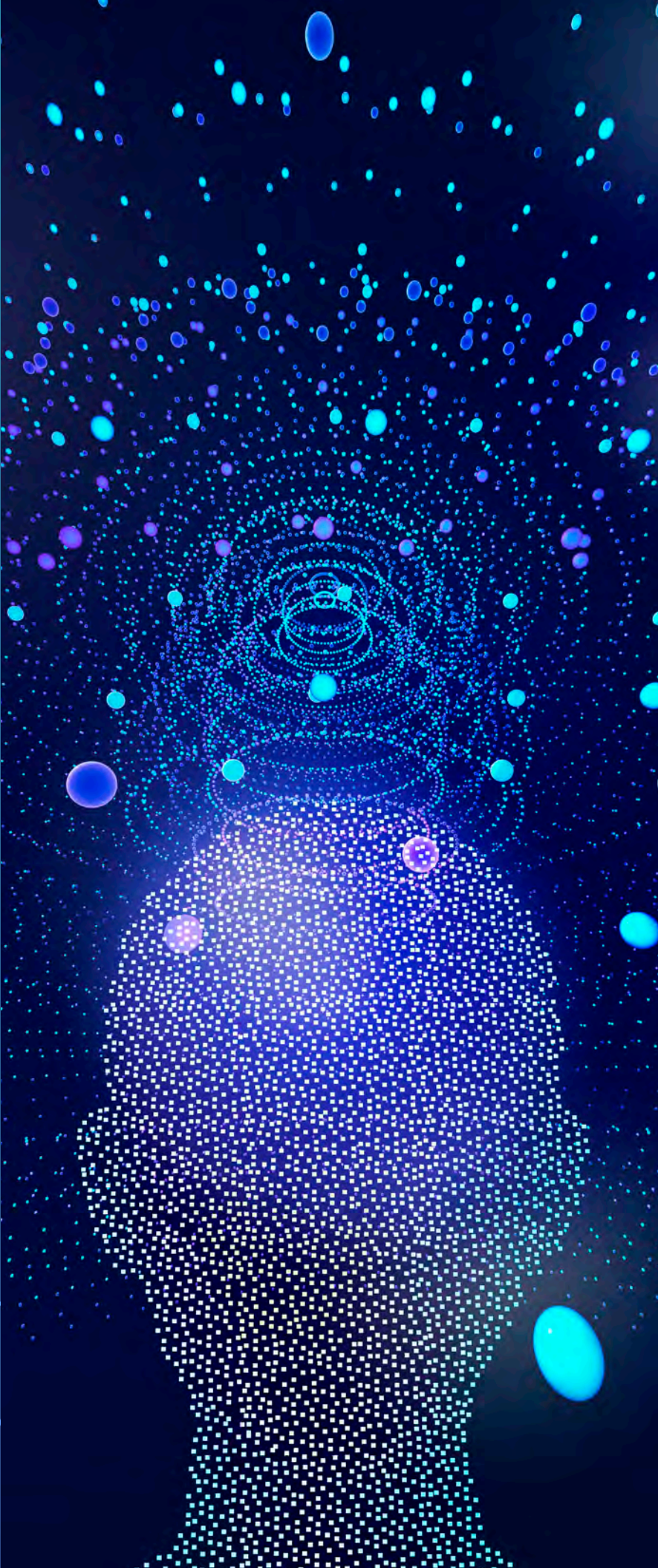


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# The Future of Technology Skills



## INTRODUCTION AND EXECUTIVE SUMMARY

Technology has never been more critical to the success of businesses across every industry. With the pace of change only advancing more rapidly, emerging technologies like generative artificial intelligence — which grew from a novel concept to front-page news in under a year — now join more-established solutions like cloud computing as critical capabilities for many businesses.

To help provide insight into what now drives technology priorities and the skills required to address those needs, Infosys commissioned an online quantitative survey of 1,000-plus senior executives in the United States. The vast majority (83%) of respondents agreed that emerging technologies will impact their organization's long-term strategy, with 66% saying they will have a significant impact.

