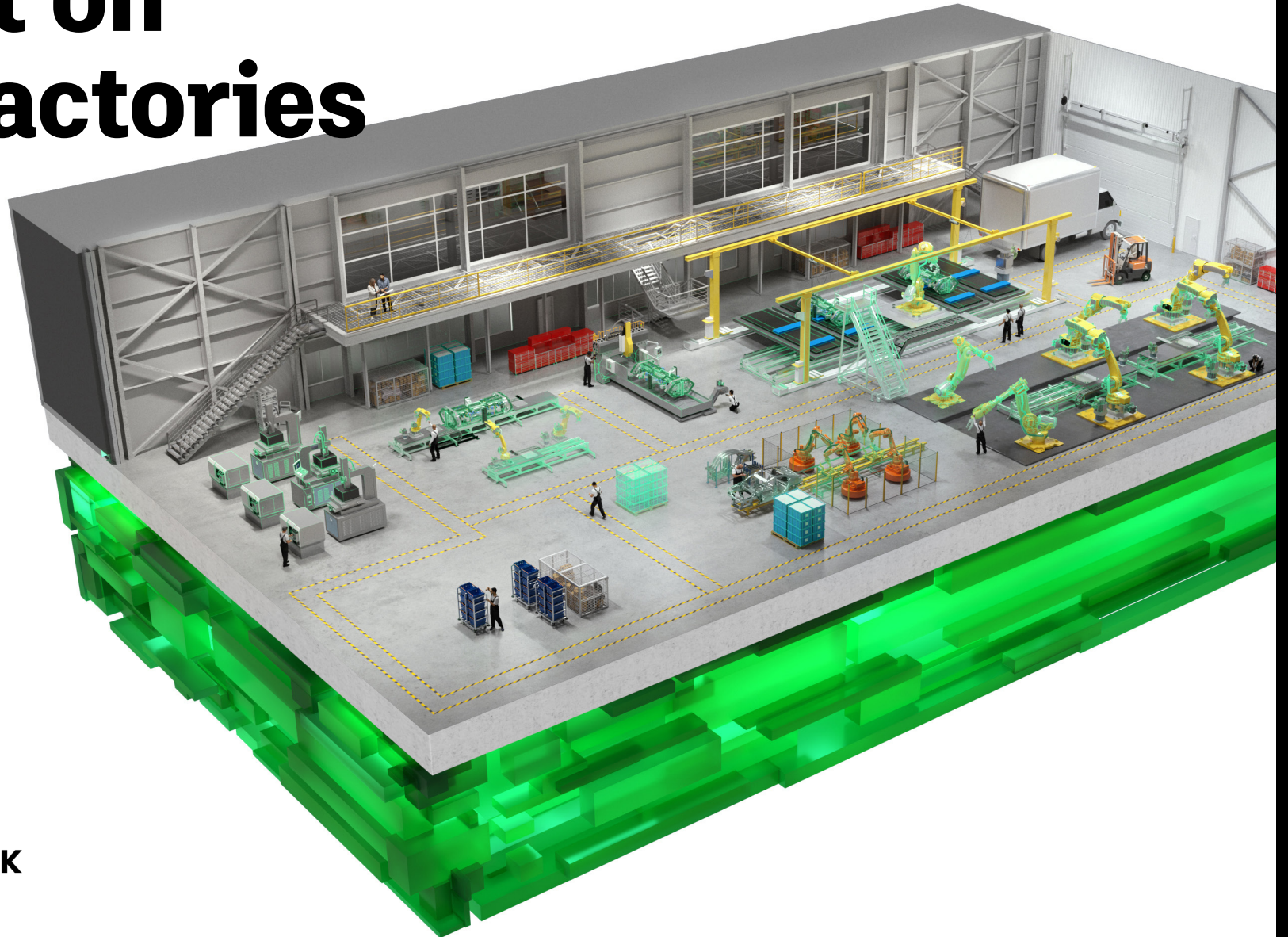


A STATE OF DESIGN & MAKE SPECIAL EDITION

# Spotlight on Digital Factories

*Summary of key findings*



20 STATE OF  
24 DESIGN  
& MAKE

 AUTODESK





# Data and digitization are revolutionizing factories

**At the exciting intersection of AI and automated processes, advanced machines and robots, and extended reality (XR) technologies, modern factories—often risk-averse—are making tremendous leaps toward a more efficient, more sustainable future.**

The engine driving such rapid change is accessibility to data, and technology that helps translate mountains of disparate datasets into actionable insights that help organizations collaborate and innovate across the entire factory lifecycle.

