

The state of AI in 2023: Generative AI's breakout year

As organizations rapidly deploy generative AI tools, survey respondents expect significant effects on their industries and workforces.

The latest annual McKinsey Global Survey on the current state of AI confirms the explosive growth of generative AI (gen AI) tools. Less than a year after many of these tools debuted, one-third of our survey respondents say their organizations are using gen AI regularly in at least one business function. Amid recent advances, AI has risen from a topic relegated to tech employees to a focus of company leaders: nearly one-quarter of surveyed C-suite executives say they are personally using gen AI tools for work, and more than one-quarter of respondents from companies using AI say gen AI is already on their boards' agendas. What's more, 40 percent of respondents say their organizations will increase their investment in AI overall because of advances in gen AI. The findings show that these are still early days for managing gen AI-related risks, with less than half of respondents saying their organizations are mitigating even the risk they consider most relevant: inaccuracy.

The organizations that have already embedded AI capabilities have been the first to explore gen AI's potential, and those seeing the most value from more traditional AI capabilities—a group we call AI high performers—are already outpacing others in their adoption of gen AI tools.¹

The expected business disruption from gen AI is significant, and respondents predict meaningful changes to their workforces. They anticipate workforce cuts in certain areas and large reskilling efforts to address shifting talent needs. Yet while the use of gen AI might spur the adoption of other AI tools, we see few meaningful increases in organizations' adoption of these technologies. The percent of organizations adopting any AI tools has held steady since 2022, and adoption remains concentrated within a small number of business functions.

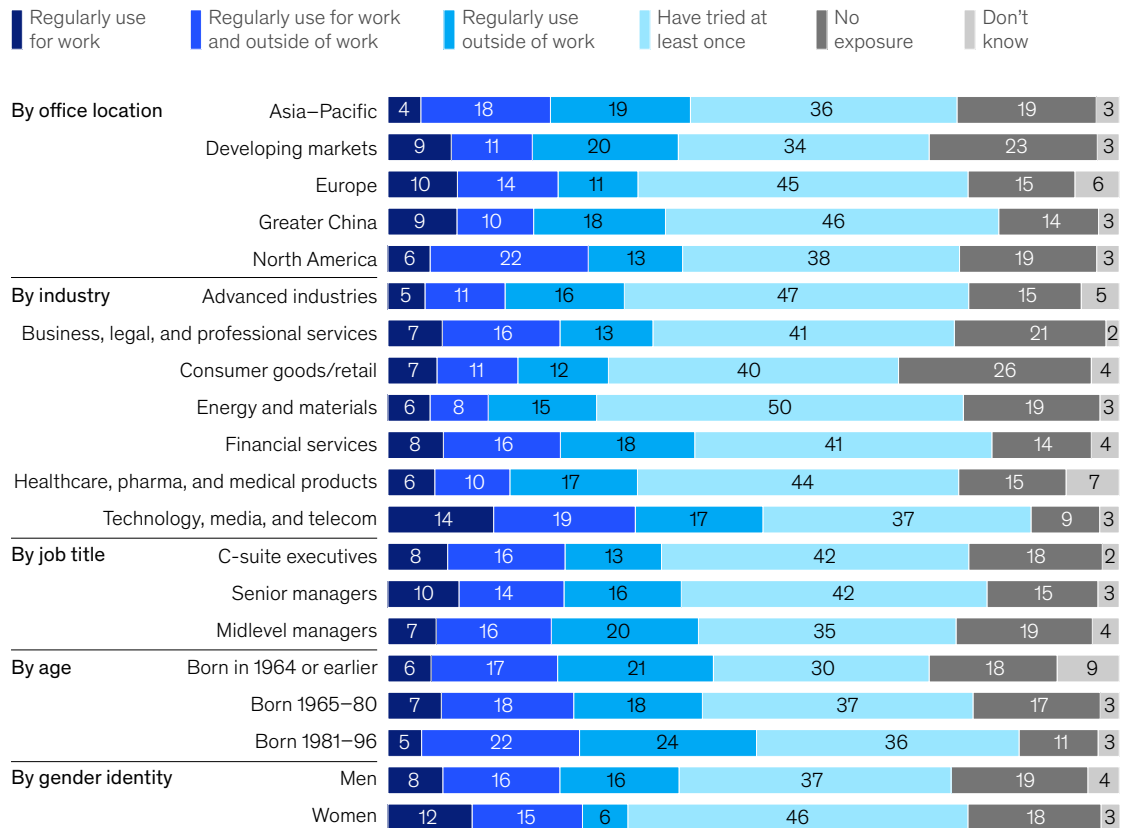
¹ We define AI high performers as organizations that, according to respondents, attribute at least 20 percent of their EBIT to AI adoption.

It's early days still, but use of gen AI is already widespread

The findings from the survey—which was in the field in mid-April 2023—show that, despite gen AI's nascent public availability, experimentation with the tools is already relatively common, and respondents expect the new capabilities to transform their industries. Gen AI has captured interest across the business population: individuals across regions, industries, and seniority levels are using gen AI for work and outside of work. Seventy-nine percent of all respondents say they've had at least some exposure to gen AI, either for work or outside of work, and 22 percent say they are regularly using it in their own work. While reported use is quite similar across seniority levels, it is highest among respondents working in the technology sector and those in North America.