However, 70% believe the pace of technological advancement exceeds their workforce's ability to learn how to incorporate it. This skills gap is hindering adoption, with 1 in 3 citing a lack of internal technical capabilities as a key barrier to embracing new technologies. To close these gaps, many businesses are increasing budgets for employee training and upskilling. Companies that invest in developing their workforce's technical capabilities while adapting to new employee dynamics will gain a competitive advantage in leveraging emerging technologies.





Among the key findings:

- **Emerging technologies are playing a major role in long-term strategic planning.** Virtually all respondents (99%) said emerging tech will have a role in their organization’s strategic planning.
- **Businesses are increasing spending on general<sup>1</sup> and generative AI, cloud computing and cybersecurity.** This highlights an ongoing challenge, as it requires increasing budgets for both critical infrastructure and more speculative emerging technologies.
- **Generative AI is seen as beneficial for productivity and forecasting.** However, few companies have yet integrated the technology into their workflows and processes.
- **The pace of change exceeds workforce readiness.** Nearly three-quarters (71%) of respondents admitted to worrying that the pace of technology change exceeds their organization’s ability to learn how to incorporate it into operations.
- **Many organizations are facing a skills “deficit” when it comes to key technologies.** Respondents showed an 8 percentage-point gap between how important advanced statistical analysis is considered and the current skill level of the workforce, and a 6 percentage-point gap for machine/deep learning.
- **Executives believe they can gain a competitive advantage if they work to close the skills gap.** Lack of internal technical skills was cited as the top challenge holding businesses back from making more effective use of emerging technologies.

## KEY RECOMMENDATIONS

- Businesses should invest in technologies like robotic process automation and generative AI to boost productivity and maximize efficiency.
- Companies need to focus on training employees in technical skills, including advanced statistics, machine learning and cloud computing (and increase budgets accordingly).
- AI training (including generative AI) needs to be a priority.
- Companies must be open-minded on candidates’ educational backgrounds when considering their technical skill sets.

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1. This study uses the term “General AI” to refer to AI initiatives that are distinct from generative AI, including machine learning, predictive analytics and other AI implementations.

“Data and AI technologies will help companies rapidly amplify human potential, open untapped market avenues and contribute to the overall economic value of the enterprise. This will lead to business outcomes unlocking efficiencies at scale, empowering the ecosystem and accelerating growth.”