Digitally mature organizations are reaping the benefits of digital transformation in their factories—41% of respondents to Autodesk's 2024 State of Design & Make survey in the automotive, process manufacturing, building products, and industrial machinery industries say increased productivity is the top benefit of digitization and that, on average, digital investments have improved productivity by 62%.

To better plan, design, build, and operate their facilities; to reconfigure them more quickly; and to maximize the efficiency and productivity of every asset throughout the factory lifecycle, leaders need to plan for, and invest in, a digital future. Because digital transformation for factories is no longer optional—it's essential.



## Top Insight

# 01

# Design and manufacturing is outperforming expectations

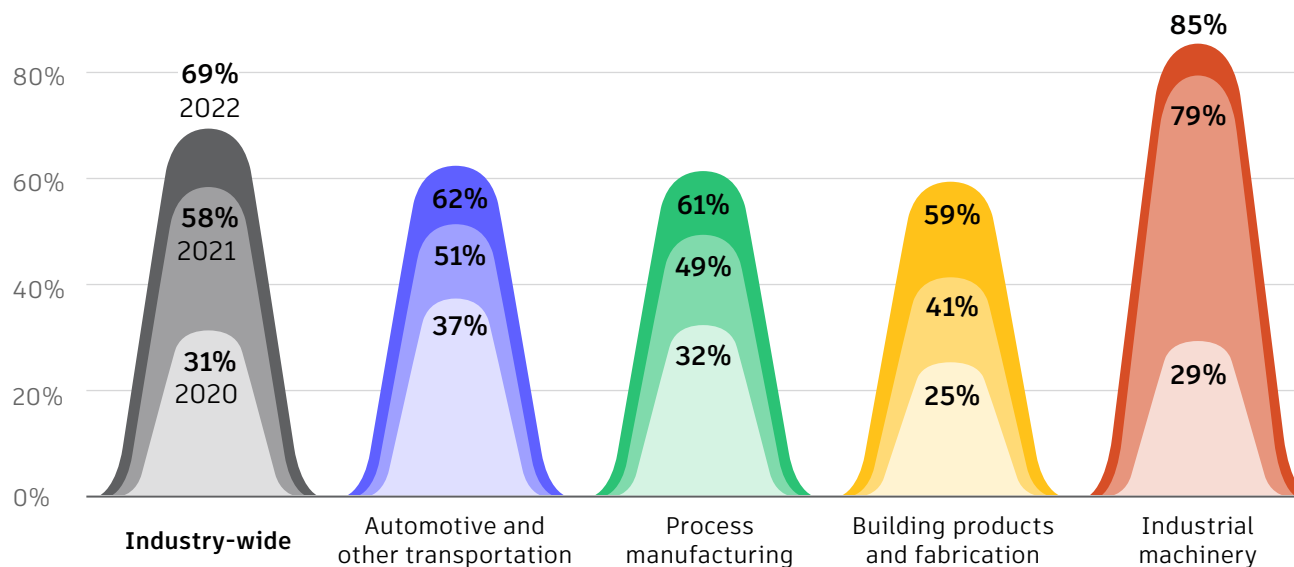
“We’ve introduced a completely new design process to speed up workflows and achieve our targets. **Digitalization in the automotive industry is vital**, but we’ve found a good balance between full digitalization and maintaining the heritage of the company.”

– **Dave Amantea**, Chief Design Officer, Automobili Pininfarina, a luxury electric vehicle manufacturer

## 93%

of leaders and experts feel they are **keeping up with the rate of change in their industry**

Percentage of businesses that outperformed corporate expectations



Survey question: How has your company or organization performed compared to corporate expectations in each of the last 3 years? In 2020, in 2021, in 2022. 5-point scale. Top two = above average performance.

