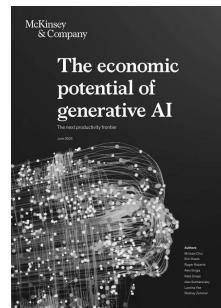


## productivity frontier

Generative AI is poised to unleash the next wave of productivity. We take a first look at where business value could accrue and the potential impacts on the workforce.

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The economic potential of generative AI: The next productivity frontier

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**A** I has permeated our lives incrementally, through everything from the tech powering our smartphones to autonomous-driving features on cars to the tools retailers use to surprise and delight consumers. As a result, its progress has been almost imperceptible. Clear milestones, such as when AlphaGo, an AI-based program developed by DeepMind, defeated a world champion Go player in 2016, were celebrated but then quickly faded from the public's consciousness.

Generative AI applications such as ChatGPT, GitHub Copilot, Stable Diffusion, and others have captured the imagination of people around the world in a way AlphaGo did not, thanks to their broad utility—almost anyone can use them to communicate and create—and preternatural ability to have a conversation with a user. The latest generative AI applications can perform a range of routine tasks, such as the reorganization and classification of data. But it is their ability to write text, compose music, and create digital art that has garnered headlines and persuaded consumers and households to experiment on their own. As a result, a broader set of stakeholders are grappling with generative AI's impact on business and society but without much context to help them make sense of it.

The speed at which generative AI technology is developing isn't making this task any easier. ChatGPT was released in November 2022. Four months later, OpenAI released a new large language model, or LLM, called GPT-4 with markedly improved capabilities.<sup>[1]</sup> Similarly, by May 2023, Anthropic's generative AI, Claude, was able to process 100,000 tokens of text, equal to about 75,000 words in a minute—the length of the average

novel—compared with roughly 9,000 tokens when it was introduced in March 2023.<sup>[2]</sup> And in May 2023, Google announced several new features powered by generative AI, including Search Generative Experience and a new LLM called PaLM 2 that will power its Bard chatbot, among other Google products.<sup>[3]</sup>

To grasp what lies ahead requires an understanding of the breakthroughs that have enabled the rise of generative AI, which were decades in the making. For the purposes of this report, we define generative AI as applications typically built using foundation models. These models contain expansive artificial neural networks inspired by the billions of neurons connected in the human brain. Foundation models are part of what is called deep learning, a term that alludes to the many deep layers within neural networks. Deep learning has powered many of the recent advances in AI, but the foundation models powering generative AI applications are a step-change evolution within deep learning. Unlike previous deep learning models, they can process extremely large and varied sets of unstructured data and perform more than one task.

Foundation models have enabled new capabilities and vastly improved existing ones across a broad range of modalities, including images, video, audio, and computer code. AI trained on these models can perform several functions; it can classify, edit, summarize, answer questions, and draft new content, among other tasks.

All of us are at the beginning of a journey to understand generative AI's power, reach, and capabilities. This research is the latest in our efforts to assess the impact of this new era of AI. It suggests that generative AI is poised to transform roles and boost performance across functions such as sales and marketing, customer operations, and software development. In the process, it could unlock trillions of dollars in value across sectors from banking to life sciences. The following sections share our initial findings.

For the full version of this report, [download the PDF](#).

**Generative AI's impact on productivity could add trillions of dollars in value to the global economy.** Our latest research estimates that generative AI could add the equivalent of \$2.6 trillion to \$4.4 trillion annually across the 63 use cases we analyzed—by comparison, the United Kingdom's entire GDP in 2021 was \$3.1 trillion. This would increase the impact of all artificial intelligence by 15 to 40 percent. This estimate would roughly double if we include the impact of embedding generative AI into software that is currently used for other tasks beyond those use cases.

**About 75 percent of the value that generative AI use cases could deliver falls across four areas:**

**Customer operations, marketing and sales, software engineering, and R&D.** Across 16 business functions, we examined 63 use cases in which the technology can address specific business challenges in ways that produce one or more measurable outcomes. Examples include generative AI's ability to support interactions with customers, generate creative content for marketing and sales, and draft computer code based on natural-language prompts, among many other tasks.

**Generative AI will have a significant impact across all industry sectors.** Banking, high tech, and life sciences are among the industries that could see the biggest impact as a percentage of their revenues from generative AI. Across the banking industry, for example, the technology could deliver value equal to an additional \$200 billion to \$340 billion annually if the use cases were fully implemented. In retail and consumer packaged goods, the potential impact is also significant at \$400 billion to \$660 billion a year.

**Generative AI has the potential to change the anatomy of work, augmenting the capabilities of individual workers by automating some of their individual activities.** Current generative AI and other technologies have the potential to automate work activities that absorb 60 to 70 percent of employees' time today. In contrast, we previously estimated that technology has the potential to automate half of the time employees spend working.<sup>[4]</sup> The acceleration in the potential for technical automation is largely due to generative AI's increased ability to understand natural language, which is required for work activities that account for 25 percent of total work time. Thus, generative AI has more impact on knowledge work associated with occupations that have higher wages and educational requirements than on other types of work.

**The pace of workforce transformation is likely to accelerate, given increases in the potential for technical automation.** Our updated adoption scenarios, including technology development, economic feasibility, and diffusion timelines, lead to estimates that half of today's work activities could be automated between 2030 and 2060, with a midpoint in 2045, or roughly a decade earlier than in our previous estimates.

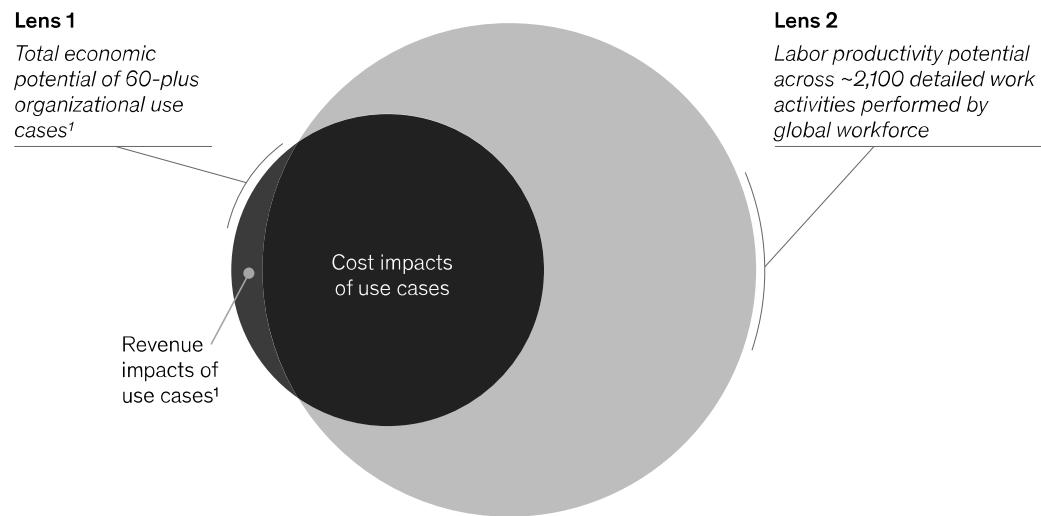
**Generative AI can substantially increase labor productivity across the economy, but that will require investments to support workers as they shift work activities or change jobs.** Generative AI could enable labor productivity growth of 0.1 to 0.6 percent annually through 2040, depending on the rate of technology adoption and redeployment of worker time into other activities. Combining generative AI with all other technologies, work automation could add 0.2 to 3.3 percentage points annually to productivity growth. However, workers will need support in learning new skills, and some will change occupations. If worker transitions and other risks can be managed, generative AI could contribute substantively to economic growth and support a more sustainable, inclusive world.

