said that their organizations are “very effective” at leveraging data for at least one of the options. In some instances, this group’s responses have been compared to those from other respondents.

Performance:

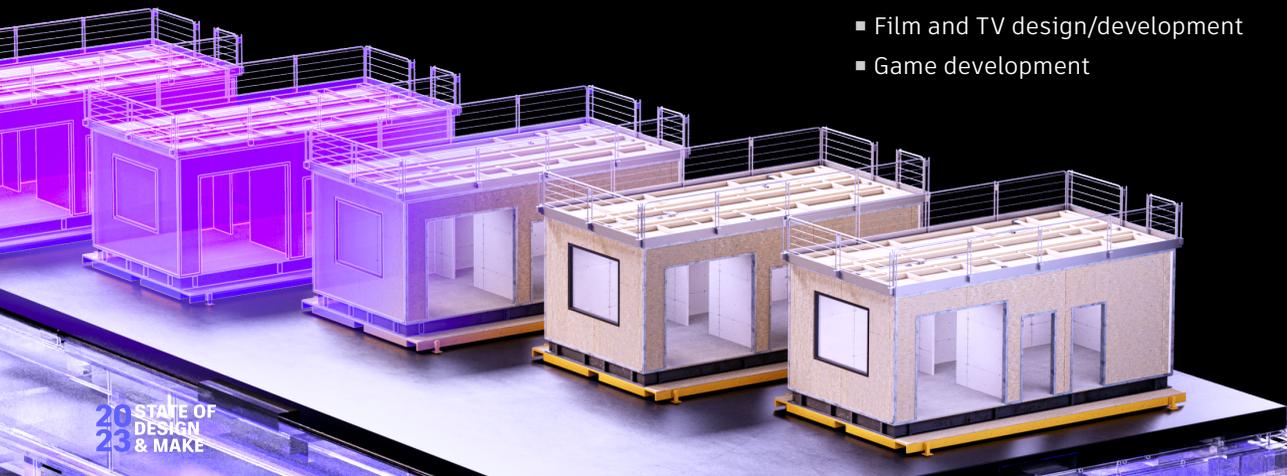
Companies whose leaders and experts rated their organization’s performance on top business metrics as “above average” or “excellent” are considered top performers.

Region:

- **APAC:** Australia, China, India, Japan, South Korea
- **Europe:** France, Germany, Italy, Netherlands, Sweden, United Kingdom
- **AMER:** Canada, United States

Sustainability:

In survey questions about sustainability, the actual phrase used was “sustainability (relating to the environment).” In one-on-one interviews, this more expansive definition was used: “efforts related to the environment (mitigating effect on climate change), the community (social well-being, improving the life of populations), and corporate governance.”





ABOUT AUTODESK

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Contact Autodesk at state.of.design.and.make@autodesk.com about this research report or to sign up to participate in future research programs.

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