**“The biggest challenge is the long-term support of automated systems.** The more you automate, the more technical your resources need to be. This requires engineers who can troubleshoot PLC programming and electrical issues. Training people to be good troubleshooters and technically skilled in various areas is crucial.”

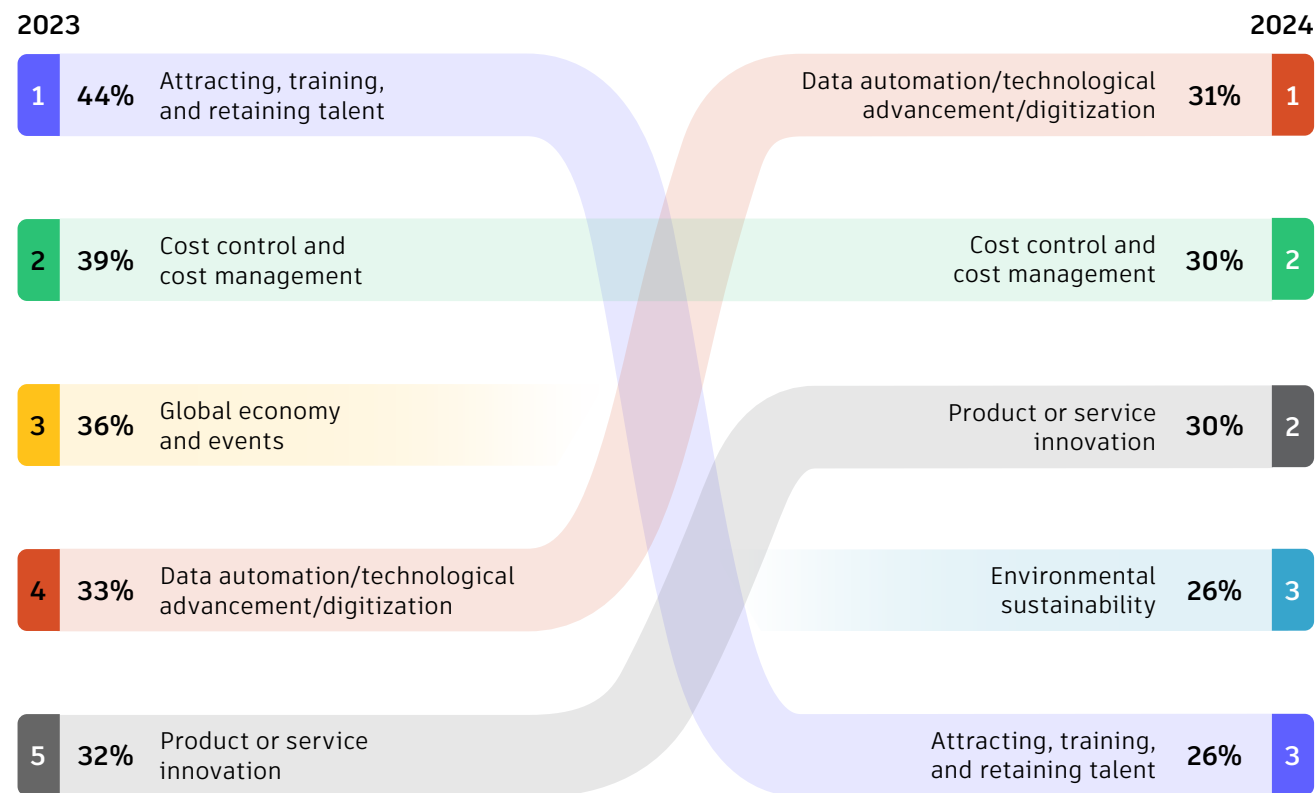
– **Clint Allen**, Senior Director of Design and Reliability Engineering, Sherwin Williams, a global leader in paints and coatings

**“The biggest challenge is that the market is changing almost every day.** If you want to stay on-trend, you need to make your processes faster and invest in helping your team be more efficient. It’s much more difficult than the last several years.”

– **Jinchun Hu**, General Manager, JAC Italy Design Center S.R.L, an automobile and commercial vehicle manufacturer

# Data and tech advancements top list of challenges for factory industries

## Top 5 business challenges showing year-over-year change



Survey question: What are the top 3 challenges your company or organization faces today? Select up to three.



