AUGURY

The State of Production Health 2023

How manufacturers are leveraging machine, process, and operational data

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Introduction and Key Findings

Industry 4.0 and Beyond: Is It All Coming Together for Manufacturers?

What does it take to be resilient in manufacturing today? What does the future hold for manufacturers? Amid uncertain economic conditions, organizations are managing a growing number of industry challenges: The never-ending need for efficiency and cost reduction, knowledge transfer issues and replacing an aging workforce, upskilling plant-floor workers and improving safety, creating and attaining sustainability goals, and meeting increased demand with a recovering supply chain. It's a balancing act that gets more complex every year.

A decade ago, organizations set their sights on Industry 4.0—the digital, connected, data-driven ideal that would modernize manufacturing. Today, only a small percentage believe they've attained that ideal and big challenges still remain:

01 Production defects still cause $3.3B in annual waste

02 10-20% of production capacity is untapped

03 1B people need upgraded skills

04 The industrial sector contributes 30% of global emissions

With talk of Industry 5.0 entering the conversation—where repetitive tasks are left to automation so people have time to focus on higher-level work—how can decision makers plan for meaningful and profitable progress, strategize for scalable success, and see how their hurdles compare to other manufacturers?

The State of Production Health

This inaugural "State of Production Health" report identifies challenges, trends, and best practices in manufacturing's quest to balance the competing demands of profits, people, and the environment. It also highlights the opportunities an approach founded on production health can create (see box below – What is Production Health?). We asked 500 manufacturing stakeholders for candid takes on topics such as their struggles with technology, roadblocks to meeting their full production potential, workforce concerns, and their views on the future of manufacturing. What we found goes far beyond the questions we posed, revealing outdated practices and missed opportunities, conflicting priorities between corporate and plant teams, and much more.

We hope this report serves as a guide to better understanding today's manufacturing environment, and that readers use it to measure the state of production health at their own businesses. Most importantly, we hope the data and analysis creates conversation and sparks action as you work to balance competing demands while finding a competitive advantage in your industry.

What Is Production Health?

Production Health transforms manufacturing and industry by removing the friction created by competing business goals. Using AI-driven insights into machines, processes, and operations, companies can improve business outcomes, empower their workforce, and achieve sustainable production, all at the same time.

Methodology

We commissioned a survey of 500 full-time employees, at VP level or of higher seniority from the U.S. and Europe. Respondents work in industries including consumer packaged goods, food and beverage, paper and packaging, building materials, cement, wood, mining, oil and gas, and chemicals. All companies have an annual revenue of $100M+. We screened for companies with five or more manufacturing sites, and for plant leadership positions and C-suite employees who were focused on manufacturing, digital transformation, or supply chain.

This report was administered online by Global Surveyz Research, a global research firm. The respondents were recruited through a global B2B research panel, invited via email to complete the survey, with all responses collected during Q1 2023. The average amount of time spent on the survey was 5 minutes and 44 seconds. The answers to the majority of the non-numerical questions were randomized in order to prevent order bias in the answers.

Key Findings

01

Manufacturers don't know their real production potential

What's possible for production capabilities? Manufacturers seem to be thinking too small: 70% of organizations rank the ability to meet their full production potential as good to excellent, but **many struggle to quantify Artificial Intelligence (AI) investments and say unreliable equipment and unplanned downtime** prevent them from reaching operational goals. These hurdles are actually hidden opportunities—such knowledge gaps and inefficiencies are not the unavoidable business costs they used to be.

02

Technology is leaving teams data-rich but insight-poor

While AI is used widely across the manufacturing landscape—for production health, supply chain management, energy consumption, machine health, and other areas—measuring the ROI of these initiatives is proving difficult. Findings show that no area is quantifiable for more than a quarter of companies, which leaves businesses in the dark on two fronts: **They can't tell what's paying off for the bottom line, and they are likely amassing data they can't act on.**

03

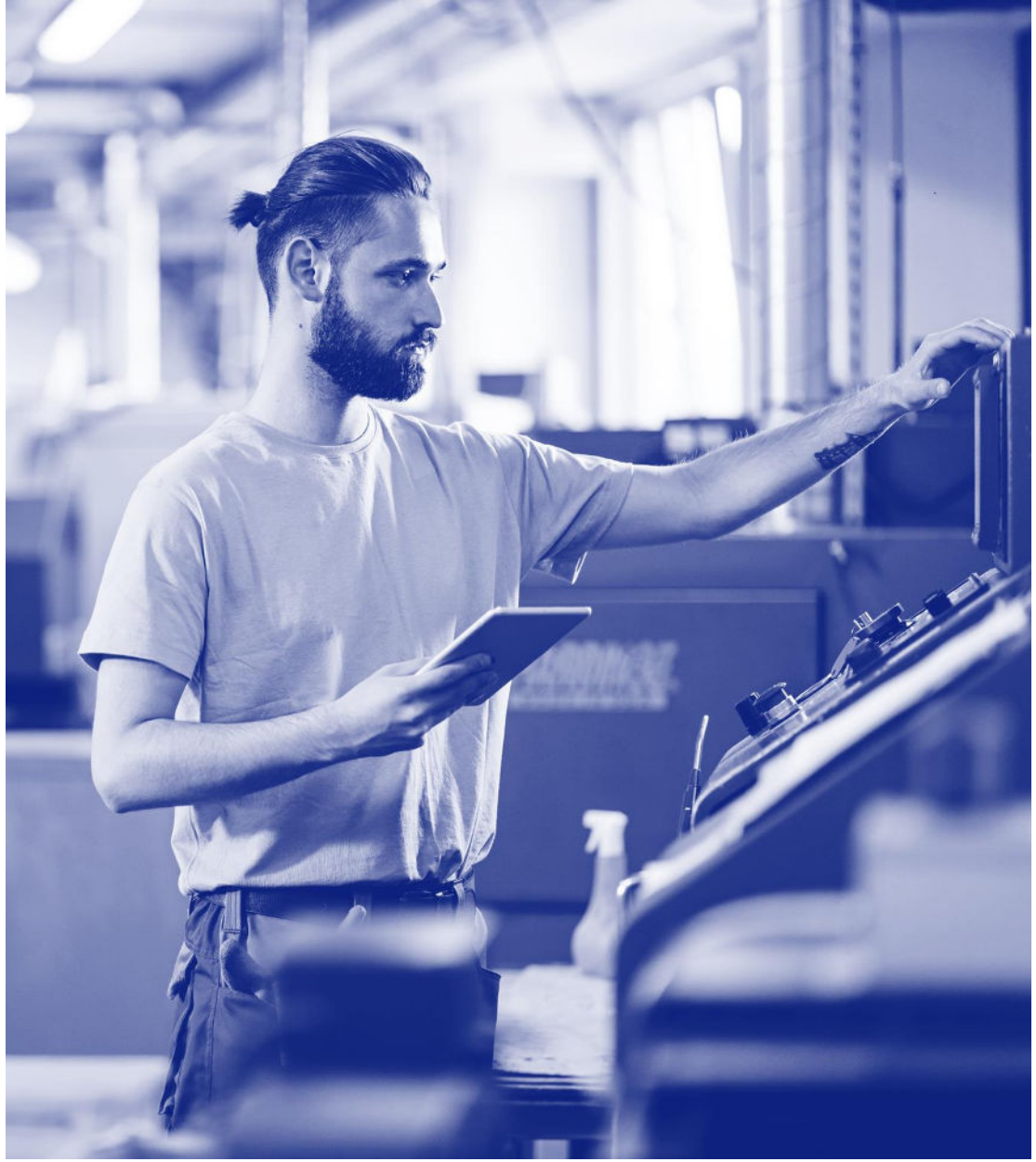
Production health rivals supply chain for AI investment

While production health is a fairly new idea in manufacturing, it ranked second among top AI use cases, just behind supply chain optimization (40% and 41% respectively). As organizations embrace IoT connectivity and move closer to realizing Industry 4.0 digitization, production health—visualizing the data that connects machines, processes, and operations—will emerge as the foundation for **balancing competing production demands, meeting upskilling needs, and achieving sustainability goals.**

04

Few see that sustainability is a win-win opportunity

71% of manufacturers say that sustainability targets either hurt or have no impact on their ability to meet production goals. In reality, **optimizing machines and processes for cleaner, less wasteful production also optimizes them for efficiency, safety, uptime, and capacity, which all lead to more profitable operations.** Plus, sustainability is top of mind with investors and today's incoming workforce, who are looking for companies with a sense of purpose.



05

The future of manufacturing stirs mixed emotions

What does the future hold for our industry? It depends on the specific topic and how one reads the data. **Just 22% of respondents feel optimistic about the future of the industry, a number that drops even lower for the C-suite in particular.** Other worries include supply chain disruptions, the economy, and onshoring, but nearly a third say that advanced technologies will help create new jobs in manufacturing. While that's still a minority, given oft-cited concerns over AI and automation, it's arguably a surprising bright spot.

As businesses continue to leverage such AI advancements and the workforce begins to see their potential as a useful "co-pilot," it wouldn't be surprising to see that percentage increase over time.

Manufacturing Challenges and Economic Environment

Critical Manufacturing Challenges

Many Pains, But the Theme Is Efficiency

Asked to choose their biggest challenges, respondents' answers came out fairly even across all challenges, which in itself highlights a problem—how to prioritize pain points.