**The era of generative AI is just beginning.** Excitement over this technology is palpable, and early pilots are compelling. But a full realization of the technology's benefits will take time, and leaders in business and society still have considerable challenges to address. These include managing the risks inherent in generative AI, determining what new skills and capabilities the workforce will need, and rethinking core business processes such as retraining and developing new skills.

Generative AI is a step change in the evolution of artificial intelligence. As companies rush to adapt and implement it, understanding the technology's potential to deliver value to the economy and society at large will help shape critical decisions. We have used two complementary lenses to determine where generative AI, with its current capabilities, could deliver the biggest value and how big that value could be (Exhibit 1).

Exhibit 1

## The potential impact of generative AI can be evaluated through two lenses.



<sup>1</sup>For quantitative analysis, revenue impacts were recast as productivity increases on the corresponding spend in order to maintain comparability with cost impacts and not to assume additional growth in any particular market.

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The first lens scans use cases for generative AI that organizations could adopt. We define a “use case” as a targeted application of generative AI to a specific business challenge, resulting in one or more measurable outcomes. For example, a use case in marketing is the application of generative AI to generate creative content such as personalized emails, the measurable outcomes of which potentially include reductions in the cost of generating such content and increases in revenue from the enhanced effectiveness of higher-quality content at scale. We identified 63 generative AI use cases spanning 16 business functions that could deliver total value in the range of \$2.6 trillion to \$4.4 trillion in economic benefits annually when applied across industries.

That would add 15 to 40 percent to the \$11 trillion to \$17.7 trillion of economic value that we now estimate nongenerative artificial intelligence and analytics could unlock. (Our previous estimate from 2017 was that AI could deliver \$9.5 trillion to \$15.4 trillion in economic value.)

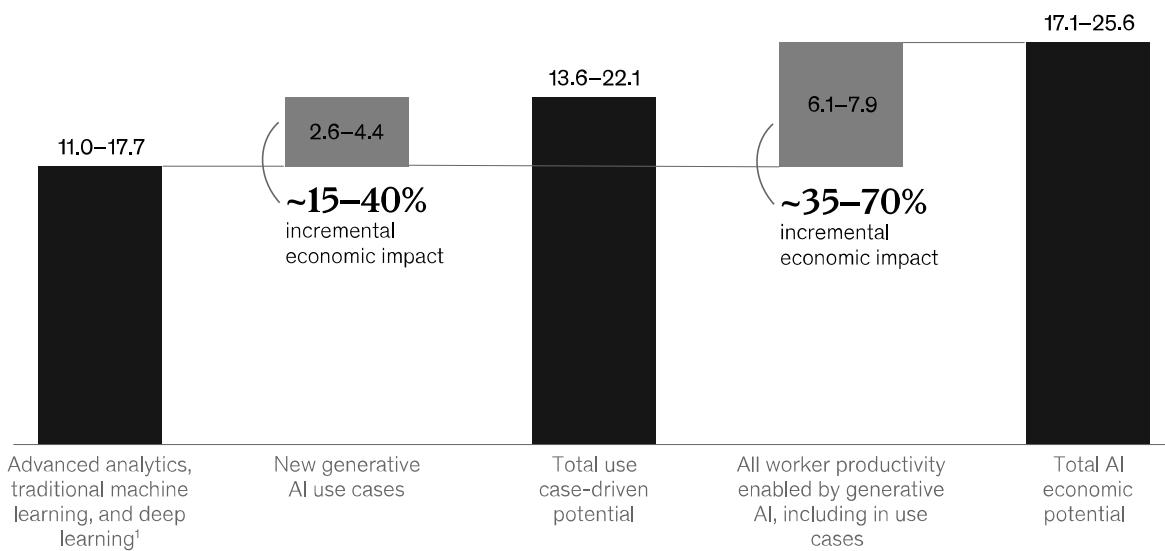
Our second lens complements the first by analyzing generative AI’s potential impact on the work activities required in some 850 occupations. We modeled scenarios to estimate when generative AI could perform each of more than 2,100 “detailed work activities”—such as “communicating with others about operational plans or activities”—that make up those occupations across the world economy. This enables us to estimate how the current capabilities of generative AI could affect labor productivity across all work currently done by the global workforce.

Some of this impact will overlap with cost reductions in the use case analysis described above, which we assume are the result of improved labor productivity. Netting out this overlap, the total economic benefits of generative AI—including the major use cases we explored and the myriad increases in productivity that are likely to materialize when the technology is applied across knowledge workers’ activities—amounts to \$6.1 trillion to \$7.9 trillion annually (Exhibit 2).

## Exhibit 2

**Generative AI could create additional value potential above what could be unlocked by other AI and analytics.**

**AI's potential impact on the global economy, \$ trillion**



<sup>1</sup>Updated use case estimates from "Notes from the AI frontier: Applications and value of deep learning," McKinsey Global Institute, April 17, 2018.

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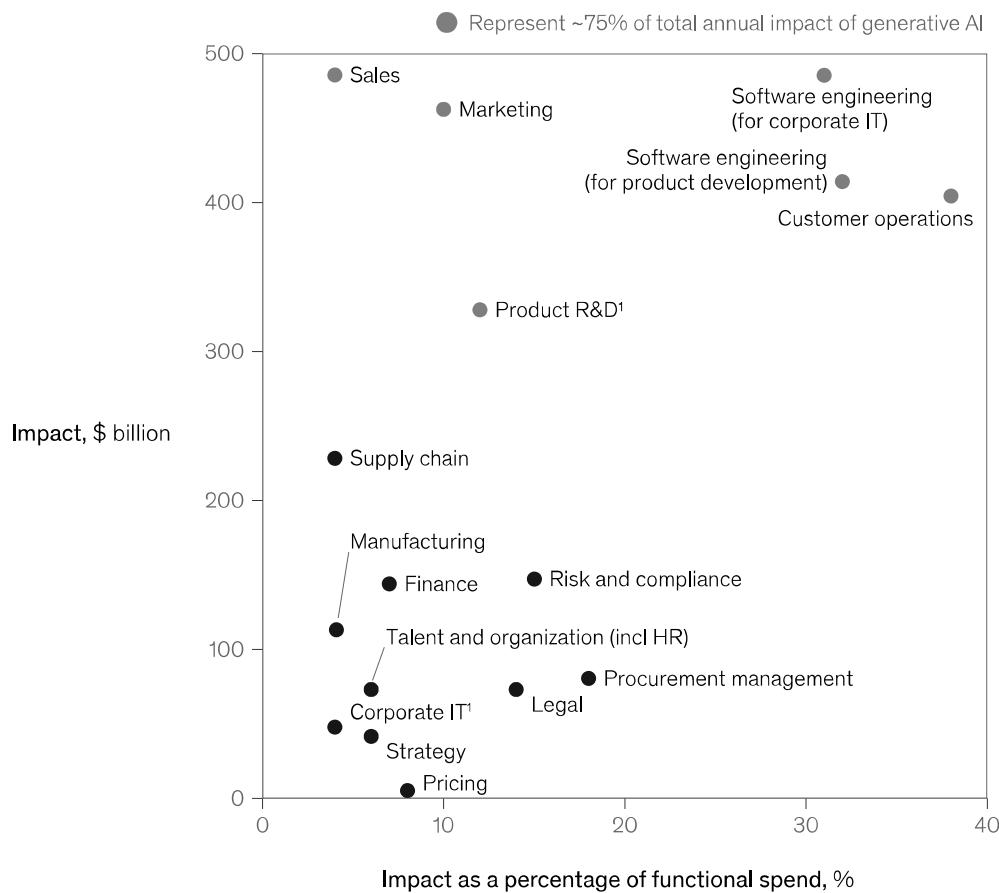
While generative AI is an exciting and rapidly advancing technology, the other applications of AI discussed in our previous report continue to account for the majority of the overall potential value of AI. Traditional advanced-analytics and machine learning algorithms are highly effective at performing numerical and optimization tasks such as predictive modeling, and they continue to find new applications in a wide range of industries. However, as generative AI continues to develop and mature, it has the potential to open wholly new frontiers in creativity and innovation. It has already expanded the possibilities of what AI overall can achieve (see sidebar "How we estimated the value potential of generative AI use cases").