## Top Insight

# 03

## Factory leaders are all-in on tech investment

**“We’ve made good progress on our digital transformation journey.** Business process mapping is already done and we are now strengthening the business system platforms. A key challenge will be how we change the culture of our customers—they are our partners in this digital system.”

—**Cucu Juanda**, Head of Business Systems and Automation, PT Sanggar Sarana Baja, an industrial machinery company

### Strongly increased investments in technology

26%

20%

24%

16%

36%

Industry-wide

Automotive and other transportation

Process manufacturing

Building products and fabrication

Industrial machinery

### Strongly increased overall investments

11%

9%

12%

6%

15%

Survey question: How has your company or organization's investment in the following changed over the past 3 years?

# Digitally mature companies see greater business success

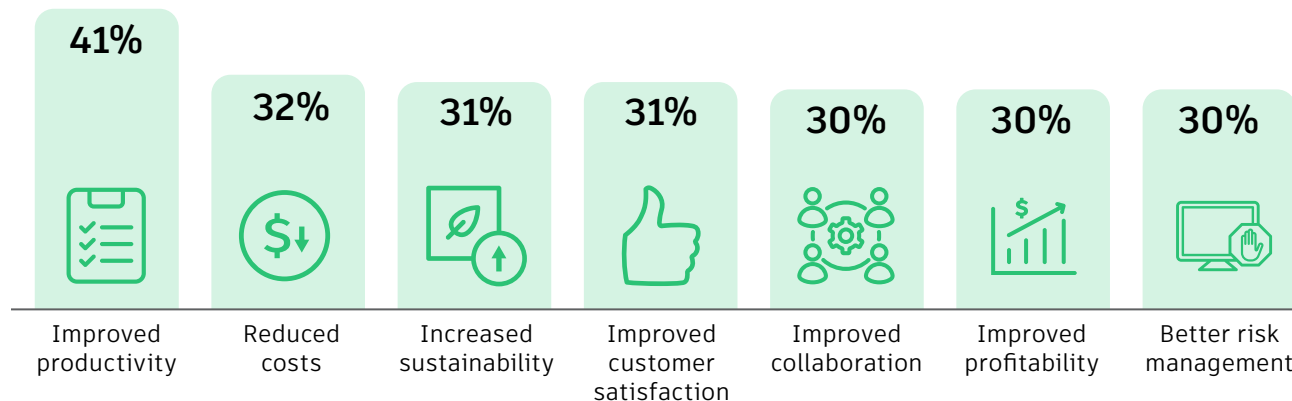
“We’ve been on this digital transformation journey for many years. It’s really come to life over the past year and energized the business. **It’s become a Trojan Horse for driving other changes** because that vision has gotten so much clearer.”

–**Dave Amantea**, Chief Design Officer, Automobili Pininfarina, a luxury electric vehicle manufacturer

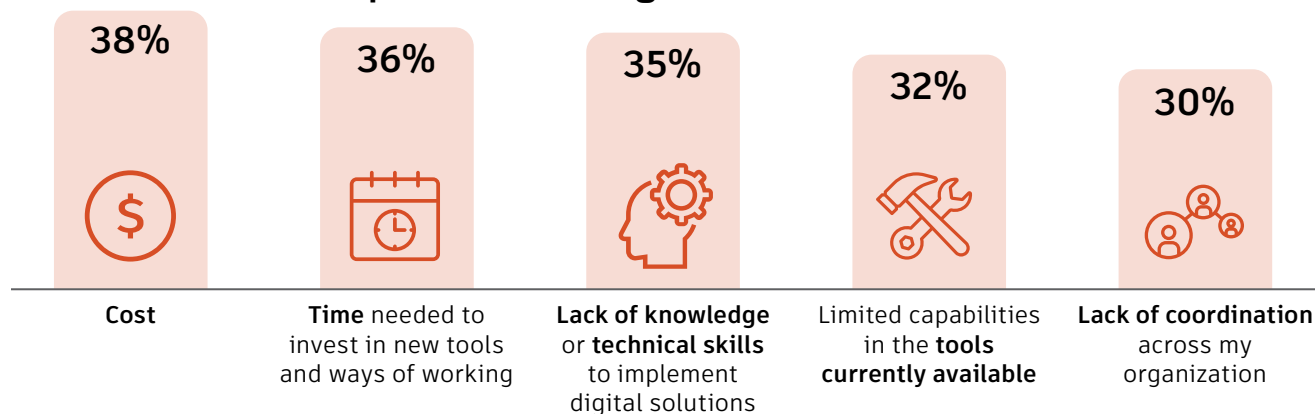
“**Mindset is the number one barrier to digital transformation.** People want to do what they’re good at. We call it habitual resistance to something which they’re not familiar with.”