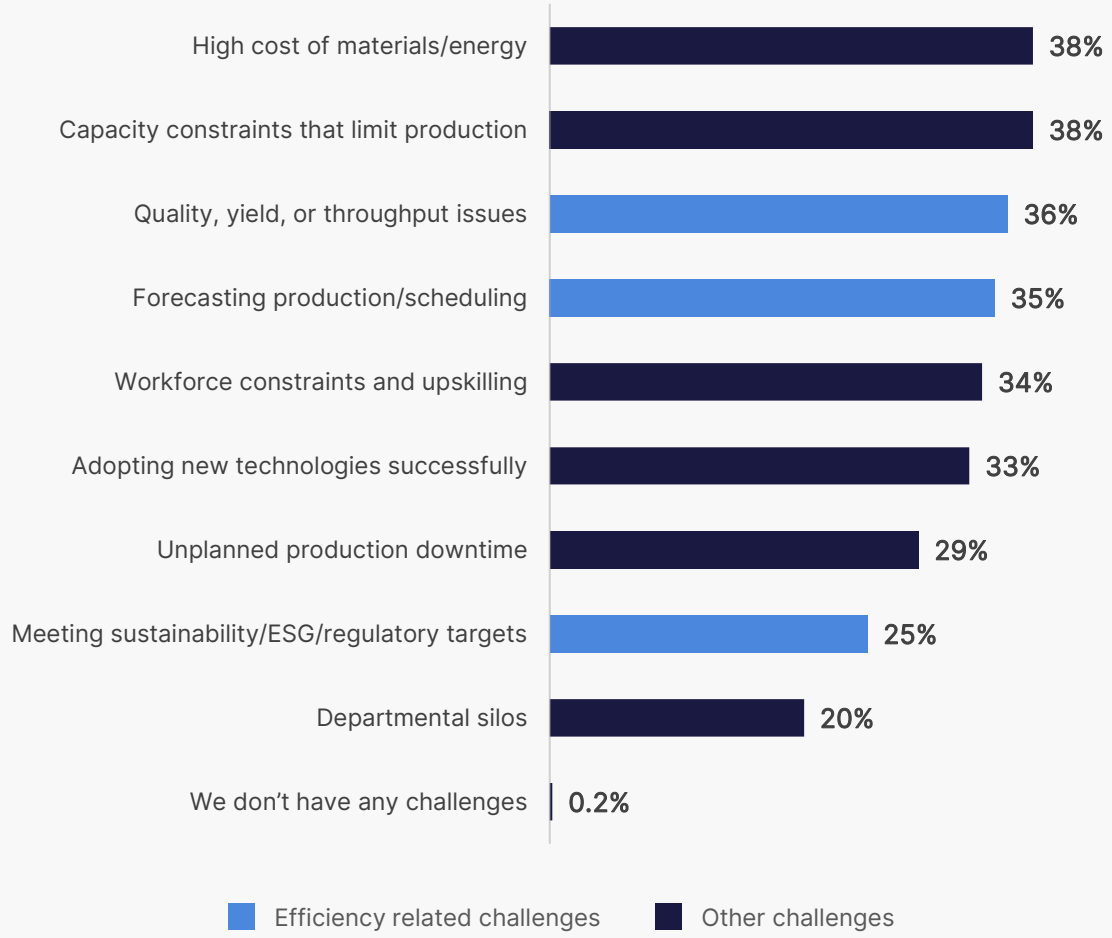
While challenges run the operational gamut, efficiency issues dominate the list, including quality, yield, and throughput issues (36%); forecasting production/scheduling (35%); and meeting sustainability and ESG targets (25%).

Further Reading

Why Overall Line Efficiency Is a Necessary Metric for Industry 4.0

Figure 1

What are your biggest manufacturing challenges?



*Question allowed more than one answer so percentages will add up to more than 100%

Roadblocks to 2023 Operational Goals

Machine Concerns Loom Large

While staffing problems took a not-surprising second place, machine health is more important than any other issue: combining outdated or unreliable manufacturing equipment (19%) with unplanned downtime (16%) brings the total to 35%.

Machines fail for a variety of reasons, including lack of operational data, and getting a handle on asset reliability can have a significant positive impact on bolstering supply chains.

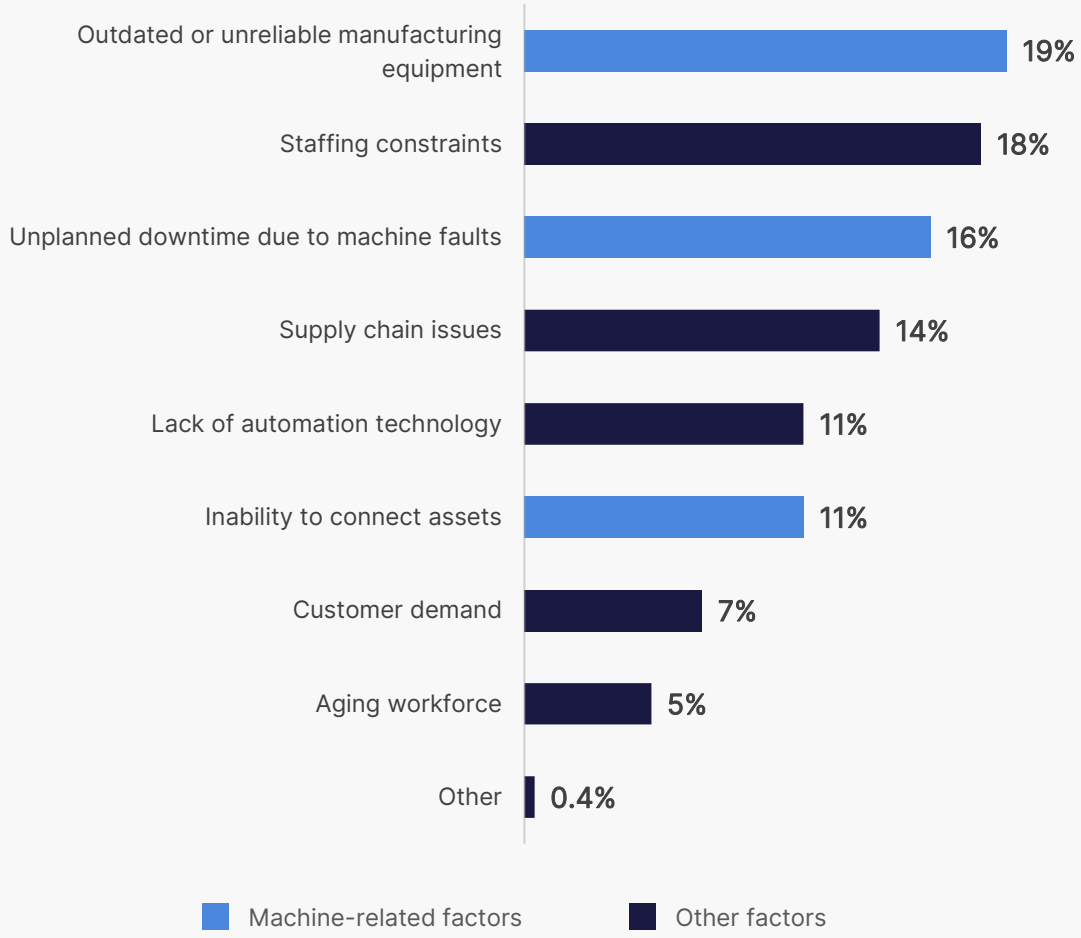
Further Reading

Getting Smarter about Machine Health to Improve Supply Chain Reliability

*Percentages do not add up to 100% due to rounding up of numbers.

Figure 2

What could limit your ability to meet business goals over the next 18 months?



Ability to Meet Full Production Potential

Manufacturers Don't Know Their True Potential

A strong majority of organizations (70%) say they're meeting their full production potential. However, their confidence conflicts with the sentiment in Figure 6 (page 14) and Figure 2 (page 10).

Figure 6 shows that only 21% are able to quantify AI investments in production health; in Figure 2, 35% cite machine health as a key concern.

Manufacturers appear to be unaware of the true potential of their production lines—maybe due to outdated processes or possibly obsolete expectations. They may not realize they can do much more with the machines and processes they already have in place.

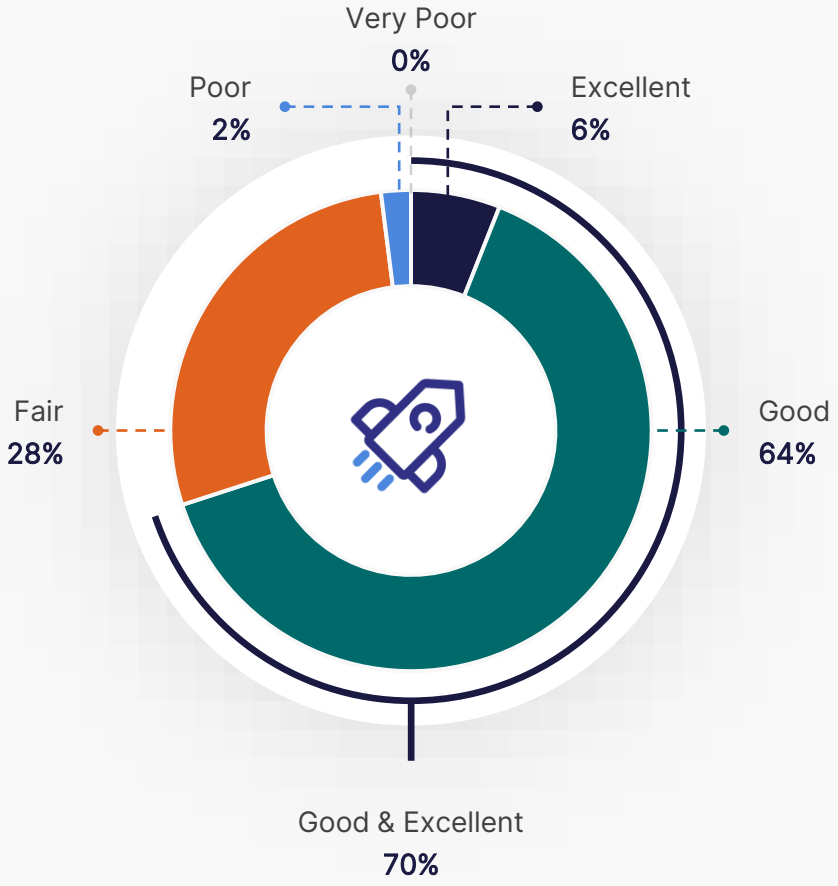
It is estimated that 10-20% of manufacturing capacity is **"shadow capacity,"** or production capabilities that exist within current manufacturing lines but are going unused. By unlocking shadow capacity with targeted AI insights, manufacturers can achieve more than they thought possible.