In this section, we highlight the value potential of generative AI across business functions.

Generative AI could have an impact on most business functions; however, a few stand out when measured by the technology's impact as a share of functional cost (Exhibit 3). Our analysis of 16 business functions identified just four—customer operations, marketing and sales, software engineering, and research and development—that could account for approximately 75 percent of the total annual value from generative AI use cases.

## Exhibit 3

## Using generative AI in just a few functions could drive most of the technology's impact across potential corporate use cases.



Note: Impact is averaged.

<sup>1</sup>Excluding software engineering.

Source: Comparative Industry Service (CIS), IHS Markit; Oxford Economics; McKinsey Corporate and Business Functions database; McKinsey Manufacturing and Supply Chain 360; McKinsey Sales Navigator; Ignite, a McKinsey database; McKinsey analysis

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Notably, the potential value of using generative AI for several functions that were prominent in our previous sizing of AI use cases, including manufacturing and supply chain functions, is now much lower.<sup>[5]</sup> This is largely explained by the nature of generative AI use cases, which exclude most of the numerical and optimization applications that were the main value drivers for previous applications of AI.

In addition to the potential value generative AI can deliver in function-specific use cases, the technology could drive value across an entire organization by revolutionizing internal knowledge management systems. Generative AI's impressive command of natural-language processing can help employees retrieve stored internal knowledge by formulating queries in the same way they might ask a human a question and engage in continuing dialogue. This could empower teams to quickly access relevant information, enabling them to rapidly make better-informed decisions and develop effective strategies.

In 2012, the McKinsey Global Institute (MGI) estimated that knowledge workers spent about a fifth of their time, or one day each work week, searching for and gathering information. If generative AI could take on such tasks, increasing the efficiency and effectiveness of the workers doing them, the benefits would be huge. Such virtual expertise could rapidly "read" vast libraries of corporate information stored in natural language

and quickly scan source material in dialogue with a human who helps fine-tune and tailor its research, a more scalable solution than hiring a team of human experts for the task.

In other cases, generative AI can drive value by working in partnership with workers, augmenting their work in ways that accelerate their productivity. Its ability to rapidly digest mountains of data and draw conclusions from it enables the technology to offer insights and options that can dramatically enhance knowledge work. This can significantly speed up the process of developing a product and allow employees to devote more time to higher-impact tasks.

Following are four examples of how generative AI could produce operational benefits in a handful of use cases across the business functions that could deliver a majority of the potential value we identified in our analysis of 63 generative AI use cases. In the first two examples, it serves as a virtual expert, while in the following two, it lends a hand as a virtual collaborator.

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Across the 63 use cases we analyzed, generative AI has the potential to generate \$2.6 trillion to \$4.4 trillion in value across industries. Its precise impact will depend on a variety of factors, such as the mix and importance of different functions, as well as the scale of an industry's revenue (Exhibit 4).

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Exhibit 4

For example, our analysis estimates generative AI could contribute roughly \$310 billion in additional value for the retail industry (including auto dealerships) by boosting performance in functions such as marketing and

customer interactions. By comparison, the bulk of potential value in high tech comes from generative AI's ability to increase the speed and efficiency of software development (Exhibit 5).

Exhibit 5

## Generative AI could deliver significant value when deployed in some use cases across a selection of top industries.

### Selected examples of key use cases for main functional value drivers (nonexhaustive)

Value potential of function for the industry  
 – High  
 – Low

	Total value potential per industry, \$ billion (% of industry revenue)	Value potential, as % of operating profits <sup>1</sup>	Product R&D, software engineering	Customer operations	Marketing and sales	Other functions
<b>Banking</b>	200–340 (3–5%)	9–15	<ul style="list-style-type: none"> <li>■ Legacy code conversion</li> <li>Optimize migration of legacy frameworks with natural-language translation capabilities</li> </ul>	<ul style="list-style-type: none"> <li>■ Customer emergency interactive voice response (IVR)</li> <li>Partially automate, accelerate, and enhance resolution rate of customer emergencies through generative AI-enhanced IVR interactions (eg, for credit card losses)</li> </ul>	<ul style="list-style-type: none"> <li>■ Custom retail banking offers</li> <li>Push personalized marketing and sales content tailored for each client of the bank based on profile and history (eg, personalized nudges), and generate alternatives for A/B testing</li> </ul>	<ul style="list-style-type: none"> <li>■ Risk model documentation</li> <li>Create model documentation, and scan for missing documentation and relevant regulatory updates</li> </ul>
<b>Retail and consumer packaged goods<sup>2</sup></b>	400–660 (1–2%)	27–44	<ul style="list-style-type: none"> <li>■ Consumer research</li> <li>Accelerate consumer research by testing scenarios, and enhance customer targeting by creating “synthetic customers” to practice with</li> </ul>	<ul style="list-style-type: none"> <li>■ Augmented reality-assisted customer support</li> <li>Rapidly inform the workforce in real time about the status of products and consumer preferences</li> </ul>	<ul style="list-style-type: none"> <li>■ Assist copy writing for marketing content creation</li> <li>Accelerate writing of copy for marketing content and advertising scripts</li> </ul>	<ul style="list-style-type: none"> <li>■ Procurement suppliers process enhancement</li> <li>Draft playbooks for negotiating with suppliers</li> </ul>
<b>Pharma and medical products</b>	60–110 (3–5%)	15–25	<ul style="list-style-type: none"> <li>■ Research and drug discovery</li> <li>Accelerate the selection of proteins and molecules best suited as candidates for new drug formulation</li> </ul>	<ul style="list-style-type: none"> <li>■ Customer documentation generation</li> <li>Draft medication instructions and risk notices for drug resale</li> </ul>	<ul style="list-style-type: none"> <li>■ Generate content for commercial representatives</li> <li>Prepare scripts for interactions with physicians</li> </ul>	<ul style="list-style-type: none"> <li>■ Contract generation</li> <li>Draft legal documents incorporating specific regulatory requirements</li> </ul>

<sup>1</sup>Operating profit based on average profitability of selected industries in the 2020–22 period.

<sup>2</sup>Includes auto retail.

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In the banking industry, generative AI has the potential to improve on efficiencies already delivered by artificial intelligence by taking on lower-value tasks in risk management, such as required reporting, monitoring regulatory developments, and collecting data. In the life sciences industry, generative AI is poised to make significant contributions to drug discovery and development.

We share our detailed analysis of these industries below.

Technology has been changing the anatomy of work for decades. Over the years, machines have given human workers various “superpowers”; for instance, industrial-age machines enabled workers to accomplish physical tasks beyond the capabilities of their own bodies. More recently, computers have enabled knowledge workers to perform calculations that would have taken years to do manually.

These examples illustrate how technology can augment work through the automation of individual activities that workers would have otherwise had to do themselves. At a conceptual level, the application of generative AI may follow the same pattern in the modern workplace, although as we show later in this chapter, the types of activities that generative AI could affect, and the types of occupations with activities that could change, will likely be different as a result of this technology than for older technologies.