–**Miro Lin**, Chief Executive Officer of Machine Tool Business Group (Taichung), Fair Friend Group, a machine and equipment manufacturing firm

## Top advantages of digital transformation



## Top barriers of digital transformation



Top ranked response to survey question: Has your company or organization experienced any of the following benefits of digital transformation?  
 Top ranked response to survey question: What are the barriers to digital transformation in your company or organization?



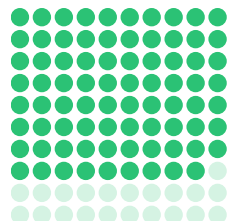
# Leaders agree: AI is transformative and essential for the future

“There are challenges, but also opportunities. **The best opportunity is AI. We can do more, even better, with less.** For example, using the same resources as before, we can create three or four proposals at the same time instead of only one.”

– **Jinchun Hu**, General Manager, JAC Italy Design Center S.R.L, an automobile and commercial vehicle

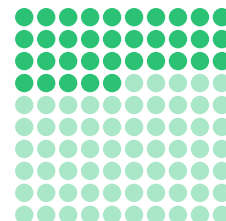
“**In five years, I hope AI can help us reduce costs, improve productivity, and better forecast demand.** It could also help us develop more efficient production schedules, reducing cross-contamination and increasing overall efficiency.”

– **Clint Allen**, Senior Director of Design and Reliability Engineering, Sherwin Williams, a global leader in paints and coatings



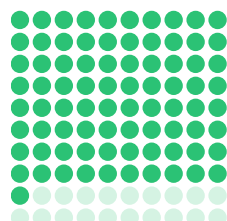
79%

trust AI technologies for their industry



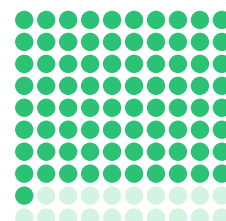
35%

of respondents say AI will destabilize their industry



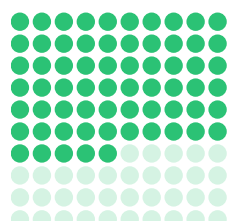
81%

agree AI will enhance their industry



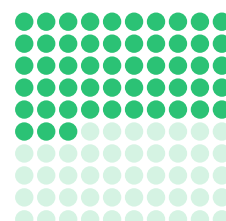
81%

agree AI will make the industry more creative



65%

agree in 2-3 years AI will be essential across the board



53%

say they are approaching or have already achieved their goal of incorporating AI

Source: 2024 State of Design & Make report



## Top Insight

# 05

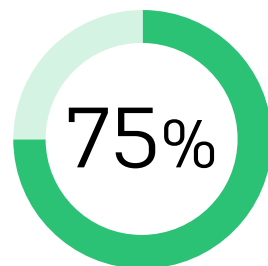
# Training and upskilling are essential for factories of the future

“The most difficult thing in a company is hiring people with the right attitude. **Skills, you can teach, but not attitude and mentality.**”

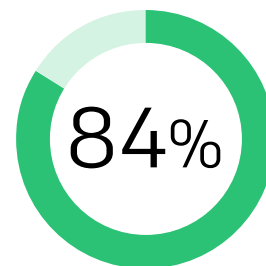
—**Dave Amantea**, Chief Design Officer, Automobili Pininfarina, a luxury electric vehicle manufacturer

“**Organizations need to develop internal partnership programs and mentorship opportunities.** Our plants with union labor benefit from apprenticeship programs that produce skilled workers. Whether through unions or internal programs, creating a pipeline for skilled trades is essential for future success.”