Further Reading

Manufacturing's Top 4 Pain Points and How to Solve Them

Figure 3

How would you rate your organization's ability to meet its full production potential?



Technology Adoption and Business Outcomes

Leveraging AI

AI Is Becoming a Standard Business Tool

Production health is now rivaling supply chain management as the top AI use case, signaling a shift toward overall operational connectivity and visualization.

The top three responses—supply chain optimization (41%), production health (40%), and tracking energy consumption (37%)—show that businesses are using AI for its intended purpose—solving issues they haven't been able to overcome by traditional means.

Lower percentages for machine and process health indicate that companies are just beginning to see what AI can achieve in these areas.

Regional Differences in AI Use

Comparing use of AI for production health by region, the survey found that U.S. companies lag behind Europe, perhaps because of stricter European regulatory standards.

Additional regulations will likely hit state-side before long, so U.S. companies should take note. By addressing the issue early, businesses can grab hold of a competitive advantage.

*Question allowed more than one answer so percentages will add up to more than 100%

Figure 4

How are manufacturers leveraging AI?

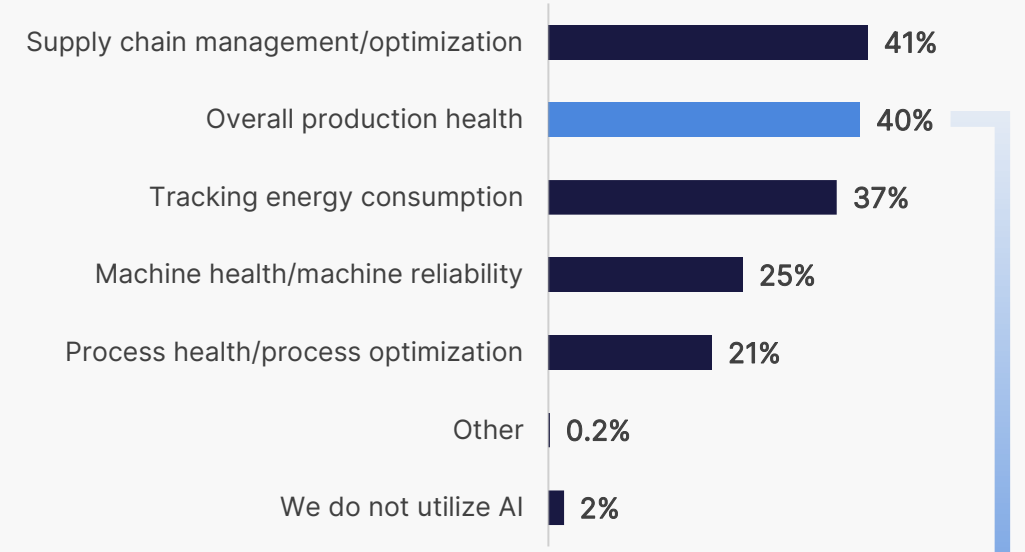
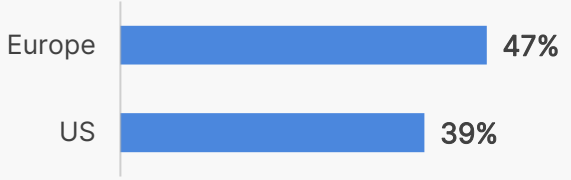


Figure 5

"Overall production health", by region



Quantifying the Impact of AI

For Many, the Promise of AI Is Elusive

Manufacturers might be embracing AI, but many are getting only a fraction of the full value from their investment.

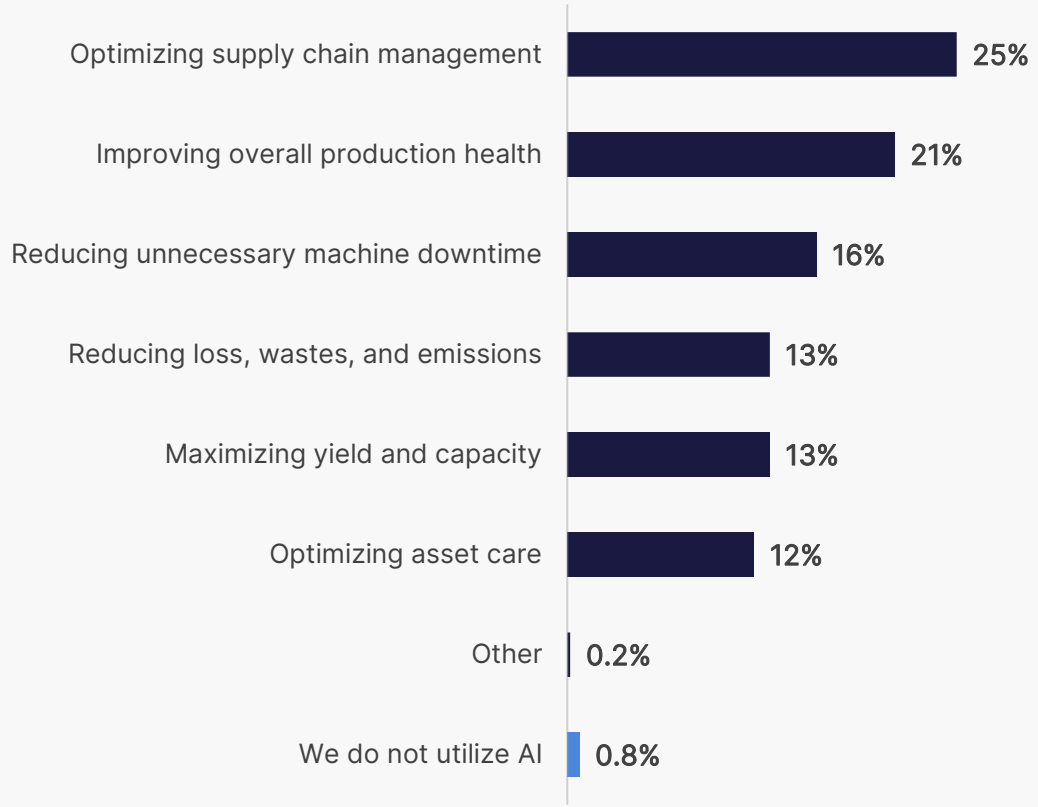
With the top quantifiable capability being optimizing supply chain management (only cited by 25% of companies), a lot of AI capabilities and benefits are being left on the table. Just 21% say that they can quantify their ROI when using AI to improve overall production health.

Getting the Most from Industrial AI

Manufacturers need to know which solution is best suited for their own unique sets of challenges and be able to measure the impact. As generative AI like ChatGPT provokes a seismic shift, businesses should look to purpose-built solutions that offer prescriptive actions and tie insights to outcomes, before they can think about effectively onboarding new innovations.

Figure 6

For which areas are you able to quantify the impact of AI in meeting business objectives?



*Percentages do not add up to 100% due to rounding up of numbers.

Top AI Objectives

High Hopes for Solving Complex Problems

Companies are using AI to address a wide range of critical challenges, with workforce upskilling ranking first overall. This is great news for business leaders who need solutions to staffing problems, and it's great news for workers: new tech skills will improve their work and provide opportunities for new roles and higher-level tasks. It can also increase their value to the business.

Digging into the data, upskilling is especially important in the mining (39%), building materials (36%), and food and beverage (29%) verticals. An aging workforce is particularly challenging in mining, an environment where roles have been learned on the job and passed on first-hand, often from one generation to the next. Disruptions to those historical norms have produced significant skills gaps.

Figure 7

What are your top objectives for leveraging AI in 2023?