The McKinsey Global Institute began analyzing the impact of technological automation of work activities and modeling scenarios of adoption in 2017. At that time, we estimated that workers spent half of their time on activities that had the potential to be automated by adapting technology that existed at that time, or what we call technical automation potential. We also modeled a range of potential scenarios for the pace at which these technologies could be adopted and affect work activities throughout the global economy.

Technology adoption at scale does not occur overnight. The potential of technological capabilities in a lab does not necessarily mean they can be immediately integrated into a solution that automates a specific work activity—developing such solutions takes time. Even when such a solution is developed, it might not be economically feasible to use if its costs exceed those of human labor. Additionally, even if economic incentives for deployment exist, it takes time for adoption to spread across the global economy. Hence, our adoption scenarios, which consider these factors together with the technical automation potential, provide a sense of the pace and scale at which workers’ activities could shift over time.

The analyses in this paper incorporate the potential impact of generative AI on today's work activities. The new capabilities of generative AI, combined with previous technologies and integrated into corporate operations around the world, could accelerate the potential for technical automation of individual activities and the adoption of technologies that augment the capabilities of the workforce. They could also have an impact on knowledge workers whose activities were not expected to shift as a result of these technologies until later in the future (see sidebar "About the research").

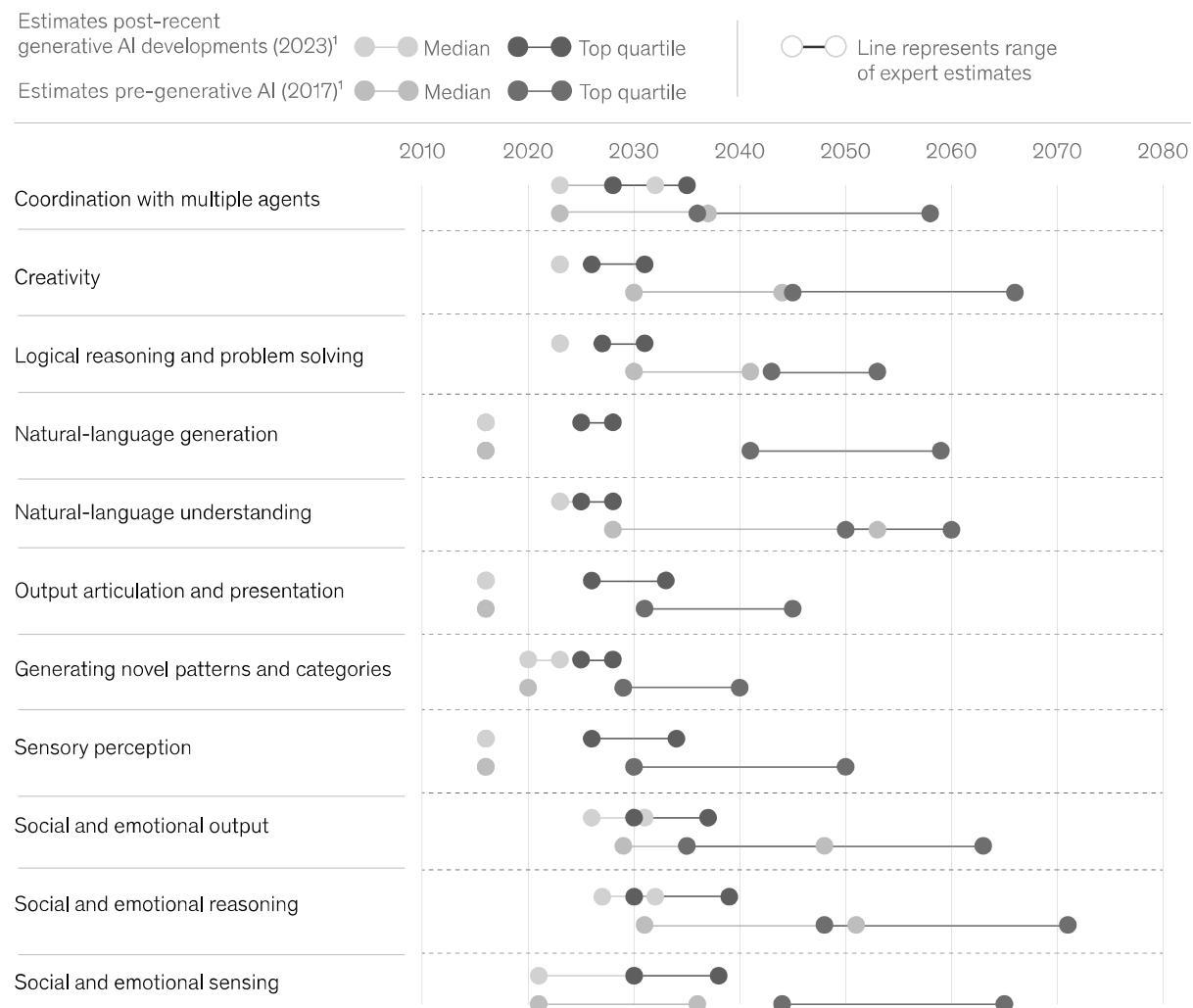
## Automation potential has accelerated, but adoption to lag

Based on developments in generative AI, technology performance is now expected to match median human performance and reach top-quartile human performance earlier than previously estimated across a wide range of capabilities (Exhibit 6). For example, MGI previously identified 2027 as the earliest year when median human performance for natural-language understanding might be achieved in technology, but in this new analysis, the corresponding point is 2023.

Exhibit 6

## As a result of generative AI, experts assess that technology could achieve human-level performance in some technical capabilities sooner than previously thought.

**Technical capabilities**, level of human performance achievable by technology



<sup>1</sup>Comparison made on the business-related tasks required from human workers. Please refer to technical appendix for detailed view of performance rating methodology.

Source: McKinsey Global Institute occupation database; McKinsey analysis

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As a result of these reassessments of technology capabilities due to generative AI, the total percentage of hours that could theoretically be automated by integrating technologies that exist today has increased from about 50 percent to 60–70 percent. The technical potential curve is quite steep because of the acceleration in generative AI's natural-language capabilities.

Interestingly, the range of times between the early and late scenarios has compressed compared with the expert assessments in 2017, reflecting a greater confidence that higher levels of technological capabilities will arrive by certain time periods (Exhibit 7).

---

Exhibit 7

Our analysis of adoption scenarios accounts for the time required to integrate technological capabilities into solutions that can automate individual work activities; the cost of these technologies compared with that of human labor in different occupations and countries around the world; and the time it has taken for technologies to diffuse across the economy. With the acceleration in technical automation potential that generative AI enables, our scenarios for automation adoption have correspondingly accelerated. These scenarios encompass a wide range of outcomes, given that the pace at which solutions will be developed and adopted will vary based on decisions that will be made on investments, deployment, and regulation, among other factors. But they give an indication of the degree to which the activities that workers do each day may shift (Exhibit 8).

---

## Exhibit 8

As an example of how this might play out in a specific occupation, consider postsecondary English language and literature teachers, whose detailed work activities include preparing tests and evaluating student work. With generative AI's enhanced natural-language capabilities, more of these activities could be done by machines, perhaps initially to create a first draft that is edited by teachers but perhaps eventually with far less human editing required. This could free up time for these teachers to spend more time on other work activities, such as guiding class discussions or tutoring students who need extra assistance.