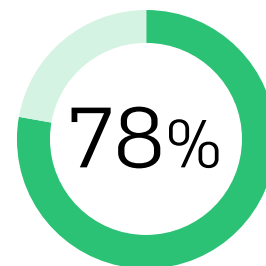
—**Clint Allen**, Senior Director of Design and Reliability Engineering, Sherwin Williams, a global leader in paints and coatings



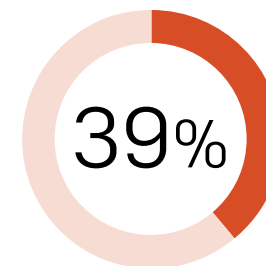
are implementing continuous learning



say upskilling is important to their company

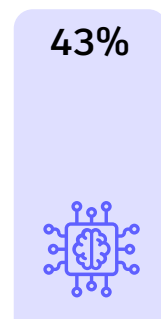


say they are investing training programs for digital skills

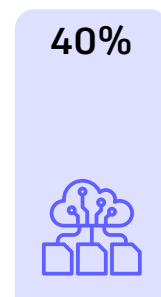


don't have the skills or the resources to design internal programs

## Top skills of the future



Ability to implement / work with AI



Digital project management



Digital design skills



Software development / programming



Knowledge of data safety and security

Survey question: What technical or digital skills do you believe your company or organization will be prioritizing when hiring over the next 3 years? Select all that apply.



# Companies are taking a multipronged approach to filling gaps in their workforce

“There is a tightness in the labor market. There’s a stack of engineering work to be done and there’s probably not enough engineers, especially ones with the expertise that you need. Attracting people to the field is a longer-term issue. **How do we grow the talent pool and mentor people to develop into really great engineers? If we don’t solve this problem, then we’re always going to be in this position.**”

– Dave Mackenzie, Managing Principal for Digital, Aurecon, a design, engineering, and advisory firm



3 in 4

or 76%, say digital maturity helps attract talent



3 in 4

or 76%, say sustainability efforts attract and help retain talent



3 in 4

or 72%, say sustainability efforts impact job satisfaction



1 in 4

or 37%, say supplementing a skills gap was a use case for AI at their company

Source: 2024 State of Design & Make report

# Factory leaders go all-in on sustainability

**“Sustainability is about environment, but also about talent.** It’s about sustainable business models and providing well-being for employees. It’s about providing learning and equitable access to opportunity—everything from our business inclusion groups, all the way up to executive compensation being tied to DEI progress.”

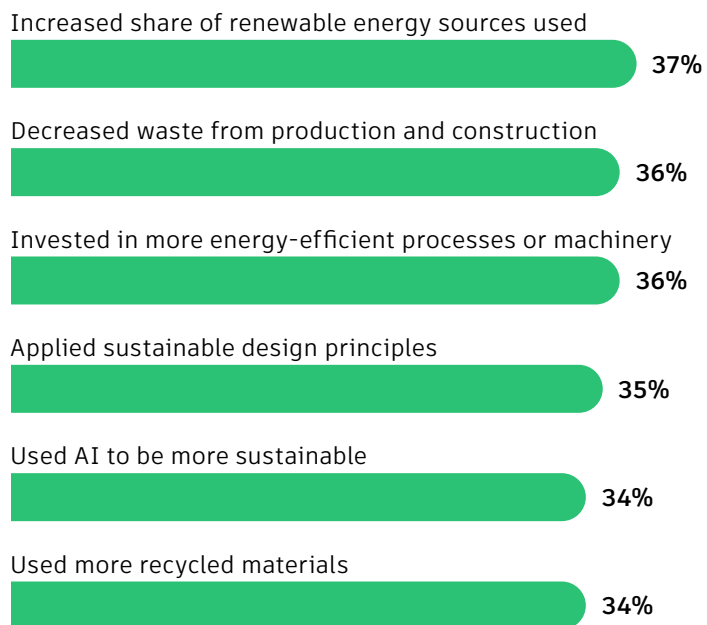
—**Kim Dabbs**, Global VP, ESG and Social Innovation, Steelcase, a furniture manufacturer

“Some of our clients from Europe and the United States started to remind us to reduce emissions, and sooner or later we will have to do it. **So why not take the initiative to do it in advance?**”

