Advancing the AI conversation

Contents

1. Data points *Bite-size insights from Deloitte research*

2. Perspectives

3. Features

On the web

● **The important role of leaders in advancing human sustainability**

● **How can organizations work better for working women?**

● **Navigating the tech talent shortage**

● **Gen Zs and millennials find reasons for optimism despite difficult realities**

● **Households transforming the grid: Distributed energy resources are key to affordable clean power**

● **Lessons for middle-market tech executives to consider from their fast-growing peers**

www.deloitteinsights.com
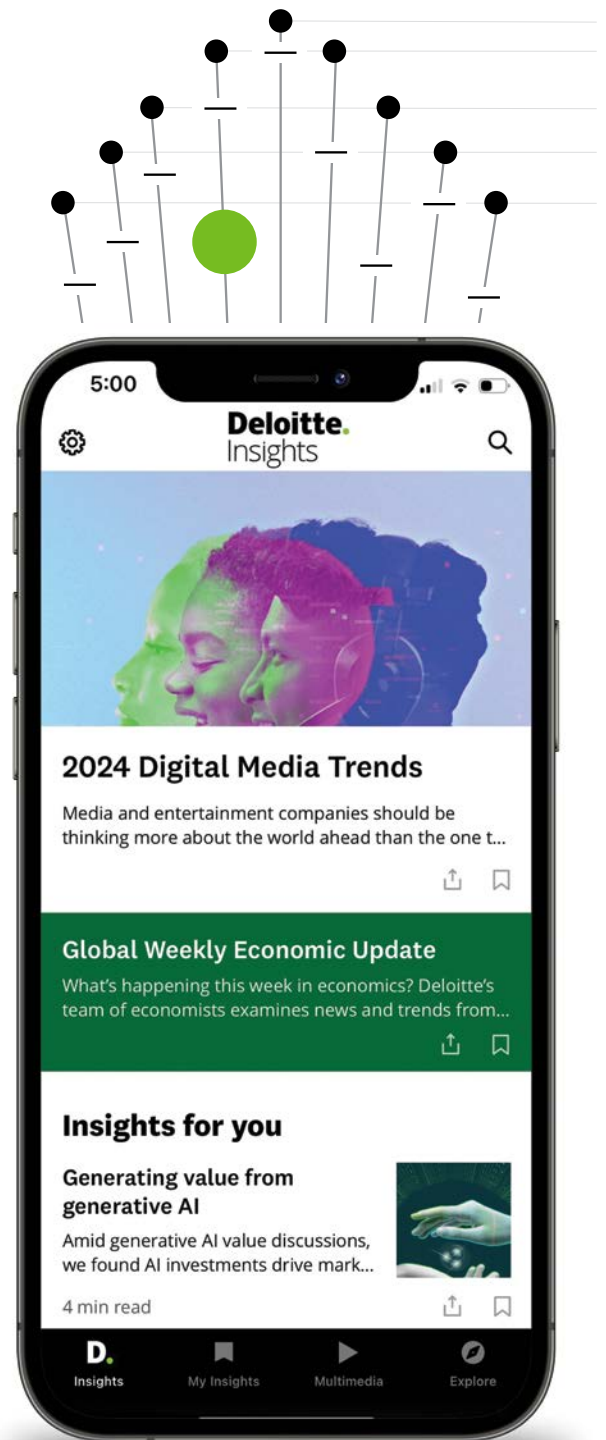
Advancing the AI conversation

Over the past two decades, and then seemingly overnight, artificial intelligence has gone from a fringe technology to what many consider to be must-have, market-making and -shaping tech. And with each passing day, the AI conversation is evolving in real time, spurred on, of course, by all things generative-AI–related and the more readily apparent impact AI could have on organizations, industries, and economies.

In this issue, we're featuring some of Deloitte's latest proprietary research and insights to help move the AI conversation forward, offering fresh perspectives and foresight on what those organizational and economic impacts might be.

For instance, Deloitte researchers have sliced and diced a data set from a proprietary survey of nearly 2,800 board members, C-suite executives, and other senior leaders in 14 countries for insights into how generative AI budgets are being spent (page 18), what it takes to scale from gen AI pilots to full implementation (page 90), and whether organizations feel prepared for any risk and governance issues associated with the technology (page 21).

We look at which success metrics business and tech leaders turn to when determining the impact of their AI investments (page 19), and which kinds of AI regulations could be most effective for the ever-evolving technology, safeguarding the public while not hindering innovation (page 20).

And we examine AI's potential impact on work and the workforce from several angles—considering gen AI's potential impact on productivity and labor demand and, therefore, economic outcomes (page 34); tracking the trend in C-suite roles requiring more data and analytics skills (page 70); making the case for the key capability people could need as work becomes more AI-enabled (page 38); and discussing why new prediction models might be needed to determine how AI and other tech could change the future of work (page 52).

And we're just scratching the surface. Deloitte is building a rich and diverse portfolio of AI-related business research and insights—the kind of trustworthy, deeply researched information that your AI-enabled searches rely on. Check out www.deloitteinsights.com for lots more where this came from.

Best,

Elisabeth Sullivan
Editor in chief, Deloitte Insights
insights@deloitte.com

Contributors

Tasha Austin
laustin@deloitte.com

Tasha Austin is a principal in Deloitte US's government and public services practice whose experience includes commercial and federal financial statement audits, fraud, dispute analysis and investigations, artificial intelligence, and advanced data analytics. Austin helps lead the practice's AI and data analytics offering, helping clients with their financial management transformation.

Sonia Breeze
sbreeze@deloitte.co.nz

Sonia Breeze leads Deloitte New Zealand's human capital consulting practice and is also the internal talent partner. She's committed to enabling organizations to maximize the potential of their people. She leverages 25 years of experience in human capital consulting and health care, and as a CPO, to advise on and implement the people-oriented aspects of change including technology enablement.

Corrie Commisso
ccommisso@deloitte.com

Corrie Commisso is a senior editor at *Deloitte Insights* leading global content strategy for human capital and the future of work. She has more than 20 years of experience in writing, editing, and creative direction, and holds degrees in journalism and library and information science—a combination she credits for her ability to tell deep and engaging stories.

Robert Hillard
rhillard@deloitte.com.au

Robert Hillard leads consulting across Asia Pacific, including in China, Japan, Australia, India, Singapore, Malaysia, Indonesia, Thailand, Vietnam, New Zealand, and South Korea. He has previously served as a member of Deloitte's global board (Deloitte Touche Tohmatsu Limited), CTO for Deloitte Asia Pacific, and the chief strategy and innovation officer for Deloitte Australia.

Andrew Blau
ablau@deloitte.com

Andrew Blau leads Deloitte US's strategic futures practice, helping clients think creatively and strategically about how they can successfully compete despite macro and market uncertainties in the world around them. He also leads eminence and insights for Deloitte Consulting, developing Deloitte US's perspectives on cross-cutting issues shaping organizations and markets.

Susan Cantrell
scantrell@deloitte.com

Susan Cantrell is vice president of products and workforce strategies at Deloitte Consulting LLP, and a frequent speaker on human capital and the future of work. She is coauthor of the Harvard Business Press book *Workforce of One* and has also been published widely in publications including *Harvard Business Review*, *The Wall Street Journal*, and *MIT Sloan Management Review*.

Peter Evans-Greenwood
peter@evans-greenwood.com

Peter Evans-Greenwood is an independent advisor and consultant, a senior fellow at the Australian Davos Connection, and a former fellow at the Deloitte Centre for the Edge in Australia. With over 20 years of experience at the intersection of business and technology, he combines systematic and integrative thinking to help organizations make informed decisions in an uncertain business environment.

Susan C. Hogan
shogan@deloitte.com

Susan C. Hogan is the global leader of Deloitte's finance and performance practice, and the leader of Deloitte US's finance transformation practice. Hogan has nearly 30 years of transformation consulting experience, primarily in finance and global business services.

Stuart Johnston
stujohnston@deloitte.com.au

Stuart Johnston is the Deloitte Global clients leader and a member of the global clients and industries executive. Based in Australia, he also serves as a lead client partner and advisory partner, focusing on enhancing relationships with board members and executives, and connecting Deloitte member firms globally.

Ira Kalish
ikalish@deloitte.com

Ira Kalish is the chief global economist at Deloitte Touche Tohmatsu Ltd. He is a specialist in global economic issues as well as the effects of economic, demographic, and social trends on the global business environment. His insights have appeared in publications including *The Wall Street Journal*, *The Economist*, and *The Financial Times*.

Thirumalai Kannan
tkannand@deloitte.com

Thirumalai Kannan is a researcher with the Deloitte Center for Government Insights. His research focuses on the quantitative analysis of cross-cutting issues in government, including emerging technologies like AI and advancing citizen trust.

Pankaj Kishnani
pkamleshkumarkish@deloitte.com

Pankaj Kishnani is a research manager with the Deloitte Center for Government Insights. His research focuses on identifying trends in emerging technologies in the public sector. He closely tracks digital government transformation, the regulation of emerging technologies, the role of government in catalyzing innovations, and citizen-centric service delivery models.

Annalyn Kurtz
ankurtz@deloitte.com

Annalyn Kurtz is the executive editor of *Deloitte Insights*. Prior to her role at Deloitte, she worked as a business journalist, newsroom leader, and educator. She has written about business and economics topics for CNN Business, *Fortune*, and *The New York Times*, among others.

Chris Lewin
chrislewin@deloitte.com

Chris Lewin is a partner in the consulting practice at Deloitte Australia with a specialization in automation. He has extensive data and analytics experience driving IT transformation programs.

David Mallon
dmallon@deloitte.com

David Mallon is chief analyst and market leader for Deloitte US's Insights2Action team, helping clients sense, analyze, and act at the ever-shifting intersection of work, workforce, workplace, and industry. He brings more than 20 years of experience in human capital, with expertise in organization design, organizational culture, HR, talent, learning, and performance.

Joe Mariani
jmariani@deloitte.com

Joe Mariani is a senior research manager with Deloitte's Center for Government Insights. His research focuses on innovation and technology adoption for both national security organizations and commercial businesses. His previous work includes experience as a consultant to the defense and intelligence industries, a high school science teacher, and a US Marine Corps intelligence officer.

Timothy Murphy
timurphy@deloitte.com

Tim Murphy is a senior manager in Deloitte's Center for Integrated Research. As a researcher and analytical scientist, he focuses on understanding how organizations undergo large-scale transformations that grow the business, bolster operations, and make the enterprise more resilient against external shocks and disruptions.

John O'Mahony
joomahony@deloitte.com.au

John O'Mahony is a lead partner at Deloitte Australia with over 20 years of professional economics experience. His skills and expertise include economic impact analyses, economic modelling, and economic policy. His specific industries of interest include telecommunications, media, technology, infrastructure, retail, housing, and manufacturing.

Nic Scoble-Williams
nscoble-williams@tohmatsu.co.jp

Nic Scoble-Williams is a partner at Deloitte Tohmatsu Consulting LLC and the Asia Pacific leader for the future of work. Based in Japan, and with more than 20 years of cross-industry experience in IT services, talent strategy and advisory, and mergers and acquisitions, Scoble-Williams works with businesses and governments to embed a "future of work" vision into enterprise transformation strategies.

Peter Williams
pewilliams@deloitte.com.au

Peter Williams is a retired partner for Deloitte Australia. He served as the chief edge officer at Deloitte's Center for the Edge Australia and the chairman of Deloitte Australia's Innovation Council, and was a founder of Deloitte Digital.

Kellie Nuttall
knuttall@deloitte.com.au

Kellie Nuttall is lead partner for strategy and business design and the AI Institute at Deloitte Australia. Nuttall specializes in AI strategy and transformation initiatives, working with senior executives to build their AI fluency and their understanding of AI technologies. Prior to joining Deloitte, Nuttall built analytics capabilities within both government and private-sector organizations.

Julian Sanders
jusanders@deloitte.com

Julian Sanders is a research lead in Deloitte's DEI Institute with multi-industry experience in education, public policy, program management, and research. In his current role, he manages and activates diversity, equity, and inclusion research, contributing to the institute's thought leadership.

Brenna Sniderman
bsniderman@deloitte.com

Brenna Sniderman leads the Center for Integrated Research, where she oversees cross-industry thought leadership for Deloitte. In this capacity, Sniderman leads a team of researchers focused on global shifts in digital transformation, innovation and growth, climate, and the future of work—how organizations can operate and strategize in an age of digital, cultural, environmental, and workplace transformation.

Michael Wolf
miwolf@deloitte.com

Michael Wolf is a global economist at Deloitte Touche Tohmatsu Ltd. He began his career as an economist at the US Labor Department and has since held economist positions at Moody's Analytics, Wells Fargo Securities, and PwC. His insights have been featured in media outlets including *The Wall Street Journal* and National Public Radio.

Artists

Jaime Austin

Jaime Austin is an art director at Deloitte Insights, a professional circle designer, a design process expert, and an Excel enthusiast. Her design approach is anchored in strategic problem-solving, where she leverages creativity and logic to craft beautiful artwork with meaningful narratives.

Bose Collins

Bose Collins is a London-based design agency established in 1994, known for its use of state-of-the-art tools. Its capabilities extend from film direction, animation, and sound design, to computer graphics, 3D modeling, and AI whispering.

Sylvia Chang

Sylvia Chang is Deloitte Insights' creative director. She is a hunter and collector of trends, and serves as a repository of inspiration for the creative team. In a world full of noise and detritus, she's able to see patterns. She treasures her Sundays jumping on the trampoline with her daughters at her home in Connecticut.

Matt Lennert

Matt Lennert led creative for Deloitte Insights and was the art director for *Deloitte Insights Magazine.* His work with artists and data visualization designers over the last two decades visually brought the stories to life. This issue marks the 33rd, and last, issue that he produced. Lennert and his wife have retired and are off traveling the world.

Natalie Pfaff

Natalie Pfaff is a senior graphic and data visualization designer at Deloitte Insights, passionate about crafting compelling visual stories. She believes that great design begins with a strong brand foundation and leverages it to push creative boundaries. At home in Wisconsin, she cherishes everyday moments with her husband and daughter.

Molly Piersol

Molly Piersol leads data visualization design at Deloitte Insights and is the designer for *Deloitte Insights Magazine*. She believes raw data creates beautiful art and works to further expand the stories that live between the lines of figures. Piersol is a Virginia transplant to the Seattle area and her roots have grown deep enough that she'll never go back.

Sofia Sergi

Sofia Sergi is a Deloitte Insights senior graphic designer from New York. Her passion for painting and drawing at a young age evolved into a love for design and storytelling. She draws inspiration from merging traditional art forms with contemporary aesthetics to tell engaging and meaningful stories.

Jim Slatton

Jim Slatton is a Deloitte Insights designer and illustrator from Asheville, N.C. His graphic style is rooted in decades of branding work and a love of mid-century minimalism. He works with custom iconography and typography, photo collage, and data to distill complex information into simple visual stories.

Sonya Vasilieff

Sonya Vasilieff is an art director at Deloitte Insights. She works in several mediums including graphic design and illustration. Vasilieff is a native of Seattle, which is as rare as the razor clams she digs for every year on her beloved gray and rainy Washington coast.

Alexis Werbeck

Alexis Werbeck is an art director and visual storyteller at Deloitte Insights. Known for her bold, color-driven style, she loves to push creative boundaries but will get irked if a single pixel is out of place. Although her dream of becoming a pop star never transpired, you can find her singing karaoke and rocking at least one article of clothing with rhinestones.

Harry Wedel

Harry Wedel is a senior data visualization designer at Deloitte Insights. With a background in scientific research, he loves to find innovative ways to display complex data through engaging information design. Based in New York, he credits his interests in music and photography for his passion for using emotion in art to bring people together.

In this era of disruption, you need practical foresight, fresh insights, and trustworthy data to help make your organization more resilient and better prepared for new opportunities.

From investigating current trends to offering cutting-edge solutions for your most complex business challenges, our teams of researchers, data scientists, and multimedia storytellers bring clarity to an uncertain world.
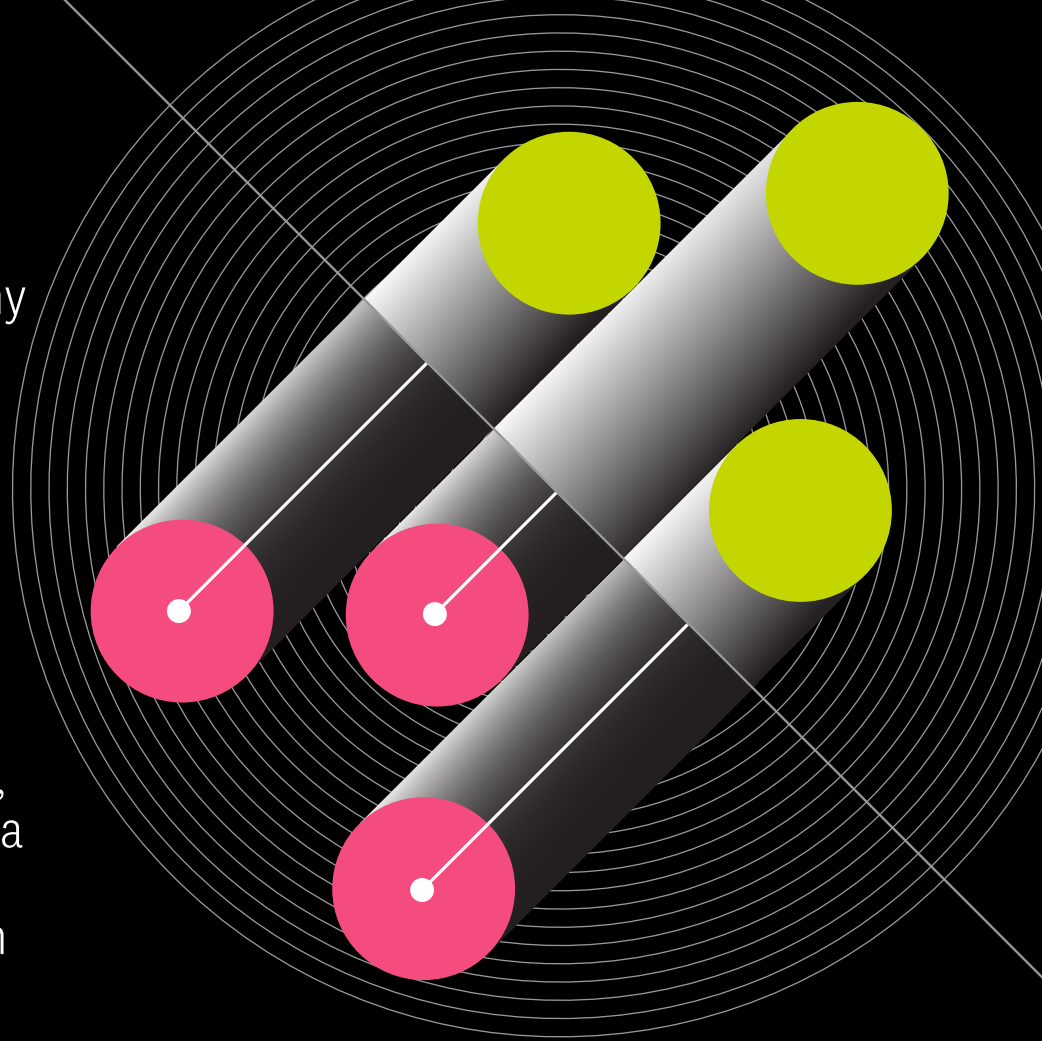
We are Deloitte Research and Insights

- Center for Energy & Industrials
- Center for Financial Services
- Center for Government Insights
- Center for Health Solutions
- Center for Integrated Research
- Center for Machine Intelligence and Data Science
- Center for Technology, Media & Telecommunications
- Consumer Industry Center
- Global Economist Network
- Deloitte Insights

Get informed. Get inspired.

www.deloitteinsights.com

Future-focused insights delivered

Elevate your email with Deloitte Insights. Subscribe now and transform your inbox into your destination for the freshest business insights.

- Weekly alerts on key business topics
- Monthly recap of our top publications
- Access to exclusive Deloitte Insights Magazine content
- Quarterly picks recommended by readers like you

www.deloitte.com/insights/subscriptions

Subscribe now

1

Gen AI investments increasingly extend beyond the AI itself

Deloitte's State of Generative AI quarterly survey explores where industry leaders are directing their gen-AI–related funding

Generative AI's near- and long-term success hinges on continued co-investment in the wider technology ecosystem, and recent Deloitte research signals that many early adopters are planning their AI-related investments accordingly.

According to the third installment of Deloitte's quarterly State of Generative AI in the Enterprise survey, which was fielded in May and June 2024, and gathered responses from nearly 2,800 leaders whose organizations are further along in their adoption and implementation of gen AI solutions, leaders across industries expect to be making critical investments in both gen AI and the intertwined and AI-enabling capabilities of data management, cloud consumption, and cybersecurity. While the prioritization of those investments varies by industry, the anticipated investments suggest that technology budgets may need to increase across the board to take advantage of gen AI's promise.

Strong data hygiene is a prerequisite for successful AI and gen AI strategies, and 70% of leaders in the Deloitte State of Gen AI study are investing in data management capabilities. Meanwhile, 73% of respondents expect their investment in cloud consumption to increase along with investments in gen AI. And, while cybersecurity capabilities are seeing high co-investment levels from respondents across all industries in the survey, averaging 75%, three industries—financial services; energy, resources, and industrials; and government institutions—seem particularly focused on increasing their cybersecurity spending to support gen AI initiatives.

On average, 53% of respondents expect investments in traditional AI and machine learning to increase alongside investments in gen AI, suggesting that those spending more on both will be looking to combine predictive and generative capabilities in powerful applications.

Research and analysis by the Deloitte Center for Integrated Research

Read the full report at
www.deloitte.com/us/state-of-gen-ai

Q: "To what extent are technology investments in the following areas impacted as a result of your organization's enterprisewide generative AI strategy?"
Percentage of respondents who selected "increasing" or "significantly increasing"

100%

Data management
70% average

Traditional AI and machine learning capabilities
53% average

Cloud consumption
73% average

Communication networks
42% average

Cybersecurity
75% average

Hardware
35% average

Note: Deloitte's AI Institute and Center for Technology, Media & Telecommunications also contributed to this data collection and analysis.
Source: Deloitte Center for Integrated Research's analysis of data from the Deloitte State of Generative AI wave 3 survey of 2,770 artificial intelligence leaders, fielded in May and June 2024. These organizations should be considered more advanced users of artificial intelligence.

Infographic by Molly Piersol

While business leaders look inward for AI's impact, tech leaders look outward

A Deloitte Global study examines the differences in metrics used by organizations' leaders to determine the success of their AI investments

KPIs for traditional AI, showing misalignment greater than or equal to 7 percentage points between business and tech leaders

● Tech leaders ○ Business leaders — Difference between responses

Overall utilization of KPI

Categories (left to right): Sales through new digital platform · Sales of new digital products · Net promoter score · Intangible assets as a percentage of long-term assets · Share price volatility · Procurement value for money · Employee development · Employee utilization rate · Process effectiveness

Used more by **tech leaders** — Used more by **business leaders**

Notes: 1) N = 1,600; 2) Out of 1,204 respondents for traditional AI, 1,180 are technology and business leaders. The remaining are categorized under "other." 3) Business roles include administration, finance, human resources, marketing, operations, procurement, risk/compliance, sales, strategy. Tech/transformation roles include digital, R&D, technology/IT, transformation.

Source: Deloitte Center for Integrated Research survey of global tech value leaders, conducted in February 2023.

Strategies are being determined. Experimentation is running rampant. Proofs of concept abound. As generative AI quickly gains a foothold across organizations and industries, there's little consensus yet about how best to determine its impact—and whether C-level executives will reach consensus, themselves. There are clues, however, in how business and technology leaders measure value for traditional artificial intelligence, the larger class of AI investments such as machine learning, deep learning, and conversational AI for which executives have established measurement behaviors and preferences.

Using data from a global survey of 1,600 business and technology leaders across 14 countries conducted in February 2023,[1] the Deloitte Center for Integrated Research analyzed how technology leaders and business leaders prioritize the key performance indicators commonly associated with digital investments when assessing the impact of their organizations' AI capabilities. The results of this assessment proved to be counterintuitive: Interestingly, while business leaders who participated in the survey reported that they're more focused on AI's process-related benefits *within* their organizations, tech leader respondents said they're more often looking outward—at KPIs associated with sales and customer satisfaction.

According to the survey, technology leaders are 12 percentage points more likely than business leaders to be using the sales of new digital products as a KPI and 7 percentage points more likely to be focused on sales through new digital platforms, for instance. They also use net promoter scores and intangible assets more than business leaders.[2]

When it comes to all forms of AI, business and tech leaders alike might collectively be missing opportunities to consider innovation measures and long-term value creation, the survey findings suggest. Among those leaders who measure traditional AI, only about 30% use innovation-oriented KPIs like the tech's effect on an organization's tolerance for experimentation or intelligent failure, or the number of agile pods or teams.[3]

Leadership's alignment on AI success metrics could be less critical during an organization's experimentation or initial adoption phase, but it could, of course, become increasingly important as the organization works to assess the technology's current and potential impact, and makes the case for continued investment.
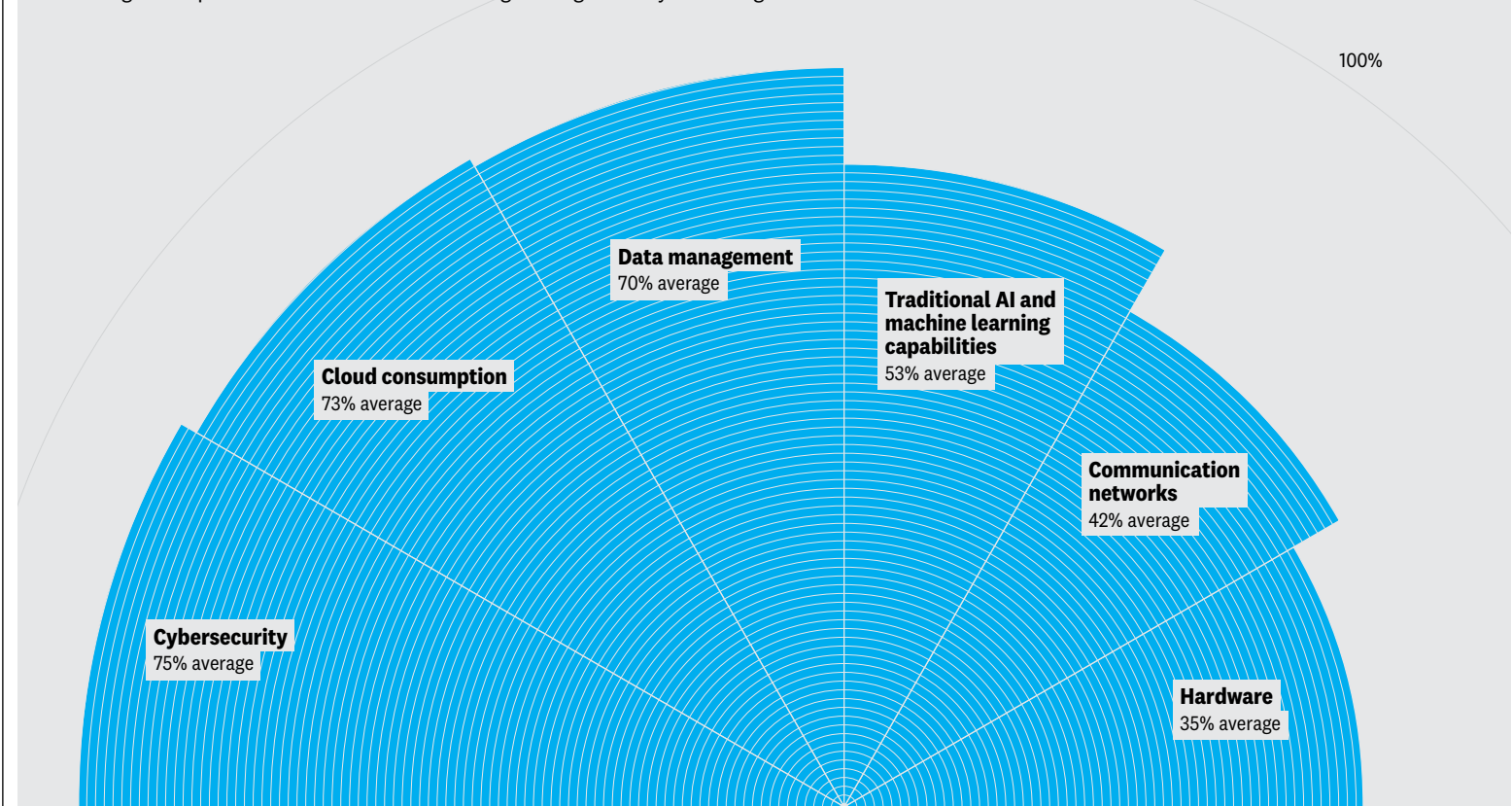
Research and analysis by the Deloitte Center for Integrated Research

Read the full report at www.deloitte.com/insights/measuring-ai

Few AI regulations across the globe address the outcomes rather than the tech

Outcome-based and risk-weighted regulations are an underused tool that can both protect the public interest and encourage innovation, a Deloitte US analysis shows

When it comes to fast-moving technologies like artificial intelligence, how can governments strike the balance between enabling innovation and protecting the public interest? Innovation and regulation tend to operate on two different time frames, which can cause problems when governments are working to regulate rapidly evolving technology like AI. And consider AI's complexity and diversity: From computer vision finding potholes in roads to generative pretrained transformers answering people's tax questions and more, it could be a formidable challenge to find a single set of rules that addresses all forms of AI and their uses, both now and in the future.

Rather than trying to find a set of rules that can control the workings of AI itself, a more effective route could be to regulate AI's outcomes, but it seems that few such regulations explicitly addressing AI exist yet, according to a recent Deloitte US analysis.

The Deloitte Center for Government Insights has defined five regulatory principles to address rapidly evolving technologies.[1] First, there are principles related to the fast-evolving nature and cross-border reach of modern technologies: adaptive regulation, which advocates for a responsive, iterative approach rather than a static one;

regulatory sandboxes that allow for prototyping and testing new methods; and collaborative regulation, which seeks alignment and engagement across national and international players within the ecosystem. Second, the research center outlines principles related to the regulations' focus: outcome-based regulation, which focuses on the results rather than the processes; and risk-weighted regulation, which proposes a shift from one-size-fits-all regulation to a data-driven, segmented approach.

Outcome-based and risk-weighted regulations can be powerful tools for regulating AI, according to the research center. For example, if it's in the public interest to limit bias in AI-enabled decisions, then requiring that the outcomes of all of those decisions, regardless of the technology used, meet certain standards—rather than regulating the workings of AI itself—could help protect public goals even as new generations of technology come online.

However, the Deloitte researchers reviewed the OECD.AI Policy Observatory's database, which contains over 1,600 AI policy initiatives from 69 countries and the European Union—including regulations and policies aimed at supporting or shaping AI technology—and found that only about 3% of regulations were either outcome-based or

risk-weighted, and no regulations included in the data set were both.

This isn't to say that outcome-based and risk-weighted regulations don't exist. They likely constitute part of the regulatory structures of the 69 countries included in the analysis, according to the researchers. It's just that those regulations aren't considered "AI regulations," so there's an opportunity for many governments' AI-adjacent regulations to become more explicit. And these clarifications don't just protect the public. They can also be critical for speeding up innovation. In some cases, innovators may slow down their work on sensitive use cases for fear of ending up on the wrong side of future regulations, while regulators, unfamiliar with the technology, are hesitant to make rules.[2]

Outcome-based and risk-weighted regulations can break this cycle by clearly showing where public equities lie, giving regulators confidence in their approaches, and giving innovators the clarity they need to move forward.

Research and analysis by the Deloitte Center for Government Insights

Read the full report at www.deloitte.com/insights/ai-regulations

Global AI policy instruments categorized by Deloitte's 'future of regulation' (FoR) principles

Not following FoR principles

43%

Adaptive regulation

Shift from "regulate and forget" to a responsive, iterative approach

28%

Collaborative regulation

Align regulation nationally and internationally by engaging a broader set of players across the ecosystem

25%

POTENTIALLY POWERFUL TOOLS FOR REGULATING AI

Regulatory sandboxes

Prototype and test new approaches by creating sandboxes and accelerators

1%

Outcome-based regulation

Focus on results and performance rather than processes

1%

Risk-weighted regulation

Shift from one-size-fits-all regulation to a data-driven, segmented approach

2%

Source: Deloitte analysis of OECD.AI Policy Observatory data.

European organizations' gen AI preparedness has increased, but few feel ready for the associated risks

Europe-based respondents to a Deloitte survey report higher levels of strategy, tech, and talent preparedness for generative AI adoption, and less progress in the areas of risk and governance

The preparedness of some European organizations to adopt generative AI appears to be accelerating rapidly, but fewer gains are being made in the areas of risk management, regulatory readiness, and governance models.

According to a Deloitte survey of over 700 senior leaders in France, Germany, Italy, the Netherlands, Spain, and the United Kingdom conducted in June 2024, there was a significant increase over the previous six months in respondents reporting that their organizations are highly prepared or very highly prepared to adopt gen AI in the areas of strategy (up 11 percentage points since December 2023), technology and infrastructure (up 9 percentage points), and talent (up 8 percentage points).

The latest wave of Deloitte's State of Generative AI in the Enterprise survey also found that Europe-based respondents are focusing less on gen AI's short-term operational use cases such as reducing costs (down 8 percentage points since December 2023) or improving efficiency and productivity (down 4 percentage points), and instead are turning their attention to applications that can help them gain a longer-term competitive advantage and secure strategic benefits. For example, more respondents are now focused on uncovering new ideas (up 6 percentage points), and encouraging innovation and growth (up 4 percentage points).[1]

However, many respondents report significant barriers to the successful development and deployment of generative AI tools and applications—including difficulty managing risks, worries about regulatory compliance, and a lack of a governance model. Only 18% of Europe-based respondents report being highly prepared or very highly prepared in the areas of gen AI risk and governance, up only 2 percentage points from the previous survey period.

And the research indicates that any clarity gained from the arrival of the EU AI Act—which was launched shortly after the survey period, in August 2024, by the European Commission, the executive arm of the European Union[2]—might not have helped yet. For example, among Germany-based respondents to a recent Deloitte Germany survey gathering executives' feedback on the EU AI Act, only about 36% report that their organizations are well-prepared to implement the act and 52% are concerned that regulation will restrict their AI innovation opportunities.[3]

Risk and regulation-oriented uncertainty are top concerns for respondents to Deloitte's State of Generative AI survey across global regions. Only 23% of all respondents rated their organizations as highly prepared to handle risk, regulation, and governance issues related to the technology.

Research and analysis conducted by the Deloitte Center for Integrated Research

Read the full report at www.deloitte.com/us/state-of-gen-ai

Q: "For each of the following areas, rate your organization's level of preparedness with respect to broadly adopting generative AI tools/applications"
Percentage of Europe-based respondents who selected "highly prepared" or "very highly prepared"

— Wave 1   — Wave 3

42%
33%
38%
27%
23%
15%
18% 16%

Technology infrastructure
Strategy
Talent
Risk and governance

Notes: Wave 1 data (N = 706) was collected in December 2023 and wave 3 data (N = 705) was collected in June 2024; countries included in this comparative analysis were France, Germany, Italy, the Netherlands, Spain, and the United Kingdom.
Source: Deloitte, State of Generative AI in the Enterprise, 2023 and 2024.

A burgeoning 'AI-generated' market: Insurance safeguards against AI risk

AI insurance could be a nearly US$5 billion market in just eight years, according to Deloitte US

Over the next few years, society may be hard-pressed to find any aspect of daily life that doesn't have an artificial intelligence engine in the background. But an AI-powered world introduces both anticipated and unforeseen risks.

Consider the following scenario: In the not too distant future, a person could take their self-driving car to a doctor's appointment to get an AI-assisted diagnosis, followed by AI-assisted surgery and, eventually, filing an insurance claim through an AI chatbot. Many things can go wrong in this scenario: The autonomous car could bump into another vehicle, the initial diagnosis could be incorrect, or the chatbot could reject the valid claim outright. The risks stemming from AI in this example could range from a significant financial loss to a potential fatality.