Our previously modeled adoption scenarios suggested that 50 percent of time spent on 2016 work activities would be automated sometime between 2035 and 2070, with a midpoint scenario around 2053. Our updated adoption scenarios, which account for developments in generative AI, models the time spent on 2023 work activities reaching 50 percent automation between 2030 and 2060, with a midpoint of 2045—an acceleration of roughly a decade compared with the previous estimate.<sup>[6]</sup>

Adoption is also likely to be faster in developed countries, where wages are higher and thus the economic feasibility of adopting automation occurs earlier. Even if the potential for technology to automate a particular work activity is high, the costs required to do so have to be compared with the cost of human wages. In countries such as China, India, and Mexico, where wage rates are lower, automation adoption is modeled to arrive more slowly than in higher-wage countries (Exhibit 9).

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## Exhibit 9

## Generative AI's potential impact on knowledge work

Previous generations of automation technology were particularly effective at automating data management tasks related to collecting and processing data. Generative AI's natural-language capabilities increase the automation potential of these types of activities somewhat. But its impact on more physical work activities

shifted much less, which isn't surprising because its capabilities are fundamentally engineered to do cognitive tasks.

As a result, generative AI is likely to have the biggest impact on knowledge work, particularly activities involving decision making and collaboration, which previously had the lowest potential for automation (Exhibit 10). Our estimate of the technical potential to automate the application of expertise jumped 34 percentage points, while the potential to automate management and develop talent increased from 16 percent in 2017 to 49 percent in 2023.

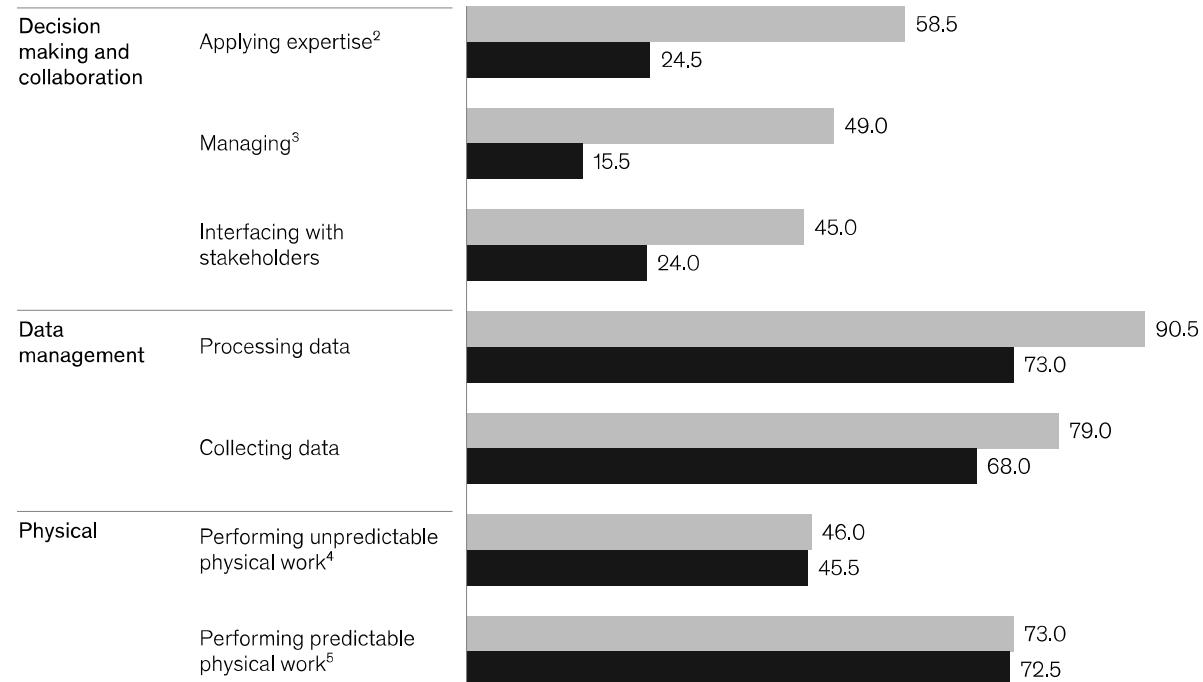
Exhibit 10

## **Generative AI could have the biggest impact on collaboration and the application of expertise, activities that previously had a lower potential for automation.**

### **Overall technical automation potential, comparison in midpoint scenarios, % in 2023**

With generative AI  
Without generative AI<sup>1</sup>

#### **Activity groups**



Note: Figures may not sum, because of rounding.

<sup>1</sup>Previous assessment of work automation before the rise of generative AI.

<sup>2</sup>Applying expertise to decision making, planning, and creative tasks.

<sup>3</sup>Managing and developing people.

<sup>4</sup>Performing physical activities and operating machinery in unpredictable environments.

<sup>5</sup>Performing physical activities and operating machinery in predictable environments.

Source: McKinsey Global Institute analysis

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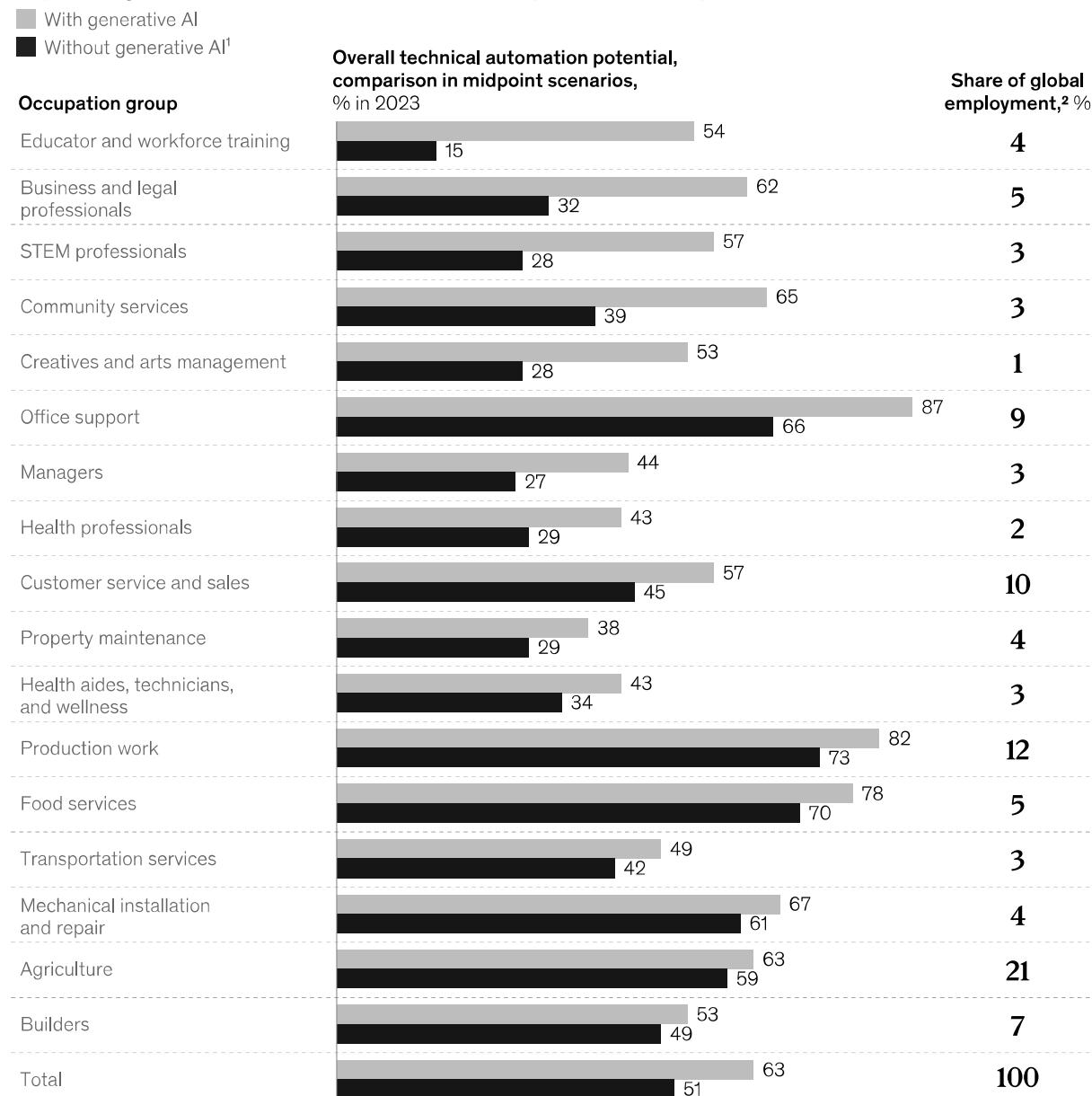
Generative AI's ability to understand and use natural language for a variety of activities and tasks largely explains why automation potential has risen so steeply. Some 40 percent of the activities that workers perform in the economy require at least a median level of human understanding of natural language.