—**Miro Lin**, Chief Executive Officer of Machine Tool Business Group (Taichung), Fair Friend Group, a machine and equipment manufacturing firm

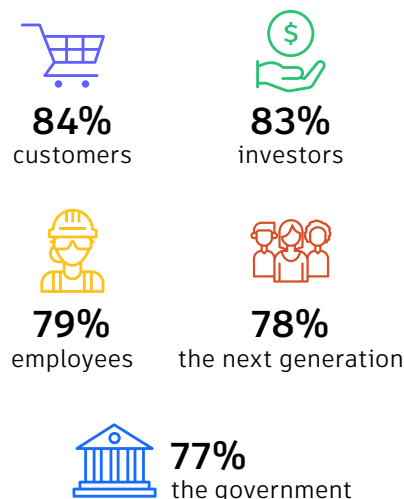
**97%** of organizations are taking steps to improve sustainability

## Sustainability actions taken by companies



Survey question: What changes has your company or organization already made to be more sustainable? Select all that apply.

## Top motivators of sustainability goals



Survey question: How influential are the following groups in pressuring your company or organization to create and meet sustainability goals?

# Sustainable factories are the future

“We focus on Brownfield expansions and reducing clean-out and wash water generation to improve productivity, which indirectly drives sustainability. Some of our sites are zero to landfill, and we’re working on reducing compressed air usage by trialing motorized air-operated double diaphragm pumps.”

—Clint Allen, Senior Director of Design and Reliability Engineering, Sherwin Williams, a global leader in paints and coatings

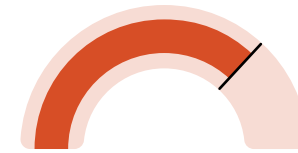
“We’ve embedded sustainability into everything that we do. It’s not just a sustainability team—we had a cross-functional team that built a sustainable design framework and now everything that we produce goes through that framework. This is critical to changing the entire ecosystem and not just pockets of the ecosystem.”

—Kim Dabbs, Global VP, ESG and Social Innovation, Steelcase, a furniture manufacturer



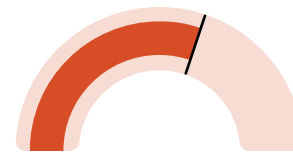
81%

say sustainability initiatives are a key part of their company’s **business growth strategy** for the next three years



74%

say that sustainability goals are **no longer a nice to have, but a requirement** of modern business