While some of these risks might seem futuristic, they're already starting to materialize. In fact, Stanford University's AI Index noted there were 260 AI incidents and controversies in 2023, a 2,500% increase from just 10 in 2012.[1] And in a recent World Economic Forum report, nearly 1,500 surveyed professionals identified AI as their organization's biggest technology risk.[2]

Enter the AI insurance policy. By drawing parallels between the post-financial–crisis growth of cyber insurance with AI insurance, the Deloitte Center for Financial Services projects that by 2032, insurers potentially could write approximately US$4.8 billion in annual global AI insurance premiums, at a compound annual growth rate of around 80%.[3]

A few large reinsurers are already participating in the AI insurance market. Munich Re rolled out a specific AI insurance product, primarily meant for AI startups, in 2018.[4] They also launched coverages for AI developers, adopters, and businesses building self-developed AI models. Several insurtech startups are also beginning to operate in this space. Armilla AI launched a product that guarantees the performance of AI products.[5]

Just from generative AI alone, businesses could face losses from risks such as cybersecurity threats, copyright infringements, wrong or biased outputs, misinformation or disinformation, and data privacy issues. Having an insurance policy to protect against such issues could help assuage concerns and even encourage further AI adoption at scale.

Research and analysis by the Deloitte Center for Financial Services

Read the full report at
www.deloitte.com/insights/fsi-predictions

Anticipated growth in global AI insurance premiums, 2024–2032
US dollars, in billions

2032
$4.77B

2031
$2.65B

2030
$1.47B

2029
$0.81B

2028
$0.45B

2027
$0.25B

2026
$0.14B

2025
$0.08B

2024
$0.04B

Source: Deloitte US analysis.

Infographic by Natalie Pfaff
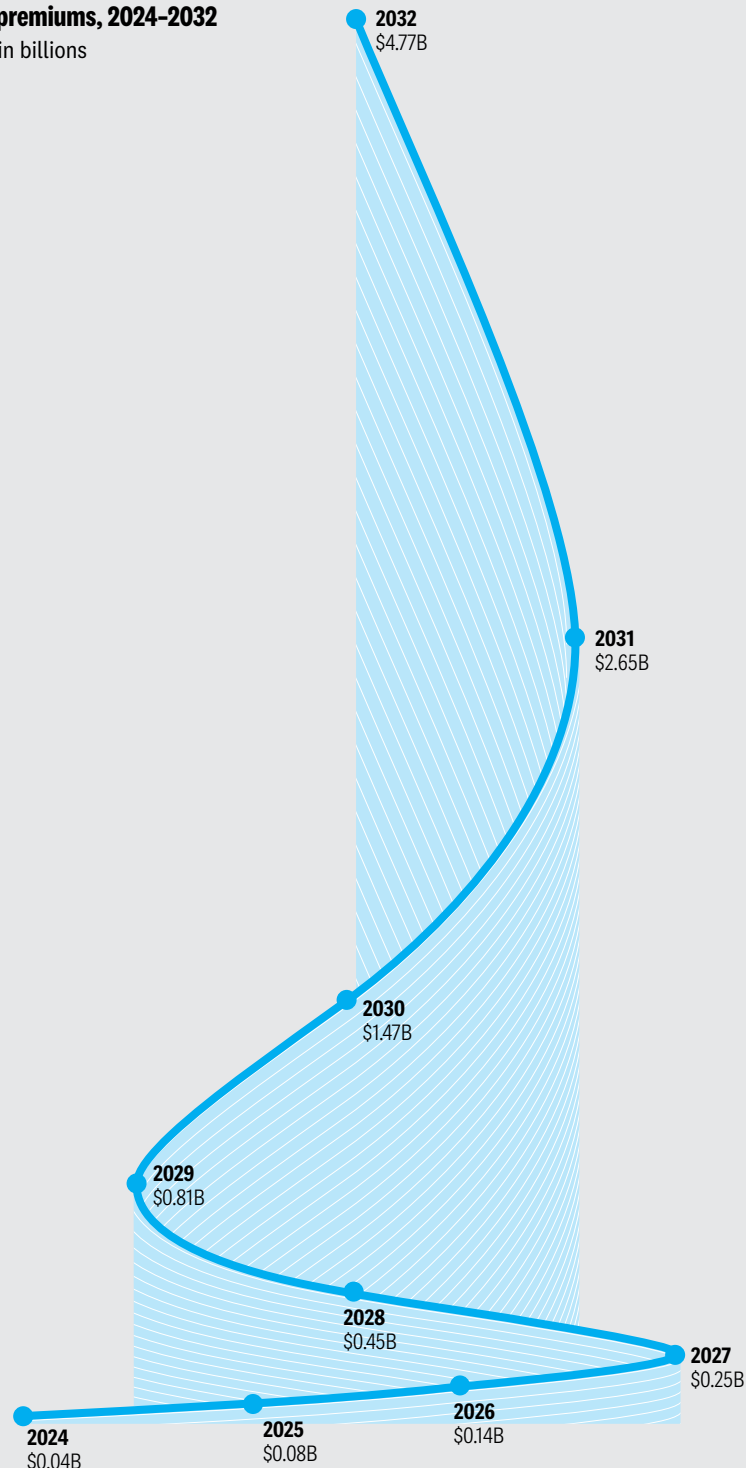
More hands-on gen AI experience increases optimism—and caution—for millennials and Gen Z

Younger workers around the world remain wary of generative AI's impact, according to an expansive, new survey from Deloitte Global

As new generative-AI-enabled tools and use cases emerge, organizations are racing to harness the opportunities. But do workers—and younger workers, in particular—view these opportunities as potential benefits or potential threats?

According to Deloitte's 2024 Gen Z and Millennial Survey, which included more than 22,800 respondents in 44 countries, uncertainty is still the top emotion for both Gen Zs and millennials when it comes to generative AI. Many young workers surveyed are not yet using gen AI at work: 27% of Gen Zs and 34% of millennials say they never use gen AI at work, while another 42% of Gen Zs and 38% of millennials say they rarely or sometimes do. But among the roughly 25% who use gen AI at work all or most of the time, there is both a stronger sense of optimism and a stronger acknowledgement of the risks.

The majority of Gen Z and millennial respondents who frequently use gen AI are more likely to believe it will free up their time, improve the way they work, and improve their work/life balance. But respondents who frequently use gen AI also are more likely to believe that gen-AI–driven automation will eliminate jobs and make it more difficult for younger generations to enter the workforce—potentially because the technology may automate many of the more manual tasks that entry-level workers typically do.

However, as with other technologies, familiarity breeds comfort, according to the survey responses, and there's an opportunity for organizations to make workers more familiar with generative AI through training. Approximately half of respondents (51% of Gen Zs and 45% of millennials) say their employer is training workers on the capabilities, benefits, and value of gen AI, so many organizations still have an opportunity to create a more positive outlook by providing workers with the kind of training they need to be successful in an AI-fueled environment.

Read the full report at
www.deloitte.com/gen-z-millennial-survey

Gen Z and millennial survey respondents weigh gen AI's benefits and risks

● Generational average
● Frequent users

	Millennials (black)	Millennials (blue)	Gen Z (black)	Gen Z (blue)
Believe gen AI will free up time and improve work/life balance	55%	84%	58%	80%
Believe gen AI will improve the way they work	47%	86%	48%	79%
Believe gen-AI–driven automation will cause the elimination of jobs	59%	73%	59%	71%
Believe younger generations will find it harder to enter the workforce because of gen AI	52%	71%	57%	73%
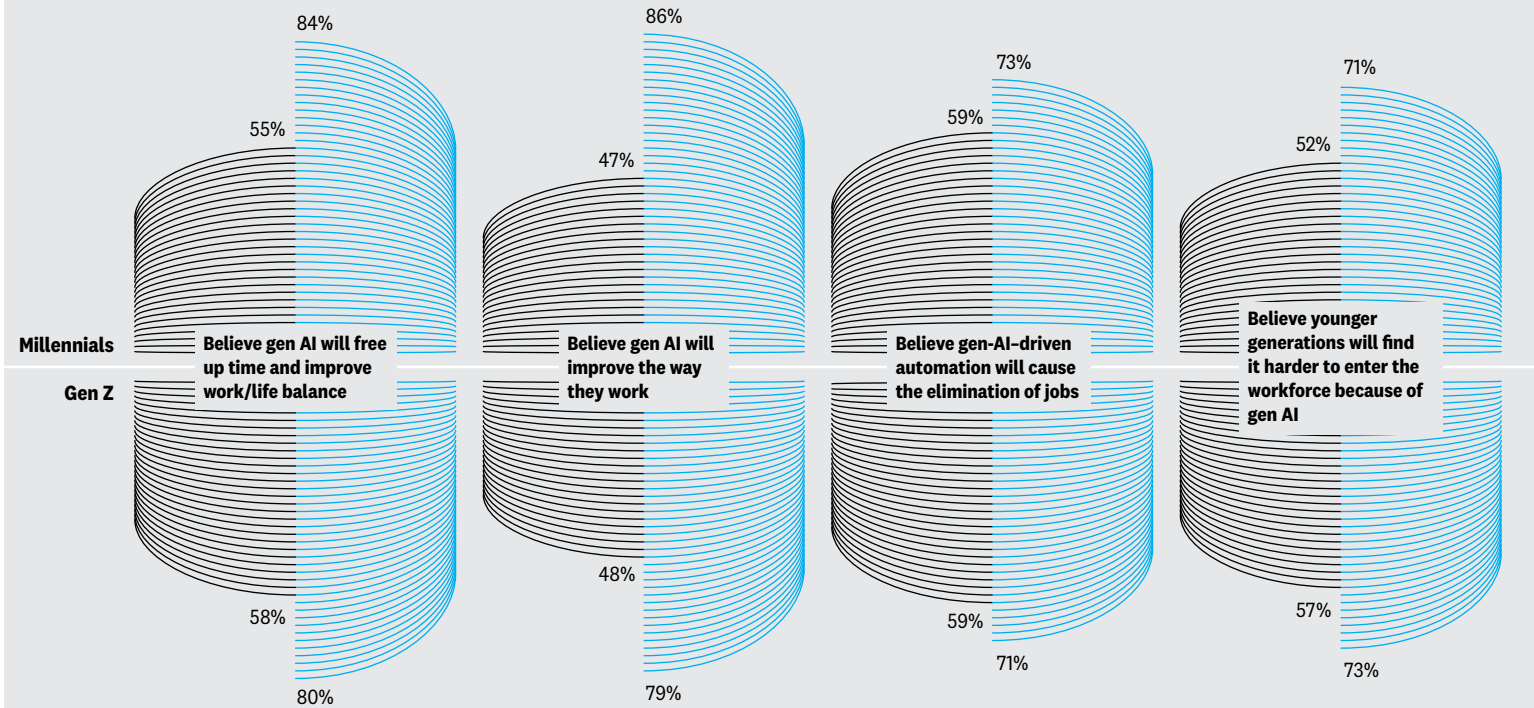
Note: N = 22,841. Includes 14,468 Gen Z respondents and 8,373 millennial respondents from 44 countries across Africa; Asia Pacific; Eastern and Western Europe; the Middle East; and North, Central, and South America.
Source: Deloitte Global, 2024 Gen Z and Millennial Survey, fielded between November 2023 and March 2024.

Infographic by Molly Piersol

Many tech leaders' influence in the C-suite is growing, new Deloitte research suggests

More tech leaders in Deloitte's CIO Pulse Survey say they report directly to their CEO, an indication of tech's increasingly influential role in business

Technology's relationship to business strategy continues to move from reactive to proactive, with more technology leaders earning an influential seat next to their CEO.

According to Deloitte's 2024 CIO Pulse Survey, conducted in February 2024 by Deloitte's CIO Program among 211 US-based tech leaders, 63% of respondents say they report directly to their CEOs. This is a significant increase from the 41% of tech leaders who said they reported to their CEOs in the 2015 Deloitte Global Technology Leadership study.

In the survey, which aimed to understand tech leaders' near-term priorities and the characteristics they believe are necessary to help address today's most pressing business issues, respondents indicate that tech leaders today face a balance of owning operational responsibilities and driving business outcomes. In addition to more conventional tech leader responsibilities such as providing expert internal technology support (55%) and mitigating risk (50%), many respondents also consider it their responsibility to enable transformation and innovation (59%), deliver topline value (57%), and serve as a change agent (54%).

Respondents' top priorities include staying ahead of emerging technologies and solutions; embracing the potential of data, analytics, artificial intelligence, and machine learning; and mitigating cybersecurity risks and preventing cyber incidents and

attacks. However, despite the growing focus on AI, only roughly one-third (35%) of the tech leaders surveyed rank embracing the potential of AI, data, analytics, and machine learning as their No. 1 priority.

The survey data suggests that more organizations may be recognizing tech leaders' role in helping to shape future-ready organizations, ensuring that technology continues to be a cornerstone of business innovation and growth.

Research and analysis by the Deloitte CIO Program

Read more at
www.deloitte.com/us/cio-perspectives

Who do technology leaders report to?

Percentage-point change in number of respondents making each selection in 2024 vs. 2015

CEO
+22

COO
+6

CFO
–15

Board
–16

Sources: US responses from the 2015 Deloitte Global Technology Leadership Study; 2024 numbers are based on responses from Deloitte's 2024 CIO Pulse Survey.

Infographic by Molly Piersol

Are new generative AI features in software a monetizable enhancement or table stakes?

A recent Deloitte US analysis assesses gen AI's potential impact on software providers' revenue

Almost every enterprise software company likely will embed generative AI in at least some of its existing products, potentially in ways that will go unnoticed by users. But it remains to be seen whether these enhancements can be monetized and, if so, how much revenue they could generate.

The Deloitte Center for Technology, Media & Telecommunications recently conducted an analysis of how many software tools likely will be enhanced with gen AI, the potential addressable market and the potential pricing models implemented for or affected by gen AI enhancements, and projected that almost all of the 50 largest enterprise software companies globally could garner no more than a collective US$10 billion increase in annual revenue by the end of 2024, which would be lower than more optimistic projections.

Software companies are looking to monetize their generative AI enhancements to existing products largely because the companies often are spending billions of dollars on integrating gen AI and the operating costs aren't trivial, with estimates that each gen AI query costs between 1 cent and 36 cents. (One service that costs US$10 per user per month is rumored to be losing US$20 per user monthly, with some users costing the provider more than US$80.)[1]

Yet at least some buyers of enterprise software are pushing back. According to a June 2023 US survey of buyers fielded by UBS Global Research and Evidence Lab, respondents believe there's significant long-term potential for gen AI features, but

some respondents consider AI features to be table stakes. Their attitude is that every vendor needs to offer them, but "good luck trying to get me to pay for it."[2]

Software providers also might be challenged to convince customers to pay for gen AI features until these customers see the value those features bring to their workflows—at least in the short term. Research abounds on generative AI's early impacts on knowledge workers' productivity from using gen AI tools themselves (not gen AI features embedded in enterprise software) to do more,

faster, and at a higher quality than those not using the tools.[3] Proof of ROI is still "just around the corner," possibly enabling software providers to list gen AI among their top value-adding features and benefits. But as of the halfway point in 2024, the potential for monetization remains in question.

Research and analysis by the Deloitte Center for Technology, Media & Telecommunications

Read the full report at
www.deloitte.com/insights/tmt-predictions

Monetizing software's gen AI features: A revenue boost or a drop in the bucket?

◯ = US$1 billion

US$860 billion
Estimated revenue of global enterprise software firms in 2024

*Projected increase in annual revenue from monetizing gen AI features by the end of 2024 = **US$10 billion (1%)***
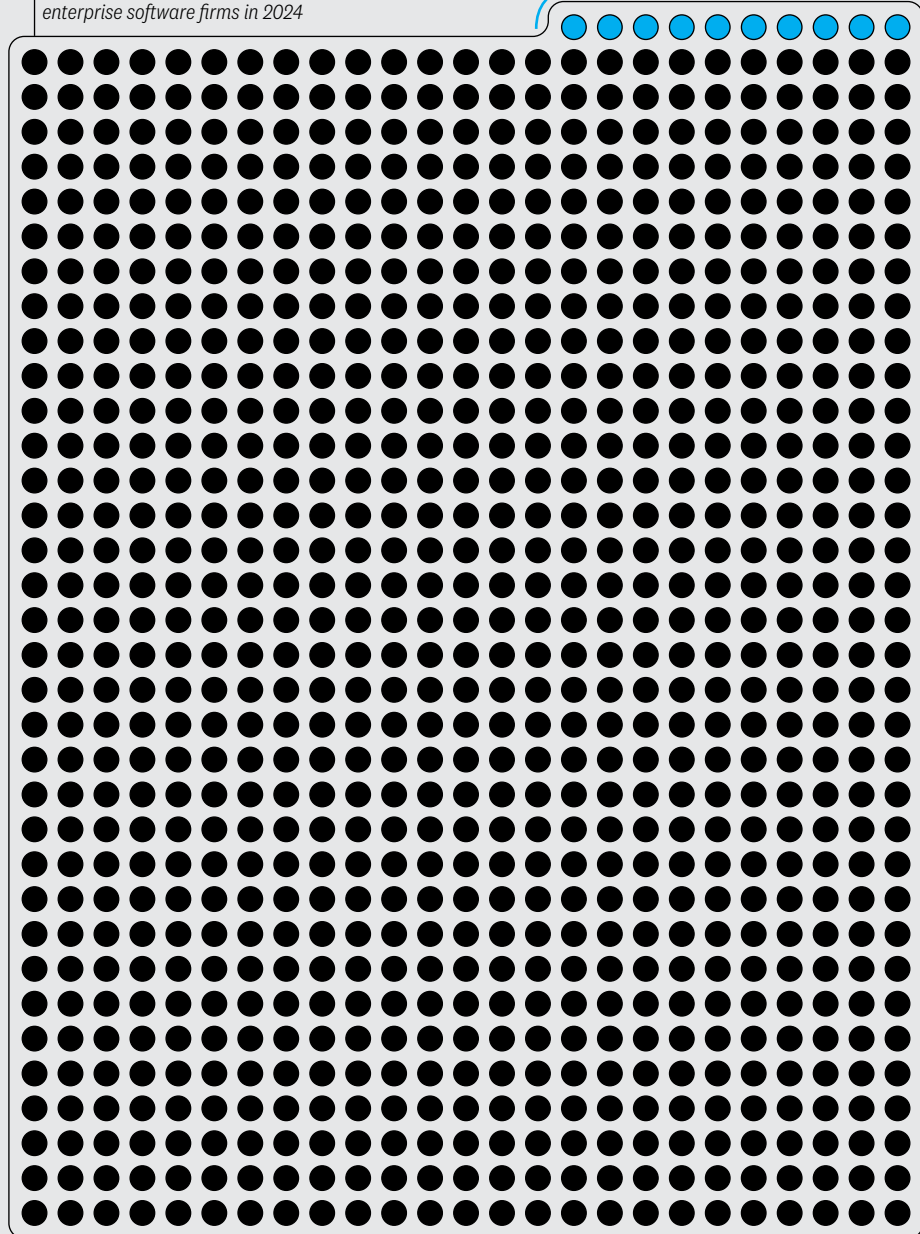
Source: Deloitte analysis, with 2024 industry revenue extrapolated from Gartner Research estimates.

A snapshot of AI adoption: Italy's design sector

Italian design connotes innovation and expert craftsmanship, and a Deloitte Private study found that AI isn't yet a common tool of the trade across some Italian design disciplines

For many, the Italian design industry embodies cutting-edge creativity mixed with old-world traditions—innovation combined with craftsmanship, creators known as much for the tools they use as the products they design. This juxtaposition makes the industry a particularly interesting case study on AI adoption: How does a field known for human originality often realized with time-tested tools (plus strong technological know-how) approach integrating artificial intelligence?

Deloitte Private recently partnered with the Symbola Foundation and two other Italy-based design organizations to survey 350 Italy-based design professionals providing services in fields including fashion, furniture, transportation, hospitality, and interior design. Thirty-eight percent of respondents ranked AI as the second-most important technology for the future of their industry, after extended-reality applications. Roughly half (45%) of the Italy-based designers who participated in the study believe they have good or excellent knowledge of how to use AI, yet only 15% say they frequently use AI solutions.

Many survey respondents see AI as a design field unto itself: 40% of interviewees say AI will represent a field in which design-related skills will be applied. Moreover, 36% think they'll play a crucial role in how AI is developed, and how quickly and easily it's adopted by other industries, both private and public—not to mention society in general.

From runways to highways and beyond, Italy's design industry often influences innovation on the global stage. As more Italy-based design professionals add AI to their thoughtfully curated toolboxes, it could both accelerate the technology's further development and bolster the country's rich heritage of design innovation.

Knowledge versus use of AI among surveyed designers in Italy

Knowledge of AI:
- Excellent knowledge 15%
- Good knowledge 30%
- Fair knowledge 37%
- Poor knowledge 12%
- No knowledge 6%

VS.

Usage of AI:
- Frequent usage 15%
- Some usage 20%
- Little usage 44%
- No usage 21%

35%
45%
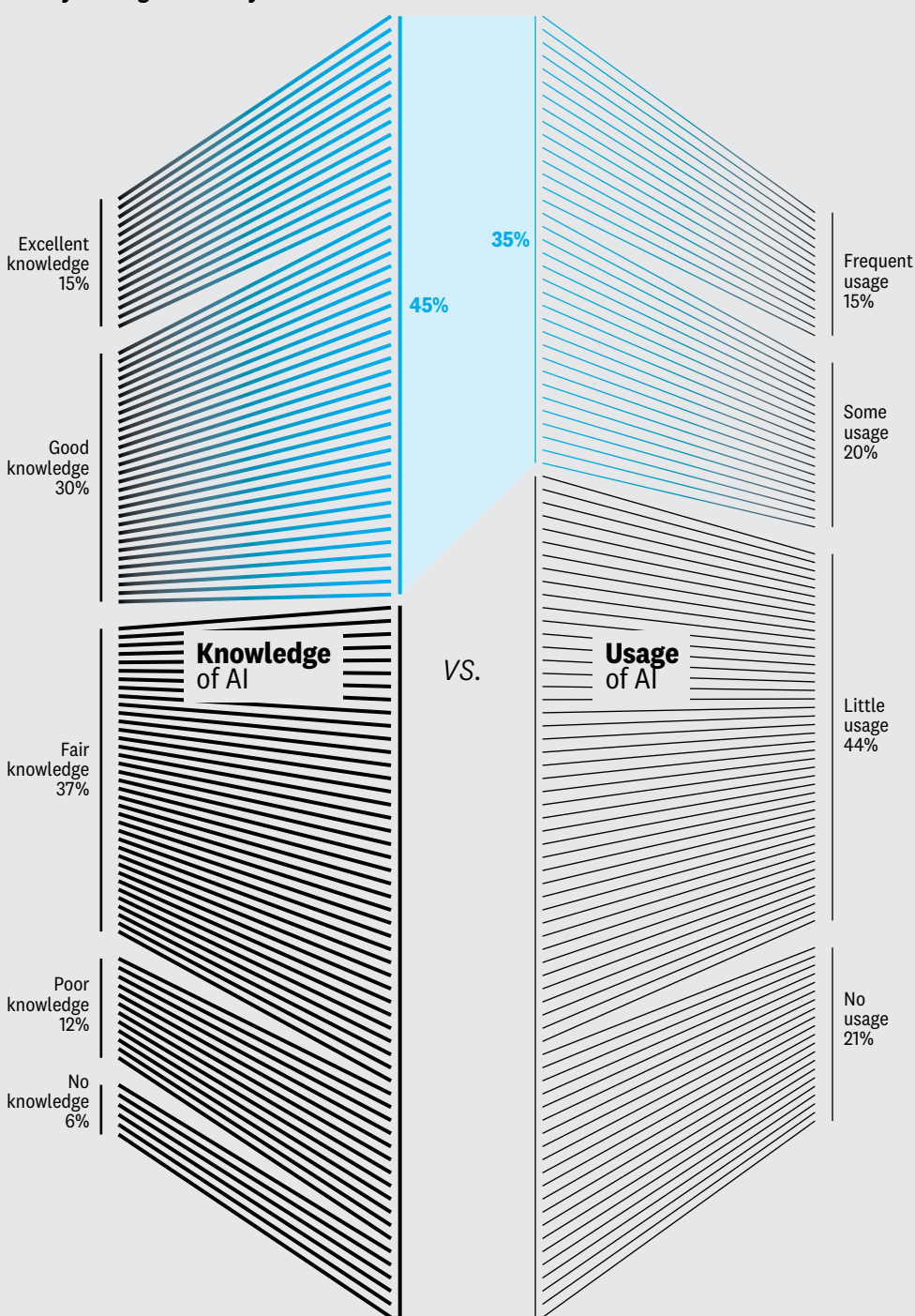
Source: Deloitte Private, in collaboration with the Symbola Foundation, POLI.design, and the Association for Industrial Design, "Design economy 2024: Design economics in Italy," Deloitte Italy, accessed Aug. 23, 2024.

Read the full report at
www.deloitte.com/it/design-economy-italy

Infographic by Molly Piersol

More US consumers think AI-generated health information should be left to the experts

While US consumers are less inclined to use gen AI for their own health fact-finding, they trust their clinicians to wield gen AI tools in care delivery, a Deloitte US survey shows

Many US consumers are optimistic about the potential for generative AI to address challenges in the US health care system including access and affordability, but they might not be as inclined to use the technology for their own health- and wellness-related fact-finding—instead preferring to go straight to the source.

According to a survey of more than 2,000 US consumers conducted in March 2024 by the Deloitte Center for Health Solutions, 30% of respondents reported that they "don't trust the information" on health and wellness from gen-AI–enabled tools, up from 23% in 2023.[1] The growing skepticism is most evident among two demographic groups: millennials and baby boomers. From 2023 to 2024, distrust among millennials has risen from 21% to 30%, and among baby boomers, it has increased from 24% to 32%.

The research indicates that, when it comes to potentially life-altering information, consumers want to know where the information came from, and whether they can trust the source—and they tend to have more confidence in the expertise of their clinicians: 74% of respondents view doctors as their most trusted source of information for health care treatment options.

Interestingly, of the respondents who are not currently using gen AI themselves, 64% are supportive of their health care providers using it for care delivery. Most respondents are comfortable with their doctors using gen AI to convey information about new treatments (71%), interpret diagnostic results (65%), and even diagnose conditions and illnesses (53%). (This trust is contingent on the assurance that consumers' personal data is being handled responsibly and protected securely.)

As it stands, consumers are generally using free and publicly available gen AI tools for health and wellness purposes.[2] However, due to the continually developing nature of the technology, these versions may sometimes provide inaccurate information, which can lead to diminished consumer trust.[3] This presents an opportunity for health care organizations to bolster trust by educating consumers, providing them with gen AI tools specifically designed for health care applications, and addressing privacy concerns.

Research and analysis by the Deloitte Center for Health Solutions

Read more at www.deloitte.com/insights/consumer-trust

US consumers are increasingly wary of the health care information that generative AI may provide
Why consumers aren't using gen AI for health- or wellness-related purposes, even as their gen AI usage increases

2023 — **2024**

"I haven't needed to look up anything" 36% → 30%

"I don't know how to use gen AI technology" 31% → 30%

→ 29%

"I didn't know that I could access gen AI tools" 25% → 24%

"I don't trust the information" 23%

"I didn't know gen AI could help with those tasks, and would like to try" 23% → 22%

Notes: N in 2024 = 1,054; N in 2023 = 1,020. The results represent the number of respondents who have not used gen AI for any health- or wellness-related reasons.
Source: Deloitte Center for Health Solutions' 2024 Health Care Consumer Survey.

Better questions about generative AI

Four scholars share critical questions leaders should ask about generative AI, from concerns about bias to existential considerations about human values

By **Annalyn Kurtz** *and* **Andrew Blau**

Across the business landscape, there's significant focus right now on how to pose better questions *to* generative AI, but many leaders are also trying to ask better questions *about* the technology—to reflect on the potential implications it could have for their organizations and the humans using it.

At the Thinkers50 conference in London, an event celebrating achievements in business and leadership research, we asked several leading management scholars: What better questions should we all be asking about generative AI?

From concerns about bias to the trade-offs between productivity and overwork, here's how four of those scholars summed up the ethical, societal, and existential considerations that are often overlooked in the rush to adopt exciting, new technologies. Their perspectives encourage a deeper examination of how AI tools align with broader human values and the future we all aspire to create.

Stephanie Creary, an assistant professor of management at the University of Pennsylvania's Wharton School, studies organizational behavior, including questions about diversity, identity, and overwork, among other topics.

Q: How can we balance AI adoption with employee well-being?

A: There's pretty much a double-edged sword to everything in life, right? There's the good and the bad, and the pros and the cons. And, certainly, when we think about generative AI and all these tools, are they designed to help us be more efficient, to get knowledge faster, to embed that into our work more quickly? Yes. And so there are great advantages to that. But we're using words like "efficient," "faster," and "more." And words like "efficient," "faster," and "more" make us actually *do* more, and we don't always calibrate our energy, our time, to deal with these advances.

I do worry about how expectations of ourselves and of us in our environments will exceed the cognitive capacity and the physical capacity that we have to do work. That hasn't changed. Doing more work hasn't all of a sudden made us superhuman. We still have limitations cognitively, emotionally, and physically. So I think we need to start having conversations around working well, even though the demands placed upon us are increasing.

That said, I think there's great potential in generative AI to produce higher-quality products. It's just, how can we do that without sacrificing ourselves cognitively, emotionally, and physically in the process? I think this is the next set of questions we have to listen to.

Annalyn Kurtz
ankurtz@deloitte.com

Annalyn Kurtz is the executive editor of *Deloitte Insights*.

Andrew Blau
ablau@deloitte.com

Andrew Blau leads Deloitte US's strategic futures practice.

Sinan Aral, a professor of management, information technology, marketing, and data science at the Massachusetts Institute of Technology's Sloan School of Management, directs a research group focused on generative AI and decentralization.

Q: What skills will new workers need in an AI world?

A: The advice I do give to young people is that, in a world in which we are building a machine that is very, very good at answering questions, the scarce and complementary human skill is asking good questions. ... The questions are about our values. The questions are about our possibilities. The questions are not so easy to glean just from an extension of what's been done in the past because it is a wide-open set of possibilities. ...

They're questions about what our future could be. ... What is the most beautiful world we could imagine tomorrow? And every other question is a sub-question of that and how we get there.

Asking those questions in a way that is meaningful is the big challenge.
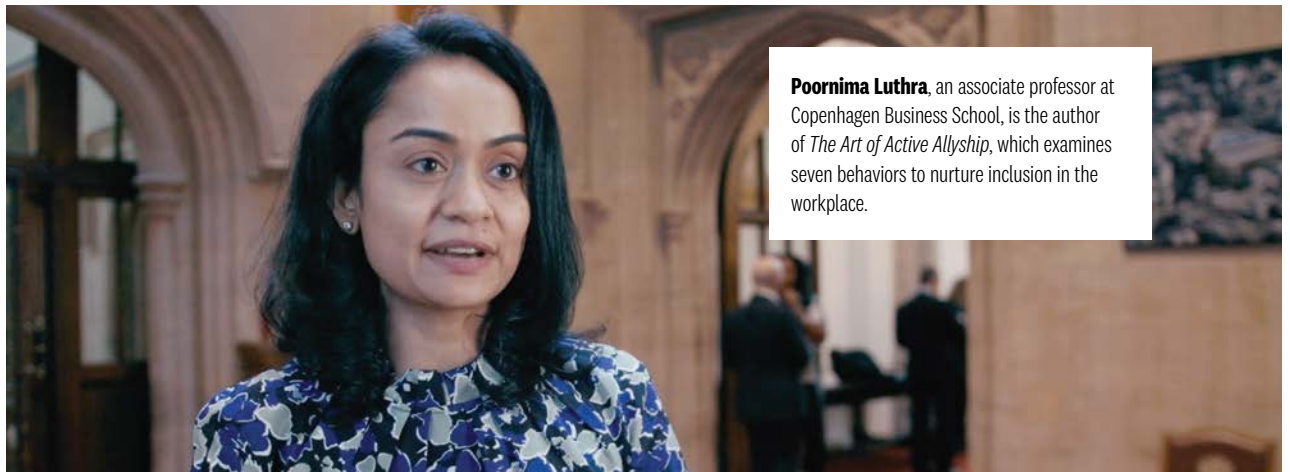
Poornima Luthra, an associate professor at Copenhagen Business School, is the author of *The Art of Active Allyship*, which examines seven behaviors to nurture inclusion in the workplace.

Q: What behaviors can help counter AI bias?

A: When we think about leadership as all of us being a leader, then how do we step up to be able to nurture those inclusive spaces using the concept of active allyship? And a few of [those behaviors] really apply here when we think about generative AI. The No. 1, the first behavior is actually deep curiosity, really being deeply curious about what is missing. Whose voice is missing? How is someone who's different from myself, are they represented in what generative AI is providing us, in the responses that we're getting? Is that perspective representative of the global majority? The Global South? The underrepresented, the underrecognized, the underestimated: Are those voices really there? So, deeply being curious.

The second is honest introspection. And that is about examining bias—bias in the way we ask questions as well. Sometimes we can ask questions in a particular way and, of course, that means that you'll get a certain type of response. ... But if we tweak the words, could we get a more inclusive response? Would that then trigger the generative AI system to be able to provide us with more nuance and more representation in the responses we get? So I think [we need] that honest introspection around our own questions but then, of course, looking at the responses we get and saying, "Well, where does bias actually lie in what is being provided to us?"

Pia Lauritzen, a trained philosopher and founder and CEO of Qvest, an employee engagement technology company based in Denmark, studies the philosophy behind questions and how they shape human thinking and knowledge.
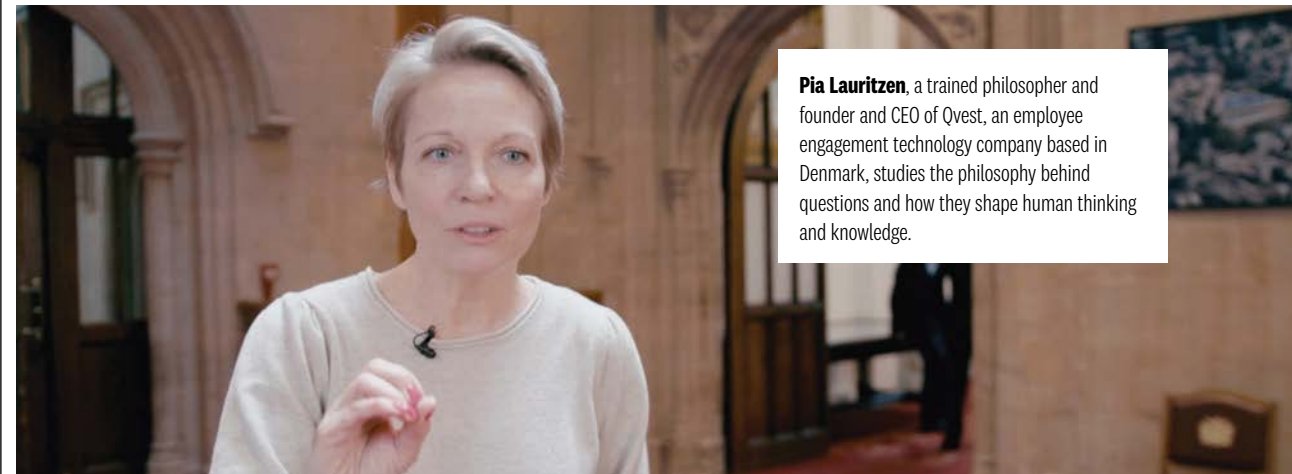
Q: What questions shouldn't be left to AI?

A: From a philosophical perspective, there are questions that we should never leave to a bot. Typically, I talk about the three big E's. The existential questions: Who am I? What does it even mean to be one person and another person? The ethical questions: How should I behave? How do I do what's good not only for myself but for the people around me and for the world at large? And the epistemological questions: How do we know, and what do we know? And how do we deal with all the things that we don't know? ... I think it becomes extremely important that we practice asking these kind of questions and recognizing this is a question that we need to discuss with each other and not with a bot. ●

To view the videos, visit www.deloitte.com/insights/ai-better-questions. For more information about the Thinkers50 Radar list, visit Thinkers50.com/radar-2024

THINKERS50-RECOGNIZED BUSINESS THINKERS EXPLORE GENERATIVE AI'S BENEFITS AND ETHICAL CHALLENGES

Stephanie Creary, Poornima Luthra, and Pia Lauritzen were honored in the Thinkers50 Radar Class of 2023, a list produced in collaboration with Deloitte US spotlighting business and management thinkers whose ideas are likely to shape the future.

In collaboration with *Deloitte Insights*, Thinkers50 recently conducted a pulse check of 48 Radar honorees about their generative AI usage to get a sense of how the technology is impacting the work of business and management thinkers. Several shared their concerns about bias, ethics, intellectual property, and plagiarism, but they also marveled at its speed, note-taking abilities, and value as a brainstorming buddy. Among these respondents, more than half were frequent users, with 28 reporting they had used generative AI tools at least once a day in their last month of work. Only one person said they had not used a generative tool in the prior month.