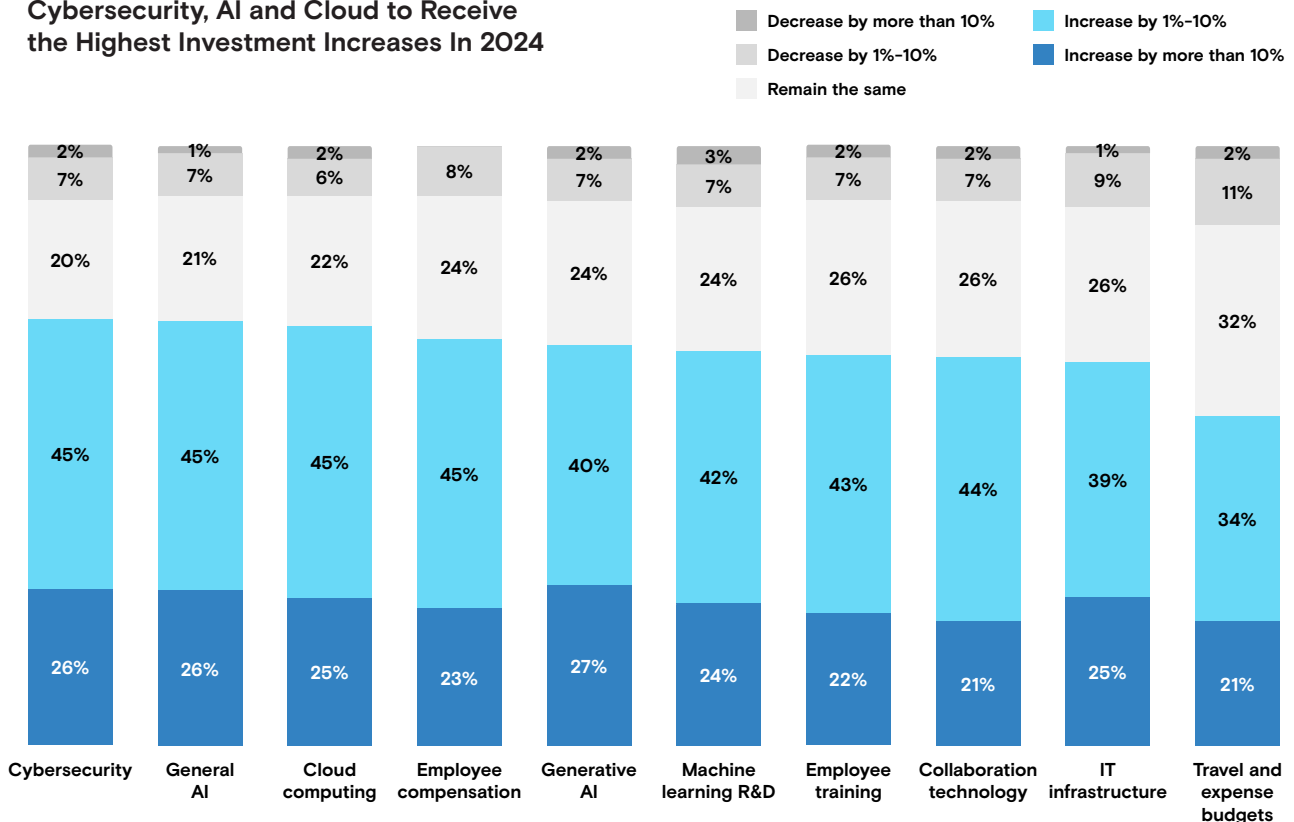
— SUNIL SENAN, SENIOR VICE PRESIDENT, INFOSYS TOPAZ

## MAKING THE RIGHT TECHNOLOGY INVESTMENTS

The big technology investments envisioned by survey respondents show that enterprise IT priorities continue to include major spending on broad organizational needs such as cybersecurity and the cloud. As cloud continues to supplant on-premises data centers, and security remains an ongoing concern across all platforms and use cases, such expenditures, in many ways, have

become part of the cost of doing business. However, AI — including generative AI — has also become a major priority. While 71% of respondents said they plan to increase their cybersecurity budgets, nearly the same number (70%) plan to increase AI spending, and 68% plan to ramp up their spending on generative AI (Figure 1). Finance, insurance and technology companies are especially focused on AI, cybersecurity and other emerging technologies.

**FIGURE 1**  
Cybersecurity, AI and Cloud to Receive the Highest Investment Increases In 2024



Source: The Future of Technology Skills Survey, Infosys, October 2023. Base: Total respondents, n=1,009. Q. Thinking about your budget allocations for 2024, please indicate how much you anticipate a change in spending in the following areas.

In some respects, the increased spending on generative AI isn't surprising; few companies had major investments in the technology before AI chatbots began growing in popularity in late 2022. Thus, many are starting from scratch, which helps explain why 27% of respondents said they planned to increase their generative AI budgets by 10% or more, leading all other categories, including IT infrastructure and cloud computing. However, most major technologies fell into a tight range, with roughly a quarter of respondents planning to increase spending on cybersecurity, AI and the cloud by at least 10%. One outlier: collaboration tech, with roughly a fifth saying they plan major spending increases, potentially indicating that heavy expenditures in this category during the pandemic continue to provide value to businesses.