61%

of leaders and experts say sustainability is **good for short-term business**



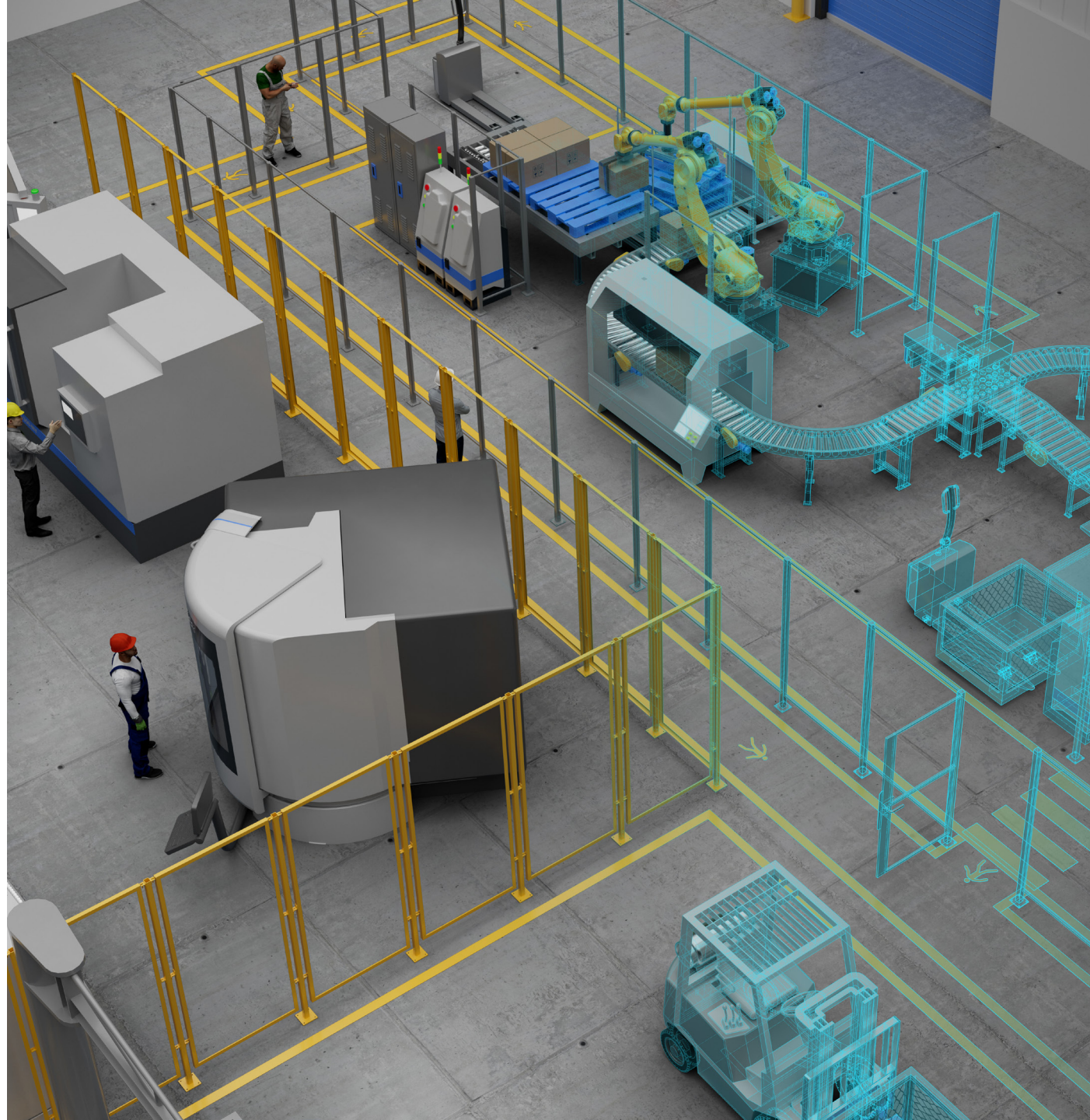
86%

of leaders and experts say sustainability is **good for long-term business**

Source: 2024 State of Design & Make report

# Learn more about digital factory

The full State of Design & Make: Spotlight on Digital Factory will publish in January 2025.



## **About the *Spotlight on Digital Factories* report**

Data for the *Spotlight on Digital Factories* report was compiled from the Autodesk *2024 State of Design & Make* survey. This year's survey is comprised of 5,398 industry leaders, futurists, and experts in architecture, engineering, construction, and operations; design and manufacturing; and media and entertainment from countries around the globe. More information about the *2024 State of Design & Make* survey and report can be found [here](#).

For the purposes of the *Spotlight on Digital Factories* report, we combined *2024 State of Design & Make* survey data from the automotive, process manufacturing, building products, and industrial machinery subindustries, totaling 1,100 respondents.

The *Spotlight on Digital Factories* report also includes qualitative interviews from business leaders and experts across the automotive, process manufacturing, building products, and industrial machinery industries.

## **About Autodesk**

Autodesk is changing how the world is designed and made. Its technology spans architecture, engineering, construction, product design, manufacturing, and media and entertainment, empowering innovators everywhere to solve challenges big and small. From greener buildings to smarter products to more mesmerizing blockbusters, Autodesk software helps customers design and make a better world for all. For more information, visit [autodesk.com](https://autodesk.com) or follow [@autodesk](#) on social media.

Contact Autodesk at [state.of.design.and.make@autodesk.com](mailto:state.of.design.and.make@autodesk.com) about this research report or to sign up to participate to future research programs.



The information provided in this report is for general informational purposes only and strictly for the convenience of our customers. Autodesk Inc. does not endorse or warrant the accuracy or completeness of any information, text, graphic, links, or other items contained within the report.

Autodesk Inc. does not guarantee that you will achieve any specific outcomes or results if you follow any advice in the report.

© 2024 Autodesk Inc. All rights reserved.