The respondents' use of generative AI tools highlights the technology's utility in day-to-day work, even as these thinkers also question its limitations.

FIG 1: How frequently did you use generative AI tools in your last month of work?

Among the 48 Radar honorees who responded to our informal pulse check, many were frequent users of generative AI tools

23 used them *multiple times a day*

5 used them *once a day*

6 used them *once a week*

13 used them *2 to 3 times per month*

1 *did not use them* last month

Source: Thinkers50, in collaboration with Deloitte Insights.
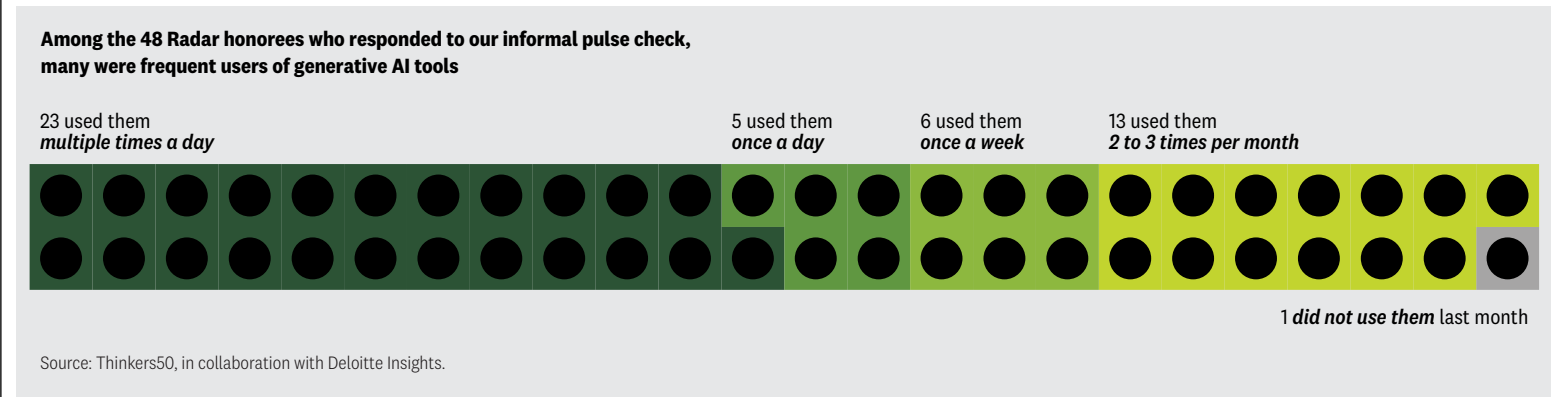
Looking for your next great read?

What are your peers reading?

10

Discover the articles your peers found interesting in Deloitte Insights' Top 10.

Access the latest perspectives and proprietary research that readers are engaging with and rating highly.

Explore our quarterly Top 10.
www.deloitte.com/insights/top10

Generative AI and the labor market: A case for techno-optimism

Generative AI can boost productivity and enhance the labor market, yet it remains to be seen if everyone can reap its many benefits

By **Ira Kalish** *and* **Michael Wolf**
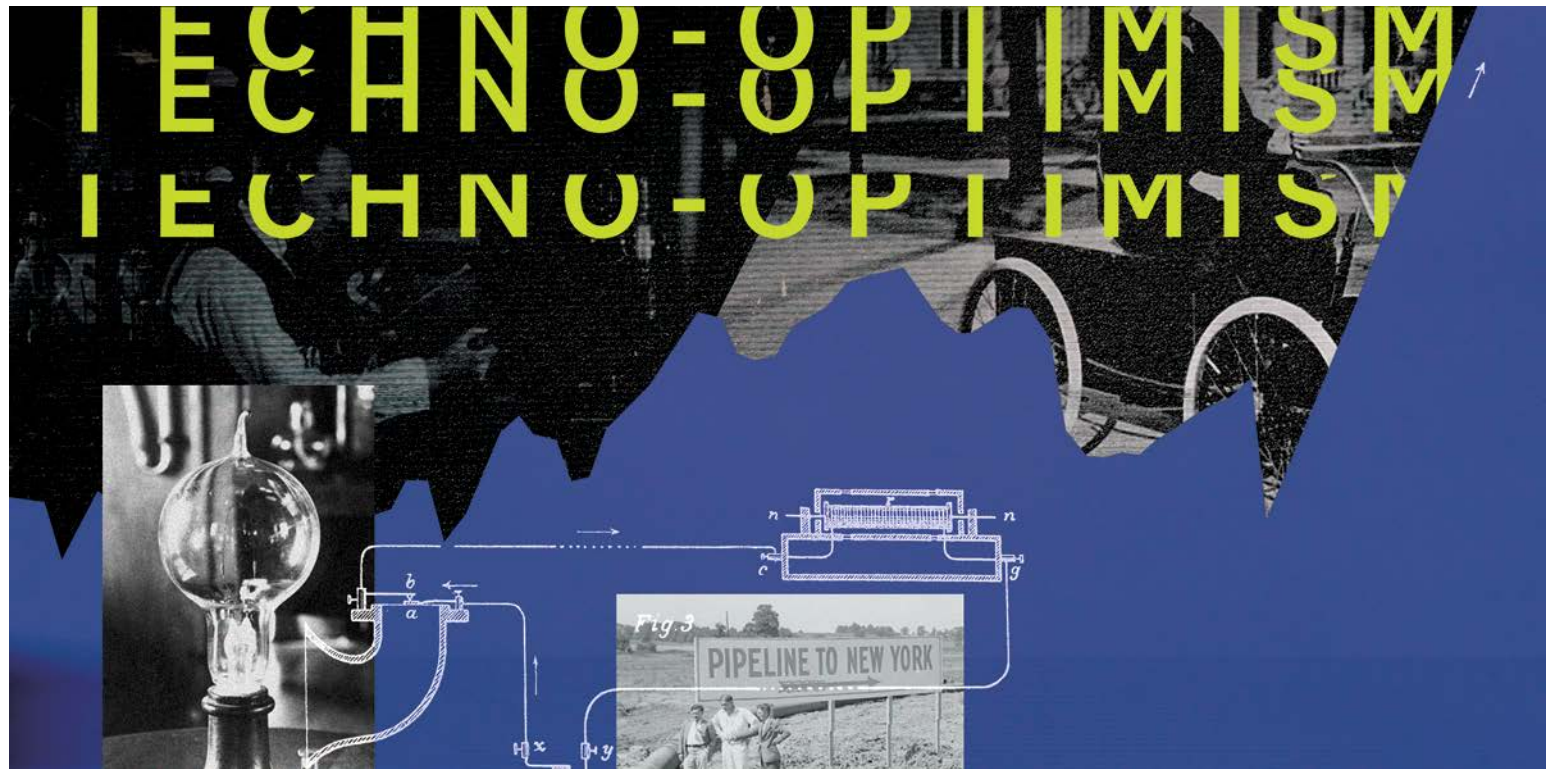
Technological advancement and innovation have a long history of fueling anxiety among workers. In the early 1800s, the so-called Luddites smashed knitting machines that threatened textile workers in England.[1] In 1930, John Maynard Keynes posited that technological innovation could at least temporarily result in widespread unemployment.[2] Today is no different. Plenty of ink has been spilled fretting about robots replacing human labor. Although it's easy to see the displacement effect that technology can have on workers, innovation can also raise demand for labor in other sectors, making the net effect a positive one.

The historical record is mixed when it comes to innovation and its impact on the labor market. Sometimes innovation can have a positive effect on labor demand while, at other times, it can be detrimental. So how can we know what type of effect generative AI will have? And what does it mean for the rest of the economy?

A quick look at the literature on the economics of innovation is useful in understanding the interaction between innovation and the wider economy. A wide assessment of innovation in the United States reveals innovation increased demand for workers in the four decades following World War II. However, in the next four decades, it had the opposite effect, weakening demand for labor.[3] This doesn't mean that labor demand actually *fell* during this later period. It was just weaker than the counterfactual and the trend demonstrated in the earlier period. It's worth noting that the employment-to-population ratio in the

United States peaked in 2000, right in the middle of this slower labor demand period (figure 1).

Stronger growth in the earlier period is often associated with the five "great inventions of the Second Industrial Revolution," which include electricity (for example, the light bulb and electric motor), the internal combustion engine, sanitation (including running water and indoor plumbing), chemicals (natural gas, plastics, and pharmaceuticals, for example), and telecommunications (the telephone and radio). Some researchers show that these inventions had such a profound and anomalous effect on the economy and living standards that their strong economic effects are unlikely to be repeated in the future.[4]

The type of innovations that occurred over the 40 years following World War II likely explains some of the associated positive economic outcomes. Most of these inventions would be considered product innovations, which are creations of a new or vastly improved good or service, rather than a process innovation, which is focused on how a good or service is created. For example, the invention of the automobile would be a product innovation, whereas the invention of industrial robots that assemble automobiles would be a process innovation. Research shows that product innovations are more likely than process innovations to improve productivity and therefore boost economic output.[5]

Researchers focusing on the labor market invoke a similar argument.[6] They believe technological innovation focused on

FIG 1: Employment-to-population ratio in the United States peaked around 2000, a period of slower labor demand

US employment population ratio

Source: US Department of Labor, via Haver Analytics.

augmenting labor or performing tasks that humans do not or cannot perform will lead to stronger growth in aggregate labor demand. Such innovations are more closely aligned to product innovations. Conversely, labor-automating technologies that focus on performing existing human tasks, such as aspects of AI, are more similar to process innovations and are more likely to diminish aggregate labor demand.

Making distinctions between product and process innovations, and labor-augmenting and -automating innovations can be murky. For example, the invention of the automobile can be considered a product innovation in that it was sold to customers and was significantly different from anything that came before it. However, it can also be a process innovation when it's used to transport goods. Similarly, an innovation such as a word processor can be considered labor-automating to a legal secretary but labor-augmenting to a lawyer.

The scale of an innovation is, perhaps, more important than whether it's a product or process innovation. Research focusing on innovations among French manufacturers shows that it's "radical innovation," rather than "incremental innovation," that has a positive effect on overall productivity growth.[7] Similarly, two leading researchers on the topic note that it isn't the "brilliant" automation technologies that threaten employment and wages, but "so-so" technologies that generate smaller productivity improvements.[8] This is because, unlike many "brilliant" inventions, "so-so" innovations don't usually boost overall productivity enough to offset the negative effects of job displacement. A "brilliant" technology would include the invention of refrigeration, which drastically reduced food spoilage and improved productivity in agriculture and food processing. A self-service kiosk that shifts work from a grocery-store cashier to the customer without improving quality could be considered a "so-so" innovation.

From a theoretical standpoint, we can decompose innovation's effect on the labor market into three distinct effects: the displacement effect, the reinstatement effect, and the productivity effect.[9] The displacement effect reduces employment as

innovation automates tasks and therefore reduces human jobs. The reinstatement effect increases demand for labor as innovation creates new tasks that humans will need to perform. For example, more data and computer scientists could be employed to produce and maintain an automating technology. Finally, the productivity effect increases demand for labor in unaffected industries as more productive economic activity raises incomes. For example, when refrigeration reduced spoilage, it brought down waste (and the costs associated with it) typically borne by both businesses and consumers. Those cost savings could then be redeployed elsewhere in the economy, driving up labor demand in other industries.

Even if labor-augmenting and product innovations are preferable to labor-automating and process innovations, respectively, many experts in the field of innovation economics argue that the magnitude of the productivity effect is what will ultimately determine if an innovation increases or decreases aggregate labor demand. The mechanism for this productivity effect is important. Larger cost savings in the innovating firm or industry will yield higher productivity growth. The productivity effect is strongest when wages are high and labor is scarce in the innovating firm or industry. [10]

Where does generative AI fit into this?

Numerous innovations are being made every day, but here we focus exclusively on generative AI, which uses foundation models to create new content in the form of text, code, voice, images, etc.[11] This technology is still in its infancy, and advancements that can be built based on this technology remain unknown. Even so, based on our understanding of generative AI as it currently exists and what some researchers predict could happen in the near term, we can assess how it might affect labor markets.

First, understanding why innovation has had a more limited productivity effect over the last 40 years acts as a useful starting point. At least part of the reason why post-1980 innovation

had a weaker productivity effect was likely due to the types of workers who were displaced: Automation over this period largely focused on low- and middle-wage workers. Word processors and spreadsheets displaced relatively low-paid clerical workers, such as file clerks. Meanwhile, machinery and industrial robots displaced middle-wage factory workers.[12] Because the cost savings were relatively low under these circumstances, the proportional productivity effect was also smaller.

This is unlikely to be the case for generative AI, however. Research that matches generative AI skills with those of workers finds that higher-wage workers are the most at risk of losing their jobs to this technology.[13] Although the exact occupations that are at risk differ across research methods, there's widespread agreement that the share of tasks that could be done by generative AI rises with income.[14] Some of the occupations that have been deemed most at risk of automation from generative AI include post-secondary educators, mathematicians, and survey researchers. The industries with the greatest exposure often include legal, financial, and professional services (figure 2).[15] Most of these occupations and industries involve high wages, suggesting that the cost savings of this technology could be substantial. Assuming the costs saved are, indeed, proportional to the productivity effect, then we should see stronger—rather than weaker—aggregate labor demand.

We know that process innovations have a lower likelihood than product innovations to increase demand for labor. Although generative AI could be considered a new product, it's likely going to be used as a process innovation across most use cases. This alone reduces the probability of generative AI boosting labor demand. However, the mixed outcomes of process innovations likely reflect the distinction between "brilliant" technologies and "so-so" technologies. It is "brilliant" technologies that have the largest productivity effects and boost labor demand.

Although there is no standard definition of what technologies qualify as "brilliant" or "so-so," generative AI likely counts as a "brilliant" innovation. For one, the technology has wide-reaching effects as it's considered a general-purpose technology.[16] This means that generative AI has applications across multiple industries and can perform a variety of tasks. For example, generative AI has proved to be adept at writing code for different types of software,[17] training telemarketers,[18] providing research support,[19] and detecting fraud.[20] General-purpose technologies don't guarantee a strong productivity effect. After all, they could have only a small positive or even neutral effect on productivity growth even if they're deployed widely. But the wide array of tasks that generative AI can perform, and the occupations and industries it will affect, bode well for a strong productivity effect.

There are at least two confounding factors that could support or hinder the expected increase in labor demand from generative AI. The first is demographics. A scarcity of workers not only bids up wages, increasing the cost savings from innovation, but also encourages employers to invest more in automation.

FIG 2: Legal and financial services are the industries with greatest exposure to generative AI
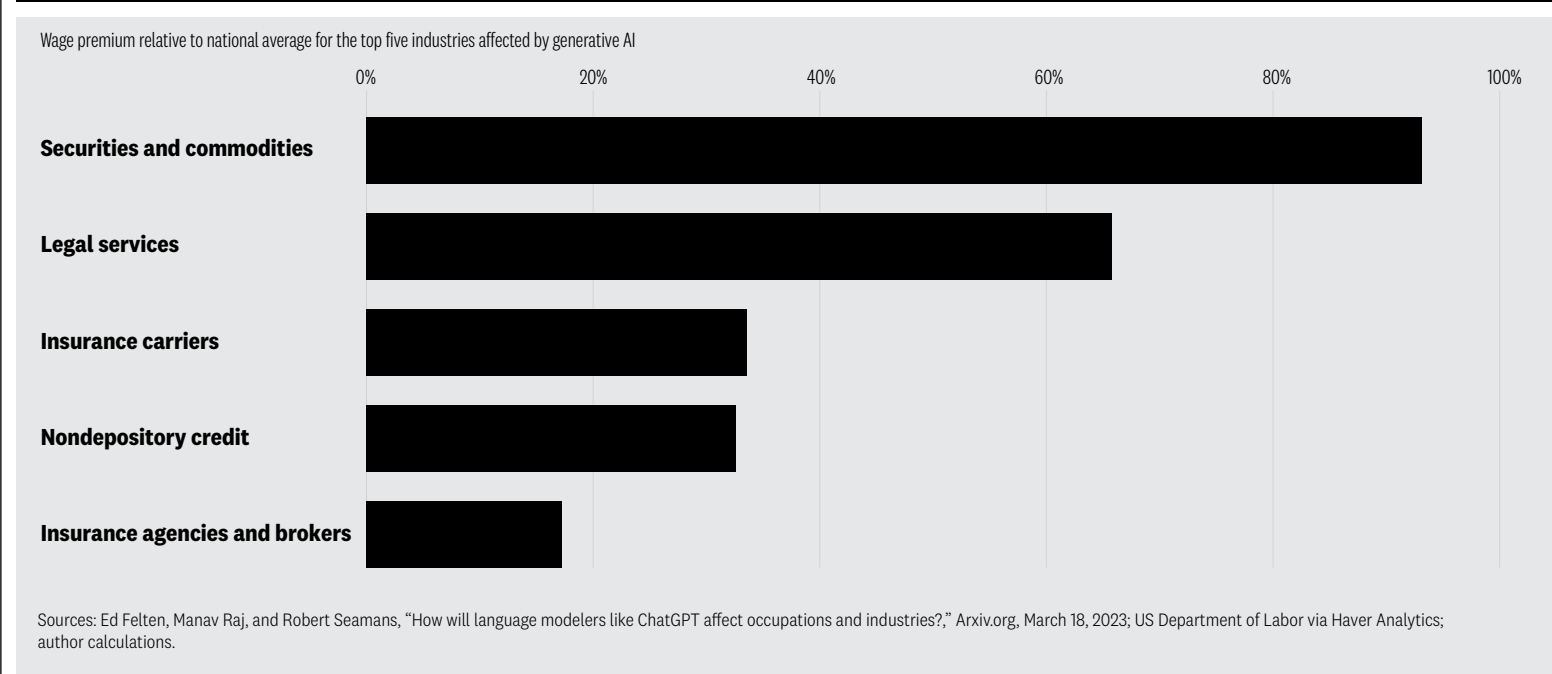
Wage premium relative to national average for the top five industries affected by generative AI

Sources: Ed Felten, Manav Raj, and Robert Seamans, "How will language modelers like ChatGPT affect occupations and industries?," Arxiv.org, March 18, 2023; US Department of Labor via Haver Analytics; author calculations.

Ira Kalish
ikalish@deloitte.com

Ira Kalish is the chief global economist at Deloitte Touche Tohmatsu Ltd.

Michael Wolf
miwolf@deloitte.com

Michael Wolf is a global economist at Deloitte Touche Tohmatsu Ltd.

In Germany, where worker protections are stronger, the adoption of industrial robots had no discernible effect on local labor demand in the decade between 1994 and 2014.

Countries and firms that are most reliant on middle-aged workers who were dwindling in number historically have been quicker than others to implement automation to offset the demographic decline.[21] Given that growth of the working-age population is weakening or even declining in most developed countries,[22] widespread adoption of generative AI becomes likelier. Such widespread adoption then raises the probability of more cost savings and improved quality of output, and therefore a stronger productivity effect.

The second factor comprises institutions. Most studies covering how innovation affects the labor market focus on the US economy due to the availability of economic data. However, the experience in other countries might look quite different. In countries with stronger worker protection laws and higher rates of union membership, the displacement effect of generative AI is likely to be smaller, at least in the near term.

For example, in the United States, the adoption of industrial robots was associated with lower demand for factory jobs. However, in Germany, where worker protections are stronger, the adoption of industrial robots had no discernible effect on local labor demand in the decade between 1994 and 2014.[23] German manufacturing workers were largely able to stay at their current employer but switched roles internally. When worker protections are strong, the growth of new workers in the affected industry slows down and ultimately is offset by gains in the business service sector. More recent union negotiations, such as the writer's strike in the United States in 2023, have focused heavily on protecting workers from AI-related disruption.[24]

In geographies or industries with stronger protections in place, generative AI's displacement effect on jobs may prove to be more muted or even nonexistent. In the meantime, the productivity effect also could be smaller overall, since there would be fewer cost savings to redeploy elsewhere. However, labor protections should allow for a more orderly shift in occupational tasks and smooth out demand across the job market. It also shifts firms' attention away from task automation and toward using generative AI to make productivity gains and improve the quality of their output, both of which should have positive effects on labor demand.

How might generative AI impact economic inequality?

Assuming that, overall, the widespread adoption of generative AI creates a stronger productivity effect than its displacement effect, labor demand should increase and unemployment should fall. It also should increase total productivity growth, which will raise real per-capita incomes, real GDP, and consumer spending. Stronger productivity growth also is associated with lower inflation as capacity constraints diminish. This would help reverse the slow productivity growth seen in developed economies over the last 10 to 15 years.

Like other technological innovations before it, generative AI could have an impact on inequality. Given that the most at-risk occupations and industries are those at the higher end of the income distribution, displacement of these workers should reduce inequality. One research paper shows that inequality between those in the 90th and 10th income percentiles should fall amid the adoption of generative AI. However, that same paper shows that there will be little negative effect on those in the top 1% of the income distribution.[25] That may be because many people in the top 1% are high-level executives whose jobs are highly interpersonal and perhaps less exposed to AI than other, more technical roles. Of course, reducing employment of higher-wage workers will reduce inequality. However, replacing high-earning skills with generative AI could expand demand for lower-paid skills, bidding up demand and wages for lower-paid workers and putting additional downward pressure on wages for high-skilled workers.

Even if these economic outcomes come to pass, it doesn't guarantee that everyone will be better off. Regions with high concentrations of affected workers may otherwise be worse off. Returning to the experience of industrial robot adoption in the United States, it's perhaps a cautionary tale. Those robots displaced jobs not just in factories and industries directly affected by the robots but also in broader local labor markets. Indeed, numerous US regions with high concentrations of manufacturing jobs that were subsequently automated or offshored faced a litany of economic and social problems thereafter.[26] Should generative AI have an outsized effect on workers in a particular industry, the regions with large concentrations of that industry could struggle as a result. Financial services is frequently cited as among the most exposed industries, which could put the economies of global financial centers at risk.

Policy also could change in response to this technology. Critics of labor-displacing technology have suggested that a change in the tax code could encourage more hiring relative to technological investment, thereby impeding negative effects on the labor market.[27] Indeed, research shows that there is unfavorable tax treatment of workers relative to investment in the United States.[28] If generative AI doesn't end up having the strong productivity effect we expect, it could increase pressure on policymakers to raise tax rates on investment or reduce taxes on wages.

There are still many variables when it comes to generative AI and how it will change the way we do business. Based on what we know so far, it has a high probability of improving demand for workers, reversing a four-decade trend of technological innovation weighing on labor. After all, there should be considerable cost savings associated with the technology that will raise the important productivity effect. Stronger labor demand and productivity will result in favorable economic outcomes, including a potential reduction in inequality. This relatively optimistic outlook, however, doesn't mean that everyone will be better off, as some workers and geographies could be overly exposed to the negative effects of the technology. ●

The more AI-enabled work becomes, the more important human imagination is

One of the most valuable skills you need to succeed in an AI-enabled working world you likely learned in kindergarten

By **David Mallon**, **Nic Scoble-Williams**, *and* **Sue Cantrell**

[1.5m]

[1m]

Illustration by Sofia Sergi
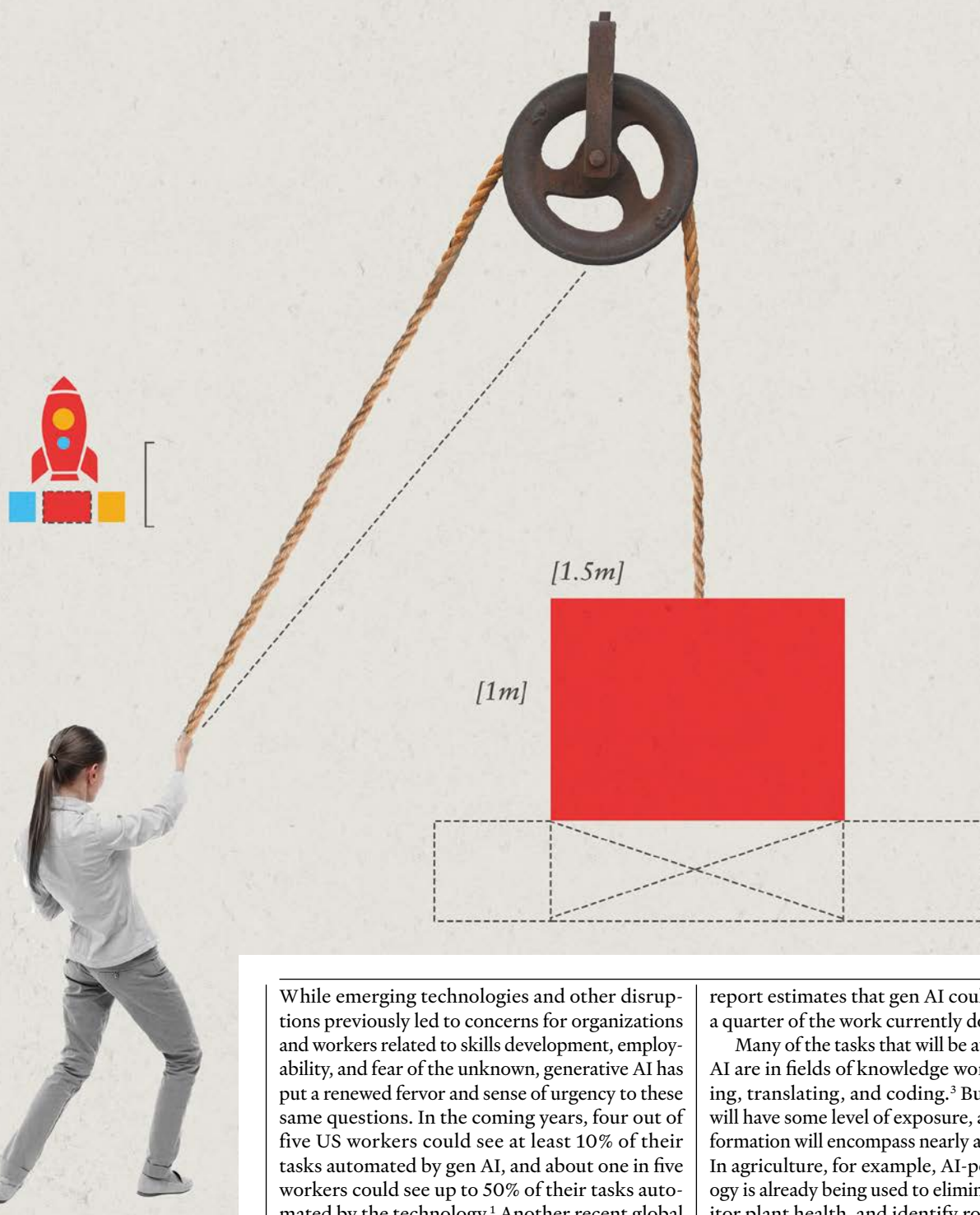
While emerging technologies and other disruptions previously led to concerns for organizations and workers related to skills development, employability, and fear of the unknown, generative AI has put a renewed fervor and sense of urgency to these same questions. In the coming years, four out of five US workers could see at least 10% of their tasks automated by gen AI, and about one in five workers could see up to 50% of their tasks automated by the technology.[1] Another recent global report estimates that gen AI could soon do up to a quarter of the work currently done by humans.[2]

Many of the tasks that will be automated by gen AI are in fields of knowledge work, such as writing, translating, and coding.[3] But nearly all jobs will have some level of exposure, and the AI transformation will encompass nearly all forms of work. In agriculture, for example, AI-powered technology is already being used to eliminate weeds, monitor plant health, and identify rocks in fields.[4] In

retail, AI is augmenting workers' ability to manage inventories in real time and provide customers with highly personalized experiences.[5]

While workers share concerns about the threat of technology taking over their jobs or worry about the new skills that will be needed to keep up with technology changes,[6] they also see an upside: 70% of workers would be willing to delegate as much work as possible to AI to free up time for other tasks and enhance their creativity.[7] To harness the extraordinary potential of this moment, organizations and workers alike should counter their fear with curiosity and imagination. Put simply, work is changing. What if it could be better?

Traditionally, organizations have focused on developing specific, easily replicable functional or technical skills and executing repeatable processes to produce standardized products and services most effectively. But the efficient execution of processes is becoming less important than the ability to adapt to changing market conditions and drive new value,[8] which depends less on training workers in specific technical skills than on cultivating curiosity and other human capabilities that allow people to respond to changing conditions and imagine different futures.[9]

The role of imagination is particularly important in the current moment, given the nontraditional nature of generative AI as a technology. In contrast to commonly used technologies such as internet browsers or word processing applications, which either work or fail, the effectiveness of gen AI can't be measured in black and white terms. Gen AI can produce results with varying levels of accuracy and precision. It may make mistakes, and humans will have to devise methods to assess its reliability.[10]

Moreover, unlike many past technologies, generative AI tools aren't necessarily anchored to any one task or domain. Rather, they can excel at generating knowledge and drawing connections from massive sets of data and ideas. Consequently, they have the potential to help workers in numerous ways—many of which have yet to be imagined.

As technology advances and humans discover more ways to use gen AI, it has the potential to become a true creative partner for workers, aiding in tasks such as production design, naming, testing, and marketing. Workers could collaborate with gen AI to compose complex texts, develop software, and interact with customers in more effective ways.

Consider Swedish retailer Ikea. The furniture company is using AI technologies to transform its global call center operations, intending to both increase efficiencies and turn each agent into a designer—shifting the focus of their roles from procedure and process to creativity and human connection. Ikea implemented an AI bot named Billie to handle most routine customer queries. They then invested in a comprehensive upskilling initiative for their 8,500 call center workers to strengthen design skills and human capabilities.[11]

Harnessing imagination to create positive change

To help ensure an adequate supply of imagination, organizations should shift from an approach that prioritizes short-term fixes to a long-term approach that prioritizes adaptability, resilience, and imagination. For many organizations, such a shift will require a redefinition of success, one that reflects a reimagined world of work in which humans and technology produce value together. There are four key steps organizations can take to begin investing in imagination and other human capabilities in their organizations.

Operationalize human capabilities as part of overall workforce strategy

Start by assessing the current state of your workforce's collective human capabilities—in particular, empathy and curiosity. Most organizations have more experience measuring functional and technical skills than broader capabilities.

According to Deloitte's Skills-Based Organization global survey, 68% of business and human resources leaders say they're confident they have verified and valid information on their workers' hard skills, but only 48% are confident they have verified and valid information on their workers' human capabilities.[12] While measuring human capabilities isn't as straightforward as measuring hard skills, there are nevertheless a variety of ways to do so. Organizations can collect peer or manager feedback, assessments, or endorsements of capabilities. They can use digital assessment tools including psychometric assessments, simulations, and challenges. Or, if workers consent, they can use AI tools that infer human capabilities by analyzing workers' daily behaviors and performance in the flow of work, including AI analysis of audio or video calls.[13]

Once an organization understands the relative strength of human capabilities in its workforce and identifies any capability gaps, it can start to close those gaps by operationalizing the development of human capabilities. One way to do this is to begin hiring for them. Many organizations are already doing so. For example, design and consulting company Ideo prioritizes hiring "T-shaped" employees: people with human capabilities such as creativity (the vertical stroke of the T) and a willingness to collaborate across disciplines (the horizontal stroke of the T). The organization understands that T-shaped candidates are more likely to ask questions about the organization that aren't directly related to the roles they're applying for, and they're more likely to talk about how past successes have involved collaboration, rather than focusing exclusively on themselves.[14]

In conjunction with deploying talent acquisition initiatives, future-thinking organizations will develop, support, and reward the effective use of human capabilities across their workforce. For example, many organizations with a large frontline worker population engage in empathy-related training and development.[15] Such development activities often involve deliberately being placed in unfamiliar experiences or having the chance to observe and then practice empathetic responses. Best Western Hotels, for example, used virtual reality to help workers better empathize with tired and frustrated travelers.[16]

Practice imagination in service of human sustainability

Today's workers have increased agency and many are seeking greater meaning in their work.[17] While extrinsic rewards can be important, research has found that one of the best rewards for exercising creativity is simply the chance to use it in service of outcomes that are meaningful to the individual.[18] Encouraging workers to use their human capabilities in service of outcomes that matter to them and to the organization has the potential to be a virtuous, reinforcing cycle. These capabilities may be innate, but when they aren't exercised on a regular basis, they can atrophy.

That's why it's so important for leaders to model and encourage their use. When given a safe space and the time to pursue projects of interest—even if that work lies outside their defined responsibilities—workers have a chance to hone and strengthen their human capabilities while generating greater value for the organization and themselves. Organizations

David Mallon
dmallon@deloitte.com

David Mallon is chief analyst and market leader for Deloitte US's Insights2Action team in the human capital practice.

Nic Scoble-Williams
nscoble-williams@
tohmatsu.co.jp

Nic Scoble-Williams is a partner at Deloitte Tohmatsu Consulting LLC and the Asia Pacific leader for the future of work.

Sue Cantrell
scantrell@deloitte.com

Susan Cantrell is vice president of products and workforce strategies for Deloitte US's consulting business.

FIG 1: Workers want the opportunity to reimagine the future of their work, but many aren't given the chance to do so

Questions included, "Is your organization helping you imagine how your job may change in the future, with technology or other advancements?" and, "How important would this be to you?"

43%

Workers who said their organization helps them imagine the future of their work

76%

Workers who said this was "moderately important" or "very important" to them

Source: Deloitte 2024 Global Human Capital Trends research.

can harness the intrinsic passion that, for most people, is the strongest motivating force.[19]

Highlight for workers, teams, and managers the need to prioritize human capabilities

Workers should not be expected to transform their mindsets overnight from "What needs to get done?" to "What possibilities can I help unlock?" Leaders have a responsibility to communicate the importance of curiosity and empathy, and model behavior that demonstrates their effective use. For example, managers and team leaders can also create space for their workers to use their human capabilities to rethink their roles (figure 1).

Moreover, organizations may need to overcome biases against curiosity and creativity, and related blind spots as to their rising importance for workers. As illustrated in figure 2, executives see human capabilities as very important for themselves (eight out of 10) but only moderately important for their workers (six out of 10). Recent research has found that many people celebrate

creativity outwardly while subconsciously viewing it as a disruptive force that introduces unwanted uncertainty.[20] Curiosity, too, has historically been seen as both a positive quality and a potentially disruptive one.[21] This may partly explain why, in a recent survey spanning 16 industries, 65% of workers said curiosity was of great importance to exploring new ideas and solving work problems, while almost as many—60%—said they encountered difficulties in fulfilling their curiosity on the job because of daily routines and rigid organizational structures.[22]

Provide opportunities and venues for workers to explore, experiment, disrupt, and cocreate

When given the safe space and encouragement to play and search for new possibilities, workers can more easily tap into their natural curiosity and let go of the fear that could be holding them back from taking risks. Create moments, both ad hoc and built into daily work, to exercise the imagination. Hackathons offer one model since creative autonomy is valued above all else.

FIG 2: Surveyed executives rate human capabilities as more important for themselves than for workers

Calculated average of executives' answers to the question: "How important are the following skills at each level of your organization for its business performance? Rate on a scale from zero to 10."

Human capabilities
(e.g., curiosity, empathy, critical thinking, emotional intelligence)

Collaboration with machines

8.2   **Executives**   5.4

6.4   **Workers**   8.2

Source: Deloitte 2024 Global Human Capital Trends research.

Instead of managing the innovation process as it happens, managers set the stage by providing access to tools and asking a set of questions to inspire creativity.

Looking toward an imagination-rich future

The disruption posed by technological innovation and an increasingly interconnected world is changing the way organizations and workers analyze, collaborate, and create. It's up to organizations to prioritize human capabilities in a technology-dependent world. This means hiring for faculties such as curiosity, creativity, and critical thinking; developing them throughout the workforce; providing safe spaces where workers can come together to experiment and practice; and rewarding workers who harness their autonomy to reimagine what's possible for themselves, the organization, and its stakeholders.

This reimagination is no longer the exclusive remit of organizational leaders. Instead, it's a team sport that involves everyone in the organization and beyond, welcoming new technologies into teams to produce transformative outcomes. When imagination becomes an expectation from top to bottom, workers can envision new opportunities and organizations can be better positioned for perpetual reinvention and innovation. ●

This perspective was adapted from Deloitte's 2024 Global Human Capital Trends. Read the full report at www.deloitte.com/insights/human-capital/trends

METHODOLOGY

Deloitte's 2024 Global Human Capital Trends survey included responses from 14,000 business and human resources leaders across many industries and sectors in 95 countries. Deloitte supplemented this research with worker- and executive-specific surveys to represent the workforce perspective and uncover where there may be gaps between leader perception and worker realities. The executive survey was done in collaboration with Oxford Economics to survey 1,000 global executives and board leaders. The survey data is complemented by over a dozen interviews with executives from some of today's leading organizations.