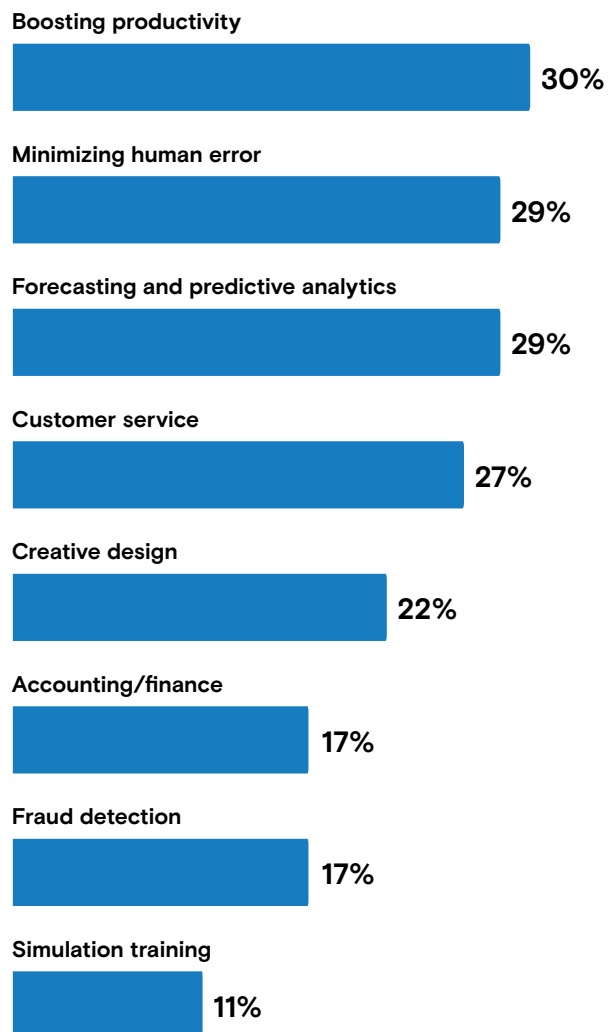
**“It is imperative that businesses don't try to force-fit the technology but conduct a strategic discovery exercise to analyze and understand the major areas and use cases for generative AI-powered transformation that would bring in the highest business value. This helps identify and prioritize high-impact use cases and establishes a clear road map with the appropriate North Star metrics for getting stakeholder buy-in.”**

— BALI D.R., EXECUTIVE VICE PRESIDENT, INFOSYS TOPAZ


In the year since generative AI rose to prominence, it has inspired everything from

comedy routines to boardroom coups. The survey indicates that it has also gained traction as a potential solution for a wide range of business challenges. Respondents cited boosting productivity, minimizing human error and forecasting/predictive analytics as benefits of investments in generative AI (Figure 2).

**FIGURE 2**  
**Generative AI Seen as Boosting Productivity, Minimizing Errors**



Source: The Future of Technology Skills Survey, Infosys, October 2023. Base: Those who selected generative AI as a technology they believe executives should be prioritizing for a competitive advantage; n=414. Q. You selected generative AI as a technology executives should prioritize in the next three years. In which of the following areas do you think generative AI will have the greatest positive impact? Please select up to two.



**“Generative AI is quickly moving to the next stage — creating business value across an array of industry use cases. Firms must have a responsible AI strategy to compete, however. A big part of this is explainable AI, which requires a new way of thinking about its evaluation methods and metrics.”**