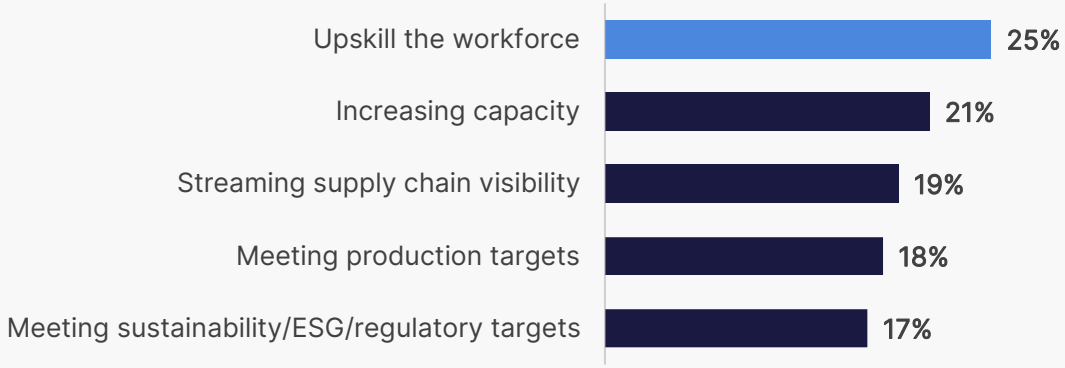
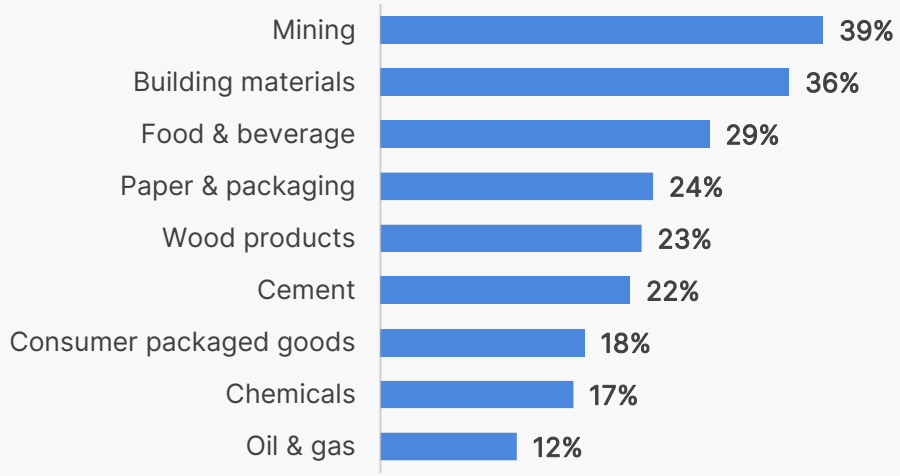


Figure 8

"Upskilling the workforce", by industry



Ability to Solve Production Problems with AI

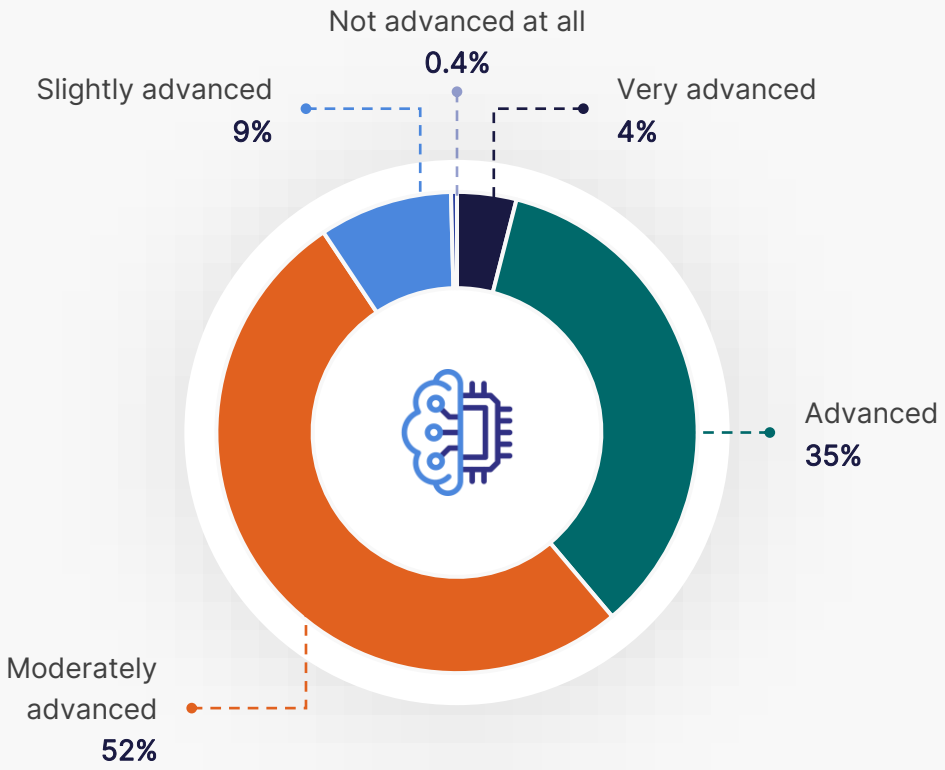
Do Manufacturers Overstate AI Confidence?

A large majority (87%) say they are either advanced or moderately advanced in using AI for solving specific production problems. Less than 1% call themselves not advanced at all.

This confidence is at odds with their lack of ability to quantify the business impact of AI on several fronts (Figure 6). This combination means most companies are missing an opportunity to fully utilize already available AI insights to transform, upskill, and build more resilient operations.

Figure 9

How advanced are you in solving specific production problems using AI?



AI and Production Goals

AI Is Firmly Entrenched in the Industrial Sector

The top AI production goals are quite varied and include improving quality, yield, and throughput (33%); managing the cost of materials and energy (31%); and reducing unplanned production downtime (28%).

As companies apply AI in many places, they may not realize where AI can really move the needle. AI adoption can help manufacturers reach their ESG goals, bolster capacity, meet production targets, and improve team coordination, issues that are close to the bottom in terms of existing goals.

*Question allowed more than one answer so percentages will add up to more than 100%.

Figure 10

What are your production goals in terms of AI usage?

Roadblocks to AI Adoption

Hurdles Exist—So Do Strategies for Surmounting Them

The top roadblocks to adopting AI tools are cybersecurity concerns (47%), process and operational hurdles (35%), and poor data quality (33%).

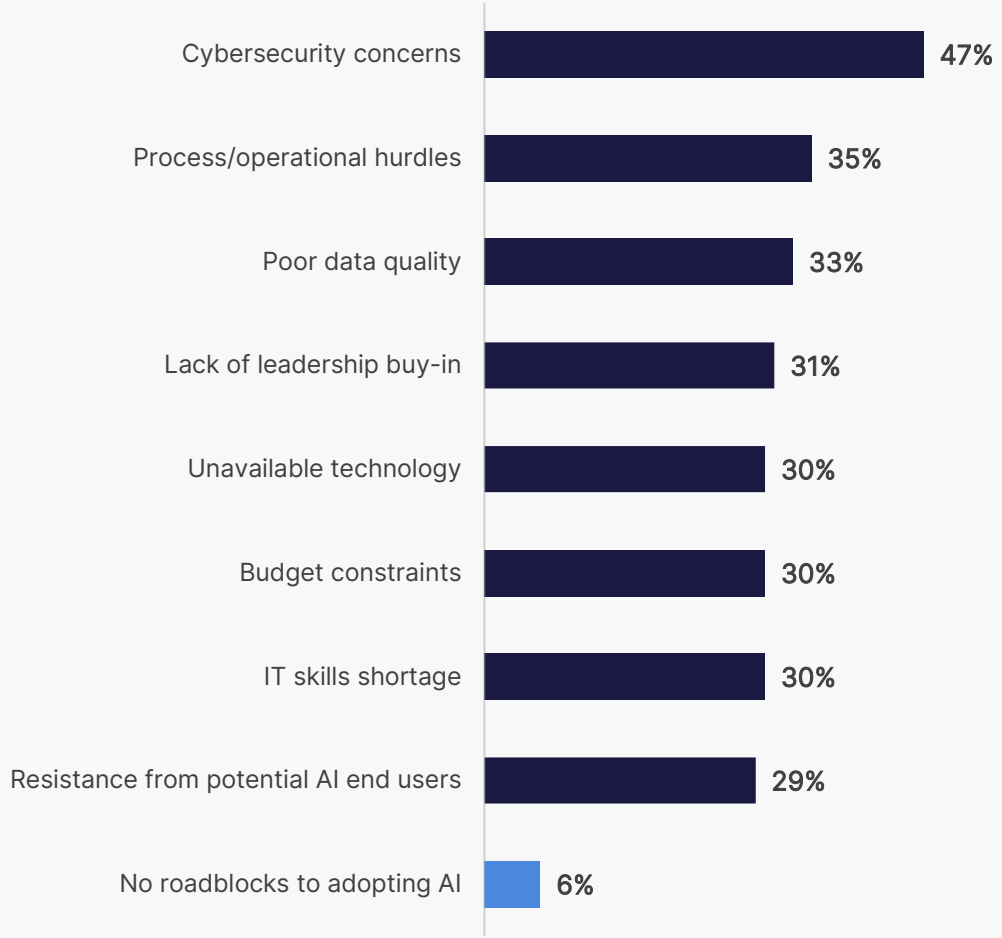
Many of these could be reduced or eliminated with better strategizing and planning at the outset. Organizations should focus on identifying the right solution to a particular challenge rather than looking for a cure-all. Additionally, a clear onboarding process that gives users the right training will lead to greater adoption, capture real business value from the technology, and more benefits.

Further Reading

Artificial Intelligence: The Driving Force Of Industry 4.0

Figure 11

What roadblocks prevent your business from adopting AI tools?



*Question allowed more than one answer so percentages will add up to more than 100%.

Investing in AI

Amid Economic Fears, Tech Investment Rises

Just 3% of manufacturers plan to reduce the amount they spend on AI this year, with 63% increasing their AI budgets. Of those who are spending more in 2023, the average increase is 17%, showing that manufacturers aren't backing down from AI investments. On the contrary, most are ready to dive deeper.

Despite uncertain economic conditions, there appears to be a comfort and confidence in the potential of AI technology. While many companies are not there yet, there is an understanding that Industry 4.0 works—everyone recognizes the need for digital tools, real-time insights, and leveraging AI. The sooner they get there the better: Manufacturing is already talking about Industry 5.0, which will usher in an era of hybrid intelligence with AI as a co-pilot for nearly every worker at every level.