Respondents across regions, industries, and seniority levels say they are already using generative AI tools.

Reported exposure to generative AI tools, % of respondents



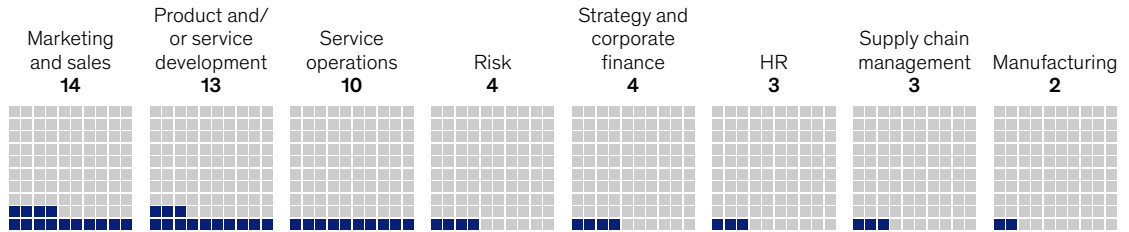
Note: Figures may not sum to 100%, because of rounding. In Asia-Pacific, n = 164; in Europe, n = 515; in North America, n = 392; in Greater China (includes Hong Kong and Taiwan), n = 337; and in developing markets (includes India, Latin America, and Middle East and North Africa), n = 276. For advanced industries (includes automotive and assembly, aerospace and defense, advanced electronics, and semiconductors), n = 96; for business, legal, and professional services, n = 215; for consumer goods and retail, n = 128; for energy and materials, n = 96; for financial services, n = 248; for healthcare, pharma, and medical products, n = 130; and for technology, media, and telecom, n = 244. For C-suite respondents, n = 541; for senior managers, n = 437; and for middle managers, n = 339. For respondents born in 1964 or earlier, n = 143; for respondents born between 1965 and 1980, n = 268; and for respondents born between 1981 and 1996, n = 80. Age details were not available for all respondents. For respondents identifying as men, n = 1,025; for respondents identifying as women, n = 156. The survey sample also included respondents who identified as "nonbinary" or "other" but not a large enough number to be statistically meaningful. Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

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Organizations, too, are now commonly using gen AI. One-third of all respondents say their organizations are already regularly using generative AI in at least one function—meaning that 60 percent of organizations with reported AI adoption are using gen AI. What's more, 40 percent of those reporting AI adoption at their organizations say their companies expect to invest more in AI overall thanks to generative AI, and 28 percent say generative AI use is already on their board's agenda. The most commonly reported business functions using these newer tools are the same as those in which AI use is most common overall: marketing and sales, product and service development, and service operations, such as customer care and back-office support. This suggests that organizations are pursuing these new tools where the most value is. In our previous research, these three areas, along with software engineering, showed the potential to deliver about 75 percent of the total annual value from generative AI use cases.

The most commonly reported uses of generative AI tools are in marketing and sales, product and service development, and service operations.

Share of respondents reporting that their organization is regularly using generative AI in given function, %¹



Most regularly reported generative AI use cases within function, % of respondents

Marketing and sales	Product and/or service development	Service operations
Crafting first drafts of text documents ■ 9	Identifying trends in customer needs ■ 7	Use of chatbots (eg, for customer service) ■ 6
Personalized marketing ■ 8	Drafting technical documents ■ 5	Forecasting service trends or anomalies ■ 5
Summarizing text documents ■ 8	Creating new product designs ■ 4	Creating first drafts of documents ■ 5

¹Questions were asked of respondents who said their organizations have adopted AI in at least 1 business function. The data shown were rebased to represent all respondents.
Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

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In these early days, expectations for gen AI's impact are high: three-quarters of all respondents expect gen AI to cause significant or disruptive change in the nature of their industry's competition in the next three years. Survey respondents working in the technology and financial-services industries are the most likely to expect disruptive change from gen AI. Our previous research shows that, while all industries are indeed likely to see some degree of disruption, the level of impact is likely to vary.² Industries relying most heavily on knowledge work are likely to see more disruption—and potentially reap more value. While our estimates suggest that tech companies, unsurprisingly, are poised to see the highest impact from gen AI—adding value equivalent to as much as 9 percent of global industry revenue—knowledge-based industries such as banking (up to 5 percent), pharmaceuticals and medical products (also up to 5 percent), and education (up to 4 percent) could experience significant effects as well. By contrast, manufacturing-based industries, such as aerospace, automotives, and advanced electronics, could experience less disruptive effects. This stands in contrast to the impact of previous technology waves that affected manufacturing the most and is due to gen AI's strengths in language-based activities, as opposed to those requiring physical labor.

²"The economic potential of generative AI: The next productivity frontier," McKinsey, June 14, 2023.