**— RAJESHWARI GANESAN, DISTINGUISHED TECHNOLOGIST,  
MACHINE LEARNING, INFOSYS**



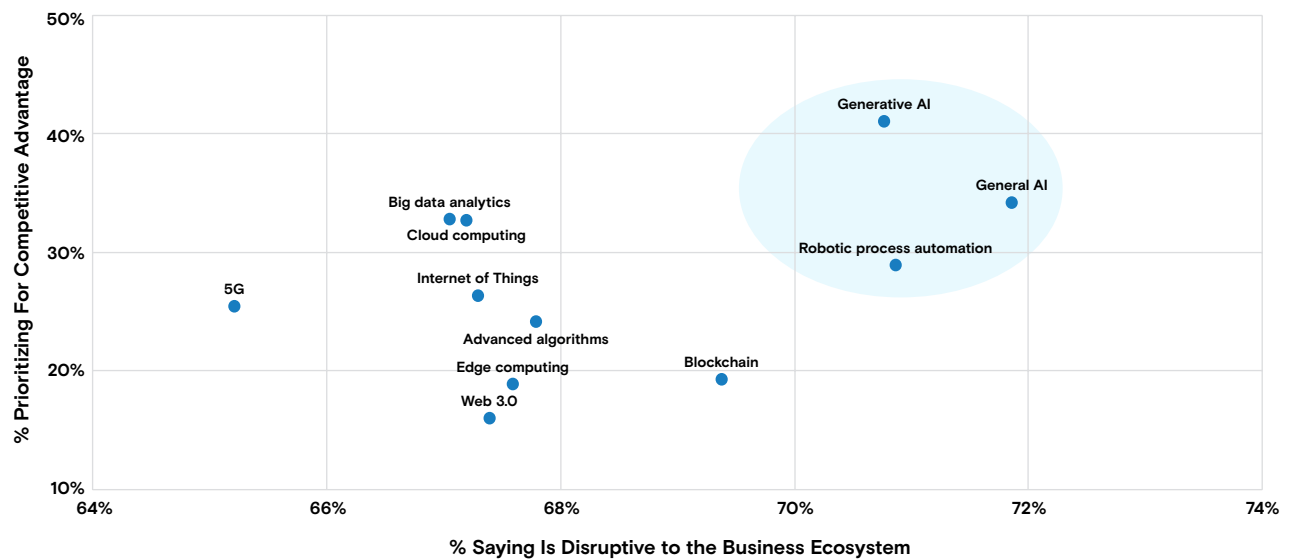
Given the prominence of AI chatbots, customer service was also a key area of interest for respondents, while uses such as fraud detection and simulation training — which already benefit from investments in existing AI and ML solutions — were seen as having less impact from generative AI. Among self-described technology leaders, minimizing human error was *not* a top priority for generative AI, perhaps indicating more awareness around the issue of “hallucinations” — fabricated or erroneous information generated by AI — among this group. These respondents instead listed creative design as a top use case for the technology.

Respondents to our survey listed profitability and cost control as their top priority for the coming year. Businesses looking for indications of the potential return on AI investments should find encouragement from the expected bottom-line impact of productivity

gains, lower customer service costs, and more reliable analytics and forecasting.

Generative AI was also seen as the most disruptive technology among those listed in the survey, with 71% of respondents seeing it as very or somewhat disruptive to the business environment over the next three years. However, not all disruptions are bad for businesses; those that allow companies to reinvent themselves and create new opportunities can provide significant value. Generative AI falls squarely in this category, as the leading technology seen by respondents as being both disruptive and providing a significant competitive advantage over the next three years (Figure 3). Respondents also listed general AI and robotic process automation at the nexus of disruption and utility, highlighting widespread interest in automation and AI to improve productivity and efficiency.

**FIGURE 3**  
Executives Should Focus on RPA and AI, at the Nexus of Disruption and Utility



Source: The Future of Technology Skills Survey, Infosys, October 2023. Base: Total respondents, n=1,009. Q. Please indicate the level of disruption you believe the following technologies will have on the business ecosystem in the next three years. Disruption is defined as forcing companies to rethink their technological capabilities and the impacts it may have on headcount, cost control and R&D. Q. Please select the top three technologies you believe executives should prioritize to create the biggest competitive advantage for companies in the next three years.