The democratization of deepfake technology brings new perils for business

A chief executive of a deepfake detection platform company and Deloitte US's chief futurist explore the growing deepfake risks, as well as mitigation strategies that could help organizations fight AI-enabled fraud with AI
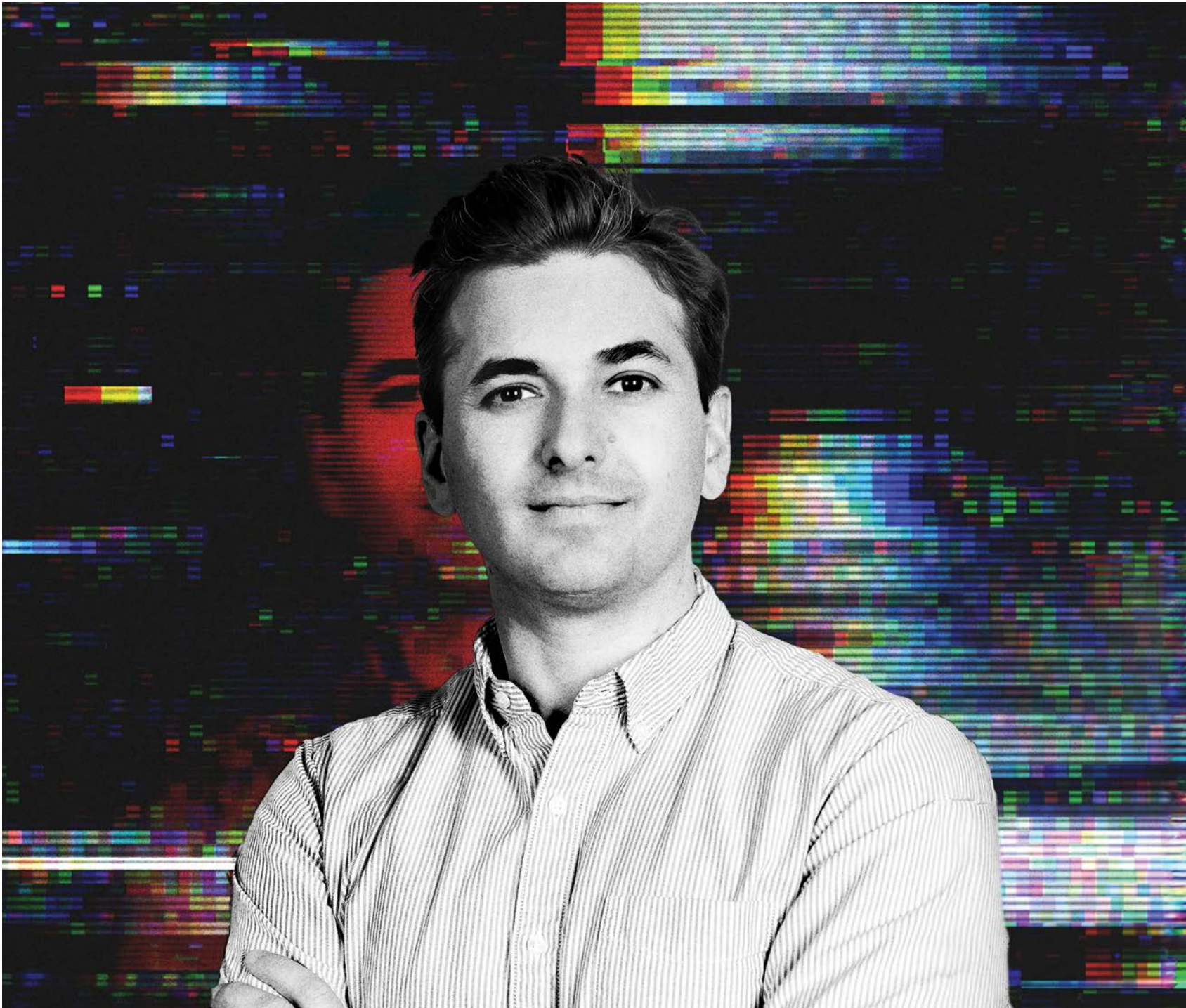
Deepfake technology has advanced rapidly, and bad actors have taken note. In February 2024, a finance worker in Hong Kong was tricked into transferring approximately US$25 million to a fraudulent account after a video conference with his CFO and other coworkers he recognized. He later discovered that everyone on the call—except him—was a deepfake.[1]

To better understand how businesses can protect themselves against deepfakes and why current protection measures might not be enough, *Deloitte Insights* spoke with Ben Colman, CEO of Reality Defender, a US-based company that monitors and detects AI-enabled fraud, and Mike Bechtel, chief futurist of Deloitte US.

Q: Are deepfakes a new and unique threat, or is this just the latest episode in the history of social engineering and fraud?

Colman: The idea [of a] deepfake goes back at least a decade, maybe more, starting within entertainment with special effects. Think about your favorite movie: the type of work, like a face swap or a fake environment, that needed really high-powered computers and also a lot of time.

What's really happened over the last few years has been the democratization of both the tools—they're now available to anybody with search, whether it's online or through the app store on your phone—but also the technology needed to run the software. Anybody with a credit card can get access to cloud compute. …

There are deepfakes for audio where you could make really entertaining audio—maybe me sounding like the Rock or another actor—or something incredibly dangerous like the deepfake audio of [US] President Biden telling folks not to vote in the primary.

This is a trend that's going to continue with other modalities beyond audio. What's not yet dangerous and what's not yet on the forefront of deepfakes is real-time video. We forecast that the idea of deepfakes in real-time video will start hitting prime time next year.

Q: Wow, that sounds like a game changer. Is it?

Colman: We think generative AI is going to change the world. It'll increase efficiency, increase productivity, increase creativity. But in a very small minority of use cases, it's incredibly dangerous.

We'll all have deepfakes of ourselves. That'll be a permissioned avatar of me and you. And we'll be able to take calls or take video conversations from our car or lying in bed and have a perfect version of us looking right at the camera always. That's going to open up a whole, new world of challenges: How do we prove that's Ben using Ben's deepfake avatar of himself?

The challenge is that anything that uses media communications can be faked and will be faked. Certain platforms, banks, and brokerages still believe that your voice is your password—and all that can be faked. Just the fact that it sounds like me and matches my voiceprint, and just because it has my birthday, my social security number, my address, all the things that could be found or stolen or hacked online, that's just not enough. The idea of "you have to see it to believe it"—or you have to hear it to believe it—doesn't work anymore. ...

The challenge is that the tools to do everything we're describing are available to anybody. On one hand, hackers and bad actors and fraudsters can now do it in real time to many more people, but also average people who might not think about committing fraud might just do it because it's just so easy. And, wow, you can get away with it.

[Generative AI] can be used for a lot of great reasons. You could create presentations for companies and help support communications as different languages are being translated in real time. But if anyone can use it without any verification of who you are and what you're doing, it's really something where the technology is moving faster than regulations required to protect average people, let alone companies and countries. ...

Choose your favorite voice-authentication solution: That platform fundamentally has to retain personal information of users and employees. It needs their voice. It needs their voiceprint. And what we've seen time and time again is if something can be hacked, it will be hacked. And unlike a password, if you lose your voiceprint or your faceprint, you can't just press reset. It's lost forever.

The ultimate password, ultimate private key, for people is our DNA, and 23andMe admitted they were hacked a year or two ago.[2] Just like your face or your voice, your DNA is not something you can reset. You can't get new versions of it. That is out there forever. ...

We take a pretty firm view that consumers should not have to become experts to detect AI-generated fraud, the same way consumers aren't required to be expert to identify a computer virus. Your email does it for you because average people, let alone experts, can't do it themselves. And these platforms don't do

this just because they want to be good corporate citizens. They do it because there are either laws or regulations or requirements from the FCC [Federal Communications Commission] or FTC [Federal Trade Commission] to do this.

Q: Ben, you've been talking about some of the technical remedies, but you also talked about nontechnical remedies like legislation that would then compel companies to do something. I'm wondering about the efficacy of media literacy campaigns. What's your assessment of how effective they would be in helping people and companies protect themselves from these dangers?

Colman: I think that any education is good and very, very important. [But] in our space, education only gets you so far.

I'll give an example of phishing campaigns. A lot of companies have started to test their employees by sending them automated, potentially fraudulent phishing campaigns. And they've seen, time and time again, people still click the button. And then, even if they're told, "Hey, you did it last month, so [we're] testing you again," they'll still click it again. But at least you're trying. You're hoping to give better information and muscle memory so that you can hopefully reduce fraud.

An example I'll give is, every company and every single organization will tell consumers you need better passwords. Now they require it. You need lowercase, you need uppercase, you need a symbol, you need a number. You can't have two characters after another. It's really painful. And people say, "OK," they'll do it. And they'll also use the same password, in multiple places, which, again, we all think is obviously something you shouldn't do, but people still do it anyway.

But the moment that our email or our social media is hacked, suddenly we have that feeling of, "Oh, my, all of my information is now online." That means all of your emails, all your personal images of your family, all your medical records. And only then do people realize they need to really be smarter and be more careful with their passwords. Typically, that's when people actually go sign up for a password manager and start generating completely randomized passwords.

There's tens of thousands of completely off-the-shelf tools to do this, [but] until you see it done on you or on somebody you work with or someone you care about, you just don't realize how dangerous and how universal this problem is.

Q: So what do companies need to be thinking about? How should they be preparing?

Colman: Companies need to be thinking about a lot of the things that, previously, they thought they solved more holistically. There is no silver bullet here. Defect detection is just one of the tools that organizations should be thinking about, but it's a tool that all organizations should use to complement other, more traditional checks they're doing on users or actions or requests, [for] both internal risks, but also external risks, whether it's to the company or to their customers.

Bechtel: Over the last 15 years, one of the macro patterns we've seen [regarding] cybersecurity and trust writ large is this move towards a "zero-trust posture." In the olden times—and by olden times, I mean five or 10 years ago—cyber defense felt like a moat around a castle. The idea [was] that our castle is our professional home. It's protected by a VPN [virtual private network]. It's protected by firewalls, aka the moat. And woe to thee who thinks they're going to get through that barrier. Well, the trick is, while the vast majority of people don't get through, those who do have free run of the castle, and havoc ensues.

The zero-trust posture basically says: "No more moats. We're going to lock every square meter of the interior of the castle, and everywhere you go is going to require proof of identity." What's so interesting about that is it replaces the idea of "trust but verify" with the idea of: "You ain't going to trust nobody, right? You're going to [have to] prove it every gosh-darn time."

And I think what we're seeing with respect to cyber and AI is the recognition that, in a world where you can't trust your eyes and ears anymore, you're going to have to fight math with math. ... You're going to need [...] the recognition that nobody can be "innocent until proven guilty," at least with regard to cybersecurity.

Colman: Absolutely. If this [were] a year ago, I'd have given you all kinds of examples of how to identify different kinds of anomalies with the naked eye. But the truth is that, with the majority of our team across research and engineering—which is two-thirds of our team, many with PhDs—if they can't see anything, how do my kids, how do my parents stand a chance?

Q: How do you guys feel as you're moving forward in this, and the technology evolves?

Bechtel: There's a tendency to characterize anything new as alternately a hero or a villain. It's newfangled: Do we fear it, or do we revere it? And I would tell you, don't do either.

If you extend this to the latest and greatest, in this case, AI and generative AI, what you realize is, OK, yeah, we can unleash a new era of creativity, a new era of productivity, and those are all true. But the cartoon, mustache-twisting villains out there are trying to figure out how to sow havoc, and we need to get out in front of that too.

Colman: I think we've had a lot of doom and gloom, but I want to end this with, there is hope. There are solutions that exist here. We can use AI to detect or to fight AI. ... [Rather than just] trusting community notes or content moderation, and asking consumers to flag a piece of media for being fake, it'll all be automated. It'll be just like looking at a computer virus. You just know it's there because the platforms flag it for you. And you can really trust when you click on a file that you're not downloading a virus on your computer.

Now, with immediate communications, it can take a little more time, but I'm extremely optimistic that, in the next two years—potentially before Q4 of this year—we'll start seeing a lot more protections for average people, but also for governments and companies in the space. ●

This is an edited excerpt from Deloitte Insights' podcast. Find the full podcast episode at www.deloitte.com/insights/deepfake-podcast

Organizations talk about equity in AI, but are they following through?

Diversity, equity, and inclusion leaders are in a unique position to advocate for AI that works for everyone. Here's where they have opportunities to lead at the intersection of AI and DEI.

By **Julian Sanders** *and* **Corrie Commisso**

Illustration by Matt Lennert
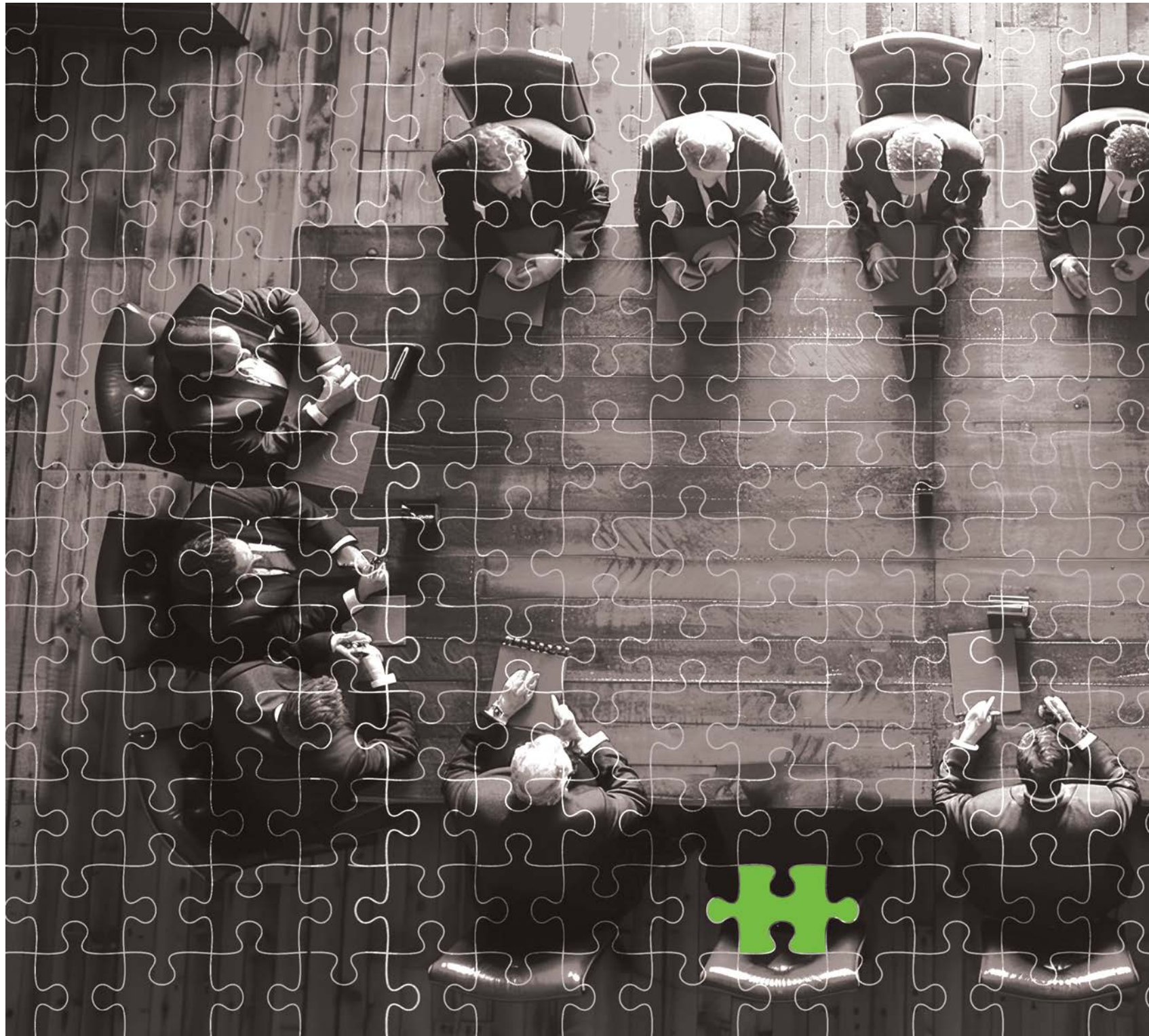
As leaders grapple with the cascade of decisions associated with artificial intelligence's impact on their organizations, one of the challenges they face is fostering trust in their AI models and implementations. Without thoughtful design and implementation that ensures equitable access and value across the organization, AI's perceived role could quickly shift from ally to adversary. Diversity, equity, and inclusion leaders could help ensure that equity remains a business priority amid the enterprisewide focus on other AI issues, including risk mitigation, governance, and compliance.

Deloitte's DEI Institute conducted a targeted, cross-industry survey of 71 chief DEI officers (CDEIOs) or equivalent leaders in March 2024 to better understand how organizations are utilizing their DEI leadership to inform the development of AI strategies and models. While 78% of CDEIOs surveyed agree or strongly agree that their organization continues to uphold its commitment to DEI alongside investments in AI, the survey also reveals that some organizations are falling short when it comes

to embracing the practices that allow DEI to inform AI strategy (figure 1). Where are these disconnects, and how can DEI leaders step in to influence how AI is created, developed, and managed with equity in mind?

Only 35% of CDEIO respondents agree or strongly agree that their boards or other C-suite members are actively involving their teams in conversations related to AI's impact on the workforce

While 97% of human resources leaders in a *Harvard Business Review* study say their organizations have made changes that are improving DEI outcomes,[1] only 35% of CDEIOs in the Deloitte DEI Institute study agree or strongly agree that their board and C-suite leaders understand the need for DEI strategy to continue to evolve alongside AI. DEI leaders are in a unique position to bring alignment between AI and DEI outcomes to ensure that

FIG 1: Organizations appear to be maintaining their overall DEI investments, but they're falling short when it comes to AI strategies that prioritize equity

Percentage of respondents who "agree" or "strongly agree"

My organization continues to uphold its commitment to DEI alongside investments in AI	
Impact assessment measures are implemented to counter potential biases	
DEI teams are actively involved in conversations related to AI impact on the workforce	
AI roles are created to foster diverse perspectives within AI teams	

Source: Deloitte DEI Institute survey of chief diversity, equity, and inclusion officers or equivalent leaders (N = 71), March 2024.

their organizations continue to prioritize equity-focused commitments. For example, consider a scenario in which a chief DEI officer is incorporated into the development process of an AI tool prior to its launch. Their unique vantage point, particularly linked to demographic data from racially and ethnically diverse populations, can empower them to identify data quality risks that could be overlooked by others—for example, due to their proximity to the data.

Only 12% of CDEIOs surveyed agree or strongly agree that their organizations are creating AI roles to foster diverse perspectives within AI teams

Incorporating a broad range of diverse perspectives into the AI life cycle—from ideation and development to deployment and assessment—is critical to minimize biases and other potential pitfalls. For example, consider a customer service chatbot that's programmed to converse in colloquial or conversational English. The user communicates by entering text, and the responses are delivered via a simulated voice. At a glance, this application appears to be a straightforward tool to facilitate customer engagement. However, what happens if the customer struggles with typing due to accessibility issues or has auditory challenges that make it difficult to understand the voice outputs? What if English is a second or less familiar language for the customer who, therefore, finds it challenging to engage with the tool? The inequities in value that can arise from AI deployment may not always be readily apparent. Recognizing these inequities necessitates contributions from stakeholders encompassing diverse backgrounds and life experiences.

Only 37% of CDEIOs surveyed agree or strongly agree that their organizations are implementing impact assessment measures to counter potential biases as they incorporate AI

Organizations may encounter potential risks if they omit ethical safeguards and accountability mechanisms for AI. Consider the challenge of talent acquisition and sourcing for skills over experience. A data science team may create and deploy an AI-enabled candidate screening tool to support efficiency. The technologists who build and train the model may not have the background or insight to identify the ways in which such an application could create bias. This could, in turn, lead to biased decision-making and potentially unfair hiring practices. Chief DEI officers are uniquely positioned to advocate for increased transparency and impact assessments of AI systems, but according to our research, few organizations seem to be incorporating equity-focused accountability measures.

CDEIOs in AI: Opportunities for collaboration

Organizations that want to prioritize equity in AI likely will need to focus on areas where disconnects between DEI strategies and AI practices are evident. While DEI leaders are uniquely positioned to help resolve these disconnects, collaboration across the C-suite will be important to successfully building trust. C-suite leaders and CDEIOs might want to consider the following ways of collaborating to foster more equitable AI.

- **Ensure that CDEIOs have a seat at the strategy table.** Comprehending and managing the subtleties of human bias, as well as mitigating equity-related risks, are often competencies in which chief DEI officers excel. If they're invited to participate in AI strategy development, CDEIOs can bring an integrated, equity-centered perspective on the design and implementation of AI tools to their collaboration with other stakeholders like chief technology officers, chief information officers, and chief talent officers. This collaboration can help in curating necessary learning opportunities that guide their organizations in responsibly and ethically leveraging AI tools.

- **Empower DEI leaders to help drive AI literacy.** Only about one-third of survey respondents agree or strongly agree that their organizations offer learning opportunities focused on the intersection of AI and DEI. But 49% of CDEIOs participating in our study agree or strongly agree that they are actively encouraging leaders and workforce members to boost their AI literacy. CDEIOs can help with curating necessary learning opportunities that guide their organizations in responsibly and ethically leveraging AI tools. Elevating AI literacy is a pivotal step toward emphasizing the importance of responsible and ethical AI usage, all while maintaining a focus on equity.

- **Engage CDEIOs as allies to help establish trust at every level.** Trust depends on the system aligning with human values and addressing risks. Each AI deployment is unique, with varying training data, model design, environments, and uses that can affect trust. Issues like bias, security, and transparency can impede responsible AI use. DEI leaders can push C-suite executives to prioritize trust. In collaboration with IT, HR, legal, finance, and ethics teams, chief DEI officers can ensure that AI promotes equitable outcomes and aligns with organizational commitments.

As AI continues to evolve, focusing on equity will be crucial to using its benefits responsibly and ethically, and CDEIOs can play a key role in making sure AI tools and strategies are built with equity in mind. ●

Read more at www.deloitte.com/us/equitable-ai

METHODOLOGY

Deloitte's DEI Institute surveyed chief DEI officers or equivalent leaders in March 2024 and received 71 responses from DEI leaders from different industries and sectors who have duties in the United States and globally. The survey aimed to gather insights on how these DEI executives perceive and use artificial intelligence, and how they engage with and navigate the AI ecosystem, as well as their beliefs and perspectives on their organizations' AI efforts.

Julian Sanders
jusanders@deloitte.com

Julian Sanders is a research lead in Deloitte's DEI Institute.

Corrie Commisso
ccommisso@deloitte.com

Corrie Commisso is a senior editor at *Deloitte Insights*.

3

Predicting the unpredictable: Exploring how technology could change the future of work

What does the future hold for worker and AI collaboration? It depends less on the tech and more on the decisions we make along the way.

By **Peter Evans-Greenwood, Peter Williams,** *and* **Kellie Nuttall**

Illustration by **Jim Slatton**

Predictions about the future of work typically bear little resemblance to the actual future once we find ourselves standing in it. Consider economist John Maynard Keynes' 1930s estimate that a 15-hour workweek would be possible within a few generations.[1] Technological advancements, he predicted, would improve productivity to the point that humans could enjoy the same living standards with less time devoted to work. But, despite some early gains in the modern era,[2] the typical workweek since the 1940s seems to be stuck at approximately 40 hours.[3]

For business leaders, inaccurate predictions can become a problem because they lead to poor decision-making and missed opportunities. So why do our predictions so often turn out to be wrong? Focusing only on trends limits our ability to see many of the decisions in front of us.

When leaders are trying to predict how technology like generative artificial intelligence will transform the future of work so that they can better prepare and equip the workplace for its impact, it's important for the leaders to be able to see *all* possibilities and possible futures on the road ahead—as well as *all* of the decision points that will determine which possibilities and futures become reality. And as evolving tech like generative AI enables previously unforeseen possibilities—and, therefore, unanticipated decisions—leaders need a new model (or set of models) to help explore all of the potential options, rather than simply extrapolating from past trends or our first assumptions.

The problem with predictions

The real problem with our predictions isn't that our technique is poor or imprecise, or that we overestimate the potential of new ideas and technologies in the short term while underestimating their impact in the long term.[4] If this were the case, then we could easily rectify these issues by improving our forecasting processes—tapping into more diverse data sources or integrating superior technology (quantum computing, perhaps) to increase the quality of our predictions. Our challenge is different: We need to rethink our prediction models in ways that allow us to see the broader spectrum of options and opportunities.

A forecast relies on a model, a way of framing the present and its dynamics. The model identifies the nouns (the actors involved) and, more importantly, the verbs (the interactions between actors, and between the actors and the environment). The models we use determine which paths to the future we can see—which possibilities and opportunities are visible to us, and which are invisible or hidden. Different models enable us to see different possibilities, and possible futures.

The models we commonly use struggle to account for humans and all their desires and inventiveness. The future is shaped by a myriad of human decisions and it's these human decisions that determine which future we find ourselves in. Discounting (or implicitly not considering) this human factor means that our predictions assume that society is heading in one direction when society often decides to make a sharp turn and go in an entirely different one.

This is perhaps most apparent in how our adoption of new technologies plays out. How we choose to use technology is as important as (if not more important than) the technology itself.[5] New technology creates new possibilities, but it's up to us to determine which possibilities crystallize into actualities.

When trying to understand the future, we're often unaware of which decisions will be the consequential ones at the time we're making (so many of) them. We might not even realize that there is a decision to be made—a choice—because the model we're using to frame the present doesn't allow us to see the choice before us. If we want to peer into the future, then we need to reconsider the models we're using, to look for complementary or alternative models that enable us to see different futures, different possibilities, and different opportunities—different ways of framing the present.

Rethinking our framework for 'work'

The model for how we determine new technologies' potential impact on work first depends on our reframing of work itself.

Historically, we've framed work as tasks completed by skilled workers in a physical workplace. Physical work is dominated by pen and paper, physical tools and materials, and in-person interactions, making it necessary for workers to gather, usually in an office or a factory, to be productive. Therefore, when we talk about how new innovations and automation opportunities will

New technology creates new possibilities, but it's up to us to determine which possibilities crystallize into actualities.

impact work, we focus on how technology can automate tasks and consequently drive skill churn. The future is quantified via estimates of which skills (and, therefore, workers and jobs) emerging technologies will make redundant.

Recent estimates of the impact of large language models (LLMs) by the International Labour Organization, for example, estimate that 24% of clerical tasks should be considered highly exposed to automation effects, with an additional 58% having medium-level exposure,[6] while another report suggests that 80% of US workers could see at least 10% of their tasks automated.[7]

These predictions assume that automation displaces skills, forcing workers into a skill-upgrading cycle where they supplement lower skills that have been automated with higher, yet-to-be-automated skills (typically 21st-century skills such as creativity, critical thinking, collaboration, information literacy, etc.)[8] via retraining. But how do we know that this skill-displacement model accurately captures the consequences of introducing new technology into the workplace? And that reskilling and retraining are the best responses for workers?

Hiding behind this focus on tasks and skills is a model of how work is done: product-process-task-skill, or the skill-based division of labor. Skilled workers complete specialized tasks within formalized processes that result in the creation of products. Our focus is on the individual workers and the attributes that enable them to perform the tasks presented to them.

The product-process-task-skill model tells us that introducing automation into a workplace drives skill upgrading. Our first (simple) attempts at automation target lower, simpler (and, therefore, easier to mechanize) tasks. Workers are driven to higher tasks (and skills) since they're unable to compete with the more productive (and tireless) machines. Automation targets increasingly advanced tasks as it's developed and becomes more capable, driving workers to increasingly higher-level skills. Eventually, workers are forced out of their job when the technology becomes more competent than the humans, with industries "de-skilled" as skilled labor has been replaced by (unskilled) machines.

In the current AI moment, much of the anxiety stems from the growing understanding that AI seems to be capable of performing more and more high-level tasks, whereas early waves of automation were mainly concerned with lower manual skills and tasks. Framing our analysis differently—considering a different

model—enables us to unlock new possible futures, and possibly more desirable futures.

New models for human and tech collaboration in the workplace

If we want to consider alternative futures, to see new possibilities and opportunities, then we need to develop new models for how work changes when new technology is introduced.

Consider the recent waves of AI-powered solutions that have entered the workplace. It's commonly assumed that AI is a task-automation technology, with the main difference between this and previous generations of automation being that AI enables us to automate higher-level tasks for knowledge work, rather than just lower-level manual ones.

While we can approach AI this way, it may be more productive to frame AI as automating behaviors, rather than tasks. AI enables us to codify decisions via algorithms: Which chess piece should be moved? What products are best to populate this investment portfolio? These decisions are made in response to a changing environment—our chess opponent's move, a change in an individual's circumstances. In fact, often it's the environmental change that prompts the action.

This responsiveness to external stimuli is why it's more natural to think of AI as mechanizing behaviors rather than skills. This is true even for LLMs. We might prompt an LLM to remember something under the assumption that training has caused it to record some fact into its trillions of weights. This is not the case, though. Rather than being recalled, the memory is (*re*)*created* when a prompt interacts with the LLM's language prediction processes. The memory is in the prompt (the words) as much as it's in the weights, much as how a smell (our prompt) can evoke a memory (a recreation) of a long-forgotten moment.

A behavior is a reaction to the world changing around us, something we do in response to an external stimulus. The same stimulus in different contexts triggers different behaviors. LLMs operate in a similar way: Subtle changes in the prompt we provide deliver quite different results, in the same way subtle changes in how we train the LLM can change its response in surprising ways.

FIG 1: Agency and authority in human/artificial intelligence collaboration

Autonomy

HUMANS *WORK FOR* **MACHINES** →

Direction
A machine delegates tasks that it can't do to a human, and monitors the result.

BOTH WORK TOGETHER →

Assembly
A human and machine negotiate the division of work.

MACHINES *WORK FOR* **HUMANS** →

Shepherding
A human manages a group of machines.

HUMANS *WORK WITH* **MACHINES** →

Machine augmentation
A human monitors and validates a machine's work, stepping in when needed.

BOTH WORK TOGETHER →

Synthesis
A problem is identified, described, and solved via a collaboration between human and machine.

MACHINES *WORK WITH* **HUMANS** →

Human augmentation
A machine automates lower-level behaviors to enable the human to focus on higher-level ones.

HUMANS *WORK ON* **MACHINES** →

Instruction
A human teaches a machine new tricks.

BOTH WORK TOGETHER →

Bricolage
A new (digital) system is created by "bricolaging" (bringing together) diverse digital and non-digital components.

MACHINES *WORK ON* **HUMANS** →

Guidance
A machine prompts a human to help them adopt knowledge, attitudes, or behaviors.

Authority

Machines lead

Humans lead

Sources: Deloitte analysis; adapted from figure 2, Peter Evans-Greenwood, Robert Hillard, and Alan Marshall, "The new division of labor: On our evolving relationship with technology," *Deloitte Insights*, April 9, 2019.

Using AI-powered automation means introducing automated behaviors into the workplace, and there are two factors we should consider. First is the ability of the behavior to effect change, its freedom to act—the behavior's agency. Agency isn't binary—that is, it's not about whether or not the behavior has freedom to act. It's a question of degree and context, as the agency depends on both the capabilities of the automated behavior and any limitations we place on it. A self-driving taxi might be quite capable of finding its own way down an uncrowded street but falters when it encounters a problem it can't recognize and, therefore, navigate its way around, so it calls for a human.[9]

Authority, our second factor, represents the superior-subordinate aspect of the human/machine relationship: who has final decision rights. Should an algorithm (that is, AI) decide to initiate recovery for supposed overpayments to welfare recipients, or is human oversight required?[10]

Both dimensions of this model (figure 1) represent a division in responsibilities—a redistribution of expertise—between human and machine. The left side represents agency: who does the work. Does the machine work on the human's behalf, or the human on the machine's? Or is the split more nuanced, somewhere between these two extremes? Authority is captured on the right. Does the human have final decision rights, or is the machine leading the human?

Within this matrix, we can see a range of possible future pathways. A truck driver, for example, might teach an autonomous truck how to park in a particular loading bay by manually guiding it in the first time. A robot chef learns to cook a meal by observing, and then copying, the actions of a human.[11] A tumor-identification behavior can augment an oncologist's ability to diagnose skin cancer by helping them locate potential tumors for investigation. We integrate AI into the work system by developing a set of integrated human and machine behaviors.

Autonomy	RELATIONSHIPS	
HUMANS *WORK FOR* MACHINES →	• THE SUPERVISOR • THE PRIORITIZER →	**Direction** A machine delegates tasks that it can't do to a human, and monitors the result.
BOTH WORK TOGETHER →	• THE COLLABORATIVE DECISION-MAKER →	**Assembly** A human and machine negotiate the division of work.
MACHINES *WORK FOR* HUMANS →	• FIRST PASS AT A TASK • THE SUBORDINATE →	**Shepherding** A human manages a group of machines.
HUMANS *WORK WITH* MACHINES →	• THE MUSE • THE PRIORITIZER →	**Machine augmentation** A human monitors and validates a machine's work, stepping in when needed.
BOTH WORK TOGETHER →	• THE COLLABORATIVE DECISION-MAKER →	**Synthesis** A problem is identified, described, and solved via a collaboration between human and machine.
MACHINES *WORK WITH* HUMANS →	• FIRST PASS AT A TASK • THE SUBORDINATE →	**Human augmentation** A machine automates lower-level behaviors to enable the human to focus on higher-level ones.
HUMANS *WORK ON* MACHINES →	• THE DOPPELGÄNGER →	**Instruction** A human teaches a machine new tricks.
BOTH WORK TOGETHER →	• THE COLLABORATIVE DECISION-MAKER →	**Bricolage** A new (digital) system is created by "bricolaging" (bringing together) diverse digital and non-digital components.
MACHINES *WORK ON* HUMANS →	• THE PERSONAL COACH →	**Guidance** A machine prompts a human to help them adopt knowledge, attitudes, or behaviors.

Individuals and organizations are already exploring these potential pathways, developing solutions, creating new work practices, weighing benefits against problems and limitations, and making the many human decisions that determine which future we'll work toward. Reoccurring solution patterns and relationships are already emerging (figure 2).

Consider the following examples of how we're seeing these human/tech collaborations play out in the workplace:

- **The supervisor:** An algorithm allocates tasks—for example, a ride-sharing company that uses AI to dispatch rides to drivers who have a few seconds to accept or reject a ride request without knowing the destination or fare. Performance and pay are determined by AI. An AI also decides when morale-boosting motivational messages are needed.
- **The prioritizer:** An AI algorithm addresses a list of tasks—sales leads to be pursued, medical problems to solve,

fundraising opportunities to follow up on—and ranks them in terms of their importance or potential value. The human worker then pursues them in order, sometimes with suggestions from the machine about how to do so.
- **The personal coach:** AI discovers the human worker's strengths and opportunities for improvement on a specific task (such as a telephone or video sales call), resulting in continuous engagement with AI to improve the human's performance.
- **The muse:** Multiple creative suggestions are prompted by a human, delivered by a machine, and iterated in an ongoing collaboration. Examples include design suggestions based on architect prompts and AI-driven generative design.
- **The collaborative decision-maker:** Complex decisions, such as medical diagnoses, are made in a dialogue between AI and humans, where AI can improve decisions by enumerating available options, helping people weigh them

objectively, and suggesting the highest probability of successful action.

- **First pass at a task:** A machine performs the first pass at a task—a life insurance application, a medical coding categorization, an analysis of an MRI scan—and makes a preliminary judgment. The human reviews the analysis and determines if it's correct. The order of this sequence could also be reversed.
- **The triage nurse:** AI assesses the problem (medical symptoms, for example) and decides whether a human consultation is necessary. If not, it dispenses advice to address the relatively minor problem.
- **The doppelgänger:** Machines learn from a human or group of humans to mimic their behaviors and decisions, so that the human(s) can be replicated digitally.
- **The subordinate:** AI systems perform menial, structured tasks (like extracting key data from documents or faxes) under human supervision and review.

It's unlikely that one all-encompassing model will be enough, however. The human/AI model we've just considered can help us think through the balance of authority and agency to create new collaboration opportunities. However, it has little to tell us about the opportunities (and challenges) we'll confront when working digitally versus working in person.

The art and science of seeing around corners

Predicting the future is hard. It was widely assumed, for example, that the last wave of AI would make radiologists redundant, but radiology is booming as a profession.[12] Nor was it the case that the mass adoption of computers by business forced all workers to become coders.[13] Our prediction track record is, at the very least, poor. Consequently, predictions on how the current crop of technologies will affect workers and the workplace should be taken with a grain of salt.