McKinsey commentary

Alex Singla

Senior partner and global leader of QuantumBlack, AI by McKinsey

It's amazing how quickly the conversation around generative AI has evolved. Just a few months ago, the conversation in the C-suite was pretty rudimentary, focused on trying to understand what it was and seeing what was hype versus what was reality. Now in just about six months, business leaders are having much more sophisticated conversations. As we can see from the survey results, almost a third of companies are using generative AI in at least one business function. This underscores the degree to which companies understand and accept that generative AI is viable in business.

The next question will be how companies will take the next step, and whether generative AI will follow the same pattern we observed with AI more generally, where adoption has plateaued at around the 50 percent mark. We see from the data that the promise of generative AI is leading almost half of companies already using AI to plan on increasing their investments in AI, driven in part by the understanding that broader capabilities are needed to take full advantage of generative AI.

Taking that next step, where generative AI can go from experiment to business engine, and ensuring a strong return on the investment requires companies to tackle a broad array of issues. Those include identifying the specific opportunities for generative AI in the organization, what the governance and operating model should be, how to best manage third parties (such as cloud and large language model providers), what is needed to manage the wide range of risks, understanding the implications on people and the tech stack, and being clear about how to find the balance between banking near-term gains and developing the long-term foundations needed to scale. These are complex issues, but they are the key to unlocking the really significant pools of value out there.

Responses show many organizations not yet addressing potential risks from gen AI

According to the survey, few companies seem fully prepared for the widespread use of gen AI—or the business risks these tools may bring. Just 21 percent of respondents reporting AI adoption say their organizations have established policies governing employees’ use of gen AI technologies in their work. And when we asked specifically about the risks of adopting gen AI, few respondents say their companies are mitigating the most commonly cited risk with gen AI: inaccuracy. Respondents cite inaccuracy more frequently than both cybersecurity and regulatory compliance, which were the most common risks from AI overall in previous surveys. Just 32 percent say they’re mitigating inaccuracy, a smaller percentage than the 38 percent who say they mitigate cybersecurity risks. Interestingly, this figure is significantly lower than the percentage of respondents who reported mitigating AI-related cybersecurity last year (51 percent). Overall, much as we’ve seen in previous years, most respondents say their organizations are not addressing AI-related risks.

Inaccuracy, cybersecurity, and intellectual-property infringement are the most-cited risks of generative AI adoption.

Generative AI–related risks that organizations consider relevant and are working to mitigate, % of respondents¹



¹Asked only of respondents whose organizations have adopted AI in at least 1 function. For both risks considered relevant and risks mitigated, n = 913. Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023



McKinsey commentary

Alexander Sukharevsky

Senior partner and global leader of QuantumBlack, AI by McKinsey

There is broad awareness about the risks associated with generative AI. But at the same time, the prevailing anxiety and fear is making it challenging for leaders to effectively address the risks. As our latest survey shows, just a little over 20 percent of companies have risk policies in place for generative AI. Those policies tend to focus on protecting a company's proprietary information, such as data, knowledge, and other intellectual property. Those are critical, but we've found that many of these risks can be addressed by making changes in the business's technology architecture that reflect established policies.

The real trap, however, is that companies look at the risk too narrowly. There is a significant range of risks—social, humanitarian, sustainability—that companies need to pay attention to as well. In fact, the unintended consequences of generative AI are more likely to create issues for the world than the doomsday scenarios that some people espouse. Companies that are approaching generative AI most constructively are experimenting with and using it while having a structured process in place to identify and address these broader risks. They are putting in place beta users and specific teams that think about how generative AI applications can go off the rails to better anticipate some of those consequences. They are also working with the best and most creative people in the business to define the best outcomes for both the organization and for society more generally. Being deliberate, structured, and holistic about understanding the nature of the new risks—and opportunities—emerging is crucial to the responsible and productive growth of generative AI.

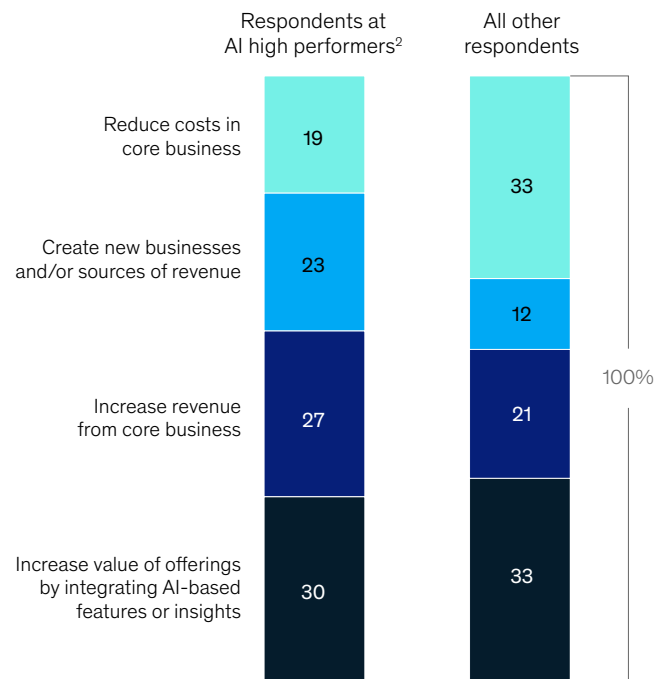
Leading companies are already ahead with gen AI