Figure 12

Plans for investing in AI in 2023 compared to 2022

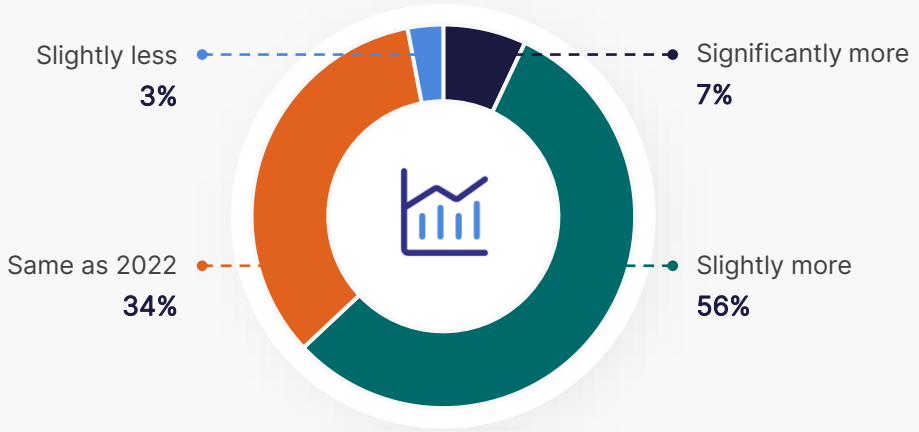
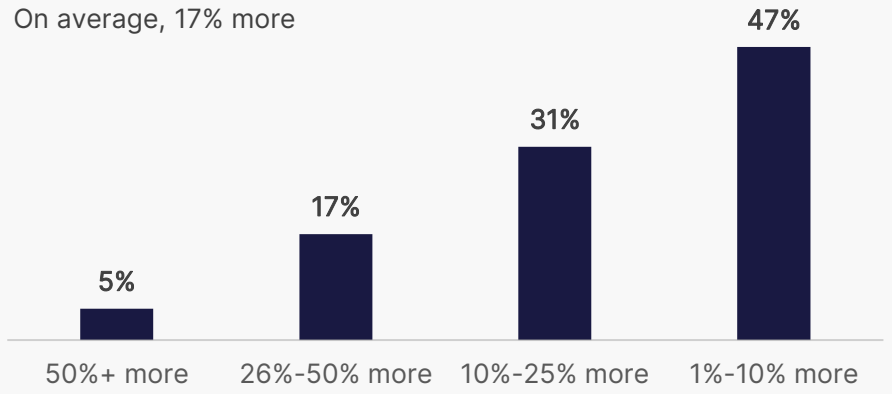


Figure 13

How much more are manufacturers investing in 2023?



Sustainability and ESG

Sustainability Targets and Key KPIs

Misconceptions and Missed Opportunities in Sustainability

Just over a quarter (26%) of respondents say their sustainability targets hurt their ability to meet production goals, while 45% say they have no impact, and just 29% say sustainability targets improve their ability to meet production goals. That means, in total, 71% believe sustainability is a negative at worst, and a wash at best.

Manufacturers may be missing an opportunity to align their business KPIs with their sustainability targets, as AI and production health strategies can benefit both: Healthier production means safer working conditions, less waste, and less emissions, all of which can have profoundly positive business impacts. Sustainable business practices and profitability are not opposing forces. They are in fact symbiotic, if approached strategically.

Breaking it Down by Industry

The top industries that feel sustainability targets work against their ability to meet KPIs are mining (55%), wood production (52%), and oil and gas (39%). These sectors often contend with tighter regulations, but that only makes the potential for AI even greater.

Figure 14

Sustainability targets and key KPIs

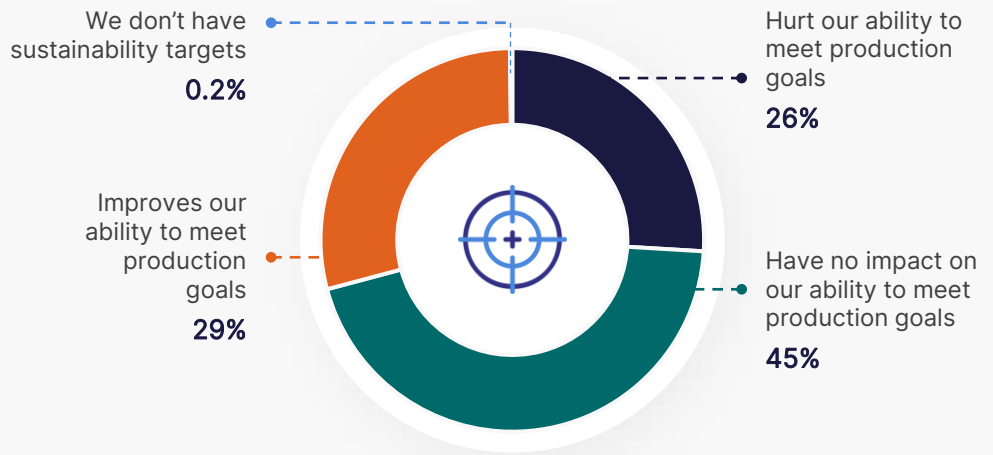
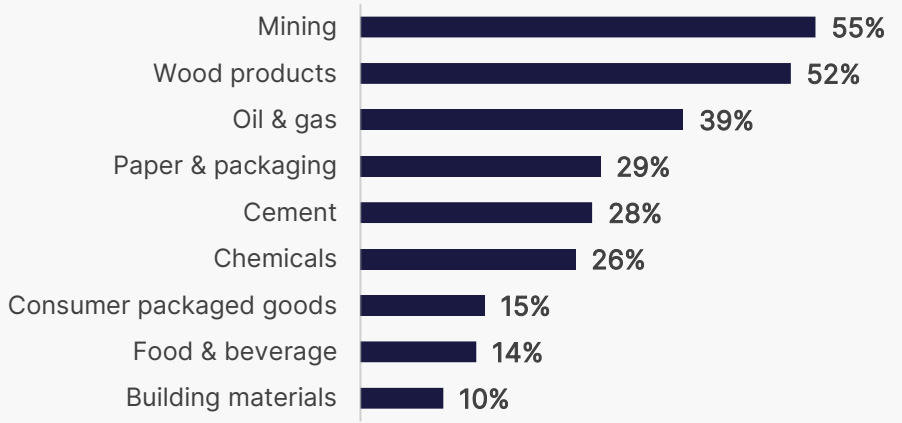


Figure 15

Industries that say AI hurts their ability to meet production goals



Sustainability/ESG Efforts and AI

More Gaps, But More Opportunity Too

The top sustainability/ESG efforts in manufacturing are environmentally smarter technologies, reducing byproduct waste, and producing more environmentally friendly products.

However, companies struggle to quantify their AI efforts at the same cadence as they implement solutions. For example, while 37% are attempting to reduce byproduct waste, just 29% can quantify the impact of these initiatives.

Prioritizing ROI

They might be assuming this gap is just the price of doing business, but manufacturers should be able to fully quantify the impact of AI, and thereby improve sustainability efforts as well as the bottom line. Most goals are set at the corporate level, and plant floor workers may not even know what they are. With greater data and insights, manufacturers can get better visibility into the before-and-after-picture of technology adoption.

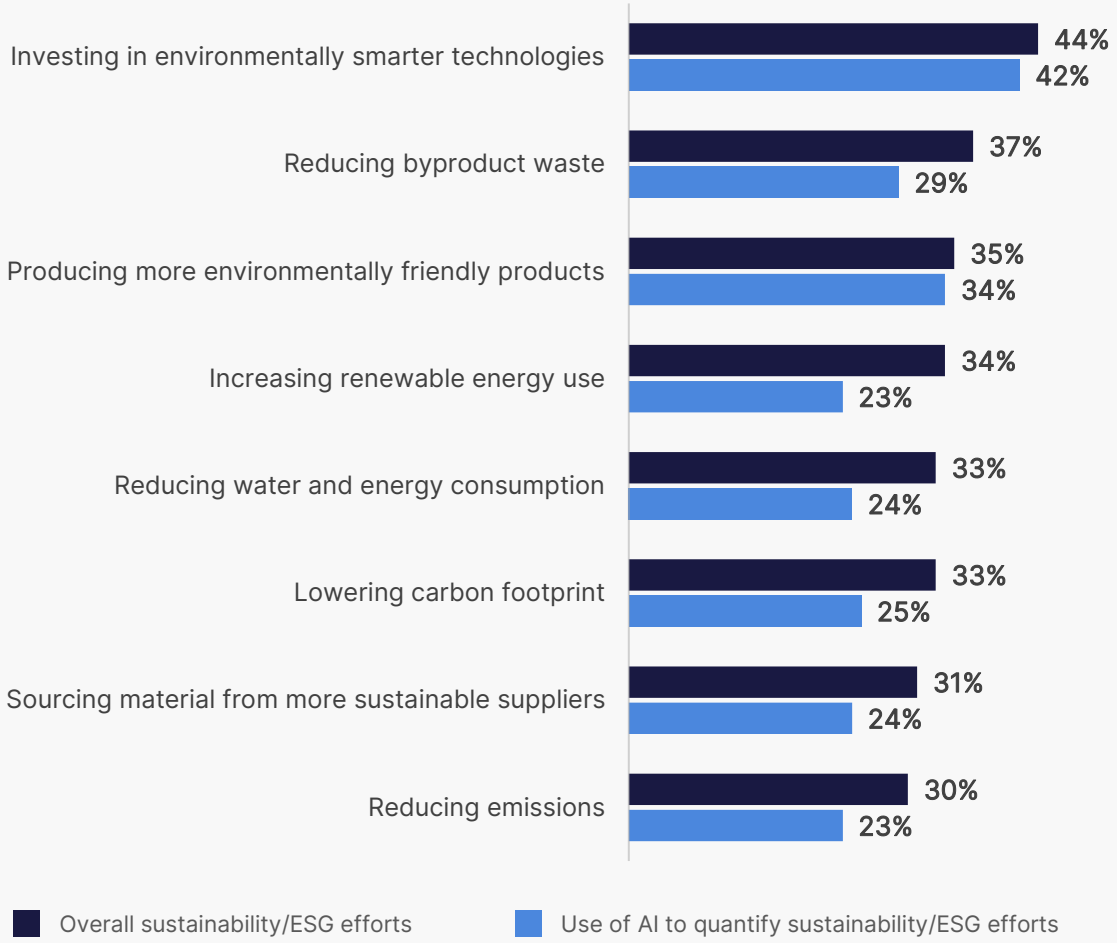
Further Reading

Today, Not One Day: How Manufacturers Can Go After Sustainability Goals

*Question allowed more than one answer so percentages will add up to more than 100%.