Predicting the future is also something of a fool's game because we don't need to predict the future to productively engage with it. Our future is shaped by a myriad of human decisions, and so it's these decisions (not the predictions) we should

be engaging with—decisions that determine the future we're heading into.

New technology provides us with new possibilities and opportunities, and it's how we choose to find and use these opportunities that determines the future we'll find ourselves in. Workplace surveillance is a case in point. New surveillance technology is creating opportunities to harvest detailed information on worker activities. This information presents us with new possibilities, creating an inflection point. Established workplace trends could continue, subjecting workers to increasingly granular command-and-control regimes that reduce job quality by increasing work intensity and reducing worker autonomy. Or we might choose to head in a new direction and establish a new trend.

To consider the longer term, we need to find and then see past the decisions that new technology creates. This means creating more and better models of how new (and old) technology interacts with complex systems like the workplace. The models we use determine which possible paths forward we can see, the possibilities both visible and invisible to us, with different models enabling us to see different possible futures. More and better models enable us to see more and better possible futures. Poor models limit our understanding of possible futures. If we are to understand the potential impact of introducing new technology into the workplace, then our first consideration should be the models we're using to frame the problem. If we're not aware of these futures, then we're not aware of the decisions we're implicitly making.

And when thinking about what kinds of models we need, it's helpful to restate our objective to better account for the nonlinear way technology tends to evolve and work evolves along with it. Iterative and incremental change is much more common than point-in-time, wholesale transformation, so clear and definitive predictions about the future might not be required. We often assume that we need to skate to where the puck will be,[14] if we are to be successful in the longer term, but that's not the case.[15] To switch sports analogies, we don't catch a flying baseball, the canonical example for prospective control,[16] by predicting where it'll land. Instead, we continually adjust our movement relative to the baseball so that we're heading in the same direction as the ball, while avoiding obstacles. Should we run behind or in

> We don't catch a flying baseball by predicting where it'll land. We continually adjust our movement relative to the baseball.

front of second base? Is diving to catch the ball a possibility? The player strives to keep multiple possibilities alive until one of them becomes so attractive that they're compelled to commit.

Research psychologists have been trying to untangle how humans successfully find their way through a complex and ever-changing world. What they found is that we don't make decisions purely in our heads, but by interacting with the environment around us.[17] Or, put another way, rather than analyzing, predicting, and planning, we observe, evaluate (often conflicting) possibilities, and respond, fostering optionality.
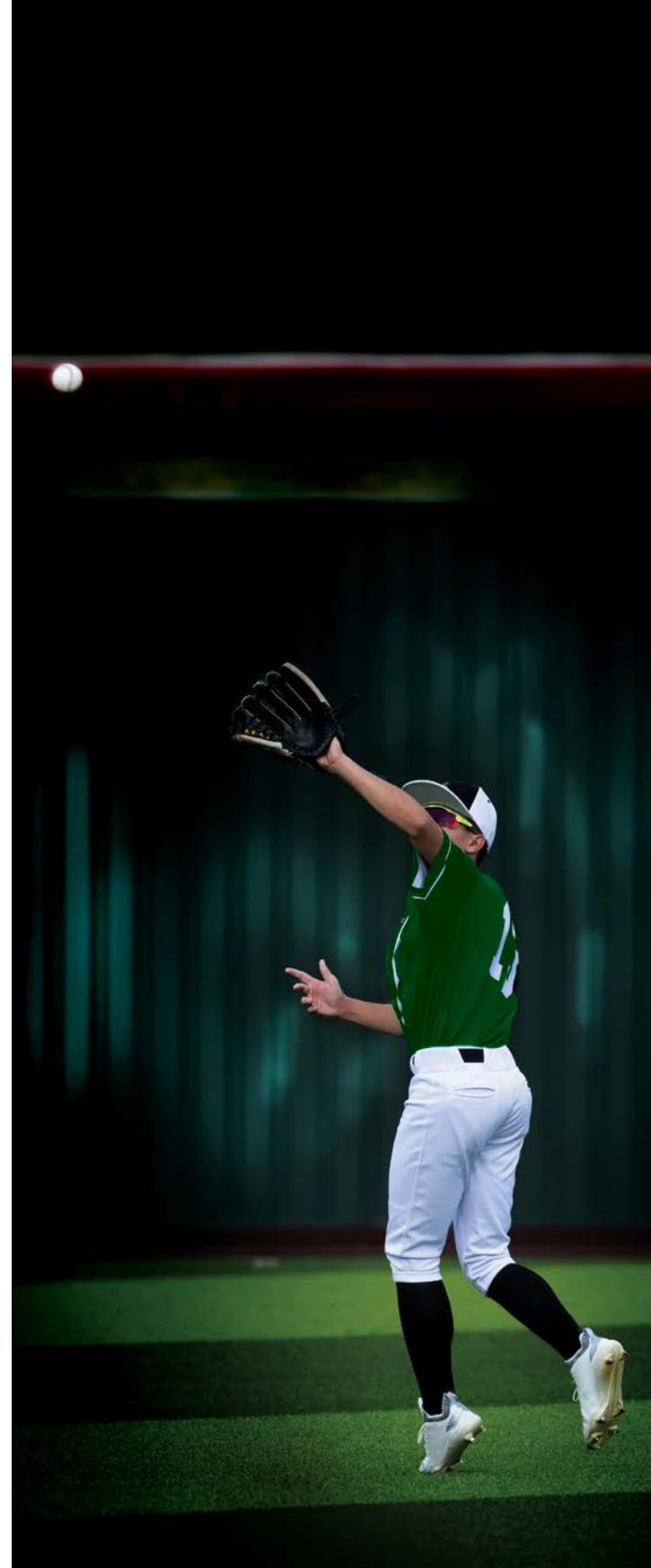
To see past current trends, we need to foster optionality, accepting that there are always multiple interpretations for current events and that a surprising, new technology can be applied in multiple ways. Our first instincts for how a technology should be applied often aren't accurate.

Rather than placing one big bet on what we think will be the winner—Betamax or VHS—and going all in, we can make many small bets with the intention of learning about and fostering potential future choices. These small bets can be approached as real options: an economically valuable right to take up or abandon some option in the future. The goal is to engage a diverse range of experiences and points of view to develop a rich vein of institutional knowledge—knowledge that includes different ways of framing the opportunities and challenges considered. Leaders and decision-makers across the organization need to appreciate that multiple futures are possible and consider how these futures interact with the organization's values and goals.

Technology won't define the future of work. We will.

When we try to predict the unpredictable, we assume that technology is taking us somewhere, but we actually need to decide where we're going. Organizations and societies need to decide how they want to reap productivity dividends made possible by technological innovations. A four-day workweek has always been an option, for example. It's just not an option we've decided to pursue as a society (though this may be changing).

If we fail to make a deliberate attempt to develop new models and explore possible futures, then our assumptions (based on past trends and first impressions) are likely to be self-fulfilling in the short to medium term but wrong in the long term. If today's predictions about how generative AI and other evolving technologies will reshape work are based on suboptimal models— or on antiquated definitions of work, itself—organizations might be investing in the wrong future. ●

Generative AI is a subset of artificial intelligence
that uses machine learning techniques to
generate data similar to the one it's been trained
on. This form of AI can create content ranging
from text to images, music, and even video. Here's
a more detailed breakdown:

1. **Understanding Generative AI:** Generative AI
   can be understood as a creative partner for
   content creation. The goal of generative AI is
   not just to learn and understand data, but to
   use what it has learned to create new
   content.

2. **Applications of Generative AI:** Some of the
   main applications of generative AI include: *
   Deepfake Technology: This involves creating
   realistic images or videos of people by
   swapping their faces with others.

 * **Text Generation:** Generative AI can write
   articles, scripts, or even poetry. For instance,
   GPT-3, developed by OpenAI, is a language
   prediction model that can write human-like
   text.

 * **Music and Art Creation:** AI can create new
   pieces of music or artwork by learning from
   existing pieces.

3. **Techniques Used in Generative AI:** The most
   common technique used in generative AI is the
   Generative Adversarial Network (GAN). GANs
   consist of two parts - a generator that
   the data and a discriminator that
   whether the data is real or
   work together to create realistic

It's important to note that while generative AI
holds a lot of potential, it also comes
considerations, especially around
use of deepfakes.

TYPE A MESSAGE ...

GENERATE →

Generative AI in Asia Pacific: Young employees lead as employers play catch-up

A survey of more than 11,900 employees and students across the region finds that gen AI is already affecting 11 billion work hours per week, but many employers likely aren't optimizing that impact

By **Stuart Johnston, Sonia Breeze, Robert Hillard, Chris Lewin, Kellie Nuttall,** *and* **John O'Mahony**

Illustration by **Jaime Austin**

Generative artificial intelligence is *the* topic of conversation for senior business leaders across all industries and geographies, yet developed economies in the Asia-Pacific region face a dual challenge: They're behind in gen AI adoption while also having more workers in industries that could soon be disrupted by the technology.

According to a 2023 study by Deloitte Access Economics and the Deloitte AI Institute, a quarter of the Australian economy faces rapid and significant disruption, with similar impacts expected across the Asia-Pacific region, as "Generation AI" matures and enters the working world. Generation AI describes children and young adults (up to 24 years old) who have grown up in an era of smart devices, voice assistants, recommendation algorithms, and other AI-powered technologies. They've experienced AI in various aspects of their lives, from entertainment and education to health care and daily interactions since early childhood. As such, they're characterized by their digital fluency and ability to navigate and use AI technologies.

The adoption of gen AI is being driven by these everyday users—young employees and students—who are experimenting at the forefront and leading this revolution. Our study surveyed more than 11,900 individuals, including approximately 9,000 employees and 2,900 students, and found that gen AI has led to saved work hours, opportunities for new skill development, and more sustainable workloads. The study also identified six key insights highlighting the transformative impact of gen AI on the Asia-Pacific region, underscoring the need for businesses and policymakers to adapt to this rapidly evolving technology so that they can disrupt with—rather than be disrupted by—this booming generative technology (figure 1).

1. Students and employees are leading the gen AI revolution across Asia Pacific, but only half believe their manager knows they're using it

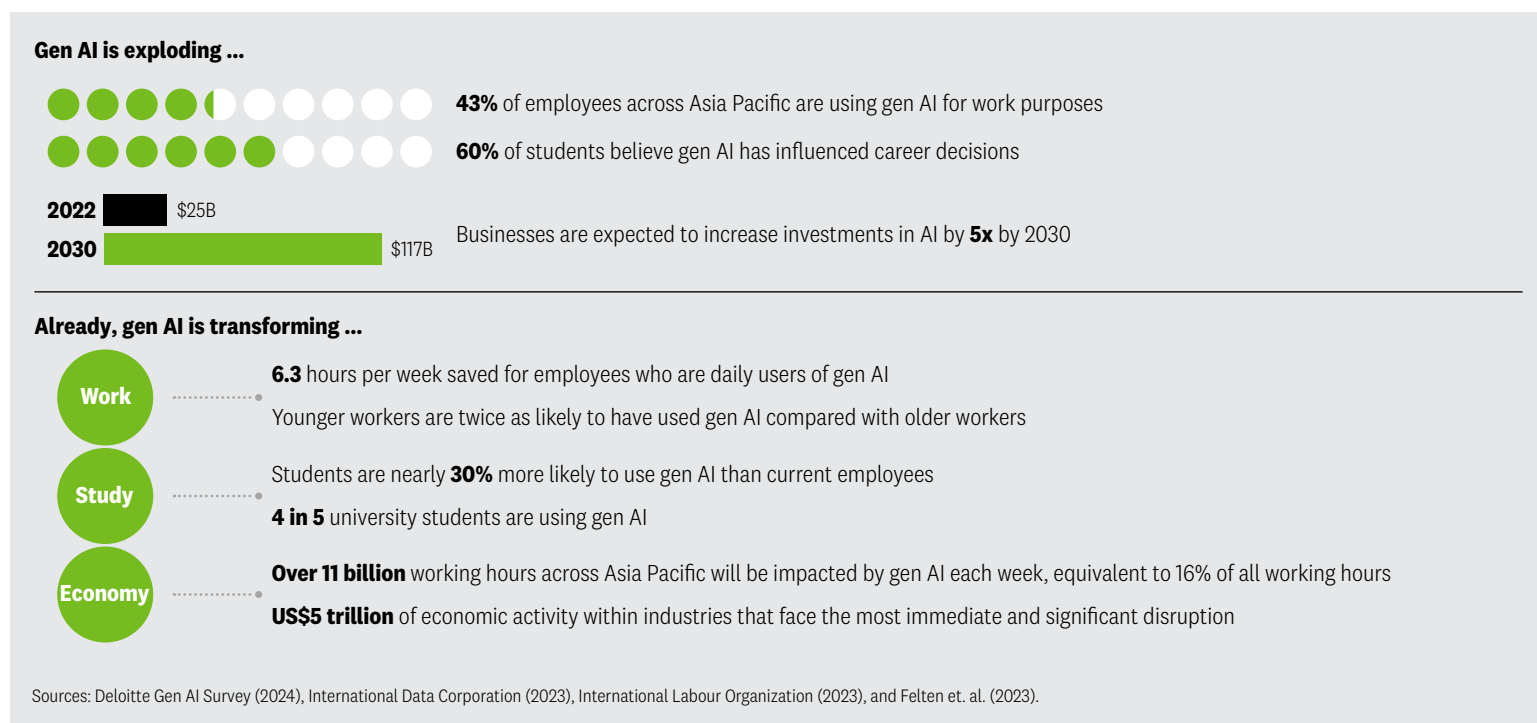Across the region, students and employees are using gen AI at astonishingly high rates. Our survey revealed that 81% of university students and 62% of employees are using the technology. In fact, 43% of the employees we surveyed are using gen AI for work purposes.

Young people who have grown up with the technology— Generation AI—are more likely to be already experimenting with and using the technology. Employees who are 18 to 24 years old are nearly twice as likely to be using gen AI compared with older workers.

Since the release of our research report, "Generation AI: Ready or not, here we come!" in 2023, the use of gen AI at Australian workplaces has increased from 32% to 38% of all employees—a notable increase in less than a year.[1] And the percentage of gen AI users who expect to use the technology daily is set to triple within the next five years, from 11% today to 32%.

Despite the growing number of gen AI users, businesses across the region are struggling to keep up. In fact, half of employees using gen AI for work purposes don't believe management knows they're using it. While businesses are looking to introduce safe and secure applications for their employees

FIG 1: Generative AI is already transforming how people work in the Asia-Pacific region, and young people are leading the transformation

Gen AI is exploding …

43% of employees across Asia Pacific are using gen AI for work purposes

60% of students believe gen AI has influenced career decisions

2022	$25B
2030	$117B

Businesses are expected to increase investments in AI by **5x** by 2030

Already, gen AI is transforming …

Work
6.3 hours per week saved for employees who are daily users of gen AI
Younger workers are twice as likely to have used gen AI compared with older workers

Study
Students are nearly **30%** more likely to use gen AI than current employees
4 in 5 university students are using gen AI

Economy
Over 11 billion working hours across Asia Pacific will be impacted by gen AI each week, equivalent to 16% of all working hours
US$5 trillion of economic activity within industries that face the most immediate and significant disruption

Sources: Deloitte Gen AI Survey (2024), International Data Corporation (2023), International Labour Organization (2023), and Felten et. al. (2023).

developed by technology vendors or bespoke platforms, they're having to play catch-up with their own employees.

2. Developing economies are leading the charge, with gen AI adoption rates 30% higher than those in developed economies

For previous technology revolutions, developed economies have been the early adopters. For example, nearly 50% of the South Korean, New Zealand, and Australian population had access to the internet in 2000 compared to less than 2% in China, India, and the Philippines.[2] Another example is cloud adoption, which started gaining traction in developed economies in the mid-2000s with many developing economies catching up a decade later. This pattern has been reversed in gen AI

and we have seen the employees and students in developing economies adopt the technology faster than those in developed economies to this point.

Developing economies (China, India, and Southeast Asia) have a 30% higher share of gen AI users compared to developed economies (Japan, Taiwan [China], Singapore, South Korea, Australia, and New Zealand).[3] In fact, Indian students and employees are 30% more likely to have used gen AI compared to their peers across Asia Pacific (figure 2). Daily usage is also higher in markets like India (32% of those surveyed) and Southeast Asia (19%), compared to Australia (8%) and Japan (4%).

This adoption gap partially reflects that these locations have more "digitally native" people as a percentage of their total populations. In fact, nearly half (46%) of those surveyed in India were between 18 and 35 years old, compared to 30% of those people surveyed in Japan.

FIG 2: Developing economies across Asia Pacific have seen higher gen AI adoption
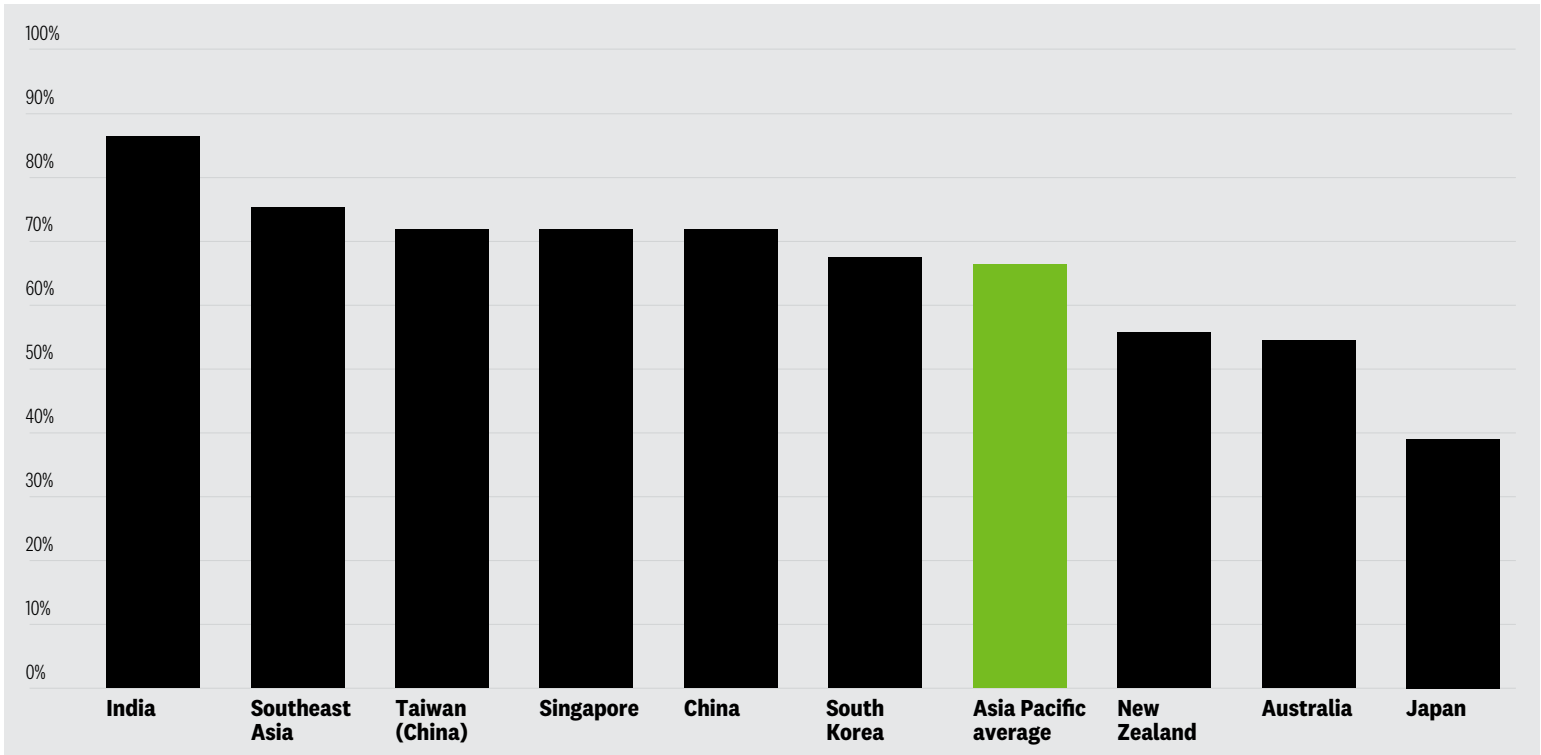
Source: Deloitte Gen AI Survey (2024).

Employees from developing economies are also more enthusiastically embracing gen AI. Over half (53%) of employees and students in developing economies felt primarily excited about gen AI technology, compared to less than a quarter (23%) of students and employees in developed economies. In comparison, over a third (36%) of employees in developed economies felt primarily uncertain about gen AI, compared to only 12% in developing economies.

Most importantly, Generation AI in developing economies is more likely to be proactively taking actions in response to the rapid emergence of gen AI. Actions taken include researching the basics of gen AI, advancing programming skills, collaborating with others about the technology, and undertaking formal study. In China, 71% of students and employees have taken at least one action, compared to an average of 49% across Asia Pacific and 31% in Australia (figure 3).

The concentration of Generation AI in developing economies suggests that there could be significant disruption in the traditional technology hierarchy across Asia Pacific as developing economies more eagerly embrace and upskill in this new technology. The finding that developing economies are ahead on leveraging gen AI highlights that this new technology is not about labor cost savings but productivity improvement and making the most of human potential.

Developed economies need to urgently address the gen AI usage gap. Lower rates of usage compared with developing economies combined with a higher proportion of their workforce in professional and managerial roles means developed economies can expect to face significant short-term disruption in these industries.[4]

Of course, there are other factors beyond usage and upskilling that will shape the impact of gen AI on an economy. These include digital infrastructure, a regulatory environment, and a skilled workforce. Based primarily on these measures, Salesforce's "Asia Pacific AI readiness index" ranked Singapore (70.1 out of 100) and Japan (59.8) as leaders in business and government AI

> 53% of employees and students in developing economies felt primarily excited about gen AI technology, compared to 23% in developed economies.

FIG 3: Students and employees are taking actions in response to gen AI

Source: Deloitte Gen AI Survey (2024).
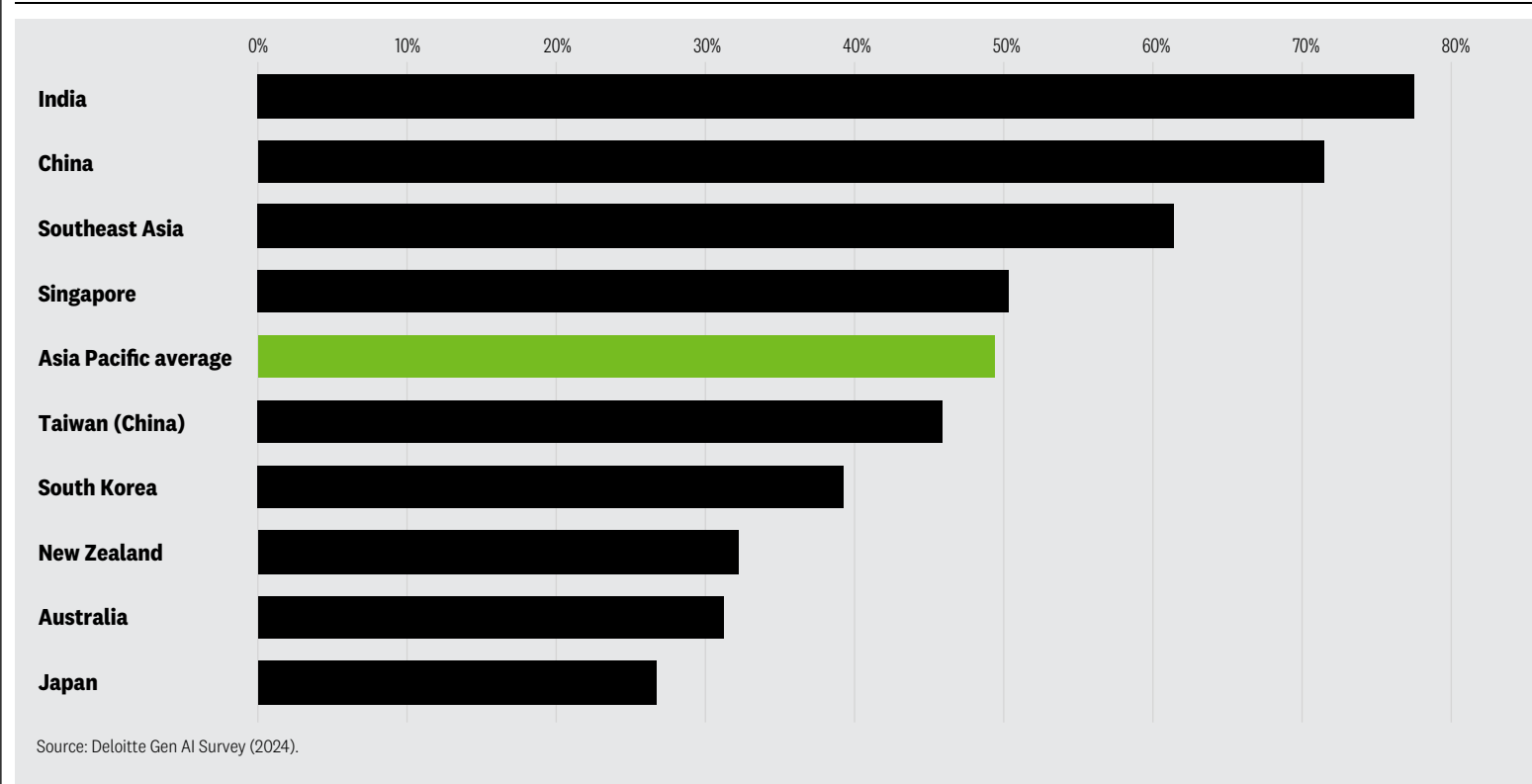
readiness across Asia Pacific,[5] followed by China (59.7), South Korea (59.2), Australia (58.2), New Zealand (54.6), India (49.8), and Southeast Asia (with an average of 40.5). AI readiness is an area that organizations in developing economies may need to focus on as their use of technology continues to grow.

3. Over 11 billion work hours per week across Asia Pacific are expected to be impacted by gen AI

While developing economies are leading the charge in gen AI adoption, every market and industry across Asia Pacific will be impacted by this technology. In an Asia Pacific first, we estimate that gen AI could affect 16% of working hours—more than 11 billion hours—across Asia Pacific per week. This impact could be in the form of gen AI automating some tasks so that they no longer require worker involvement or augmenting tasks in a way that requires workers to use AI to complete the task. For some workers, this may mean significant change and retraining in their everyday work, while for others, gen AI will require more modest upskilling or simply will operate in the background of the work they do.

Even this analysis may underestimate the true impact of AI on the tasks that workers currently complete. While this analysis uses academic research on which jobs are expected to be impacted by the introduction of AI based on tasks currently required for the role, new uses of AI are certain to emerge, which will create new tasks, shift the need for the type of workers economies need, and create roles that have not yet been imagined.

When employees were asked about how gen AI would impact their tasks, they expected 61% of their current tasks would be impacted by the technology in the next five years.

To further unpack the impact of gen AI on the Asia-Pacific region, Deloitte Access Economics mapped 18 industries in terms of the extent of gen AI's impact (what we call the "bang") and how soon those industries will be affected (the length of the "fuse"). Timing was determined by examining which industries in our survey showed signs of early adoption, while impact was estimated by the number of occupational hours within those industries that are exposed to 10 possible applications of AI (figure 4). See the methodology for more details.

The four industries facing a "short fuse, big bang" scenario are finance; IT, communications technology, and media; professional services; and education. While the importance of these

FIG 4: How and when will gen AI affect different industries?
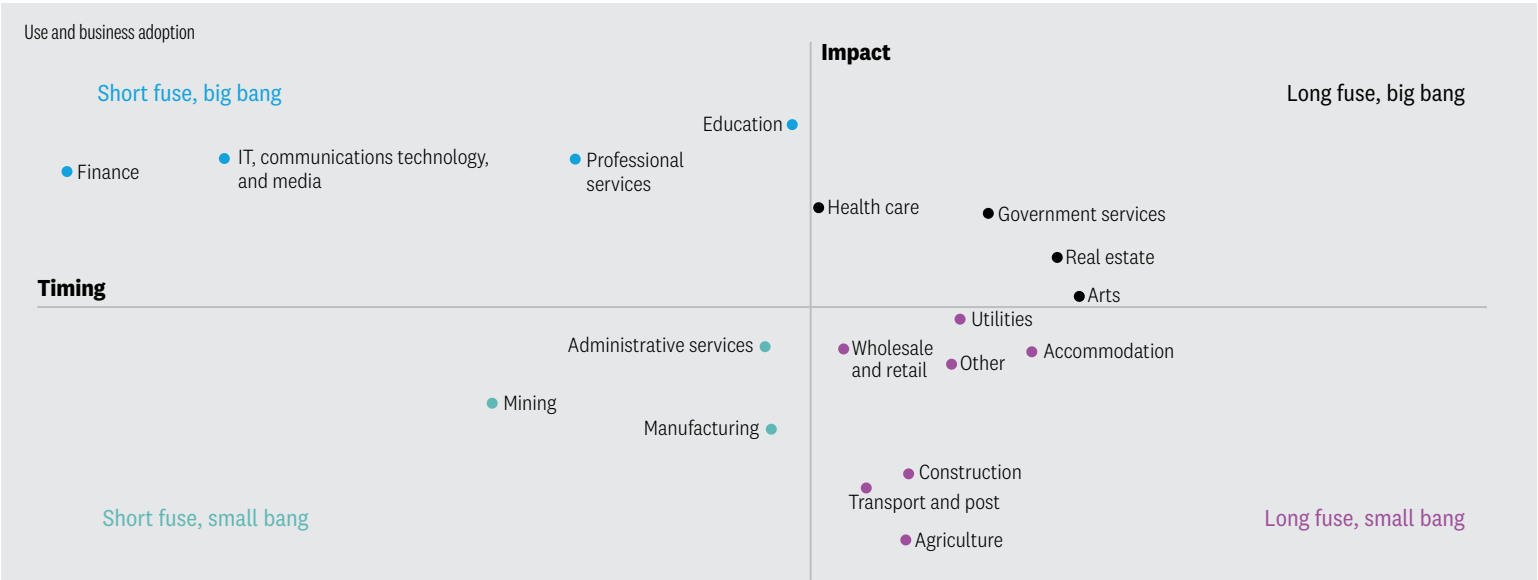
Sources: Deloitte Gen AI Survey (2024), Felten et al. (2023).

industries varies across countries, on average they account for one-fifth of the economies in Asia Pacific.[6] This share is expected to grow as some of the markets increasingly shift toward service industries like professional services, finance, and information and communications technology that face higher impact. These industries are also where over 40% of students who are using gen AI plan to start their careers, which will only speed up the transformation.

While all industries will be transformed by gen AI, those involving more manual tasks—such as agriculture, construction, transportation, and wholesale and retail trade—face relatively less disruption over a long period compared to other knowledge-intensive industries.

4. Using gen AI saves each user almost a day per week and frees up time to learn new skills

Those who use gen AI are already experiencing improvements in their work and study performance. According to our gen AI survey, 80% of gen AI users said that it's improved the speed at which they can complete tasks. This has led to large time savings for completing tasks. On average, daily users of gen AI save approximately 6.3 hours per week.

These productivity improvements have been supported by other studies. One study found that 85% of respondents in four surveyed locations in Asia Pacific (Australia, India, Japan, and Singapore) believe AI will allow them to do their job faster or more efficiently.[7] Another study found that around 80% of surveyed AI users in the manufacturing and financial sectors said that AI had improved their performance at work.[8]

So what is Generation AI doing with these time savings? Fifty-four percent of employees said they used the time savings to complete other tasks while 45% invested time in additional learning or skill development.

Gen AI has also improved people's ability to learn new information. According to our gen AI survey:

- 71% of gen AI users said that it has improved their ability to generate new ideas.
- 67% of users said that it has improved their ability to learn new skills.
- 73% of users said gen AI improved the quality of their outputs.
- 65% of users said gen AI improved the accuracy of their outputs.

From employees who have improved skill-building with gen AI, nearly 40% believe that using it halves the time it takes to become proficient in a skill.

5. Gen AI increases the level of satisfaction at work and study

The current work environment is unlike anything we've previously experienced. Following the rapid reshaping of the way we undertook work during the COVID-19 pandemic, employees are now facing increasing cost pressures along with a weakened economic outlook for many locations across Asia Pacific.

These pressures can lead to feelings of burnout among employees. In fact, an Asia-Pacific study showed that almost 50% of workers end the workday feeling mentally or physically exhausted.[9] The estimated cost of mental-health–related absenteeism for businesses in Australia alone is around US$13.6 billion per annum.[10]

The impressive time savings associated with gen AI can help employees more efficiently complete routine or repetitive tasks to focus on more value-adding tasks that require more critical and creative thinking. This can create more sustainable workloads and reduce employee burnout. According to our survey, 41% of time savers believe this time has improved their work/life balance.

FIG 5: Most users agree that gen AI makes their work more enjoyable

● Strongly agree   ● Agree   ○ Neutral   ● Disagree   ● Strongly disagree

I enjoy using technology at work or study
41% | 46% | 11%

I am better equipped to support team members and peers
27% | 48% | 22%

The nature of my work or study has improved
30% | 51% | 15%

My workload is more manageable using gen AI
32% | 46% | 18%

Source: Deloitte Gen AI Survey (2024).
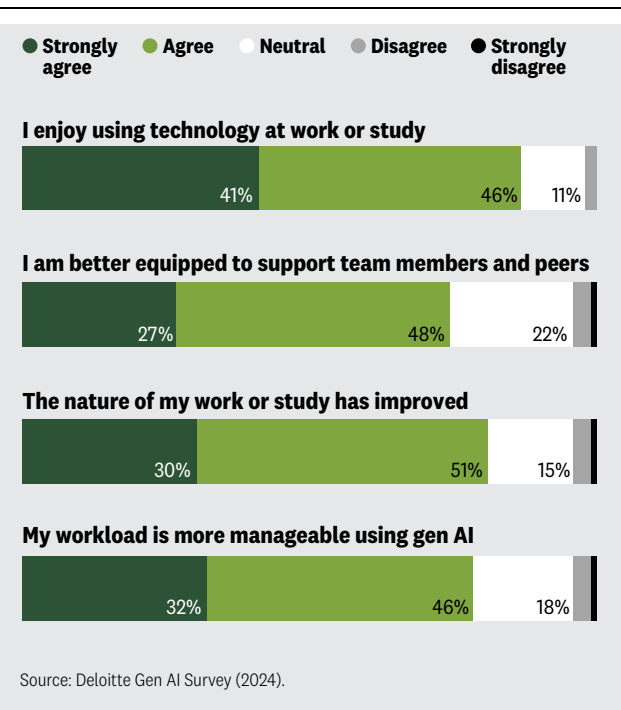
More time spent on value-adding tasks such as creative thinking can also make work more enjoyable. In fact, most gen AI users believe it's improved the nature of their work or study (81%), as represented in figure 5. One study has described this impact as a dual advantage, as the productivity benefits of technology can lead to greater employee engagement.[11]

Another use case is for coaching services. Gen AI can assist with personalized coaching and customized communication. According to our survey, 75% of gen AI users agree that because of the technology, they're better equipped to support team members and peers, for example, with coaching and mentoring.

6. Nearly three-quarters of businesses are falling behind on gen AI adoption, according to their own employees

Generation AI has rapidly adopted new gen-AI–enabled tools, while business leaders play catch-up. Across Asia Pacific, businesses are experimenting and deploying gen AI in its multiple forms. Data from the International Data Corporation shows that investments in AI are expected to increase from US$25 billion in 2022, when ChatGPT first came onto the scene, to US$117 billion by 2030.

That's nearly a fivefold increase in eight years and puts AI on track to have one of the fastest deployment rates of any new enterprise technology.

This investment is leading to greater rates of adoption. One study found that nearly half of medium-sized businesses in the region are either exploring potential use cases or using gen AI technologies.[12] Some businesses are providing access to certain AI applications that can be used in a secure and confidential manner provided by technology vendors or developed in-house.

Despite the growing investment and adoption, many businesses are falling behind. Employees were asked to categorize their place of employment in terms of maturity of gen AI use (by selecting one of the following: laggard, late majority, early majority, early adopter, or innovator). Only 29% of employees consider their business to be early adopters or innovators, suggesting substantial room for improvement for three-quarters of businesses across Asia Pacific (figure 6). Compare this to another survey that found 44% of senior business leaders believe their organization has high or very high levels of expertise with gen AI.[13]

Employees are also cautious about the potential for improvement within their own business. The share of businesses expected to be considered innovators or early adopters is only expected to increase to 38% in the next five years.