The survey results show that AI high performers—that is, organizations where respondents say at least 20 percent of EBIT in 2022 was attributable to AI use—are going all in on artificial intelligence, both with gen AI and more traditional AI capabilities. These organizations that achieve significant value from AI are already using gen AI in more business functions than other organizations do, especially in product and service development and risk and supply chain management. When looking at all AI capabilities—including more traditional machine learning capabilities, robotic process automation, and chatbots—AI high performers also are much more likely than others to use AI in product and service development, for uses such as product-development-cycle optimization, adding new features to existing products, and creating new AI-based products. These organizations also are using AI more often than other organizations in risk modeling and for uses within HR such as performance management and organization design and workforce deployment optimization.

Another difference from their peers: high performers' gen AI efforts are less oriented toward cost reduction, which is a top priority at other organizations. Respondents from AI high performers are twice as likely as others to say their organizations' top objective for gen AI is to create entirely new businesses or sources of revenue—and they're most likely to cite the increase in the value of existing offerings through new AI-based features.

Smaller shares of AI high performers see cost reductions as their top objective for generative AI efforts.

Top objective for organizations' planned generative AI activities, % of respondents¹



Note: Figures do not sum to 100%, because of rounding.

¹Asked only of respondents whose organizations have adopted AI in at least 1 function.

²Respondents who said that at least 20 percent of their organizations' EBIT in 2022 was attributable to their use of AI. For respondents at AI high performers, n = 45; for all other respondents, n = 712.

Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

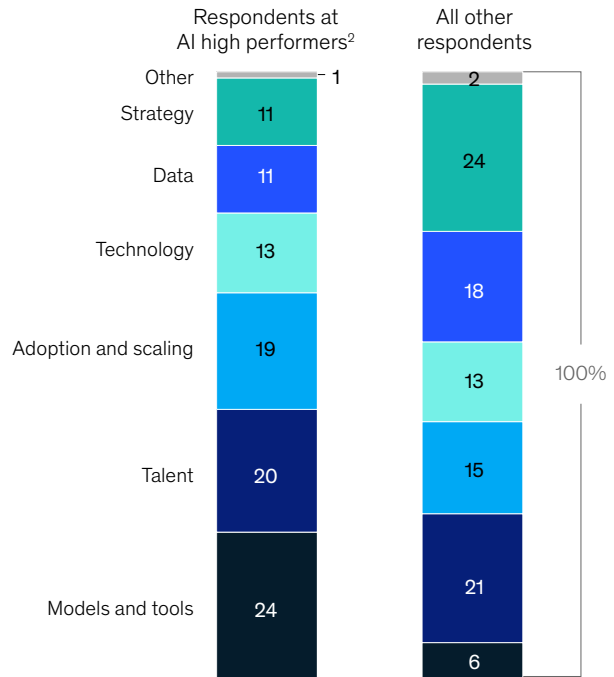
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As we've seen in previous years, these high-performing organizations invest much more than others in AI: respondents from AI high performers are more than five times more likely than others to say they spend more than 20 percent of their digital budgets on AI. They also use AI capabilities more broadly throughout the organization. Respondents from high performers are much more likely than others to say that their organizations have adopted AI in four or more business functions and that they have embedded a higher number of AI capabilities. For example, respondents from high performers more often report embedding knowledge graphs in at least one product or business function process, in addition to gen AI and related natural-language capabilities.

While AI high performers are not immune to the challenges of capturing value from AI, the results suggest that the difficulties they face reflect their relative AI maturity, while others struggle with the more foundational, strategic elements of AI adoption. Respondents at AI high performers most often point to models and tools, such as monitoring model performance in production and retraining models as needed over time, as their top challenge. By comparison, other respondents cite strategy issues, such as setting a clearly defined AI vision that is linked with business value or finding sufficient resources.

Models and tools pose the biggest AI-related challenge for high performers, while strategy is a common stumbling block for others.

Element that poses the biggest challenge in capturing value from AI, % of respondents¹



Note: Figures do not sum to 100%, because of rounding.

¹Asked only of respondents whose organizations have adopted AI in at least 1 function.

²Respondents who said that at least 20 percent of their organizations' EBIT in 2022 was attributable to their use of AI. For respondents at AI high performers, n = 49; for all other respondents, n = 792.

Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

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The findings offer further evidence that even high performers haven't mastered best practices regarding AI adoption, such as machine-learning-operations (MLOps) approaches, though they are much more likely than others to do so. For example, just 35 percent of respondents at AI high performers report that where possible, their organizations assemble existing components, rather than reinvent them, but that's a much larger share than the 19 percent of respondents from other organizations who report that practice.