Figure 16

Sustainability/ESG efforts and quantifying AI impacts



Workforce Issues

Top Workforce Obstacles

Manufacturing's Complex People Challenge

Knowledge transfer (33%), rising labor costs (32%), and the need for reskilling (30%) rounded out the top three workforce issues for manufacturers. All of these are ranked closely, highlighting the complexity and deep-rooted nature of labor issues in manufacturing. No single workforce challenge stood out for respondents above the others.

As manufacturers work to reshape their staffing and upskilling approaches, they should be mindful of how technology adoption can help on several fronts, including empowering current employees, attracting new talent, filling skills gaps, and enabling new hybrid workflows.

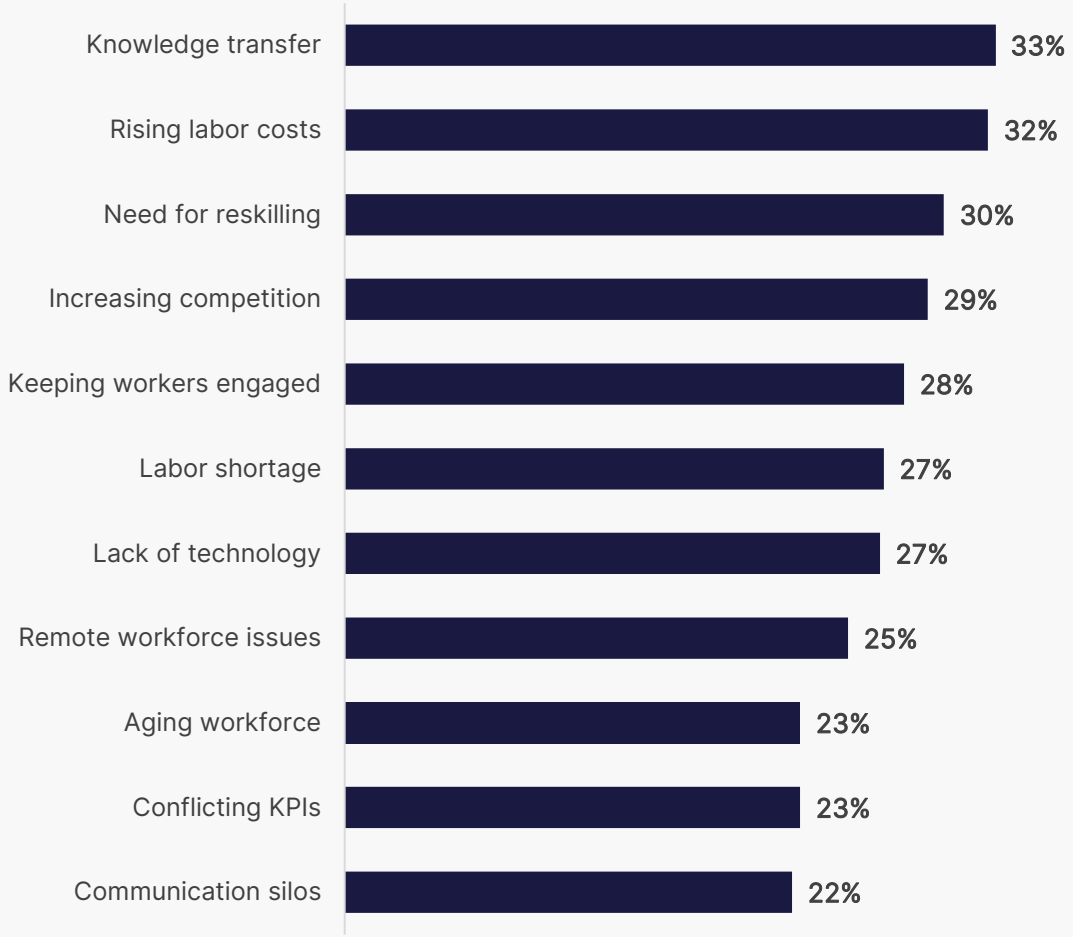
Further Reading

Manufacturing – The News: A Crossroads for Superhumans

*Question allowed more than one answer so percentages will add up to more than 100%.

Figure 17

What are your top workforce obstacles?



Technology's Impact on Upskilling

It's Not People vs. Technology Any More

Despite the widespread opinion that AI and automation are "stealing jobs," 80% of respondents say technology adoption will have a positive impact on workforce upskilling efforts. Of those, 12% say that it will have a significant positive impact.

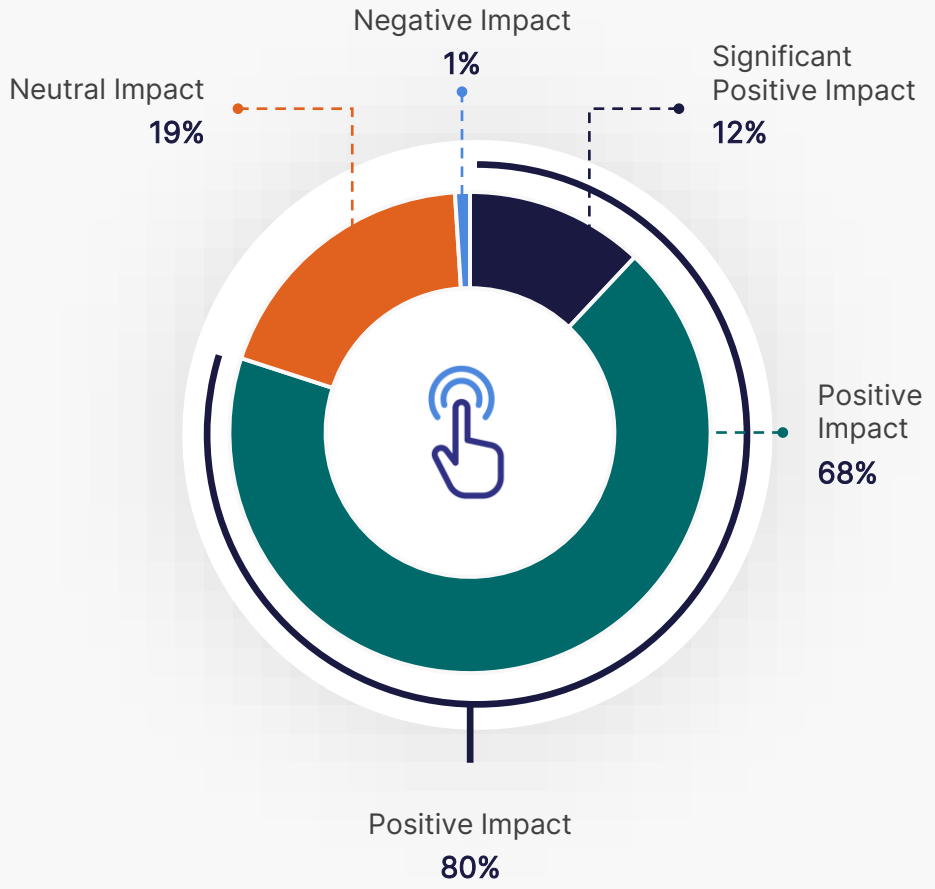
This is a much-needed change in the manufacturing industry, as technology is critical for bringing in new qualified talent and attracting the next generation of workers. Still, almost one fifth of respondents (19%) say that technology adoption will have no impact on upskilling their workforces, showing that there is still work to be done in proving technology's worth in addressing the skills gaps.

Further Reading

AI in Manufacturing Empowers Worker Innovation and Success

Figure 18

How will technology adoption impact upskilling efforts?