FIG 6: Employees are largely skeptical that their companies will race to adopt gen AI

Source: Deloitte Gen AI Survey (2024).

In the age of gen AI, employees will continue to play a vital role in driving business success. Given that gen AI use increases worker satisfaction, businesses risk losing employees to innovative competitors when they fail to engage their employees on gen AI.

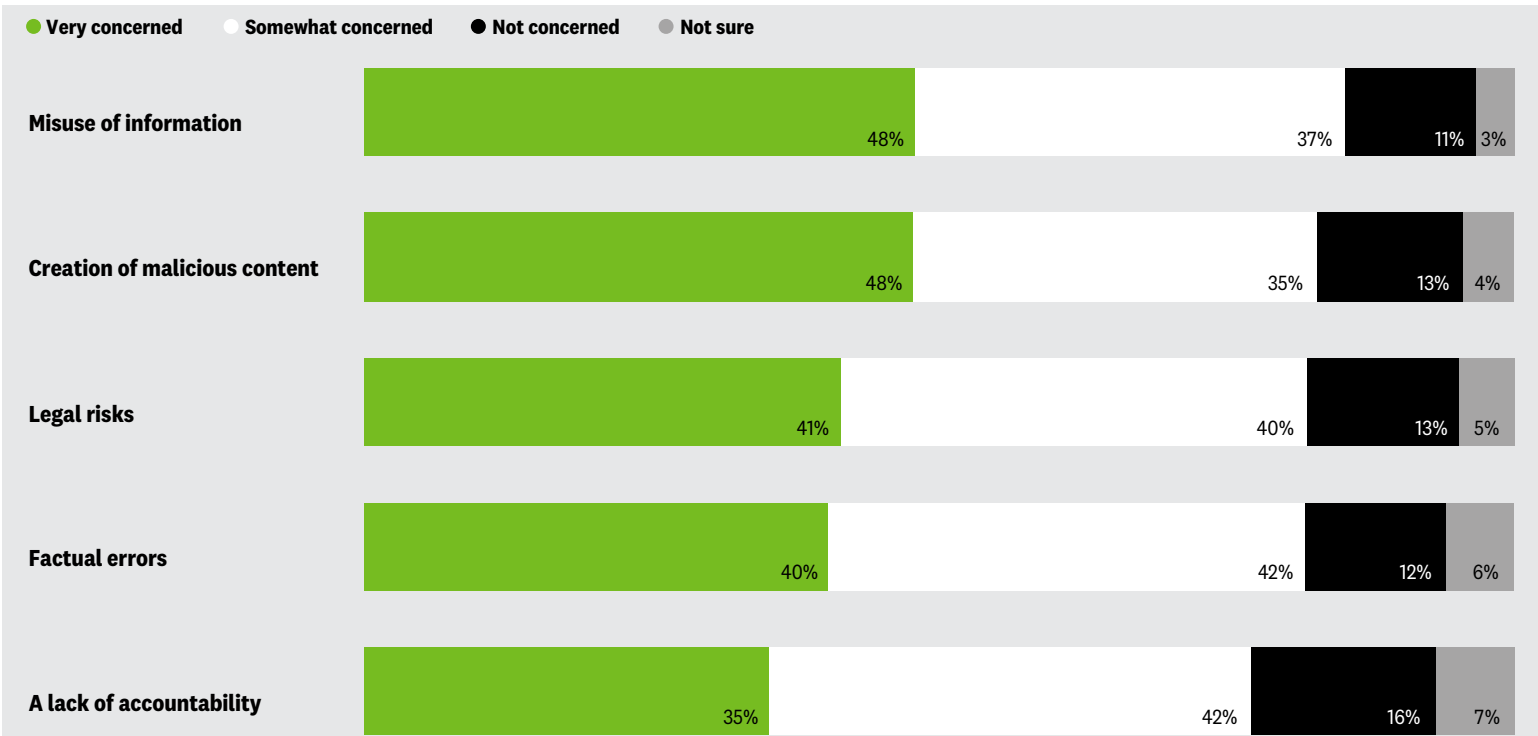## Embracing the gen AI revolution

Despite high use of gen AI, employees have identified some key risks associated with using the technology for work purposes. Specifically, 85% are concerned that using gen AI will lead to a misuse of personal, confidential, or sensitive information (figure 7). A similar share of employees is concerned about the potential for the creation of malicious content (83%), as well as legal risk and copyright infringement (81%).

Business leaders should address these risks and empower employees to fully utilize gen AI applications to realize the significant benefits from this powerful tool. On the other hand, there are key risks to not using gen AI. Over the longer term, businesses that do not explore its use in their business or industry risk being left behind by competitors.

While 43% of employees are using gen AI for work purposes, 29% of all employees are not aware of any measures from the business that respond to its rapid emergence in the workplace. This may reflect either a lack of action or a breakdown in communication between senior leaders and employees about the response to this important development.

Moreover, according to our survey, 22% of employees across Asia Pacific are working in a business that bans or restricts the use of gen AI. However, banning or restricting the use of gen AI has been shown to be ineffective. In fact, employees are *more likely* to

FIG 7: Despite wide adoption, employees worry about the risks of gen AI

- Very concerned
- Somewhat concerned
- Not concerned
- Not sure

	Very concerned	Somewhat concerned	Not concerned	Not sure
Misuse of information	48%	37%	11%	3%
Creation of malicious content	48%	35%	13%	4%
Legal risks	41%	40%	13%	5%
Factual errors	40%	42%	12%	6%
A lack of accountability	35%	42%	16%	7%

Source: Deloitte Gen AI Survey (2024).

76% of employees at a workplace that bans or restricts gen AI have used it compared to 62% of employees overall.

use gen AI if they work for a business that has a gen AI ban. Seventy-six percent of employees at a workplace that bans or restricts gen AI have used it compared to 62% of employees overall.

Many other businesses are looking to encourage gen AI use among employees. The most popular actions taken by businesses to address the emergence of gen AI are speaking to employees (42% of employees are aware of their business taking this action), encouraging on-the-job learning (39%), and discussing limitations of the technology (35%). Only 33% of employees have received formal training on gen AI. Of those, 35% reported that they are not satisfied with the training. Training related to gen AI

use has been found to increase worker productivity and improve working conditions for employees.[15]

As the influence of Generation AI continues to reshape the Asia-Pacific region, it's crucial for employers to adapt and embrace the rapid advancements in AI technology. By doing so, organizations can not only keep pace with the evolving workforce, but also capitalize on the immense potential that gen AI presents for economic and societal transformation. The future of work in the region depends on harnessing the power of gen AI in a way that fosters collaboration and innovation among employees and employers alike. ●

METHODOLOGY

Deloitte Gen AI Survey

In February and March 2024, we surveyed 2,903 university students and 9,042 employees across 13 locations: Australia, China, India, Japan, Singapore, Taiwan (China), South Korea, New Zealand, and Southeast Asia (Indonesia, Malaysia, the Philippines, Thailand, and Vietnam).

Deloitte Access Economics developed this report in collaboration with the Deloitte AI Institute and Deloitte Insights to understand the use of gen AI by employees and students, current actions taken by individuals, businesses, and educational providers, the barriers to gen AI adoption, and expectations for the future in the Asia-Pacific region. This report is informed by a survey fielded by Dynata.

'Short fuse, big bang' methodology

The four industries in the "short fuse, big bang" scenario are finance; IT, communications technology, and media; professional services; and education. We have mapped each of the industries in terms of the extent of the impact (what we call the "bang") and how soon those industries will be affected (the length of the "fuse").

The impact score is based on occupational exposure scores produced by Edward Felten, Manav Raj, and Robert Seamans in their April 2023 paper, "Occupational heterogeneity in exposure to generative AI."[16] The exposure scores assess the relative exposure of occupations to 10 applications of gen AI including language modelling and image generation. Scores have been mapped and aggregated from granular O*NET standard occupational classification to two-digit, International Standard Classification of Occupations codes using correspondences sourced from the International Labour Organization.

The impact score is then calculated based on the occupational composition of each pair-wise country-industry weighted by average hours worked from the International Labour Organization's International Standard Classification of Occupations database. Data availability across locations varied, with several only having one-digit, International Standard Classification of Occupations employment codes available. Where this occurred, the same process was undertaken at the best level of data granularity available.

Another computation to demonstrate the scale of impact from gen AI was estimating the number of working hours impacted by gen AI per week. This estimate was derived by using several inputs (such as the Jobs and Skills list included in the Australian Skills Classification database, among others) and then calculating the sum of each occupation's work time by gen AI multiplied by the people employed in that occupation multiplied by the average hours worked. The exact nature of these impacts will differ across occupations. As such, this estimate of working time impacted is not equivalent to time saved from gen AI.
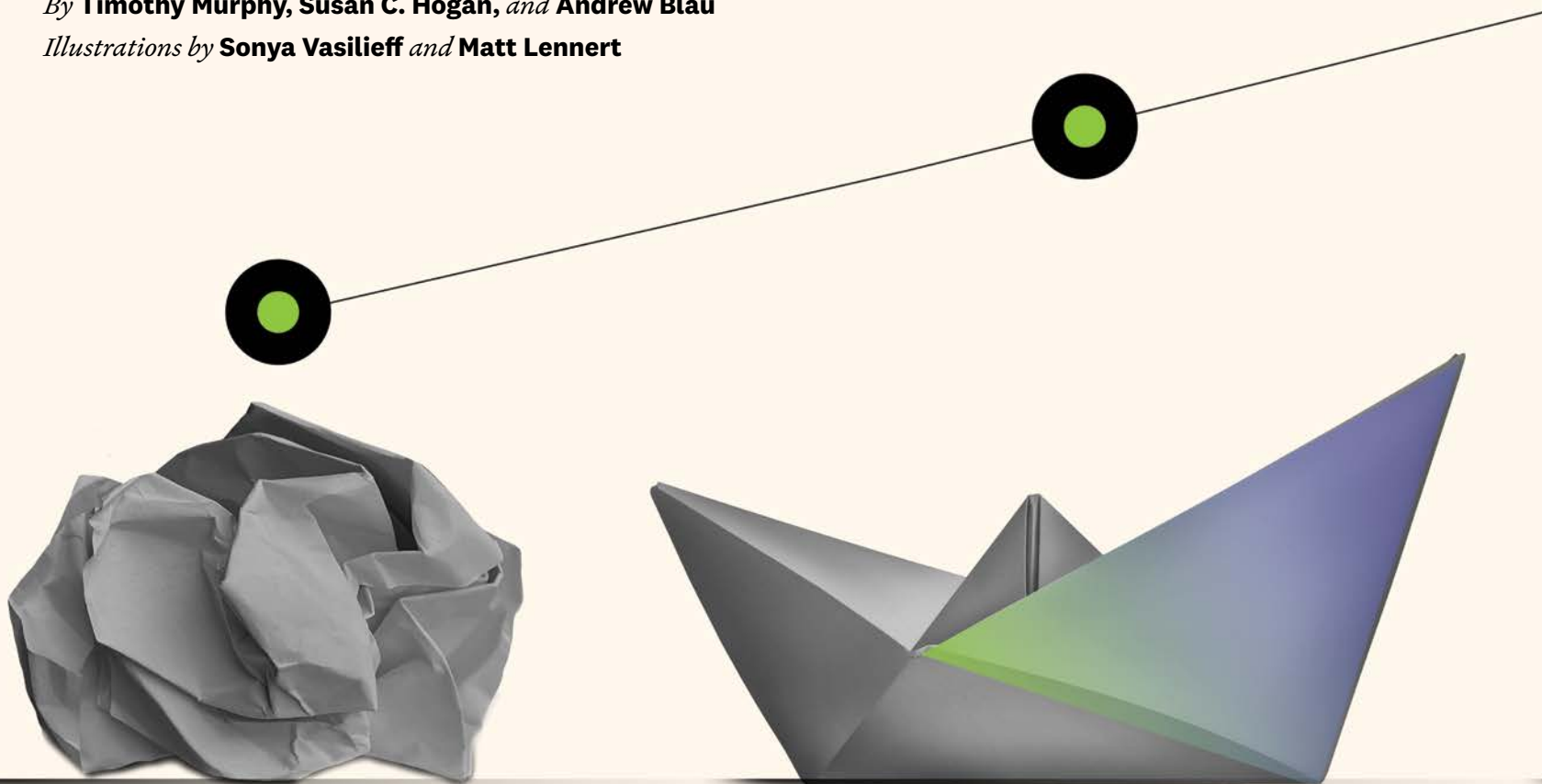

For the full methodologies, please visit www.deloitte.com/insights/gen-ai-apac

Designing for growth in the C-suite

An analysis of over 46,000 job postings reveals the most in-demand skills for C-suite roles like CFOs, COOs, and other executive leaders

By **Timothy Murphy, Susan C. Hogan,** *and* **Andrew Blau**

Illustrations by **Sonya Vasilieff** *and* **Matt Lennert**
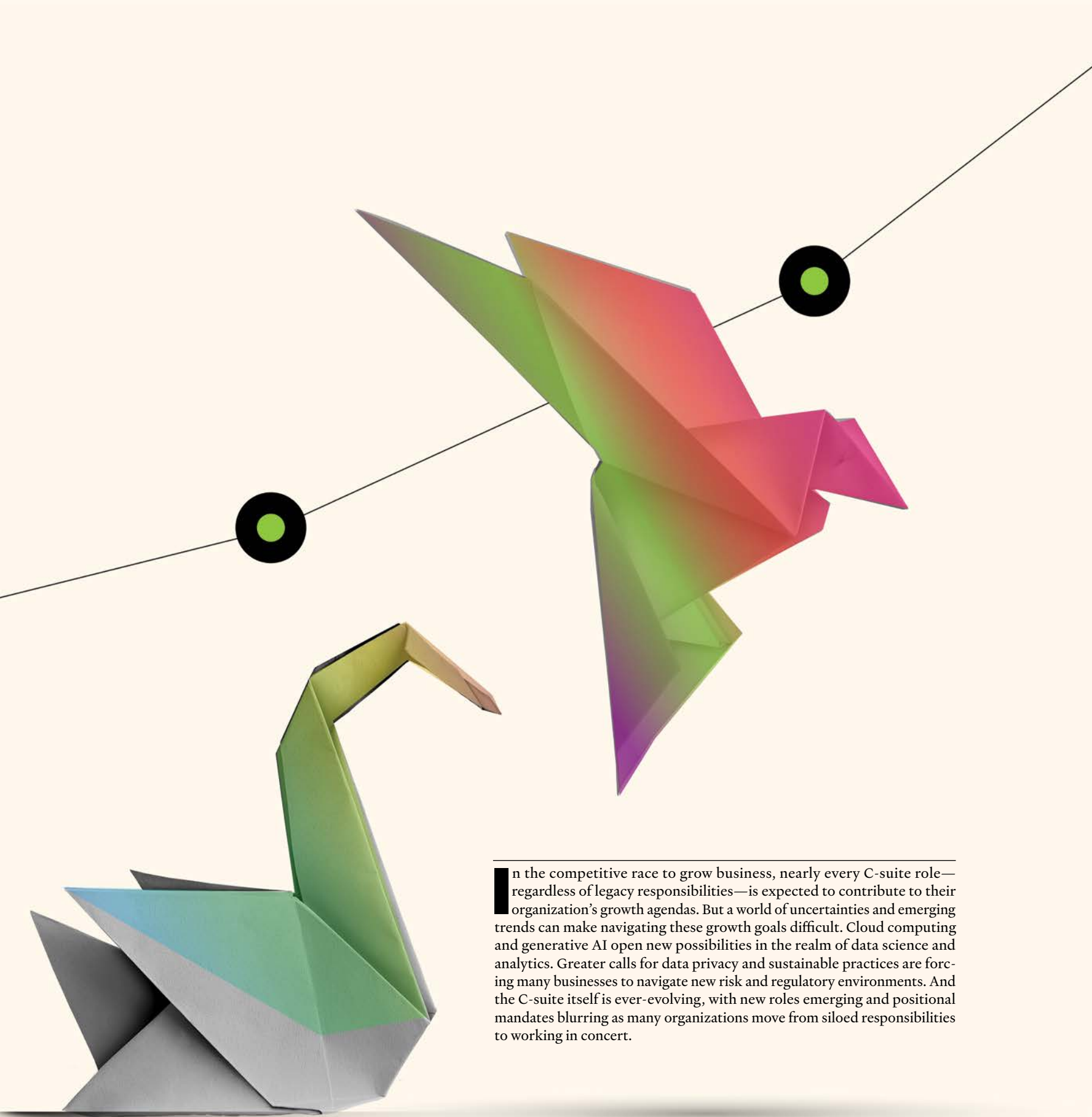
I n the competitive race to grow business, nearly every C-suite role—regardless of legacy responsibilities—is expected to contribute to their organization's growth agendas. But a world of uncertainties and emerging trends can make navigating these growth goals difficult. Cloud computing and generative AI open new possibilities in the realm of data science and analytics. Greater calls for data privacy and sustainable practices are forcing many businesses to navigate new risk and regulatory environments. And the C-suite itself is ever-evolving, with new roles emerging and positional mandates blurring as many organizations move from siloed responsibilities to working in concert.

These complexities are causing many organizations to rethink how emerging C-suite skills and knowledge can better support their organization's growth agenda. To help understand how organizations are designing for growth within the C-suite, we analyzed over 46,000 C-suite job postings on the open market between 2018 and 2023, using Lightcast's Open Skills database. We examined the most in-demand skills and experiences for six C-suite roles: chief financial officer, chief operating officer, chief human resource officer, chief information officer, chief strategy officer, and chief revenue officer.

Our analysis highlights two near-universal shifts in role design in the last six years that could directly impact an organization's ability to grow its business: the elevated importance of a strong quantitative background (that is, experience with analysis, research, or scientific backgrounds) for C-suite leaders, and the ability to navigate risk and regulatory environments. In addition, "soft skills" regularly emerged as a key demand for these C-suite roles—something that could be crucial to driving a growth agenda across the C-suite. Through the lens of these job postings, we're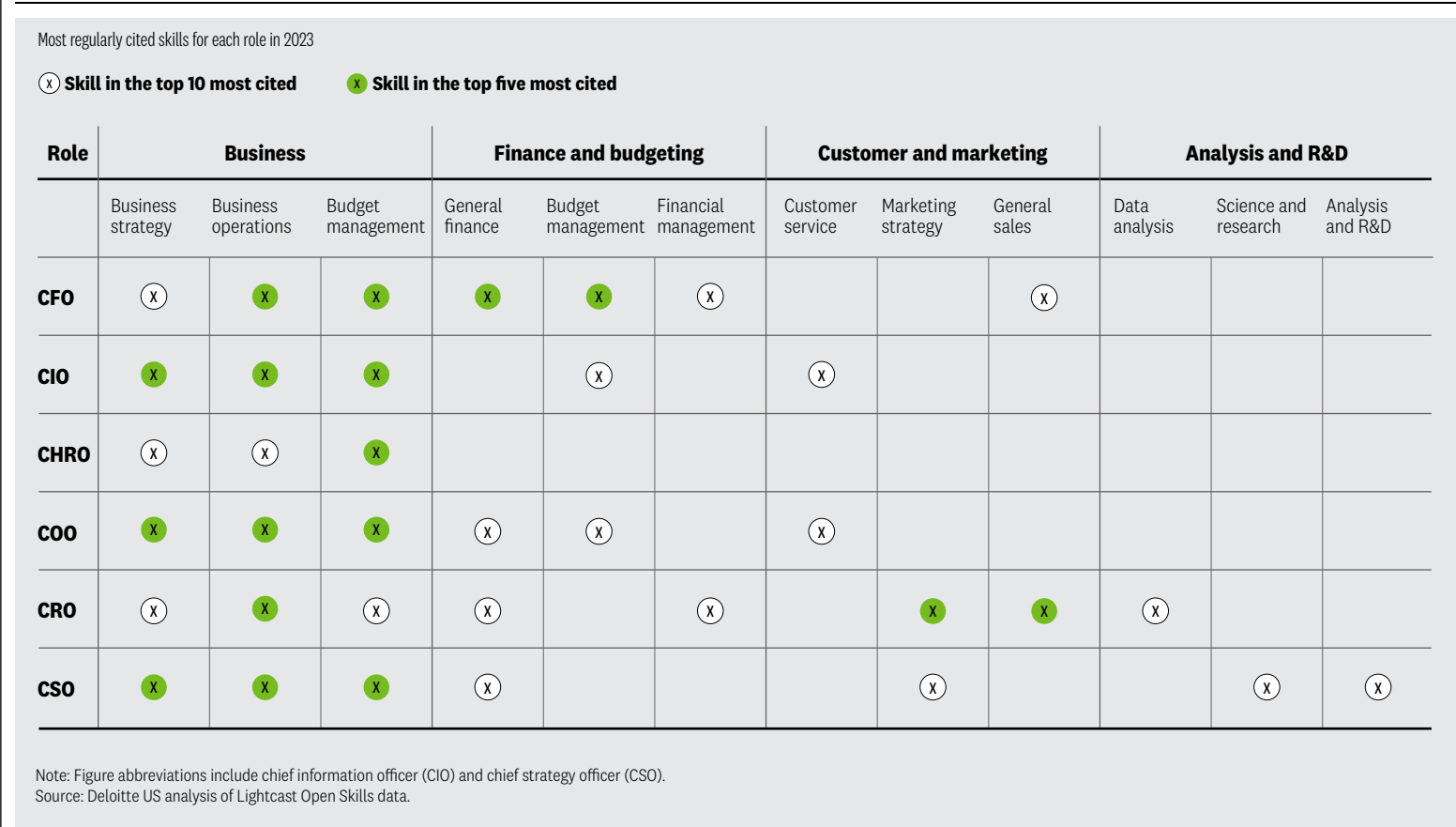 afforded an unfiltered view of a C-suite wish list of skills and responsibilities that organizations are actively seeking to help drive the future success of their business.

Setting the stage for growth: Speaking the language of the C-suite

Regardless of role, there are clear expectations that executives should come to the C-suite with strong business backgrounds. In fact, the top 10 most-cited skills in our analysis of 46,000 job postings reveal three areas that are ubiquitous across the C-suite: business strategy, business operations, and business management (figure 1).

But our analysis also shows it's not solely about possessing strong business backgrounds—or at least not anymore. As the C-suite is asked to bring new perspectives to the organization, we explore how two new shifts in role design—quantitative experience, plus risk and regulatory expertise—can be positioned in a manner that catalyzes growth.

FIG 1: Business skills top the list of most in-demand C-suite skills

Most regularly cited skills for each role in 2023

(x) Skill in the top 10 most cited   (x) Skill in the top five most cited

Role	Business			Finance and budgeting			Customer and marketing			Analysis and R&D		
	Business strategy	Business operations	Budget management	General finance	Budget management	Financial management	Customer service	Marketing strategy	General sales	Data analysis	Science and research	Analysis and R&D
CFO	X	●X	●X	●X	●X	X			X			
CIO	●X	●X	●X		X		X					
CHRO	X	X	●X									
COO	●X	●X	●X	X	X		X					
CRO	X	●X	X	X		X		●X	●X	X		
CSO	●X	●X	●X	X				X			X	X

Note: Figure abbreviations include chief information officer (CIO) and chief strategy officer (CSO).
Source: Deloitte US analysis of Lightcast Open Skills data.
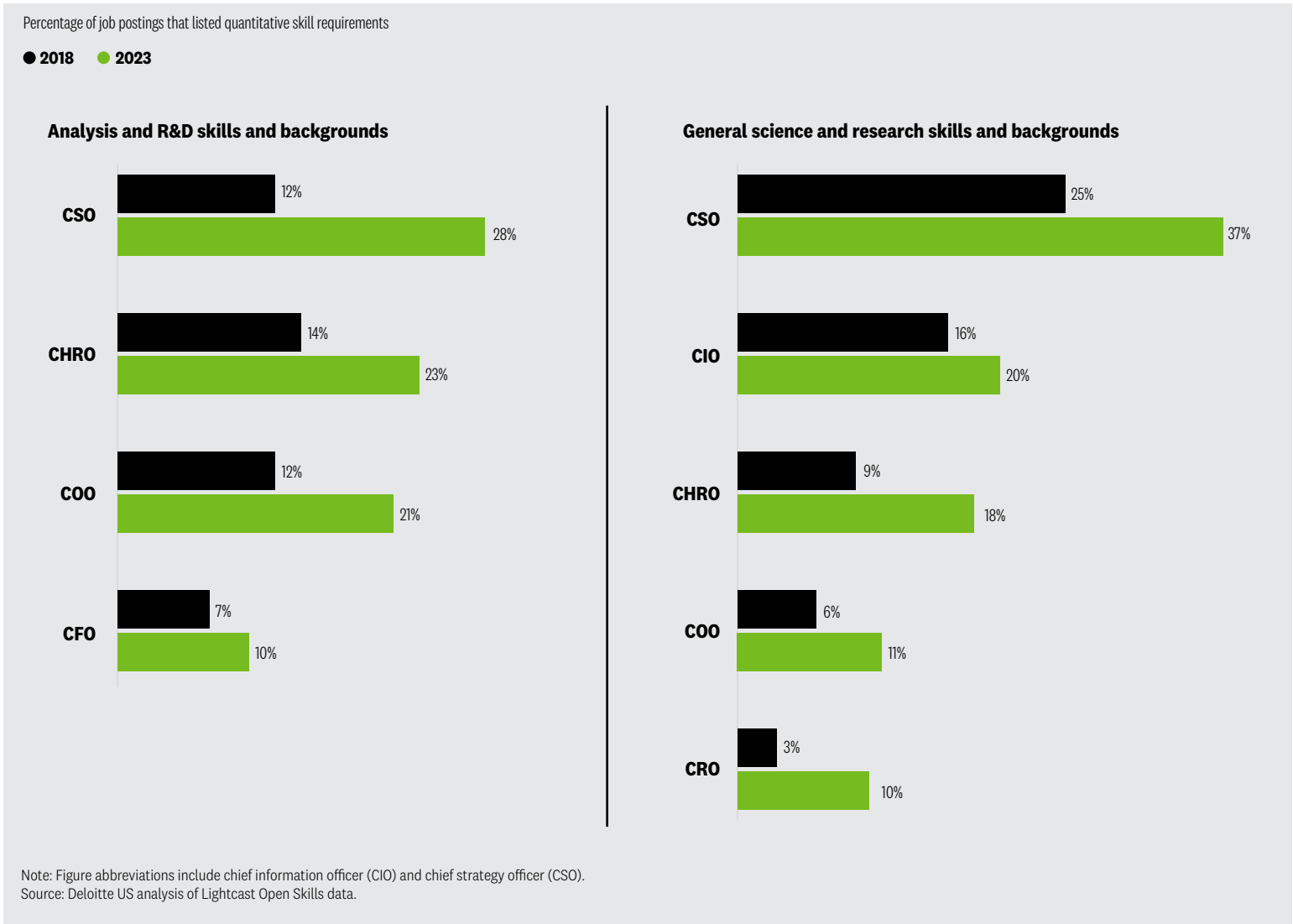
Building the quantitative C-suite

As technology and artificial intelligence grow in capability, organizations tend to look for new ways to integrate these solutions into their business operations and strategy. Infusing strategy with more quantitative expertise may offer a path for turning new capabilities, like generative AI, from efficiency plays (typically an organization's first forms of adoption) to growth drivers (such as improving existing products and services, and increasing revenue).

This may be why we see a substantial increase in demand across the C-suite for more quantitative expertise. Deloitte's State of Generative AI in the Enterprise report shows that as expertise increases, so do the appetites for implementing generative AI for growing the business. Organizations surveyed with "very high" levels of quantitative expertise are significantly more likely to have already adopted generative AI solutions for marketing, sales, customer service, research and development, and product development.[1]

Every C-suite role included in our analysis has experienced a significant uptick in the demand for some form of quantitative background between 2018 and 2023 (figure 2). This is especially true for research and development, analytics, and general science and research skills.

FIG 2: Organizations are looking for C-suite leaders with quantitative skills

Percentage of job postings that listed quantitative skill requirements

● 2018   ● 2023

Analysis and R&D skills and backgrounds

Role	2018	2023
CSO	12%	28%
CHRO	14%	23%
COO	12%	21%
CFO	7%	10%

General science and research skills and backgrounds

Role	2018	2023
CSO	25%	37%
CIO	16%	20%
CHRO	9%	18%
COO	6%	11%
CRO	3%	10%

Note: Figure abbreviations include chief information officer (CIO) and chief strategy officer (CSO).
Source: Deloitte US analysis of Lightcast Open Skills data.

These shifts may also signal an important evolution occurring at the strategic level of the organization. Consider the role of the chief strategy officer: In 2018, a background in analysis or R&D was the 27th most frequent requirement for CSO postings; by 2023, it had become the 10th most-cited requirement (figure 3). The other five roles in our analysis follow a similar trajectory, an early sign that organizations may be seeking to quickly add this expertise—or at least the ability to speak a common quantitative language—across the entire enterprise to drive growth.

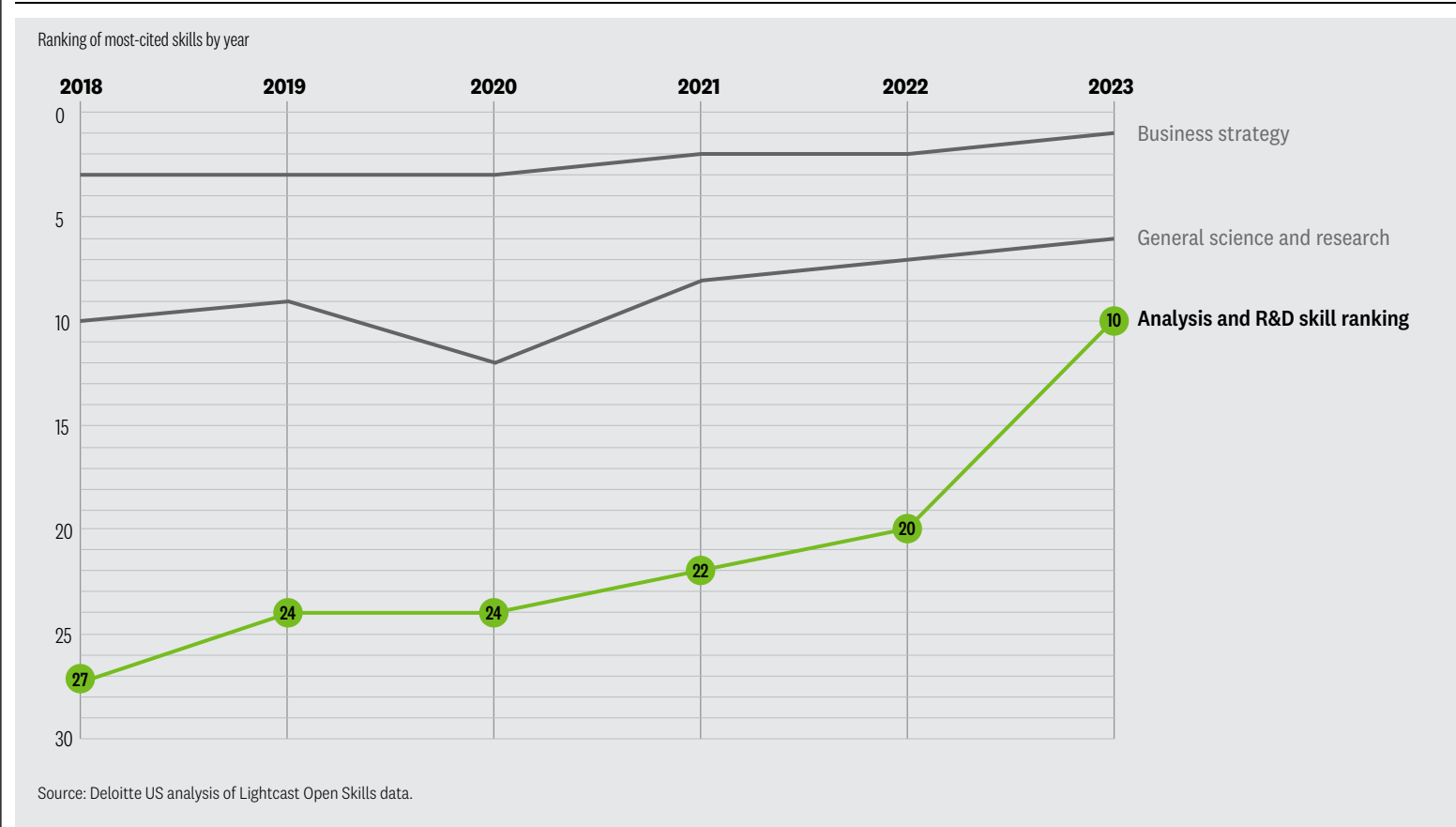## Reframing the language of risk and regulation

The C-suite is experiencing a similar surge in demand for risk and regulatory backgrounds. While nearly every C-suite leader is increasingly being asked to bring these skills to the role, our analysis of job postings shows that CSOs, in particular, experienced a 208% increase in demand for regulation and legal compliance skills since 2018 (figure 4). Similarly, CFOs are increasingly expected to have a strong grasp of risk management—a skill requirement that

appeared in 9% of postings in 2018 and grew to 19% of postings in 2023. And CHROs are experiencing a steady increase in demand for labor compliance skills, from 16% in 2018 to 24% in 2023.

Historically, risk and regulation efforts have been reactive approaches—for example, quickly responding to a supply chain shock or adjusting processes to adhere to new regulations. But as the world has collectively navigated an onslaught of new uncertainties including a pandemic, geopolitical instabilities, and climate events, to name a few, many organizations are pivoting to proactively transform their businesses.[2] That may mean developing new products that better meet the needs of a changing world or reorganizing a supply chain to flourish no matter the external circumstances.