Many specialized MLOps technologies and practices may be needed to adopt some of the more transformative uses cases that gen AI applications can deliver—and do so as safely as possible. Live-model operations is one such area, where monitoring systems and setting up instant alerts to enable rapid issue resolution can keep gen AI systems in check. High performers stand out in this respect but have room to grow: one-quarter of respondents from these organizations say their entire system is monitored and equipped with instant alerts, compared with just 12 percent of other respondents.



McKinsey commentary

Bryce Hall

Associate partner

Over the past six years as we've conducted our annual global AI research, one consistent finding is that high performers take a broad view of what's needed to be successful. They are particularly strong in staying focused on value, and then rewiring their organization to capture that value. This pattern is clear when looking at how high performers are working with generative AI as well.

For example, on strategy, leaders from our analysis are mapping out where the high-value opportunities are from AI across their business domains. Tellingly, they're not doing this for only generative AI. As excited as we all are about the dazzling new gen AI applications, significantly more than half of the potential value for companies comes from AI applications that don't use gen AI. They are maintaining discipline in viewing the full range of AI opportunities based on potential value.

That approach extends to all capability areas. In technology and data, for example, high performers are laser focused on capabilities needed to capture the value they've identified. This includes capabilities to enable large language models to train on company and industry-specific data. They're evaluating and testing the efficiencies and speed enabled by consuming existing AI services (what we call the "taker" approach) and developing capabilities to create competitive advantage—for example, by tuning models and training them to use their own proprietary data (what we call the "shaper" approach).

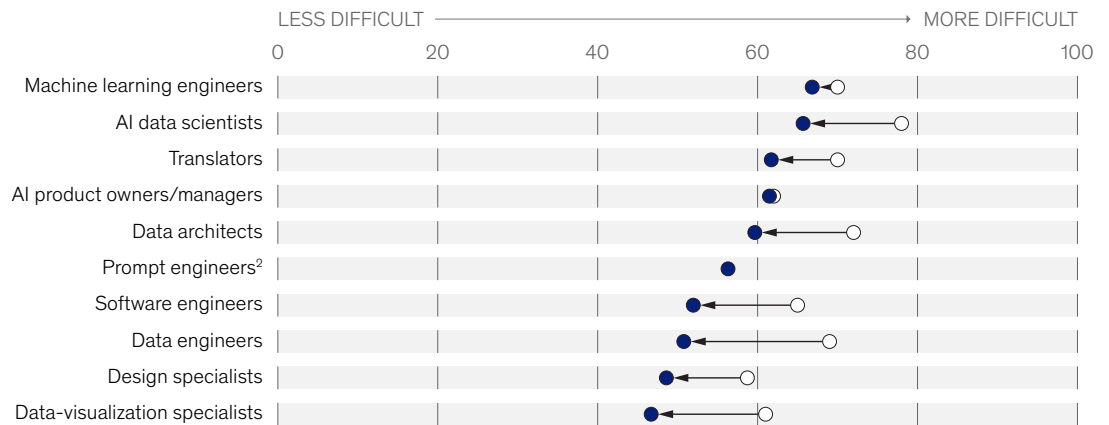
AI-related talent needs shift, and AI's workforce effects are expected to be substantial

Our latest survey results show changes in the roles that organizations are filling to support their AI ambitions. In the past year, organizations using AI most often hired data engineers, machine learning engineers, and AI data scientists—all roles that respondents commonly reported hiring in the previous survey. But a much smaller share of respondents report hiring AI-related-software engineers—the most-hired role last year—than in the previous survey (28 percent in the latest survey, down from 39 percent). Roles in prompt engineering have recently emerged, as the need for that skill set rises alongside gen AI adoption, with 7 percent of respondents whose organizations have adopted AI reporting those hires in the past year.

The findings suggest that hiring for AI-related roles remains a challenge but has become somewhat easier over the past year, which could reflect the spate of layoffs at technology companies from late 2022 through the first half of 2023. Smaller shares of respondents than in the previous survey report difficulty hiring for roles such as AI data scientists, data engineers, and data-visualization specialists, though responses suggest that hiring machine learning engineers and AI product owners remains as much of a challenge as in the previous year.

Hiring for AI-related roles remains a challenge, though reported difficulty has decreased since 2022 for many roles.

Share of respondents reporting difficulty in organizations' hiring of AI-related roles,¹% ○ 2022 ● 2023



¹Asked only of respondents whose organizations have adopted AI in at least 1 function and who said their organization hired the given role in the past 12 months. Respondents who said "easy," "neither difficult nor easy," or "don't know" are not shown.

²Not asked of respondents in 2022.

Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

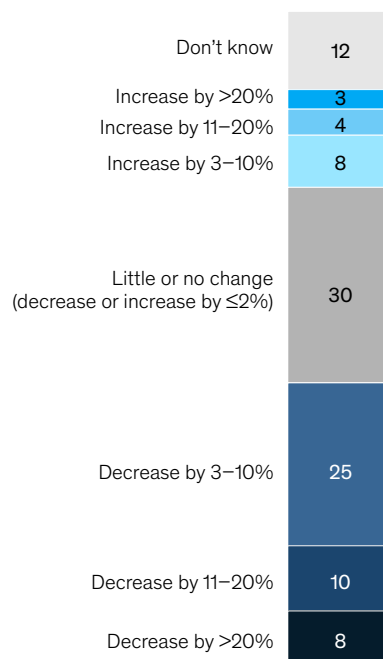
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Looking ahead to the next three years, respondents predict that the adoption of AI will reshape many roles in the workforce. Generally, they expect more employees to be reskilled than to be separated. Nearly four in ten respondents reporting AI adoption expect more than 20 percent of their companies' workforces will be reskilled, whereas 8 percent of respondents say the size of their workforces will decrease by more than 20 percent.

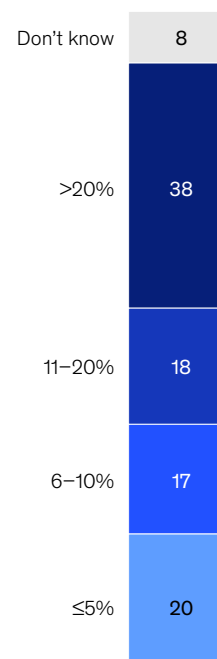
Survey respondents expect AI to meaningfully change their organizations' workforces.

Expectations about the impact of AI adoption on organizations' workforces, next 3 years, % of respondents¹

Change in number of employees



Share of employees expected to be reskilled



Note: Figures may not sum to 100%, because of rounding.

¹Asked only of respondents whose organizations have adopted AI in at least 1 function; n = 913.

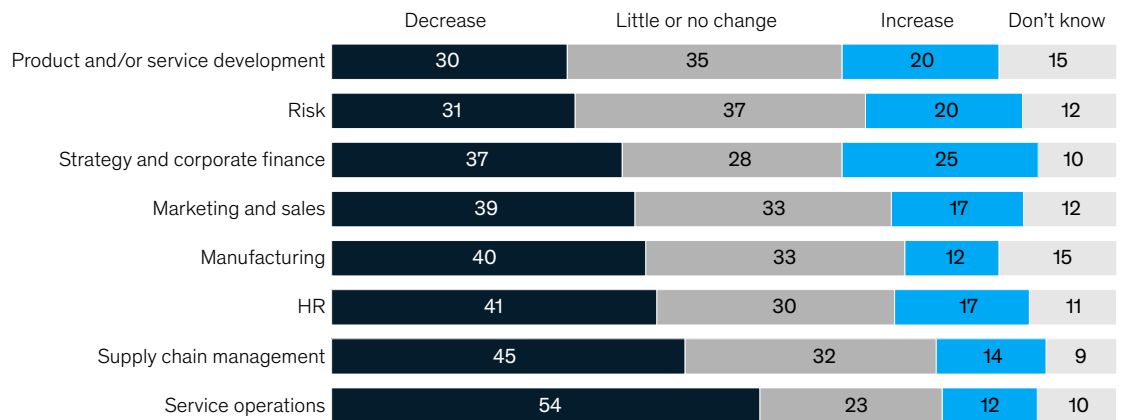
Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

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Looking specifically at gen AI's predicted impact, service operations is the only function in which most respondents expect to see a decrease in workforce size at their organizations. This finding generally aligns with what our recent research suggests: while the emergence of gen AI increased our estimate of the percentage of worker activities that could be automated (60 to 70 percent, up from 50 percent), this doesn't necessarily translate into the automation of an entire role.

Service operations is the only function in which most respondents expect to see a decrease in workforce size because of generative AI.

Effect of generative AI adoption on number of employees, by business function, next 3 years, % of respondents¹



Note: Figures may not sum to 100%, because of rounding.

¹Respondents were asked about only the business functions in which they said their organizations have adopted AI.

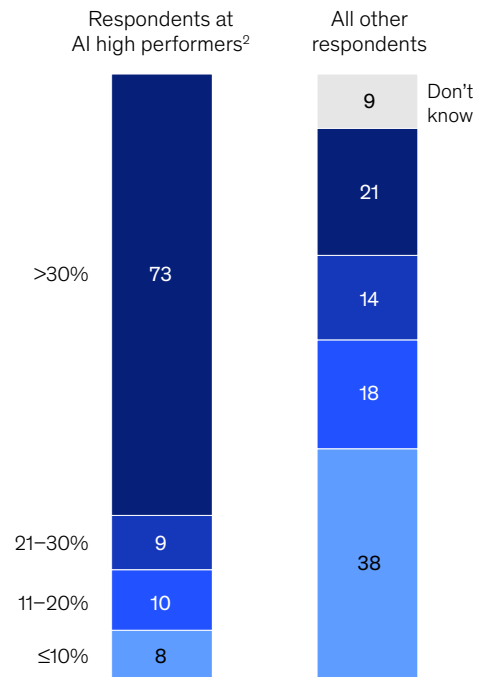
Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

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AI high performers are expected to conduct much higher levels of reskilling than other companies are. Respondents at these organizations are over three times more likely than others to say their organizations will reskill more than 30 percent of their workforces over the next three years as a result of AI adoption.