Rating the Workforce

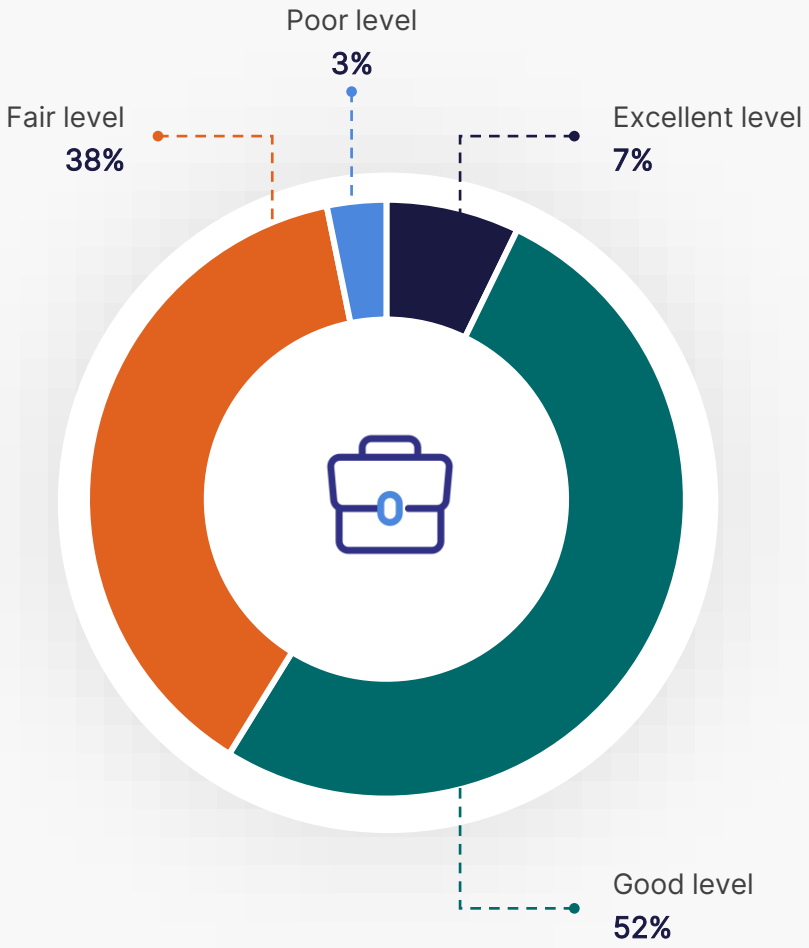
Confidence in Integration and Agility Is High

Respondents give themselves relatively high scores for workforce integration and agility. To improve these scores even further, it's important to implement tools and practices that weave collaboration, data sharing, and communication into everyday tasks.

The impact of improving integration and agility cannot be underestimated: Greater efficiency means more time for higher-level work, stronger cross-functional teams, operational innovation, and more empowered workers.

Figure 19

How do organizations rate their workforce integration and agility?



Balancing Competing Demands & Looking Ahead

Balancing Competing Business Demands

Views Differ Significantly Across the Organization

When asked to rate their ability to balance competing demands, 63% of respondents give themselves good to excellent scores. When broken down by role, we found that far fewer plant leaders (just 2%) rate their ability to balance competing demands as excellent in comparison to other personas.

This disconnect is important to address. All sides of a manufacturing operation need to be able to see and understand one another's challenges and ascertain a shared view of the landscape. Only with this vantage point can manufacturing teams achieve their organizational and production goals.

Figure 20

Ability to balance competing business demands

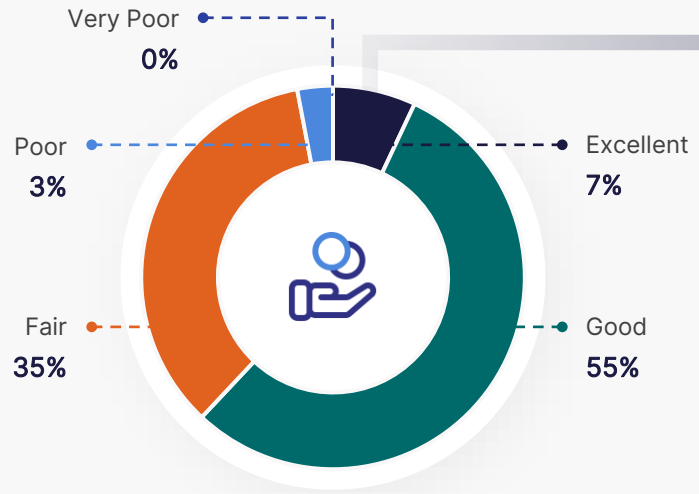
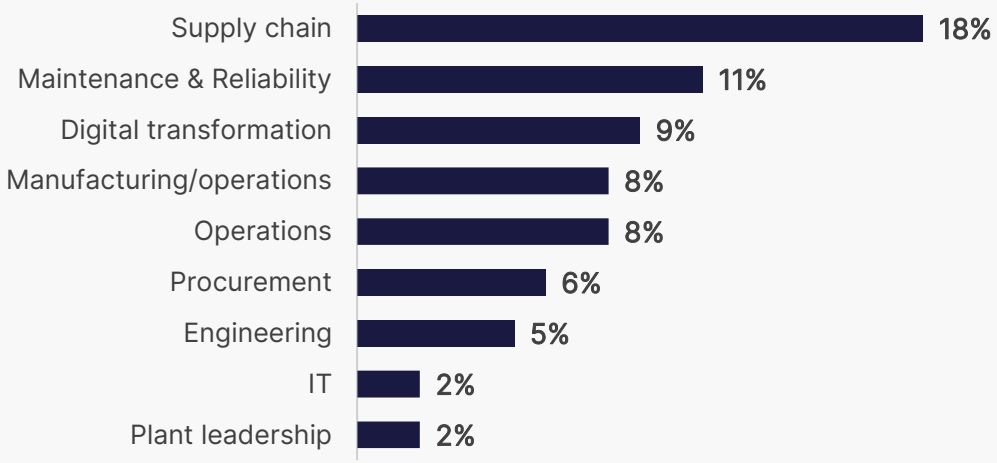


Figure 21

Departments ranking their ability to balance competing demands as excellent



The Future of Manufacturing

Looking Ahead with Uncertainty

Just a third (31%) of respondents say that AI and advanced technologies will help create new jobs in the manufacturing industry (in contrast to the 68% who said AI would help with upskilling in Figure 18); 28% expect supply chain disruptions to become more frequent over the next 12 months; and 24% say onshoring will accelerate over the coming year.

Just 22% say that they are optimistic about the future of the manufacturing industry, and this number drops to 13% when we speak to the C-suite directly.

The industry is facing major challenges, and these numbers reflect that. However, as evidenced throughout the report, manufacturers believe technology has the potential to transform the industry through data-driven insights into machine and processes, skills enhancement, and improving a variety of production health issues.

*Question allowed more than one answer so percentages will add up to more than 100%.

Figure 22

Views on the future of the manufacturing industry

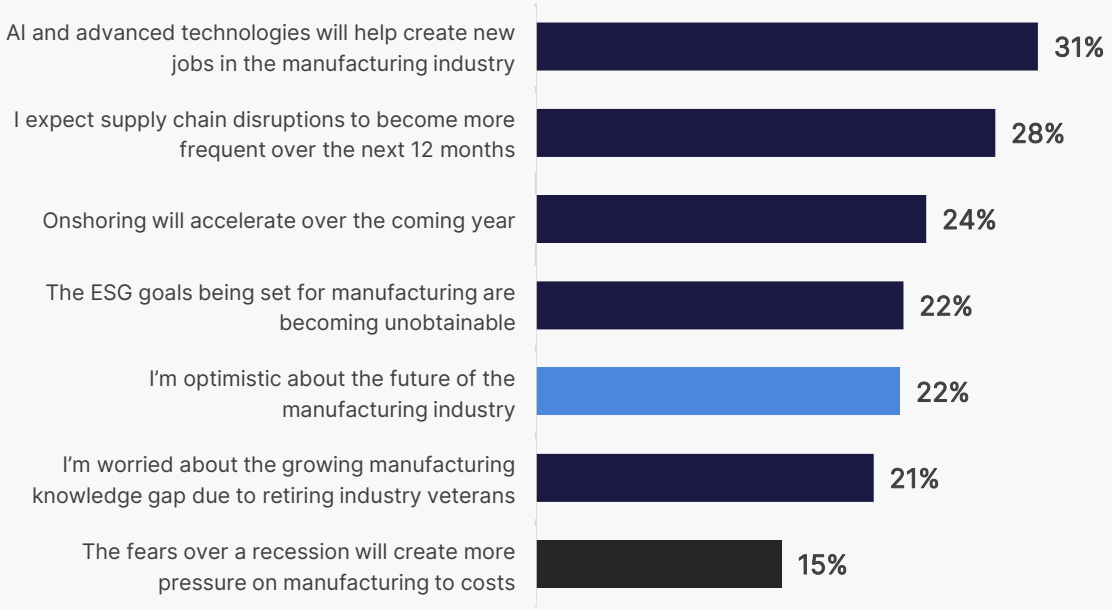
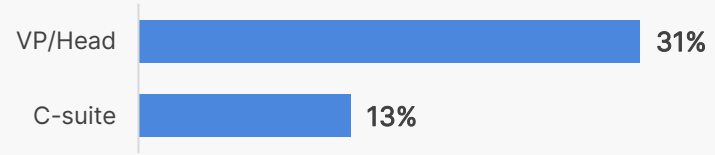