However, it may be difficult to capitalize on these changing environments if businesses don't consider how their revenue-generating initiatives fit into a risk or regulatory strategy. And, notably, the one exception to this shift in C-suite skills is the chief revenue officer. While the other five roles in our analysis are increasingly expected to be well-versed in risk and regulation, the CRO role hasn't followed a similar trend. Given their mandate to

FIG 3: Demand for analysis and R&D expertise is on the rise for chief strategy officers

Ranking of most-cited skills by year

Source: Deloitte US analysis of Lightcast Open Skills data.

grow revenue, they could either lean on their C-suite peers to help inform strategy or jeopardize limiting their risk and regulation initiatives to more reactionary approaches.
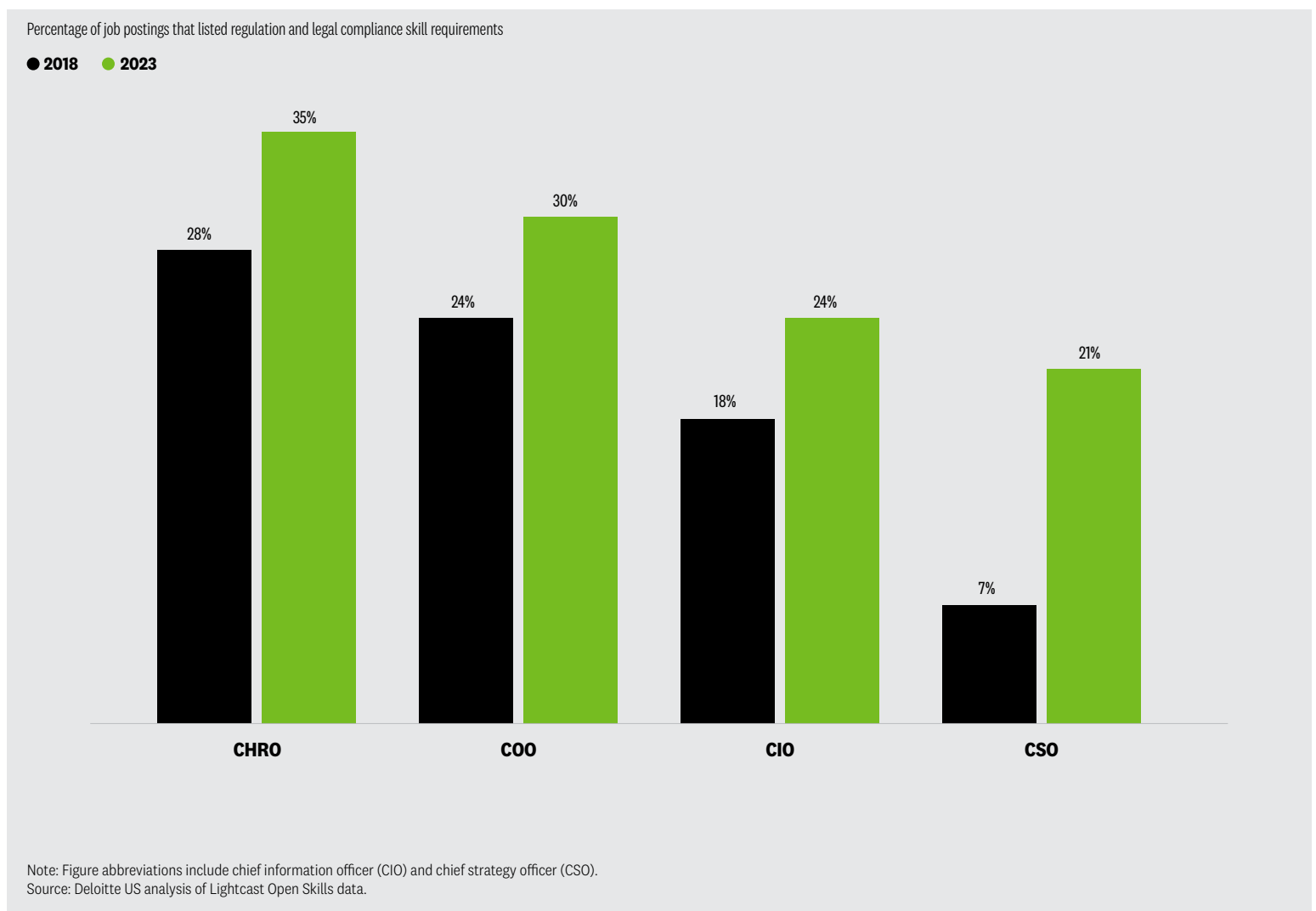
Further, the opportunity to work *with* regulation seems to only be growing. This could mean working directly with regulatory agencies or changing processes or products to better integrate into the new environments created by the regulations themselves. For example, the US Department of Energy established a technology commercialization fund that issued over US$35 billion in loans and loan guarantees for large-scale energy projects,[3] the Swedish Energy Agency provided US$100 million in grants to 250 startups in developing green solutions,[4] and Norway incentivizes electric vehicle development by granting

EV consumers reduced tolls and parking fees.[5] With new opportunities continuing to emerge, the C-suite can benefit from an enterprise-wide strategy to not only react to regulation, but grow from it.[6]

An evolving C-suite needs soft skills to flourish

With so much change in the technical makeup of the C-suite, leaders may need exceptional personal and human skills to help assess how they bring solutions to market, communicate their vision to internal and external stakeholders, and lead their teams through strategic execution. When it comes to their broader

FIG 4: Regulation and legal compliance skills are in demand across the C-suite

Percentage of job postings that listed regulation and legal compliance skill requirements

● 2018　● 2023

	CHRO	COO	CIO	CSO
2018	28%	24%	18%	7%
2023	35%	30%	24%	21%

Note: Figure abbreviations include chief information officer (CIO) and chief strategy officer (CSO).
Source: Deloitte US analysis of Lightcast Open Skills data.

workforce, employers surveyed by the World Economic Forum describe the most in-demand skills between now and 2027 as a mix of technical expertise (for example, analytical thinking and technical literacy) and human skills (for example, leadership, social influence, and creative thinking).[7]
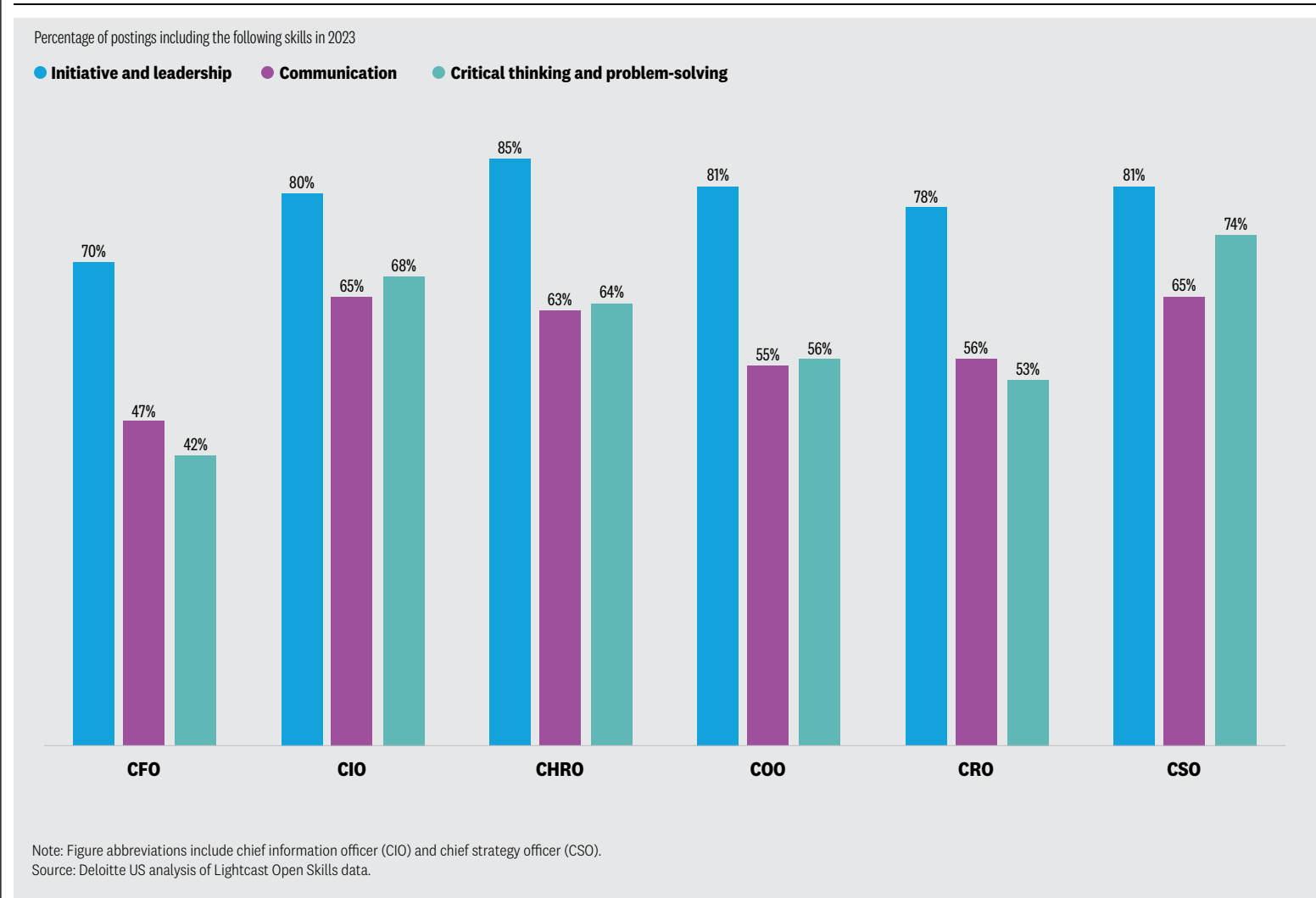
The good news: Overall, C-suite role postings frequently cite the need for leadership and initiative, communication, and critical thinking and problem-solving skills (figure 5). In many cases, job postings are increasingly highlighting the need for these human capabilities. While CFO roles list lower percentages of these required skills compared to other C-suite roles, job postings for CFOs over the last six years have shown increases in initiative and leadership (61% to 70%), communication (41% to 47%), and critical thinking and problem-solving skills (35% to 42%).

As CRO postings pursue greater quantitative backgrounds, they're also increasing the demand for critical thinking and problem-solving (33% to 53% in six years). And, encouragingly, the CHRO role, which is traditionally anchored in people development, consistently shows some of the highest rates of human skills and capabilities in their job postings.

It may be a promising sign that organizations seem to be prioritizing these human capabilities in the C-suite. But taking steps to ensure these skills go beyond role descriptions and are seamlessly woven into decision-making and cross-role collaboration may be easier said than done.

In Deloitte's 2024 Global Human Capital Trends research, which surveyed 14,000 business and human resources leaders in 95 countries, 73% of respondents acknowledge that human

FIG 5: The elevated need for human skills

Percentage of postings including the following skills in 2023

● Initiative and leadership ● Communication ● Critical thinking and problem-solving

Note: Figure abbreviations include chief information officer (CIO) and chief strategy officer (CSO).
Source: Deloitte US analysis of Lightcast Open Skills data.

capabilities need to move in step with technological innovation, even though only 9% say they're making progress toward achieving that balance. However, when organizations are able to bridge the gap between knowing that human capabilities are important and embedding them into the organization, they're 1.8 times more likely to achieve their desired business outcomes (like growth goals) than those organizations that are unable to bridge this gap.[8]

In this spirit, some organizations are focusing their hiring efforts on "T-shaped" employees: people with human capabilities such as creativity (the vertical stroke of the T) and a willingness to collaborate across functions (the horizontal stroke of the T).[9] Organizations can consider a similar approach to their executive searches as well. And on the development side, research shows that soft skills can be cultivated to improve outcomes in work, school, and other domains.[10]

Preparing for growth

Though the evolving demands for the modern C-suite are still unfolding, there likely won't be any wholesale changes overnight for most organizations. A Korn Ferry study estimates that the average C-suite tenure is 4.9 years (with variations depending on role).[11] Given this reality, these evolutions likely will occur incrementally over a multiyear horizon. In some respects, this can grant organizations time to adjust, but simultaneously, it may be challenging to seamlessly integrate new experiences and capabilities as the evolution slowly takes shape across the organization.

While skills and responsibilities will evolve over time, the need to drive a uniform growth agenda across the organization will almost certainly remain a constant. The organizations that learn to speak the new language of the C-suite and develop, recruit for, and harness new skill sets can elevate their C-suite *and* the bottom line. ●

METHODOLOGY

To understand how organizations are pursuing executive talent, we analyzed publicly available job postings in the Lightcast Open Skills Taxonomy database, which includes a wide array of industries in both the public and private sector (60 unique industries represented).

To benchmark what these roles looked like prior to the pandemic, we opened our sample to include postings from 2018 to 2023 (the last full year of data).

Finally, we leveraged Lightcast's skills and backgrounds taxonomy (with more than 32,000 different skills categorizations represented within the database) to see which types of expertise were most often pursued (for example, experience with managing budgets would be categorized as "budget management").

Generative AI and government work: An analysis of 19,000 tasks

Deloitte US's analysis reveals three criteria that can help determine which tasks could be assigned to generative AI tools and when different occupations could feel pressure to adopt them

By **Tasha Austin, Joe Mariani, Thirumalai Kannan,** *and* **Pankaj Kishnani**

Illustration by **Sofia Sergi** *and* **Sonya Vasilieff**

We're awash in examples of what generative artificial intelligence can produce: near-human quality text, images, and even video. Yet there's less evidence of how generative AI will impact how work is done. In government, where a broad range of agencies performs a wide variety of tasks, this uncertainty could stall adoption of gen AI and even other automation tools that could otherwise have benefitted the public.

To help cut through that uncertainty and get the broadest possible perspective on how and where generative AI can impact government work, we examined more than 19,000 tasks collected by the US Department of Labor to represent the wider US workforce.[1] By analyzing how much of three work attributes are needed to accomplish each task—accuracy, creative difficulty, and context variability (how much a task changes in different scenarios)—we were able to assess which tasks could be amenable to which types of automation.

We identified three categorizations that can help government leaders—or leaders in any industry or sector—make informed, strategic decisions about how to implement generative AI in their organizations.

Dark blue: Tasks with moderately high creative difficulty, moderate context variability, and moderate accuracy could be good candidates for gen AI. Take, for example, tasks like recording regulatory compliance, preparing speeches, summarizing laws, or making reports. Prior to the release of gen AI, nearly all of these creatively intensive tasks could have only been completed by humans.

Teal: Tasks with high accuracy and low context variability (like data entry) are likely good for other forms of automation, ranging from robotic process automation to other forms of machine learning. These tasks typically harness automation's abilities to handle large volumes of data with precision to accomplish tasks such as predicting maintenance failures or calculating costs.

Purple: Finally, humans still outperform AI at dealing with tasks that have high context variability, especially tasks that have a high social aspect (like coaching workers) or a physical component (like maintaining vehicles). These tasks involve high context variability, especially when that context involves social interaction or physical movement. For example, training other workers and making strategic decisions for an organization are tasks still best left to human judgment.

But beware of easy answers. Just because a task is shown as a particular color doesn't mean it's *always* the best fit for that automation tool. The color coding simply suggests that if you're undertaking a dark blue or teal task, it might be worthwhile to explore how an automation tool could help.

Different automation tools have different strengths and weaknesses, and generative AI is no exception

Generative AI is a powerful tool that can do many things, but just because it can doesn't mean it should.

While it can create new content in ways that other automation tools can't, it may occasionally do so at the cost of accuracy—for example, the now-infamous hallucinations.[2]

You can see generative AI's strengths and weaknesses visually in figure 1. As you move from right to left on the creative difficulty axis, you move into creative tasks like preparing whole reports that previous iterations of AI could not handle, but gen AI can.

But moving from bottom to top on the accuracy axis also shows generative AI's weaknesses: tasks that require significant levels of accuracy such as making eligibility determinations for benefits like unemployment insurance or a small business loan. Gen AI will usually give you an answer for such tasks, but it may not always be correct—something that is not acceptable for tasks that demand accuracy.

Because different occupations do different tasks, the impact of generative AI will vary widely

With different industries and occupations performing different tasks in their work, it may be natural to see a variation in how much generative AI is likely to impact how that work is done. With government performing such a wide range of work, understanding the variation in generative AI impact is crucial for adoption. At a high level, more knowledge-based occupations such as education or management are seeing greater immediate impact from gen AI than more physical occupations in areas like logistics or maintenance.

Even within an industry, variation can help shine a light on exactly how gen AI is being used. Within education, for example, teaching professions have a high percentage of tasks that are amenable to gen AI. As a result, teachers are already grappling with both students' use of generative AI and how they can use gen AI in instruction and research themselves.[3]

The dots in figure 2 represent common work tasks in education. Many teaching-related tasks (like maintaining attendance records or creating syllabi) are amenable to gen AI. These are highlighted in dark blue.

But teachers' experiences with generative AI may not be the same as some of their noninstructional colleagues.
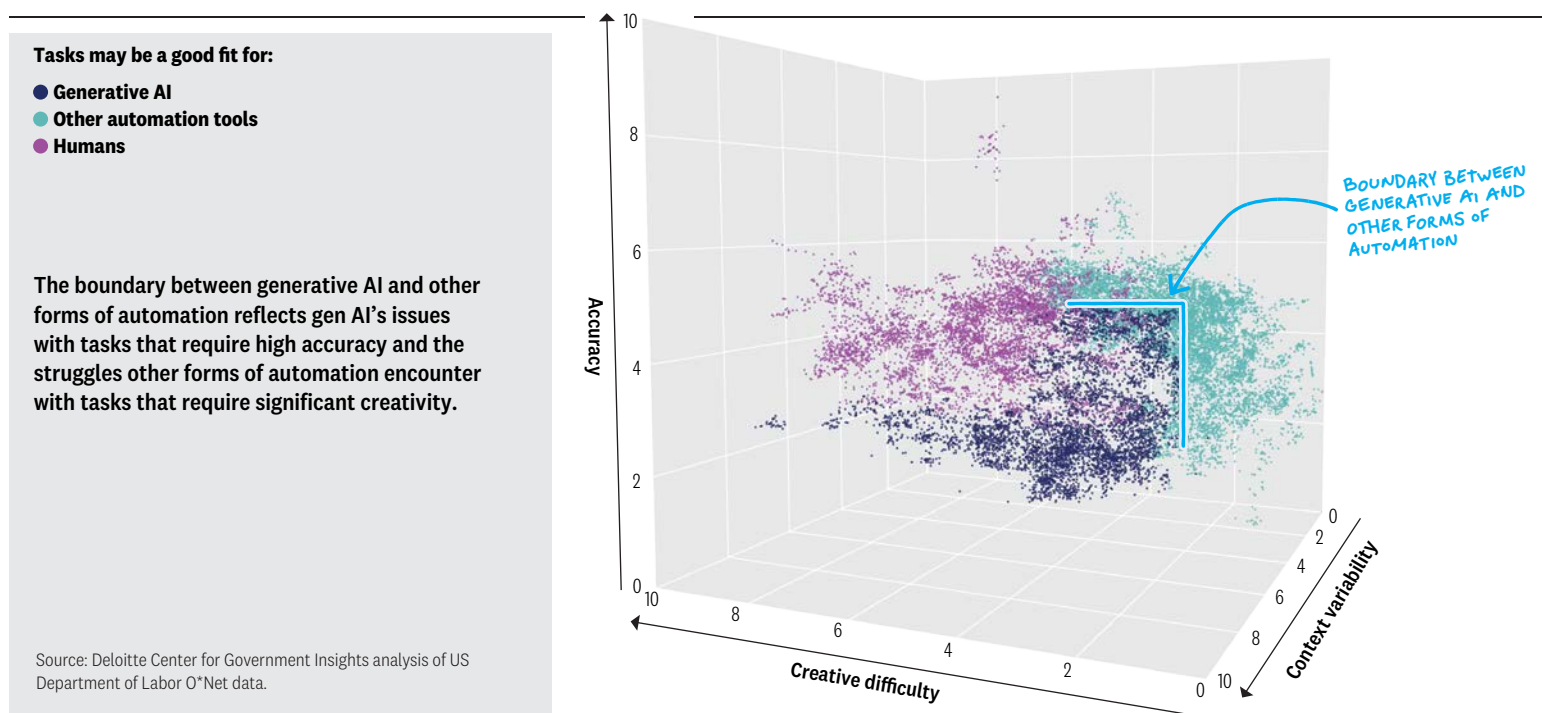
In contrast to teaching roles, noninstructional roles in education (such as administrative roles in finance and human resources) have many automatable tasks, but many of those tasks may be more suited to other forms of automation and may already have been automated. The result is less immediate pressure to adopt generative AI tools, at least for the time being.

With fewer tasks amenable to generative AI, noninstructional roles in education may not feel as strong a need to use stand-alone gen AI tools. However, over the next few years, generative AI models are likely to become less expensive and less computationally intensive, allowing them to be more easily embedded into a variety of tools that people already use to do their jobs (from accounting software to HR tools to contract templates).[4] Embedding gen AI into these tools can make them easier to use (by auto-generating reports, for example) or improve productivity (for instance, by allowing users to query huge volumes of data using plain language).

The result is that there are likely to be two waves of gen AI adoption: one immediate wave for those with many tasks already

Generative AI is a powerful tool that can do many things, but just because it can doesn't mean it should.

FIG 1: Where gen AI can fall short

Tasks may be a good fit for:
- Generative AI
- Other automation tools
- Humans

The boundary between generative AI and other forms of automation reflects gen AI's issues with tasks that require high accuracy and the struggles other forms of automation encounter with tasks that require significant creativity.

BOUNDARY BETWEEN GENERATIVE AI AND OTHER FORMS OF AUTOMATION

Source: Deloitte Center for Government Insights analysis of US Department of Labor O*Net data.

amenable to the tool, like teachers and professors, and a later wave a few years later for those who will make use of future versions of gen-AI–enabled tools.
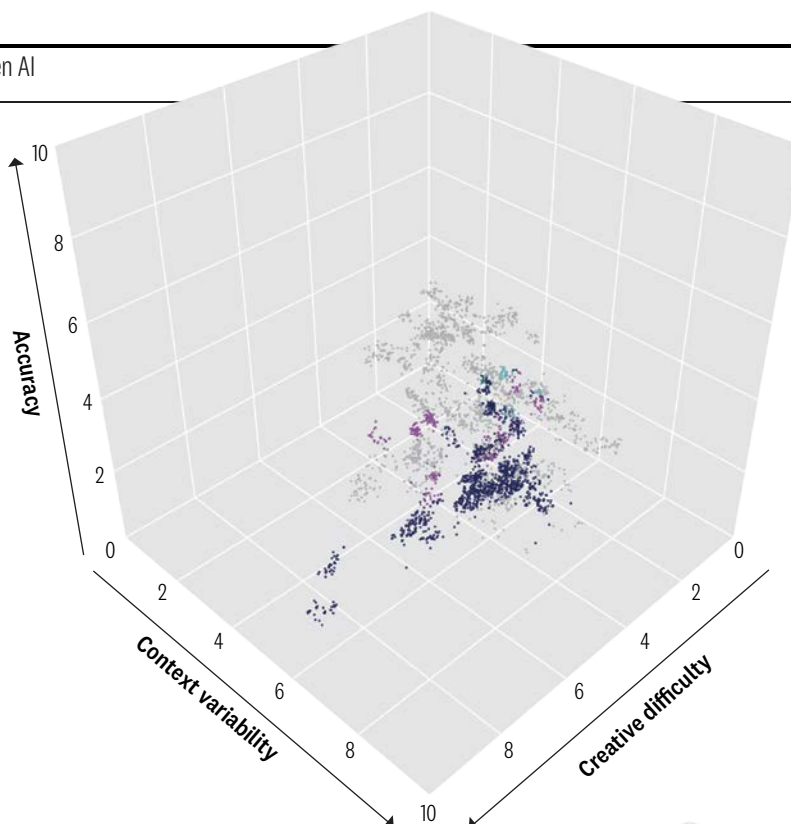
In figure 3, the colored dots represent common work tasks for noninstructional roles in education, like finance and human resources.

Compared to teachers, noninstructional roles have fewer generative-AI–amenable tasks shown in the dark blue dots, which likely yields a lower pressure to adopt gen AI immediately. But there is still value to be gained. Over the coming years, as gen AI is built into existing tools used by noninstructional staff, they are likely to find themselves using gen AI as well.

FIG 2: Teaching is already grappling with gen AI

Teaching-related tasks in education that are amenable to:

- Generative AI
- Other automation tools
- Humans
- Other noninstructional work tasks in education

Source: Deloitte Center for Government Insights analysis of US Department of Labor O*Net data.

FIG 3: Noninstructional roles in education may not adopt gen AI for a few years

Work tasks for noninstructional roles in education, like finance and human resources, that are amenable to:

- Generative AI
- Other automation tools
- Humans
- Other teaching-related tasks in education
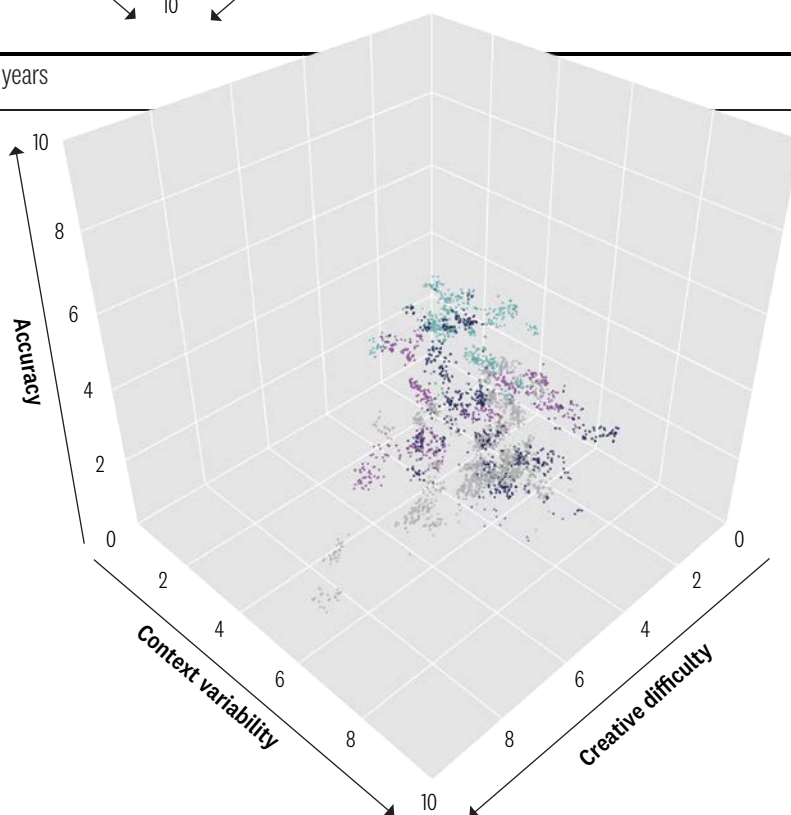
Source: Deloitte Center for Government Insights analysis of US Department of Labor O*Net data.

Even occupations with lots of physical work are not immune

The dual-wave adoption of generative AI also has implications for government workers with more physical work. Government workers in maintenance, manufacturing, construction, logistics, and similar occupations may not see much immediate impact from gen AI but are likely to experience the second wave of adoption.

Consider workers in government shipyards, highway maintenance divisions, or sanitation departments. The bulk of their day-to-day work is physical in nature, but they still often need to receive work orders, track tools, or record maintenance fixes. Embedding gen AI in maintenance management, inventory tracking, and other systems that these workers use every day can improve both the ease and the efficiency of their work.
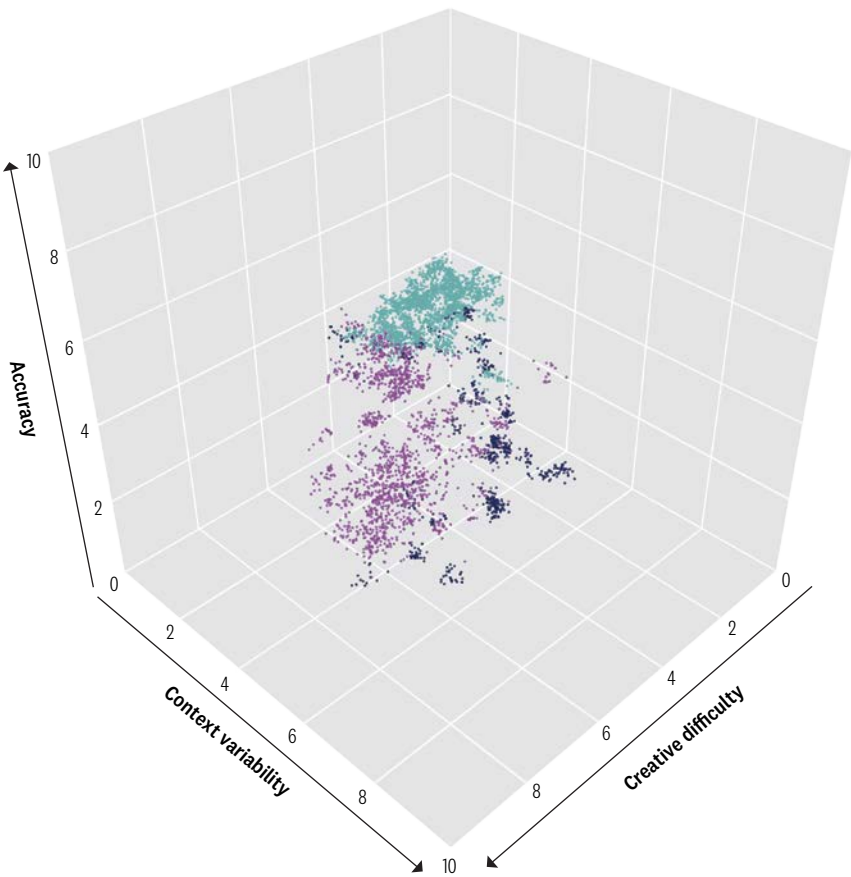
So, while every government worker may not be using generative AI immediately, most will likely find it touching their work eventually.

In figure 4, the dots represent common work tasks for manufacturing roles, which can serve as a proxy for other types of government jobs with significant physical activities, such as highway maintenance, logistics, and more.

Automation is not new to these occupations. Many of the tasks shown in teal have already been automated by tools such as robotics in warehouses or robotic process automation filling in forms. Like noninstructional roles in education, these jobs may not see immediate use of generative AI due to the low proportion of gen-AI–amenable tasks shown in dark blue. But like noninstructional roles in education, they are also likely to use gen AI over time as it becomes embedded in their existing workflow tools.

FIG 4: Manufacturing helps show that physical work is likely to be part of the second wave of gen AI adoption

Source: Deloitte Center for Government Insights analysis of US Department of Labor O*Net data.

Work is about more than just accomplishing individual tasks

It's important to remember that most work activities involve more than one task. Work activities that create value for an organization are likely to feature several different types of tasks amenable to different automation tools.

Take the work of a government lawyer, for example (figure 5). To make an argument in court, government lawyers may need to do several tasks:
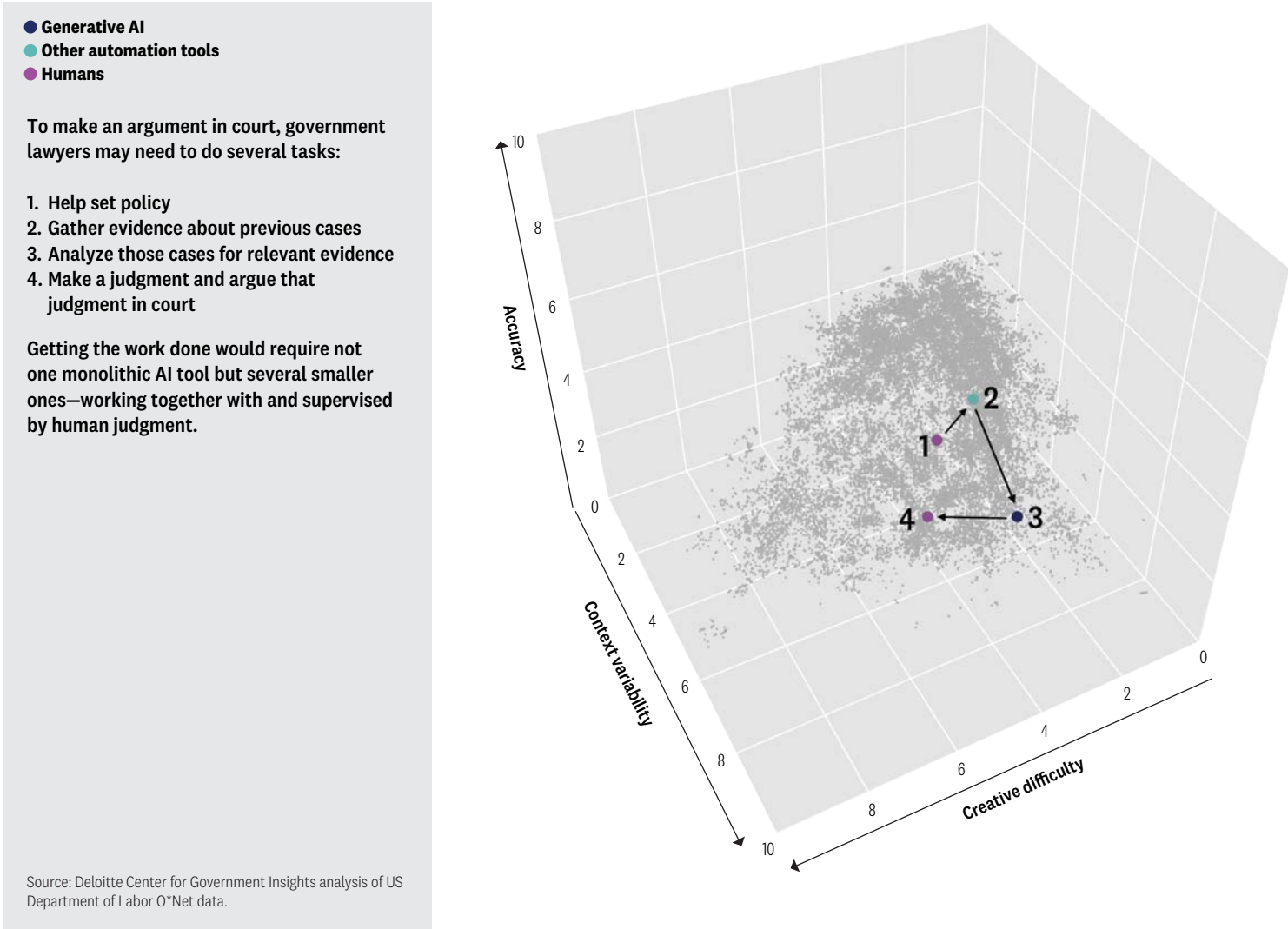
1. Help set policy.

2. Gather evidence about previous cases.

3. Analyze those cases for relevant evidence.

4. Make a judgment and argue that judgment in court.

Those tasks each require different skills, making them amenable to different types of automation. Getting the work done would require not one monolithic AI tool but several smaller ones—working together with and supervised by human judgment.

The future of gen AI, then, is embedded and ubiquitous. Small, narrowly scoped gen AI tools are likely to be embedded within a wide range of the tools we already use today, working alongside other forms of automation to help make our work faster and more productive. ●

> The future of gen AI is embedded and ubiquitous.

FIG 5: Value comes from workflows of several, often very different, tasks

● **Generative AI**
● **Other automation tools**
● **Humans**

To make an argument in court, government lawyers may need to do several tasks:

1. Help set policy
2. Gather evidence about previous cases
3. Analyze those cases for relevant evidence
4. Make a judgment and argue that judgment in court

Getting the work done would require not one monolithic AI tool but several smaller ones—working together with and supervised by human judgment.

Endnotes

P19
While business leaders look inward for AI's impact, tech leaders look outward

1. Tim Smith, Gregory Dost, Garima Dhasmana, Diana Kearns-Manolatos, Ari Ginsberg, Nuno Goncalves, Ahmed Alibage, and Iram Parveen, "Mapping digital transformation value: Metrics that matter," Deloitte, Nov. 17, 2023.
2. Ibid.
3. Ibid.

P20
Few AI regulations across the globe address the outcomes rather than the tech

1. William D. Eggers, Mike Turley, and Pankaj Kishnani, "The future of regulation: Principles for regulating emerging technologies," *Deloitte Insights*, June 19, 2018.
2. We have previously examined this phenomenon in regulation of the Internet of Things: Joe Mariani, "Guiding the IoT to safety," Deloitte University Press, 2017.

P21
European organizations' gen AI preparedness has increased, but few feel ready for the associated risks

1. Deloitte, State of Generative AI in the Enterprise, Quarter three, August 2024.
2. European Parliament, "Artificial Intelligence Act: Deal on comprehensive rules for trustworthy AI," press release, Dec. 9, 2023.
3. Deloitte Germany, "AI Act survey 2024," September 2024.

P22
A burgeoning 'AI-generated' market: Insurance safeguards against AI risk

1. Artificial Intelligence Index and Stanford University, "Artificial intelligence index report 2024," accessed July 25, 2024.
2. World Economic Forum, "The global risks report 2024," accessed July 25, 2024.
3. Similar to the way cyber insurance protects the digital economy, artificial intelligence insurance should safeguard the economic value added by AI. Drawing parallels between the post-financial–crisis growth of cyber insurance (2009 to 2017) with AI insurance, the Deloitte Center for Financial Services' insurance research team estimates that AI insurance penetration can map a similar maturity curve as cyber did in its early years.
4. Russ Banham, "AI insurance takes a step toward becoming a market," *Carrier Management*, Nov. 28, 2022.
5. Armilla AI, "Armilla Assurance launches Armilla Guaranteed: Warranty coverage for AI products in partnership with leading insurance companies," Sept. 28, 2023.

P25
Are new generative AI features in software a monetizable enhancement or table stakes?

1. Tom Dotan and Deepa Seetharaman, "Big Tech struggles to turn AI hype into profits," *The Wall Street Journal*, Oct. 9, 2023.
2. Karl Keirsted et. al., "Ears to the ground: Unvarnished feedback on gen AI adoption and trends from large enterprises through AI startups," UBS Global Research and Evidence Lab, June 7, 2023.
3. Fabrizio Dell'Acqua, Edward McFowland, Ethan R. Mollick, Hila Lifshitz-Assaf, Katherine Kellogg, Saran Rajendran, Lisa Krayer, François Candelon, and Karim R. Lakhani, "Navigating the jagged technological frontier: Field experimental evidence of the effects of AI on knowledge worker productivity and quality," SSRN, Sept. 18, 2023.

P27
More US consumers think AI-generated health information should be left to the experts

1. Bill Fera, Jennifer A. Sullivan, Hemnabh Varia, and Maulesh Shukla, "Building and maintaining health care consumers' trust in generative AI," *Deloitte Insights*, June 6, 2024.
2. Salesforce, "More than half of generative AI adopters use unapproved tools at work," Nov. 15, 2023.
3. Digital Government of New Zealand, "Managing the risks of gen AI to the public service," accessed May 23, 2024.