Respondents at AI high performers expect their organizations to reskill larger portions of the workforce than other respondents do.

Share of employees at respondent's organization expected to be reskilled over the next 3 years as a result of AI adoption, % of respondents¹



¹Asked only of respondents whose organizations have adopted AI in at least 1 function.

²Respondents who said that at least 20 percent of their organizations' EBIT in 2022 was attributable to their use of AI. For respondents at AI high performers, n = 50; for all other respondents, n = 863.

Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11-21, 2023

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McKinsey commentary

Lareina Yee

Senior partner, McKinsey; chair, McKinsey Technology Council

We are in the early innings of generative AI, and companies already anticipate a meaningful impact on talent—from opening up new work opportunities and transforming how work gets done to introducing whole new job categories such as prompt engineering. One of the benefits of generative AI is that it can help nearly everyone with their jobs, and this is also its greatest challenge.

This scale differs from traditional AI, which affected a fairly small—though no less important—portion of the workforce who had deep skills in technical areas like machine learning, data science, or robotics. Given the highly specialized capabilities required, AI talent always seemed in short supply. Our survey highlights that hiring for these roles is still a challenge. Generative AI, in contrast, will still need highly skilled people to build large language models and train generative models, but users can be nearly anyone, and they won't need data science degrees or machine learning expertise to be effective. The analogy is similar to the move from mainframe computers—large machines operated by highly technical experts—to the personal computer, which anyone could use. It's a revolutionary shift in terms of how people can use technology as a power tool.

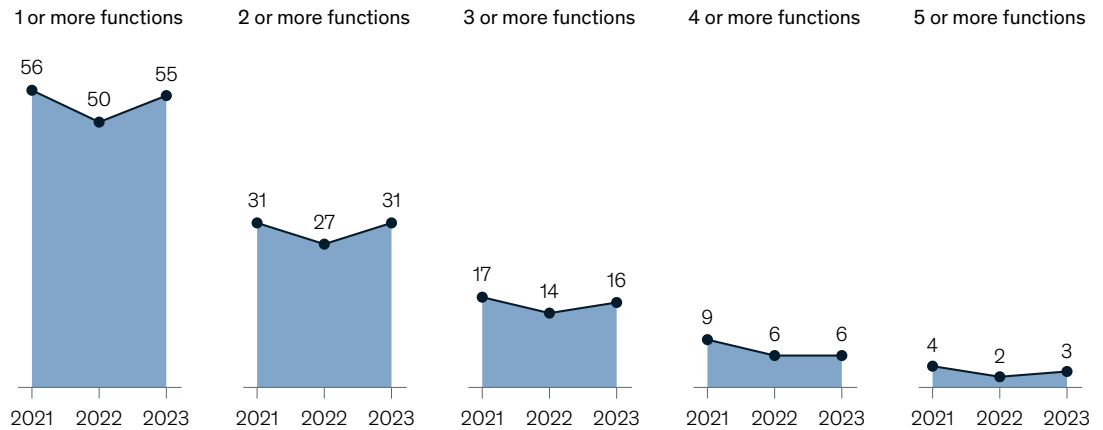
This view of generative AI as a tool is reflected in our survey. In most instances companies see generative AI as a tool to augment human activities, not necessarily replace them. So far, we're mainly seeing companies that are leaning forward with generative AI, focusing on pragmatic areas where the routes to improvements in top-line growth or productivity are clearest. Examples include using generative AI tools to help modernize legacy code or speed up research and discovery time in the sciences. We're still just scratching the surface of these augmentation capabilities, and we can anticipate that their use will accelerate.

With all eyes on gen AI, AI adoption and impact remain steady

While the use of gen AI tools is spreading rapidly, the survey data doesn't show that these newer tools are propelling organizations' overall AI adoption. The share of organizations that have adopted AI overall remains steady, at least for the moment, with 55 percent of respondents reporting that their organizations have adopted AI. Less than a third of respondents continue to say that their organizations have adopted AI in more than one business function, suggesting that AI use remains limited in scope. Product and service development and service operations continue to be the two business functions in which respondents most often report AI adoption, as was true in the previous four surveys. And overall, just 23 percent of respondents say at least 5 percent of their organizations' EBIT last year was attributable to their use of AI—essentially flat with the previous survey—suggesting there is much more room to capture value.

Less than one-third of respondents say their organizations use AI in more than one function—a share largely unchanged since 2021.