Figure 23

"I'm optimistic about the future of the manufacturing industry", by role



Demographics

Country, Industry, Department, and Job Seniority

Figure 24
Country

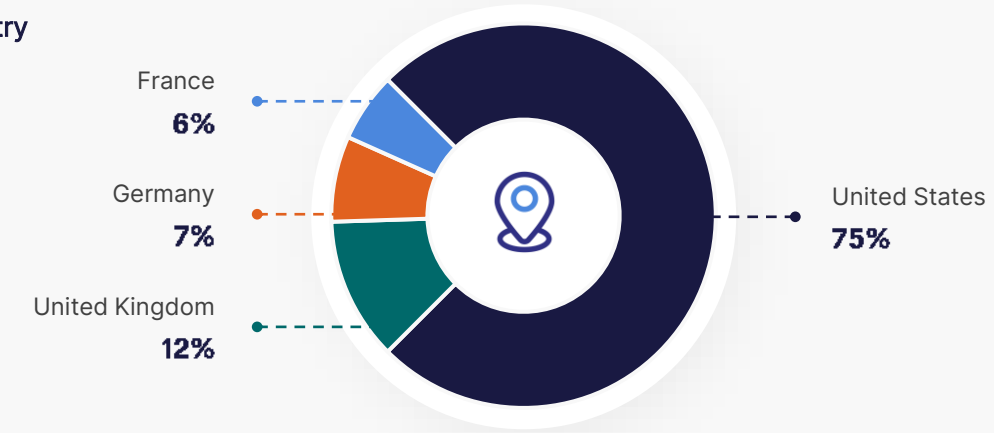


Figure 25
Industry

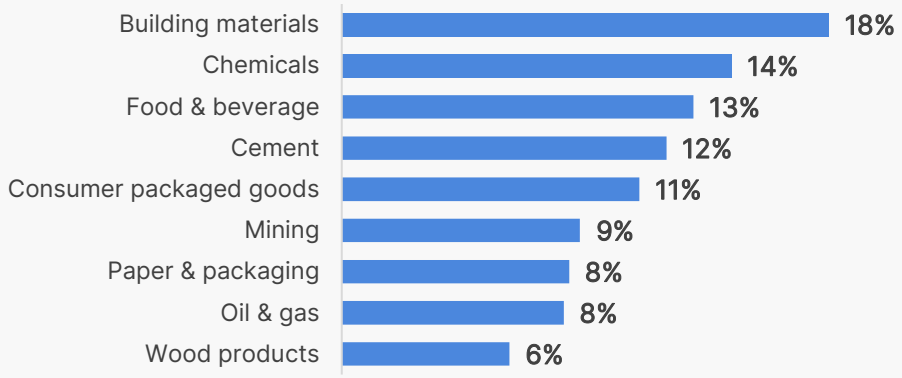


Figure 26
Department

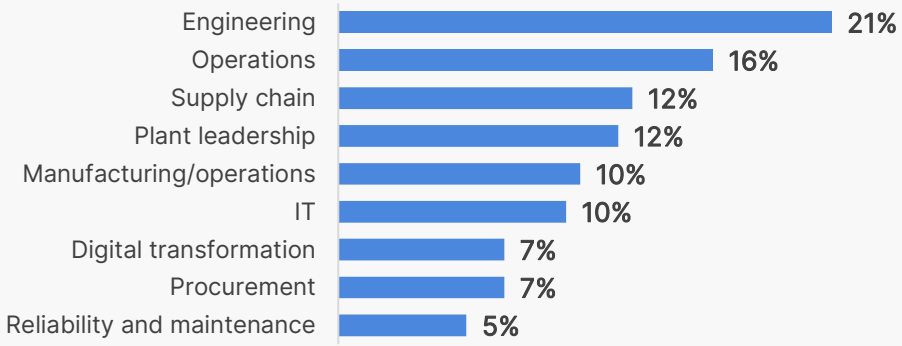
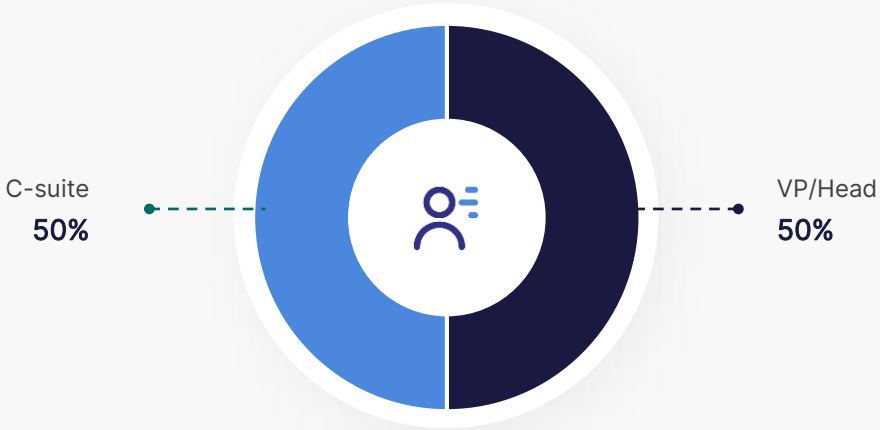


Figure 27
Role



Annual Revenue and Manufacturing Sites

Figure 28
Annual Revenue

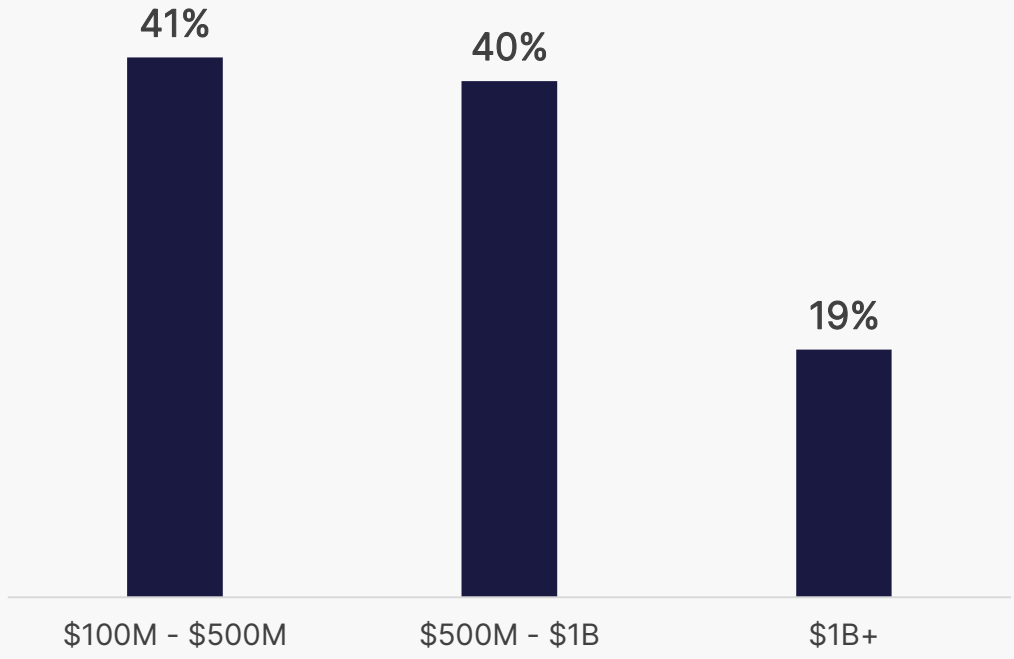
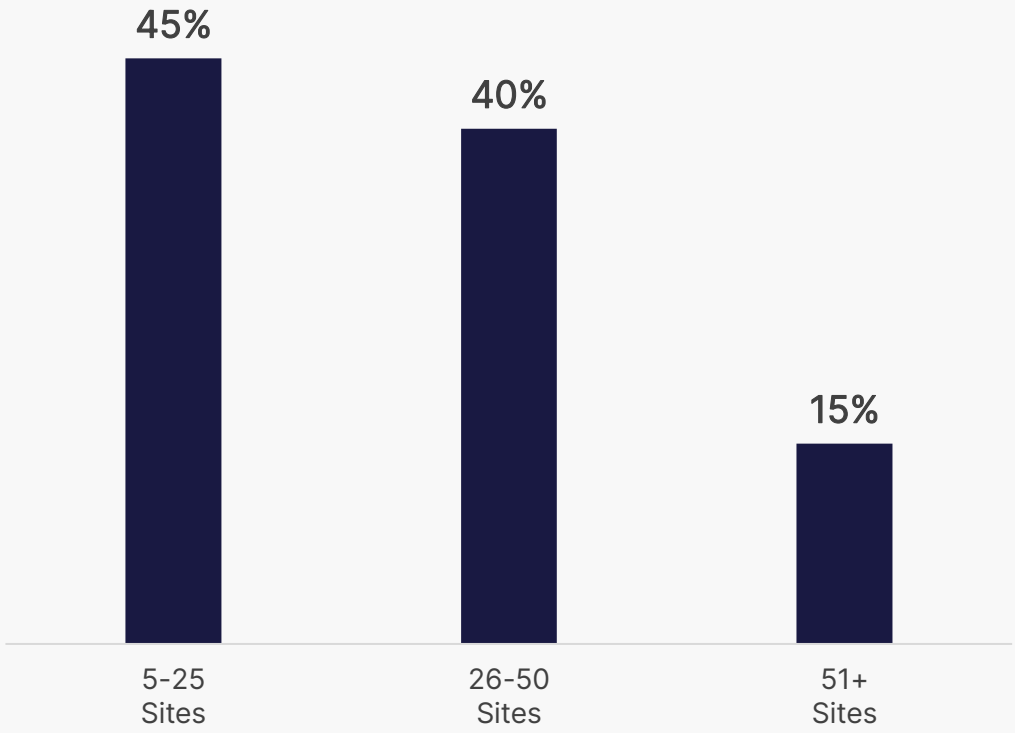


Figure 29
Number of Manufacturing Sites



About Augury

Our mission is to provide manufacturers and other industrial sectors with insights into the health of machines, processes, and operations to transform how people work and what they can create. Together with our customers, we are building a world where the combined work of people and machines makes life better in every way. A pioneer in Machine Health and Process Health solutions, we use purpose-built AI, trained by industry experts and the world's largest data library, to help customers eliminate production downtime, improve process efficiency, maximize yield, and reduce waste and emissions. Augury's global customers achieve 3-10x ROI, often in a matter of months.

Speak with a Production Health specialist to see how Augury can help you meet all of your production goals.

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