As a result, many of the work activities that involve communication, supervision, documentation, and interacting with people in general have the potential to be automated by generative AI, accelerating the transformation of work in occupations such as education and technology, for which automation potential was previously expected to emerge later (Exhibit 11).

Exhibit 11

## Advances in technical capabilities could have the most impact on activities performed by educators, professionals, and creatives.

### Impact of generative AI on technical automation potential in midpoint scenario, 2023



Note: Figures may not sum, because of rounding.

<sup>1</sup>Previous assessment of work automation before the rise of generative AI.

<sup>2</sup>Includes data from 47 countries, representing about 80% of employment across the world.

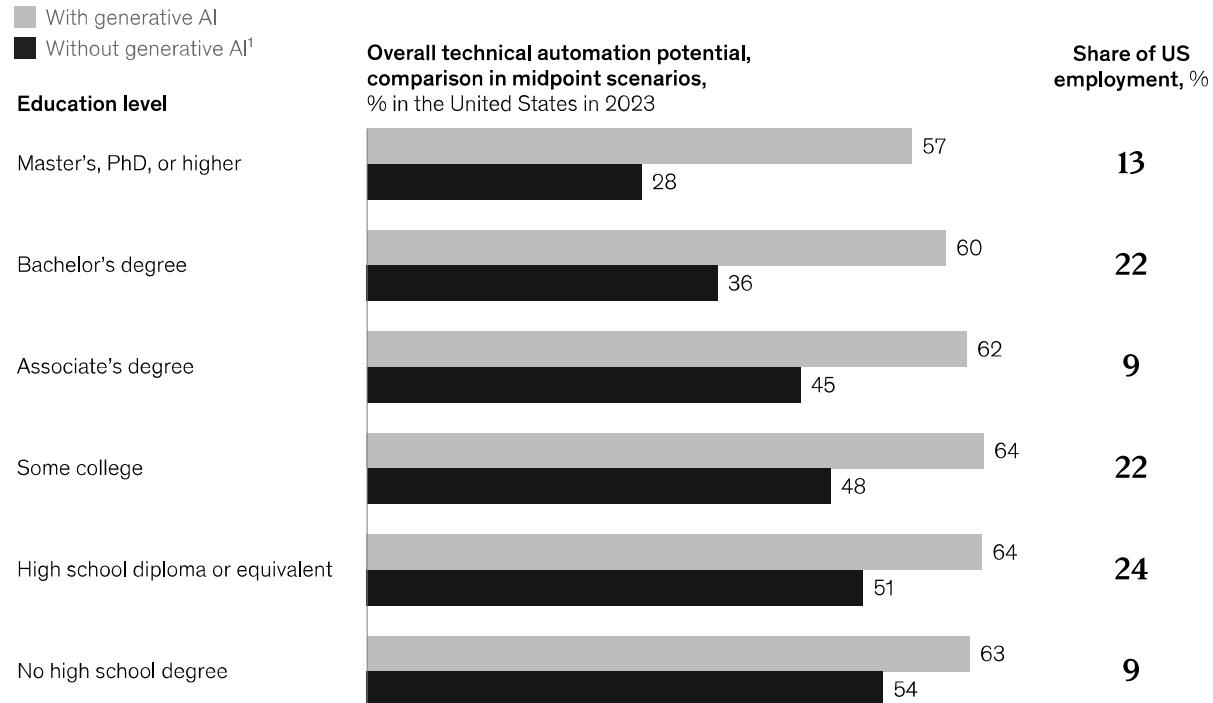
Source: McKinsey Global Institute analysis

Labor economists have often noted that the deployment of automation technologies tends to have the most impact on workers with the lowest skill levels, as measured by educational attainment, or what is called skill biased. We find that generative AI has the opposite pattern—it is likely to have the most incremental impact through automating some of the activities of more-educated workers (Exhibit 12).

Exhibit 12

## Generative AI increases the potential for technical automation most in occupations requiring higher levels of educational attainment.

### Impact of generative AI on technical automation potential in midpoint scenario, 2023



<sup>1</sup>Previous assessment of work automation before the rise of generative AI.  
Source: McKinsey Global Institute analysis

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Another way to interpret this result is that generative AI will challenge the attainment of multiyear degree credentials as an indicator of skills, and others have advocated for taking a more skills-based approach to workforce development in order to create more equitable, efficient workforce training and matching systems. [7] Generative AI could still be described as skill-biased technological change, but with a different, perhaps more granular, description of skills that are more likely to be replaced than complemented by the activities that machines can do.

Previous generations of automation technology often had the most impact on occupations with wages falling in the middle of the income distribution. For lower-wage occupations, making a case for work automation is more difficult because the potential benefits of automation compete against a lower cost of human labor. Additionally, some of the tasks performed in lower-wage occupations are technically difficult to automate—for example, manipulating fabric or picking delicate fruits. Some labor economists have observed a “hollowing

out of the middle," and our previous models have suggested that work automation would likely have the biggest midterm impact on lower-middle-income quintiles.