Generative AI and the labor market: A case for techno-optimism

1. Kyle Chayka, "Rethinking the Luddites in the age of AI," *The New Yorker*, Sept. 26, 2023.
2. Luciano Floridi, "Technological unemployment, leisure occupation, and the human project," *Philosophy & Technology* 27 (2014): pp. 143–150.
3. David Autor, Caroline Chin, Anna Salomons, and Bryan Seegmiller, "New frontiers: The origins and content of new work, 1940–2018," Massachusetts Institute of Technology, Aug. 14, 2022.
4. Robert Gordon, "Productivity and growth over the years at BPEA," conference draft, Brookings Papers on Economic Activity, March 25, 2021.
5. Bronwyn H. Hall, "Innovation and productivity," National Bureau of Economic Research, June 2011.
6. Daron Acemoğlu and Simon Johnson, "Rebalancing AI," International Monetary Fund, December 2023.
7. Ibid.
8. Daron Acemoğlu and Pascual Restrepo, "Automation and new tasks: How technology displaces and reinstates labor," IZA Institute of Labor Economics, April 2019.
9. Andrew Green, "OECD employment outlook 2023: Artificial intelligence and the labour market," The Organisation for Economic Cooperation and Development, July 11, 2023.
10. Ibid.
11. Deloitte AI Institute, "Generative AI is all the rage," Deloitte, accessed Dec. 5, 2023.
12. Daron Acemoğlu and Pascual Restrepo, "Tasks, automation, and the rise in US wage inequality," *Econometrica*, Oct. 14, 2022.
13. Tyna Eloundou, Sam Manning, Pamela Mishkin, and Daniel Rock, "GPTs are GPTs: An early look at the labor market impact potential of large language models," Arxiv.org, March 23, 2023.
14. Ibid.
15. Ed Felten, Manav Raj, and Robert Seamans, "How will language modelers like ChatGPT affect occupations and industries?" Arxiv.org, March 18, 2023.
16. James Pethokoukis, "The economic promise of ChatGPT and GenAI as a general purpose technology," American Enterprise Institute, April 24, 2023.
17. Deloitte, "The generative AI dossier: A selection of high-impact use cases across six major industries," April 3, 2023.
18. Ajay Agrawal, Joshua S. Gans, and Avi Goldfarb, "The Turing transformation: Artificial intelligence, intelligence augmentation, and skill premiums," Brookings, June 12, 2023.
19. Anton Korinek, "Language models and cognitive automation for economic research," National Bureau of Economic Research, February 2023.
20. Padma Chukka, "Generative AI: The missing piece in financial services industry?" *Finextra*, April 21, 2023.
21. Daron Acemoğlu and Pascual Restrepo, "Demographics and automation," National Bureau of Economic Research, January 2021.
22. Barry P. Bosworth and Gary Burtless, "Budget crunch: Population aging in rich countries," Brookings, June 1, 1997.
23. Wolfgang Dauth, Sebastian Findeisen, Jens Suedekum, and Nicole Woessner, "Adjusting to robots: Worker-level evidence," Federal Reserve Bank of Minneapolis, Aug. 21, 2018.
24. Rebecca Klar, "How Hollywood writers set a new standard for AI protections," *The Hill,* Oct. 10, 2023.
25. Michael Webb, "The impact of artificial intelligence on the labor market," Stanford University, January 2020.
26. Carnegie Endowment for International Peace, "How trade did and did not account for manufacturing job losses," Dec. 10, 2018.
27. Diego Areas Munhoz and Samantha Handler, "AI-fueled job displacement anxiety triggers tax code scrutiny," *Bloomberg Law*, June 15, 2023.
28. Christopher Ingraham, "For the first time, workers are paying a higher tax rate than investors and owners," *The Washington Post*, Oct. 16, 2019.

The more AI-enabled work becomes, the more important human imagination is

1. Tyna Eloundou, Sam Manning, Pamela Mishkin, and Daniel Rock, "GPTs are GPTs: An early look at the labor market impact potential of large language models," OpenAI, March 17, 2023.
2. Jan Hatzius, Joseph Briggs, and Devesh Kodnani, "Global Economics Analyst: The potentially large effects of artificial intelligence on economic growth," Goldman Sachs, March 23, 2023.
3. Claire Cain Miller and Courtney Cox, "In reversal because of AI, office jobs are now more at risk," *The New York Times,* Aug. 24, 2023.
4. Nate Bek, "AI on the farm: Ag-tech startups help zap weeds, fertilize crops—but still face challenges with data," *GeekWire*, Aug. 11, 2023.
5. Geoff Williams, "How artificial intelligence will change retail," National Retail Federation, June 28, 2023.
6. Deloitte, 2024 Global Human Capital Trends, Feb. 5, 2024
7. Microsoft, "Will AI fix work?" blog, May 9, 2023.
8. Francesca Gino, "The business case for curiosity," *Harvard Business Review* (September–October 2018).
9. John Hagel, John Seely Brown, and Maggie Wooll, "Skills change, but capabilities endure," *Deloitte Insights*, Aug. 29, 2019.
10. Mike Bechtel and Bill Briggs, Tech Trends 2024, *Deloitte Insights*, Dec. 6, 2023.
11. Steal Your Thoughts! "How Ikea upskilled 8,500 employees to boost sales by $1.4 billion," Sept. 1, 2023.
12. Michael Griffiths and Robin Jones, "The skills-based organization," Deloitte, Nov. 2, 2022.
13. These tools need to be responsibly used. Deloitte, "Beyond productivity: The journey to the quantified organization," May 2023.
14. Gino, "The business case for curiosity."
15. Ashley Abramson, "Cultivating empathy," *Monitor on Psychology* 52, no. 8 (2021): p. 44.
16. Allan V. Cook, Michael Griffiths, Siri Anderson, Laura Kusumoto, and Cary Harr, "A new approach to soft skill development," *Deloitte Insights,* May 8, 2020.
17. Sue Cantrell, Karen Weisz, Michael Griffiths, and Kraig Eaton, "Harnessing worker agency," *Deloitte Insights*, Jan. 9, 2023.
18. Markus Baer, Greg R. Oldman, and Anne Cummings, "Rewarding creativity: When does it really matter?" *The Leadership Quarterly* 14, Nos. 4–5 (August–October 2003): pp. 569–586.
19. John Hagel III, Maggie Wooll, John Seely Brown, and Alok Ranjan, "Passion of the explorer," *Deloitte Insights*, Aug. 17, 2020.
20. Matt Richtel, "We have a creativity problem," *The New York Times*, April 16, 2022.
21. Shayla Love, "This is how to nurture curiosity in children (and yourself)," *Psyche*, Aug. 22, 2023.
22. Yu-Yu Chang and Hui-Yu Shih, "Work curiosity: A new lens for understanding employee creativity," *Human Resource Management Review* 29, no. 4 (December 2019).

P42–45
The democratization of deepfake technology brings new perils for business

1. Heather Chen and Kathleen Magramo, "Finance worker pays out $25 million after video call with deepfake 'chief financial officer'," CNNWorld, Feb. 4, 2024.
2. Shiona McCallum and Joe Tidy, "23andMe: Profiles of 6.9 million people hacked," BBC News, Dec. 5, 2023.

P46–49
Organizations talk about equity in AI, but are they following through?

1. Jeremie Brecheisen, "Where companies think companies diversity, equity, inclusion, and belonging efforts are failing," *Harvard Business Review*, March 9, 2023.

P52–59
Predicting the unpredictable: Exploring how technology could change the future of work

1. "But beyond this, we shall endeavor to spread the bread thin on the butter—to make what work there is still to be done to be as widely shared as possible. Three-hour shifts or a fifteen-hour week may put off the problem for a great while. For three hours a day is quite enough to satisfy the old Adam in most of us!": see John Maynard Keynes, "Economic possibilities for our grandchildren," *Essays in Persuasion* (London: Palgrave Macmillan, 2010), pp. 321–332.
2. In the late 1800s, the typical work week was six 10-hour days. By 1940, this had been reduced to five eight-hour days. Subsequent reductions have involved sick days and vacations. See Dora L. Costa, "The wage and the length of the work day: From the 1890s to 1991," *Journal of Labor Economics* 18, no. 1 (2000): pp. 156–181.
3. With some variation by country, Europe, for example, chose to take a greater proportion of the productivity dividend in terms of improved job quality rather than increased wealth.
4. Commonly known as Amara's Law as it was coined by Roy Amara, former president of the Institute for the Future; Bill Gates made a similar observation in his book *The Road Ahead*: "Most people overestimate what they can achieve in a year and underestimate what they can achieve in ten years." See: Bill Gates, *The Road Ahead* (New York: Viking, 1995).
5. An observation known as Kranzberg's fourth law, which goes as follows: "Although technology might be a prime element in many public issues, nontechnical factors take precedence in technology-policy decisions." See Melvin Kranzberg, "Technology and history: 'Kranzberg's Laws'," *Technology and Culture* 27, no. 3 (1986): pp. 544–560.
6. Janine Berg, David Bescond, and Pawel Gmyrek, "Generative AI and jobs: A global analysis of potential effects on job quantity and quality," ILO working paper 96, International Labour Organization, 2023.
7. Tyna Eloundou, Sam Manning, Pamela Mishkin, and Daniel Rock, "GPTs are GPTs: An early look at the labor market impact potential of large language models," working paper, arXiv, Aug. 21, 2023.
8. Jenny Soffel, "Ten 21st-century skills every student needs," World Economic Forum, March 10, 2016.
9. Workers from General Motors' Cruise LLC "intervened to assist the company's vehicles every 2.5 to five miles." See Tripp Mickle, Cade Metz, and Yiwen Lu, "GM's Cruise moved fast in the driverless race. It got ugly," *The New York Times*, Nov. 3, 2023.
10. Government of Australia, "Report of the Royal Commission into the Robodebt Scheme," July 11, 2023.
11. University of Cambridge, "Robot 'chef' learns to recreate recipes from watching food videos," ScienceDaily, June 5, 2023.
12. Gary Smith and Jeffrey Funk, "AI has a long way to go before doctors can trust it with your life," Quartz, June 4, 2021.
13. Peter Evans-Greenwood, Peter Williams, and Kellie Nuttall, "Predicting the unpredictable: How will technology change the future of work?" *Deloitte Insights*, June 26, 2024.
14. "Skate to where the puck is going, not to where it is," a quote mistakenly attributed to Wayne Gretzky: The original quote, "Go to where the puck is going, not where it has been," was provided by Wayne's father, Walter Gretzky, for a junior hockey team.
15. It's not good enough just to be directionally correct in the short term, when dealing with weekly or quarterly horizons. Trends will remain an important tool for managing in the short term. In these circumstances, being directionally correct is no substitute for a good sales forecast.
16. Andrew D. Wilson and Sabrina Golonka, "Prospective control I: The outfielder problem," Notes from Two Scientific Psychologists, Oct. 9, 2011.
17. Andy Clark and David Chalmers, "The extended mind," *Analysis* 58, no. 1 (1998): pp. 7–19.

P60–69
Generative AI in Asia Pacific: Young employees lead as employers play catch-up

1. Deloitte, "Generation AI: Ready or not, here we come!" accessed April 2024.
2. The World Bank, "DataBank," accessed April 2024.
3. International Monetary Fund, "World Economic Outlook database: Groups and aggregates information," April 2024.
4. Carlo Pizzinelli, Augustus Panton, Marina M. Tavares, Mauro Cazzaniga, and Longji Li, "Labor market exposure to AI: Cross-country differences and distributional implication," International Monetary Fund, October 2023.
5. Ibid.
6. Asian Development Bank, "Key indicators database," April 24, 2024.
7. Ibid.
8. Marguerita Lane, Morgan Williams, and Stijn Broecke, "The impact of AI on the workplace: Main findings from the OECD AI surveys of employers and workers," Organisation for Economic Co-operation and Development, 2023.
9. Aon plc and TELUS Health, "2023 Asia mental health index," accessed April 2024.
10. Australian Government's Productivity Commission, "Mental health inquiry report: Volume 1," No. 95, June 30, 2020.
11. Lane, Williams, and Broecke, "The impact of AI on the workplace."
12. Deloitte, "Operating in the new normal," Sept. 29, 2020.
13. International Data Corporation, "IDC predicts half of Asia/Pacific medium-sized businesses to adopt gen AI apps for enhanced marketing and sales automation by 2026," Jan. 29, 2024.
14. Deborshi Dutt, Beena Ammanath, Costi Perricos, and Brenna Sniderman, "Now decides next: Insights from the leading edge of generative AI adoption," Deloitte, January 2024.
15. Lane, Williams, and Broecke, "The impact of AI on the workplace."
16. Edward W. Felten, Manav Raj, and Robert Seamans, "How will language modelers like ChatGPT affect occupations and industries?" Social Science Research Network, April 17, 2023.

P70–77
Designing for growth in the C-suite

1. Deborshi Dutt, Beena Ammanath, Costi Perricos, and Brenna Sniderman, "Now decides next: Insights from the leading edge of generative AI adoption," Deloitte, January 2024.
2. Bill Marquard, Tim Johnson, Abigail Worsfold, and Timothy Murphy, "One size doesn't fit all: Four postures toward resilience," Deloitte, May 11, 2023.
3. US Department of Energy Loans Program Office, "Financing options for energy infrastructure," accessed May 16, 2024.
4. International Energy Agency, "How governments support clean energy start-ups," March 14, 2022.
5. Tom Willerton-Gartside, "Let's learn from Norway: How governments can accelerate EV's road to the mainstream," Ibex Publishing, March 1, 2022.
6. William D. Eggers, Sam J Walsh, Carsten Joergensen, and Pankaj Kamleshkumar Kishnani, "Regulation that enables innovation," *Deloitte Insights*, March 23, 2023.
7. Victoria Masterson, "Future of jobs 2023: These are the most in-demand skills now—and beyond," World Economic Forum, May 1, 2023.
8. David Mallon, Nic Scoble-Williams, Michael Griffiths, Sue Cantrell, and Matteo Zanza, "What do organizations need most in a disrupted, boundaryless age? More imagination," *Deloitte Insights,* Feb. 5, 2024.
9. Francesca Gino, "The business case for curiosity," *Harvard Business Review,* September–October 2018.
10. James J. Heckman and Tim Kautz, "Hard evidence on soft skills," *Labour Economics* 19, no. 4 (2012): pp. 451–464.
11. Korn Ferry, "Age and tenure in the C-suite," press release, Feb. 14, 2017.

P78–83
Generative AI and government work: An analysis of 19,000 tasks

1. National Center for O*NET Development, O*Net Online, "Homepage," accessed March 19, 2024.
2. Karen Weise and Cade Metz, "When AI chatbots hallucinate," *The New York Times*, May 9, 2023.
3. Khari Johnson, "Teachers are going all in on generative AI," *Wired*, Sept. 15, 2023.
4. Recent Deloitte analysis of publicly available announcements suggests that 100% of the 50 largest enterprise software companies are planning to offer a version of their software that has generative AI features. Duncan Stewart, Baris Sarer, Gillian Crossan, and Jeff Loucks, "Generative AI and enterprise software: What's the revenue uplift potential?" *Deloitte Insights,* accessed March 19, 2024.

Like what you're reading?
Subscribe to *Deloitte* **INSIGHTS** *Magazine*
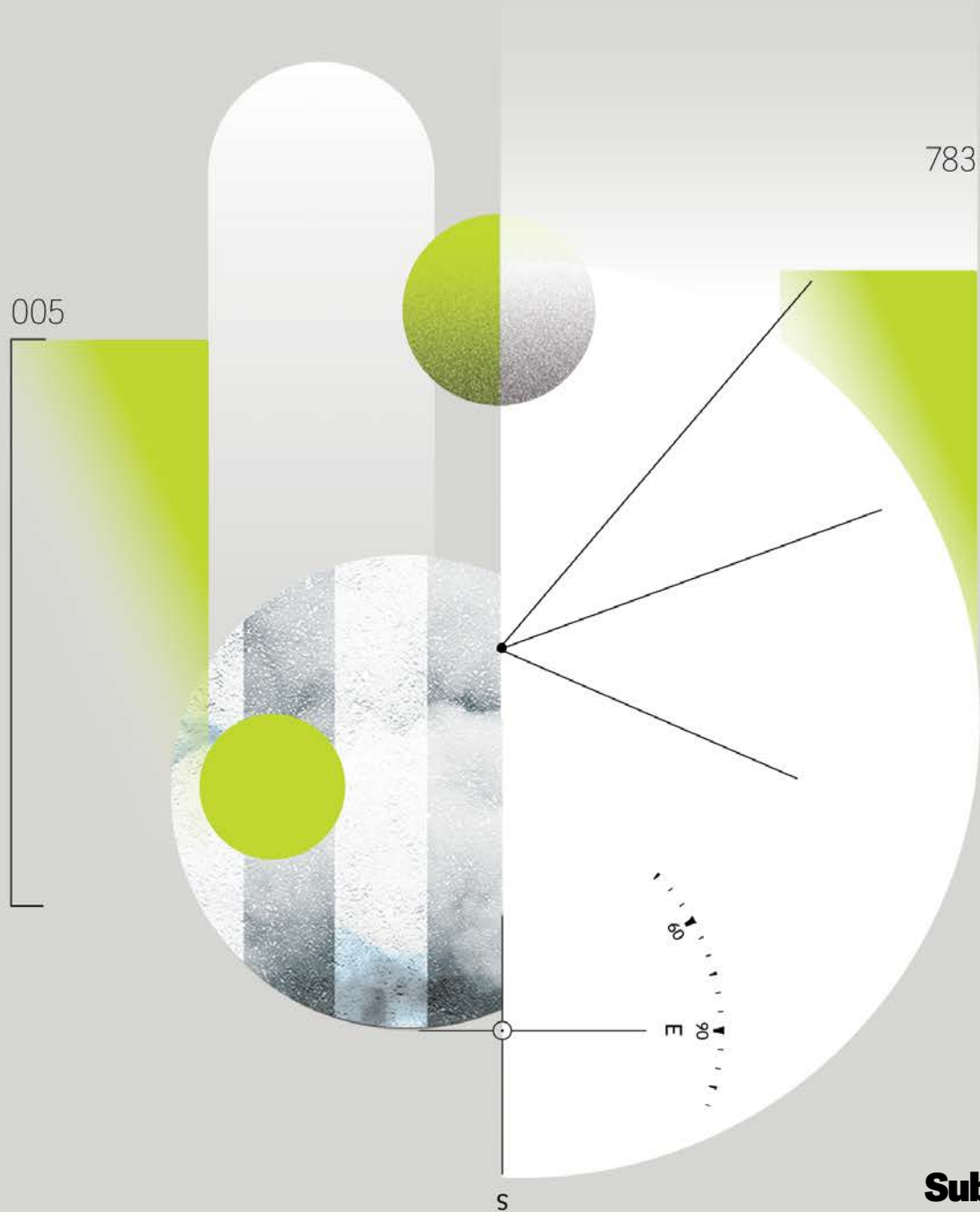
How do you grow from here?

Scaling generative AI from pilots to full implementation takes talent—literally

By **Brenna Sniderman**

In Deloitte's latest State of Generative AI in the Enterprise survey, a mere 5% of respondents say their organizations have managed to scale 70% or more of their gen AI pilots. It's still early days with gen AI, but compare the success of those "superscalers" with where the majority of organizations participating in our global survey currently sit: 68% of executive respondents report that, thus far, they've only scaled 30% or fewer of their generative AI pilots.

What sets the superscalers apart? According to our data, one of the main differences appears to be their approach to talent—giving as much of the workforce as possible access to generative-AI–enabled tools and positioning those tools in a way that supports (rather than replaces) humans doing what humans uniquely do best. ●
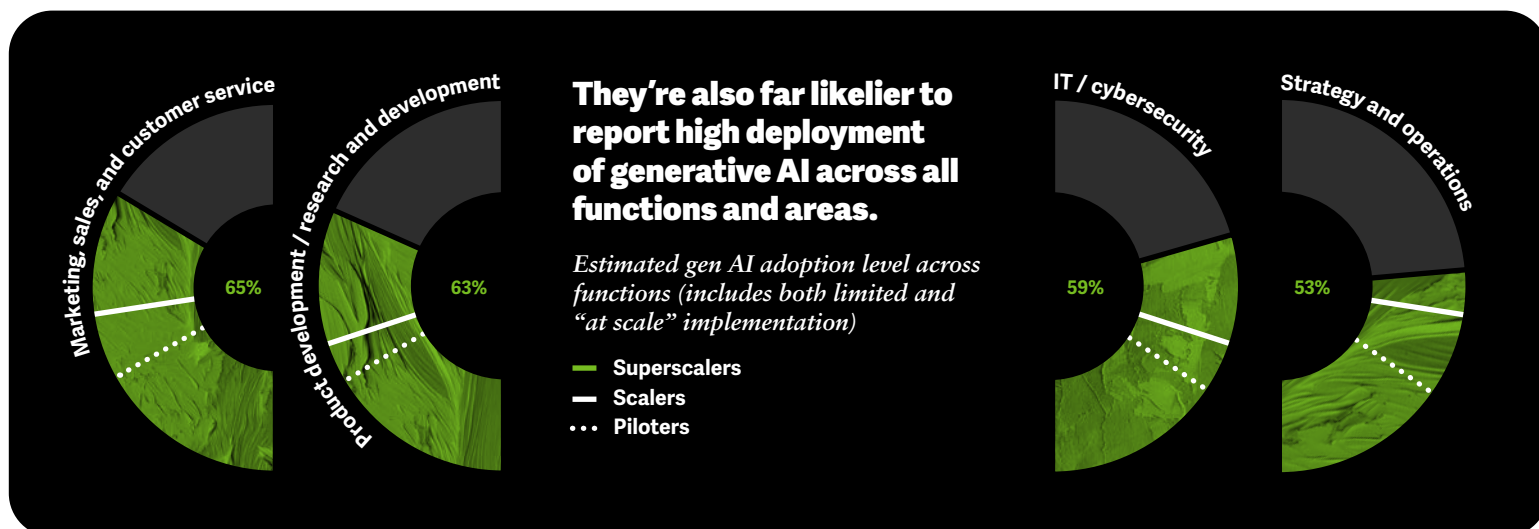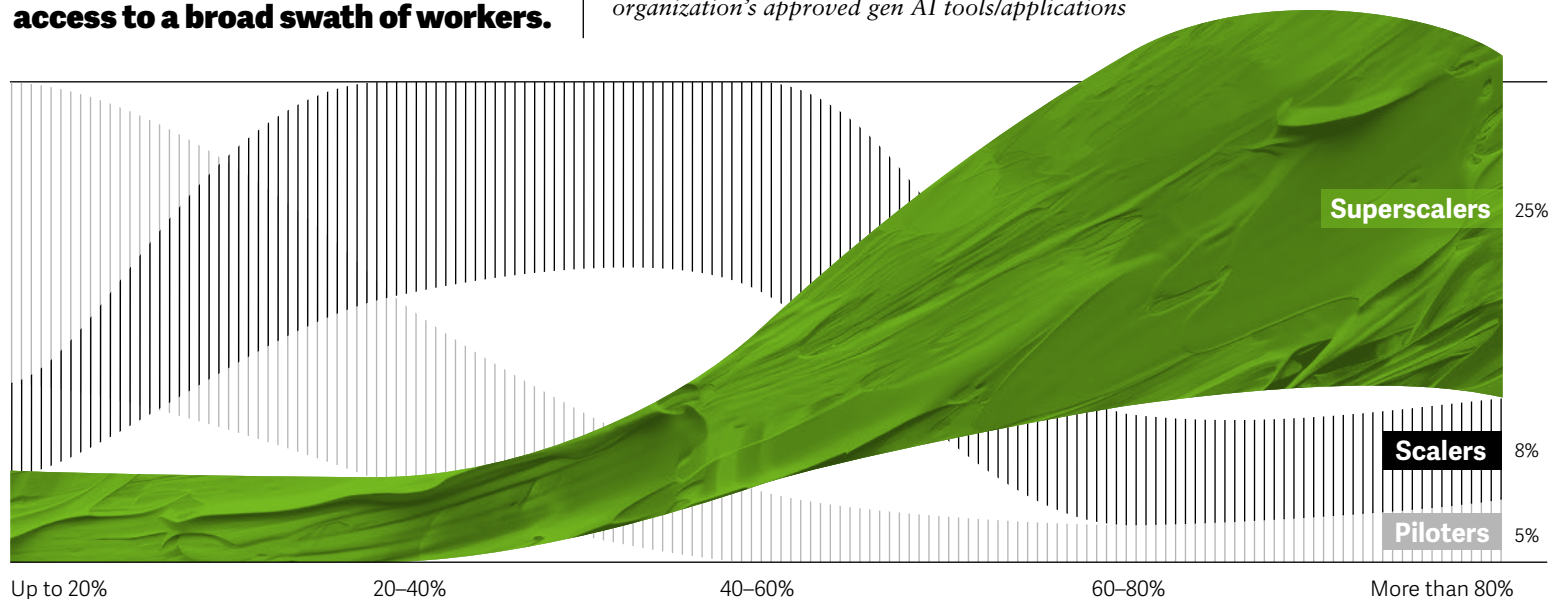
"It's all about strategically augmenting human effort. Superscalers are positioning gen AI as an accessible tool in their organization's tech toolbox, working to get the right guardrails in place, and investing in the right things–including talent–to take full advantage of this transformative technology."

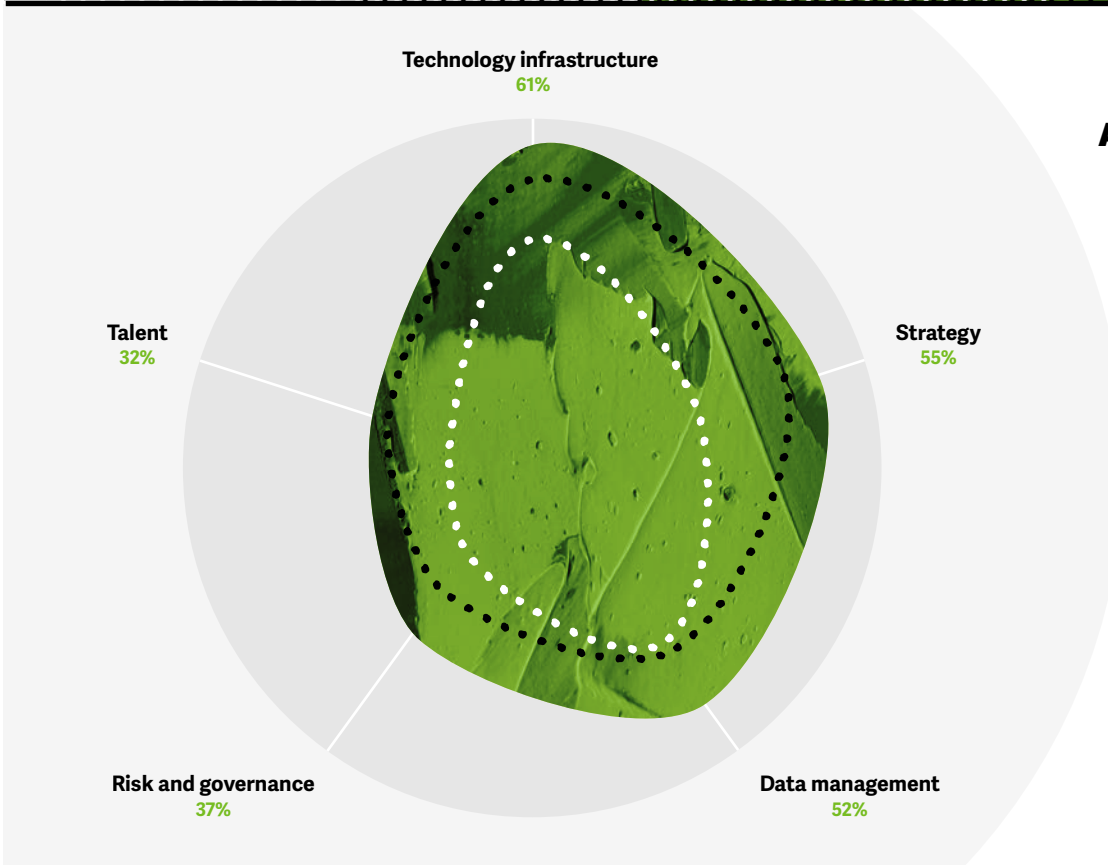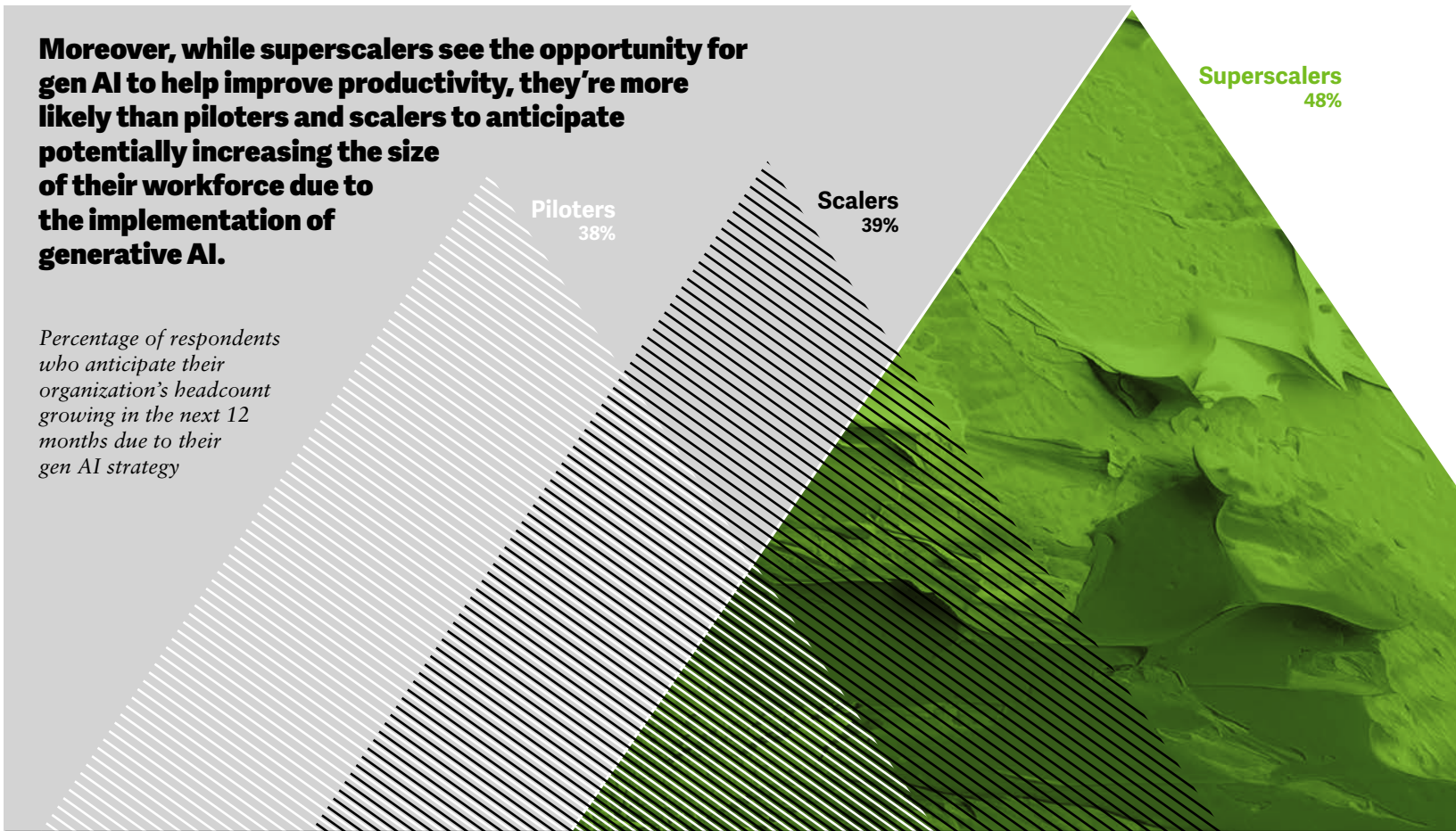*– Jim Rowan, head of AI at Deloitte US*

Superscalers are far likelier to give access to a broad swath of workers.

Estimated percentage of workers with access to their organization's approved gen AI tools/applications

Superscalers 25%
Scalers 8%
Piloters 5%

Up to 20%   20–40%   40–60%   60–80%   More than 80%

They're also far likelier to report high deployment of generative AI across all functions and areas.

Estimated gen AI adoption level across functions (includes both limited and "at scale" implementation)

Marketing, sales and customer service — 65%
Product development / research and development — 63%
IT / cybersecurity — 59%
Strategy and operations — 53%

— Superscalers
— Scalers
⋯ Piloters

Infographics by Harry Wedel

Moreover, while superscalers see the opportunity for gen AI to help improve productivity, they're more likely than piloters and scalers to anticipate potentially increasing the size of their workforce due to the implementation of generative AI.

Percentage of respondents who anticipate their organization's headcount growing in the next 12 months due to their gen AI strategy

Superscalers
48%

Scalers
39%

Piloters
38%

Technology infrastructure
61%

Talent
32%

Strategy
55%

Risk and governance
37%

Data management
52%

And while preparedness is in the eye of the beholder, even superscalers believe their organizations have more work to do to be ready to adopt gen AI tools and applications, especially when it comes to talent, risk, and governance.

Percentage of respondents who perceive their organization to be highly or very highly prepared to adopt gen AI in these areas

— Superscalers
··· Scalers
▦ Piloters

Note: N = 2,770. Superscalers are respondents who reported scaling 70% or more of their generative AI pilots, comprising 139 respondents, or 5% of total respondents.
Source: Deloitte State of Generative AI in the Enterprise survey, quarter 3, June 2024.

Research and analysis by the Deloitte Center for Integrated Research
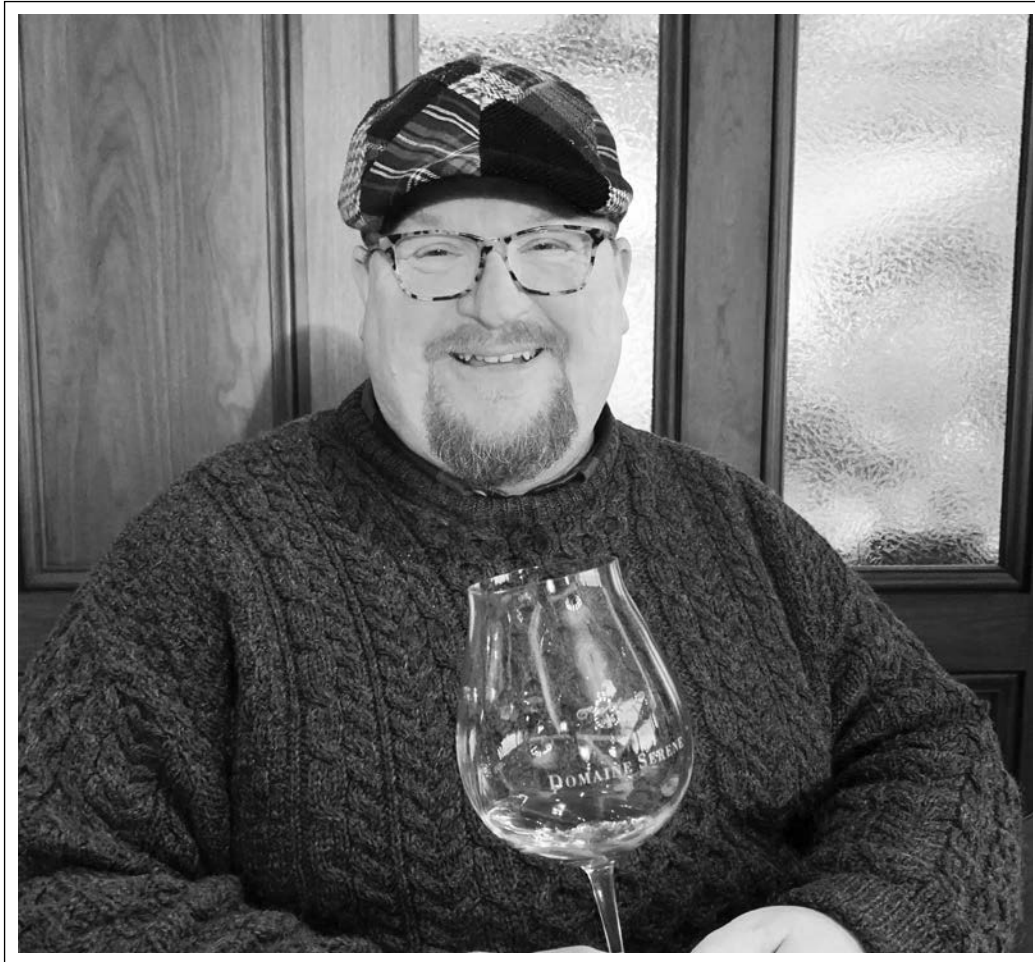
This issue is dedicated to Matt Lennert, art director extraordinaire and one of the founders of *Deloitte Insights Magazine*, in recognition of his retirement. Matt, thank you for bringing beauty to our work and bringing out the best in all of us.

Cheers to you, and to your next chapter.

Your friends at Deloitte Insights