Number of business functions at respondents' organizations that have adopted AI, % of respondents¹



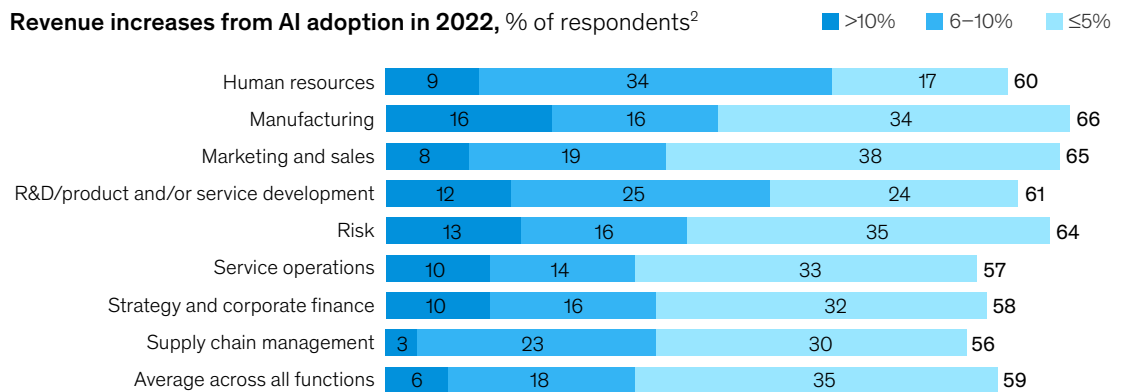
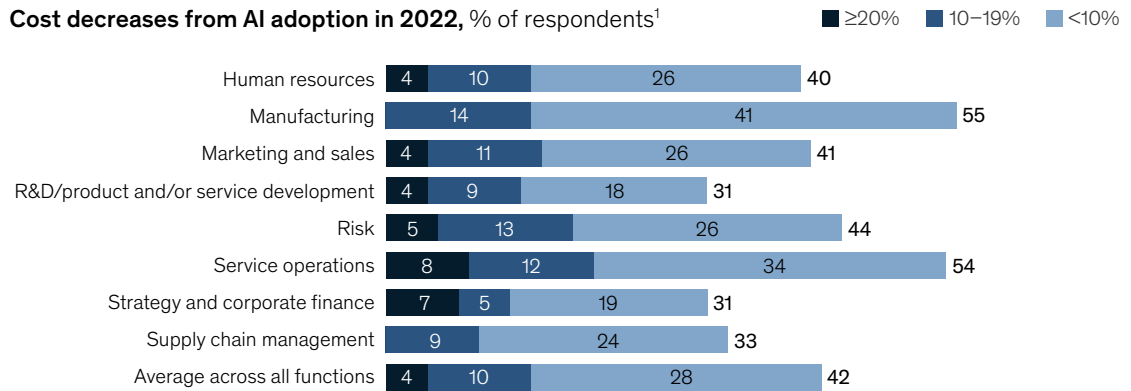
¹In 2021, n = 1,843; in 2022, n = 1,492; in 2023, n = 1,684.
Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

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More than two-thirds of respondents expect their organizations to increase their AI investment over the next three years.

Organizations continue to see returns in the business areas in which they are using AI, and they plan to increase investment in the years ahead. We see a majority of respondents reporting AI-related revenue increases within each business function using AI. And looking ahead, more than two-thirds expect their organizations to increase their AI investment over the next three years.

Organizations continue to see benefits from AI adoption in the functions using AI capabilities.



¹Question was asked only of respondents who said their organizations have adopted AI in a given function. Respondents who said "cost increase," "no change," "not applicable," or "don't know" are not shown.

²Question was asked only of respondents who said their organizations have adopted AI in a given function. Respondents who said "revenue decrease," "no change," "not applicable," or "don't know" are not shown.

Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

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McKinsey commentary

Michael Chui

Partner, McKinsey Global Institute

We've been emphasizing the importance of generative AI—and for good reason, given its revolutionizing potential—but this survey is a good reminder that there's a lot of value out there in the broader AI world. In fact, some of our other research indicates that nongenerative AI has even more value potential than generative AI. Use cases in areas such as improvements in forecasting accuracy, optimizing logistics networks, and providing next-product-to-buy recommendations can all generate value for companies that can take advantage of the broader AI promise.

While reported overall AI adoption remains steady at around 55 percent, more than two-thirds of respondents say their companies plan on increasing their investments in AI. And we continue to see a set of AI high performers that are building out the foundations and capabilities that allow them to generate value. One way to interpret this is that “the rich are getting richer” when it comes to extracting value from AI. We'll be interested in seeing whether the great interest in generative AI opens the door to higher overall adoption of AI going forward.

About the research

The online survey was in the field April 11 to 21, 2023, and garnered responses from 1,684 participants representing the full range of regions, industries, company sizes, functional specialties, and tenures. Of those respondents, 913 said their organizations had adopted AI in at least one function and were asked questions about their organizations' AI use. To adjust for differences in response rates, the data are weighted by the contribution of each respondent's nation to global GDP.

The survey content and analysis were developed by **Michael Chui**, a partner at the McKinsey Global Institute and a partner in McKinsey's Bay Area office, where **Lareina Yee** is a senior partner; **Bryce Hall**, an associate partner in the Washington, DC, office; and senior partners **Alex Singla** and **Alexander Sukharevsky**, global leaders of QuantumBlack, AI by McKinsey, based in the Chicago and London offices, respectively.

They wish to thank Shivani Gupta, Abhisek Jena, Begum Ortaoglu, Barr Seitz, and Li Zhang for their contributions to this work.

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