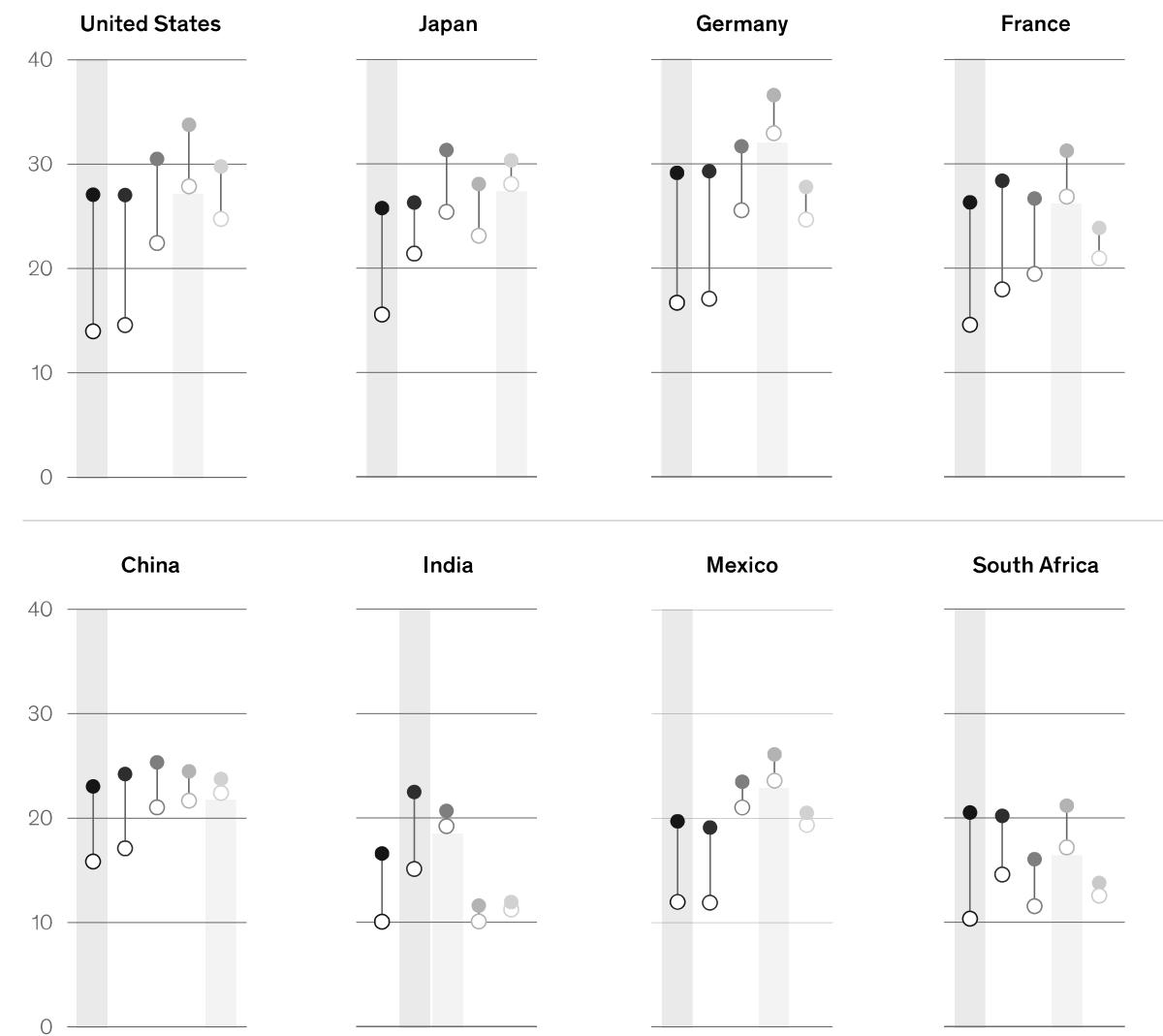
However, generative AI's impact is likely to most transform the work of higher-wage knowledge workers because of advances in the technical automation potential of their activities, which were previously considered to be relatively immune from automation (Exhibit 13).

Exhibit 13

## Generative AI could have the biggest impact on activities in high-wage jobs; previously, automation's impact was highest in lower-middle-income quintiles.

### Automation adoption per wage quintile, % in 2030, midpoint scenario

**Wage quintiles** Higher earners ● 81–100 ● 61–80 ● 41–60 ● 21–40 ● 0–20 Lower earners  
 ○ Without generative AI<sup>1</sup> ● With generative AI      ■ Largest increase in automation adoption from generative AI      □ Largest automation adoption without generative AI



<sup>1</sup>Previous assessment of work automation before the rise of generative AI.  
Source: McKinsey Global Institute analysis

# Generative AI could propel higher productivity growth

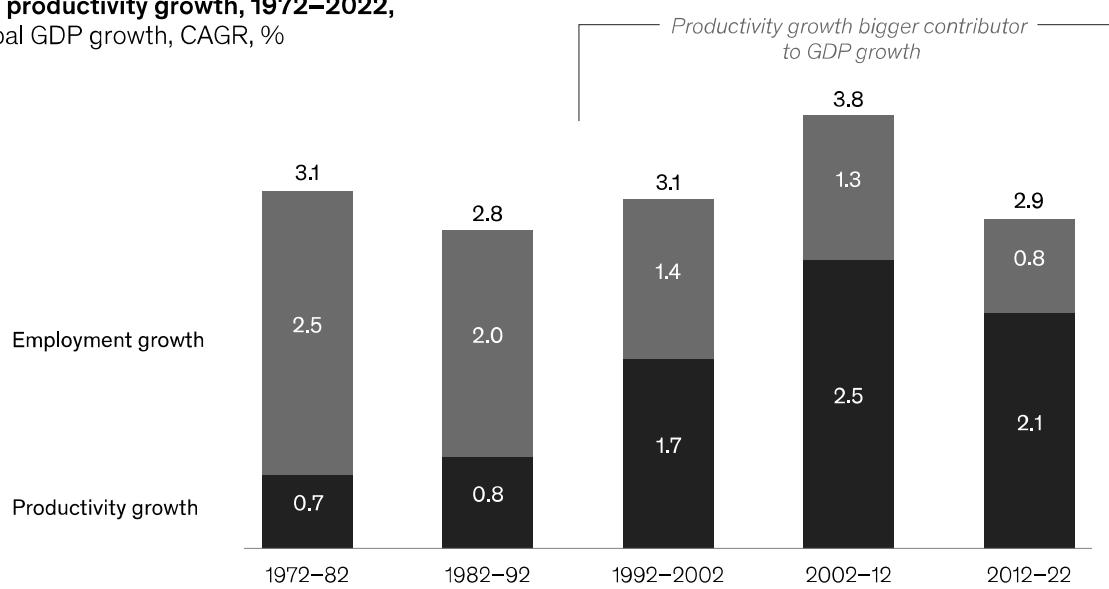
Global economic growth was slower from 2012 to 2022 than in the two preceding decades.<sup>[8]</sup> Although the COVID-19 pandemic was a significant factor, long-term structural challenges—including declining birth rates and aging populations—are ongoing obstacles to growth.

Declining employment is among those obstacles. Compound annual growth in the total number of workers worldwide slowed from 2.5 percent in 1972–82 to just 0.8 percent in 2012–22, largely because of aging. In many large countries, the size of the workforce is already declining.<sup>[9]</sup> Productivity, which measures output relative to input, or the value of goods and services produced divided by the amount of labor, capital, and other resources required to produce them, was the main engine of economic growth in the three decades from 1992 to 2022 (Exhibit 14). However, since then, productivity growth has slowed in tandem with slowing employment growth, confounding economists and policy makers.<sup>[10]</sup>

Exhibit 14

## Productivity growth, the main engine of GDP growth over the past 30 years, slowed down in the past decade.

**Real GDP growth contribution of employment and productivity growth, 1972–2022,**  
global GDP growth, CAGR, %



Source: Conference Board Total Economy database; McKinsey Global Institute analysis

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The deployment of generative AI and other technologies could help accelerate productivity growth, partially compensating for declining employment growth and enabling overall economic growth. Based on our estimates, the automation of individual work activities enabled by these technologies could provide the global economy with an annual productivity boost of 0.2 to 3.3 percent from 2023 to 2040, depending on the rate of automation adoption—with generative AI contributing 0.1 to 0.6 percentage points of that growth—but only if individuals affected by the technology were to shift to other work activities that at least match their 2022

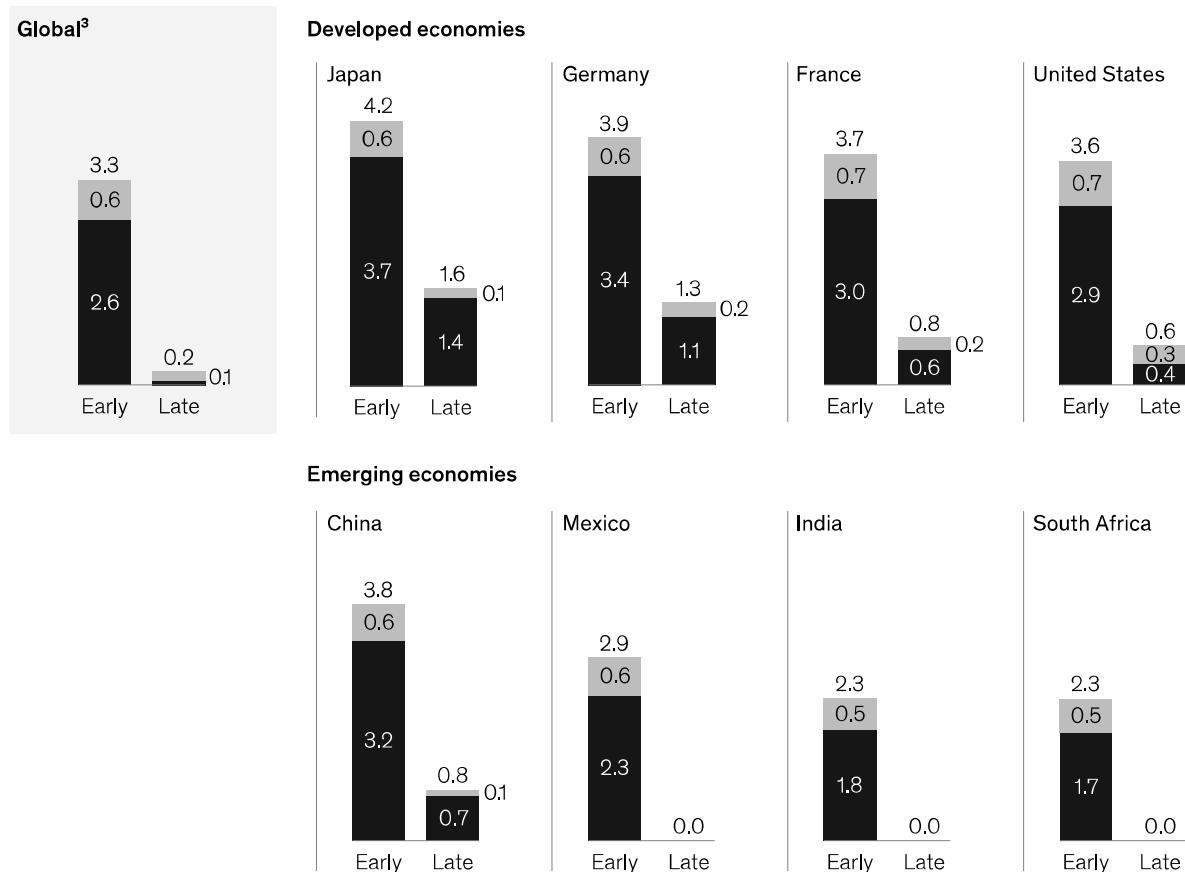
productivity levels (Exhibit 15). In some cases, workers will stay in the same occupations, but their mix of activities will shift; in others, workers will need to shift occupations.

Exhibit 15

## Generative AI could contribute to productivity growth if labor hours can be redeployed effectively.

### Productivity impact from automation by scenario, 2022–40, CAGR,<sup>1%</sup>

■ Without generative AI<sup>2</sup> ■ Additional with generative AI



Note: Figures may not sum, because of rounding.

<sup>1</sup>Based on the assumption that automated work hours are reintegrated in work at productivity level of today.

<sup>2</sup>Previous assessment of work automation before the rise of generative AI.

<sup>3</sup>Based on 47 countries, representing about 80% of world employment.

Source: Conference Board Total Economy database; Oxford Economics; McKinsey Global Institute analysis

History has shown that new technologies have the potential to reshape societies. Artificial intelligence has already changed the way we live and work—for example, it can help our phones (mostly) understand what we say, or draft emails. Mostly, however, AI has remained behind the scenes, optimizing business processes or making recommendations about the next product to buy. The rapid development of generative AI is likely to significantly augment the impact of AI overall, generating trillions of dollars of additional value each year and transforming the nature of work.

But the technology could also deliver new and significant challenges. Stakeholders must act—and quickly, given the pace at which generative AI could be adopted—to prepare to address both the opportunities and the risks. Risks have already surfaced, including concerns about the content that generative AI systems produce: Will they infringe upon intellectual property due to “plagiarism” in the training data used to create foundation models? Will the answers that LLMs produce when questioned be accurate, and can they be explained? Will the content generative AI creates be fair or biased in ways that users do not want by, say, producing content that reflects harmful stereotypes?

There are economic challenges too: the scale and the scope of the workforce transitions described in this report are considerable. In the midpoint adoption scenario, about a quarter to a third of work activities could change in the coming decade. The task before us is to manage the potential positives and negatives of the technology simultaneously (see sidebar “Using generative AI responsibly”). Here are some of the critical questions we will need to address while balancing our enthusiasm for the potential benefits of the technology with the new challenges it can introduce.

## Companies and business leaders

How can companies move quickly to capture the potential value at stake highlighted in this report, while managing the risks that generative AI presents?

How will the mix of occupations and skills needed across a company’s workforce be transformed by generative AI and other artificial intelligence over the coming years? How will a company enable these transitions in its hiring plans, retraining programs, and other aspects of human resources?

Do companies have a role to play in ensuring the technology is not deployed in “negative use cases” that could harm society?

How can businesses transparently share their experiences with scaling the use of generative AI within and across industries—and also with governments and society?

## Policy makers

What will the future of work look like at the level of an economy in terms of occupations and skills? What does this mean for workforce planning?

How can workers be supported as their activities shift over time? What retraining programs can be put in place? What incentives are needed to support private companies as they invest in human capital? Are there earn-while-you-learn programs such as apprenticeships that could enable people to retrain while continuing to support themselves and their families?

What steps can policy makers take to prevent generative AI from being used in ways that harm society or vulnerable populations?

Can new policies be developed and existing policies amended to ensure human-centric AI development and deployment that includes human oversight and diverse perspectives and accounts for societal values?

## Individuals as workers, consumers, and citizens

How concerned should individuals be about the advent of generative AI? While companies can assess how the technology will affect their bottom lines, where can citizens turn for accurate, unbiased information about how it will affect their lives and livelihoods?

How can individuals as workers and consumers balance the conveniences generative AI delivers with its impact in their workplaces?

Can citizens have a voice in the decisions that will shape the deployment and integration of generative AI into the fabric of their lives?

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Technological innovation can inspire equal parts awe and concern. When that innovation seems to materialize fully formed and becomes widespread seemingly overnight, both responses can be amplified. The arrival of generative AI in the fall of 2022 was the most recent example of this phenomenon, due to its unexpectedly rapid adoption as well as the ensuing scramble among companies and consumers to deploy, integrate, and play with it.

All of us are at the beginning of a journey to understand this technology's power, reach, and capabilities. If the past eight months are any guide, the next several years will take us on a roller-coaster ride featuring fast-paced innovation and technological breakthroughs that force us to recalibrate our understanding of AI's impact on our work and our lives. It is important to properly understand this phenomenon and anticipate its impact. Given the speed of generative AI's deployment so far, the need to accelerate digital transformation and reskill labor forces is great.

These tools have the potential to create enormous value for the global economy at a time when it is pondering the huge costs of adapting and mitigating climate change. At the same time, they also have the potential to be more destabilizing than previous generations of artificial intelligence. They are capable of that most human of abilities, language, which is a fundamental requirement of most work activities linked to expertise and knowledge as well as a skill that can be used to hurt feelings, create misunderstandings, obscure truth, and incite violence and even wars.

We hope this research has contributed to a better understanding of generative AI's capacity to add value to company operations and fuel economic growth and prosperity as well as its potential to dramatically transform how we work and our purpose in society. Companies, policy makers, consumers, and citizens can work together to ensure that generative AI delivers on its promise to create significant value while limiting its potential to upset lives and livelihoods. The time to act is now.<sup>[11]</sup>

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