“In the future, as AI becomes pervasive and part of our day-to-day life, we will have to learn to work with AI tools and assistants, collaborate with AI to complete creative tasks and become good at using it to be hyperproductive and efficient. This requires upskilling to be proficient in new technologies, development of new skills and roles and continuous learning. Creating the right incentives for learning is key to making the policies and environment conducive for training.”

— RAFEE TARAFDAR, CHIEF TECHNOLOGY OFFICER, INFOSYS

Other technologies considered highly disruptive, including blockchain and edge computing, were seen as far less valuable in terms of providing a key competitive advantage. Once-buzzworthy concepts, such as Web 3.0, or those more pertinent to certain industries, like 5G, were viewed as neither highly disruptive nor high priorities, an indication of how quickly new technologies can fall from favor if they don’t provide concrete value. When asked which technologies respondents see as providing the biggest competitive advantage over the next three years, generative AI, general AI and analytics led the pack, highlighting the continued need to create value from data. Web 3.0 was in last place, cited by just 16% of respondents.

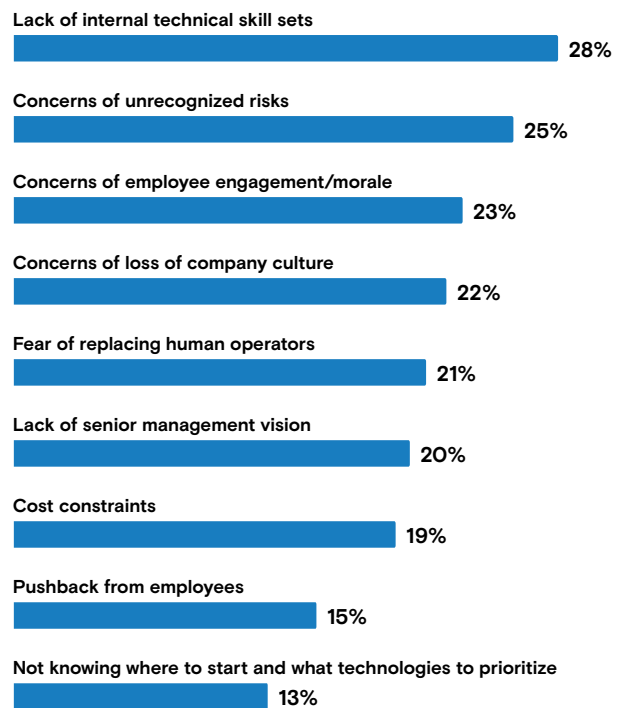
## NEW TECH DEMANDS NEW SKILLS

It’s not news that there’s a critical skills gap when it comes to technology work. As far back as 2007, the U.S. Department of Labor published a report warning that the “future well-being, security and prosperity” of the United States was at risk if the country didn’t find a way to address the STEM skills shortage.<sup>2</sup>

Little wonder, then, that as businesses continue to invest in emerging technologies, the skills gap in the workforce remains a pivotal concern. After all, without the right personnel to implement new technologies, businesses can’t effectively harness those solutions. And 70% of respondents to the survey acknowledge that the pace of technological

advancement far outstrips current skill levels within their organizations, requiring investments in reskilling and upskilling. When asked about the main barriers impacting their businesses’ ability to embrace new technologies, lack of internal technical skill sets was the leading response, well ahead of concerns such as cost constraints, lack of consensus over which emerging technologies to prioritize and fears of jobs being replaced by technology (Figure 4).

**FIGURE 4**  
**Lack of Technical Skills Is Preventing Businesses From Embracing New Technologies**



Source: The Future of Technology Skills Survey, Infosys, October 2023.  
Base: Total respondents, n=1,009. Q: What are the main barriers or concerns preventing your organization from embracing new technologies more fully? Please select up to two.

2. “The STEM Workforce Challenge: the Role of the Public Workforce System in a National Solution for a Competitive Science, Technology, Engineering, and Mathematics (STEM) Workforce,” U.S. Department of Labor, April 2007.



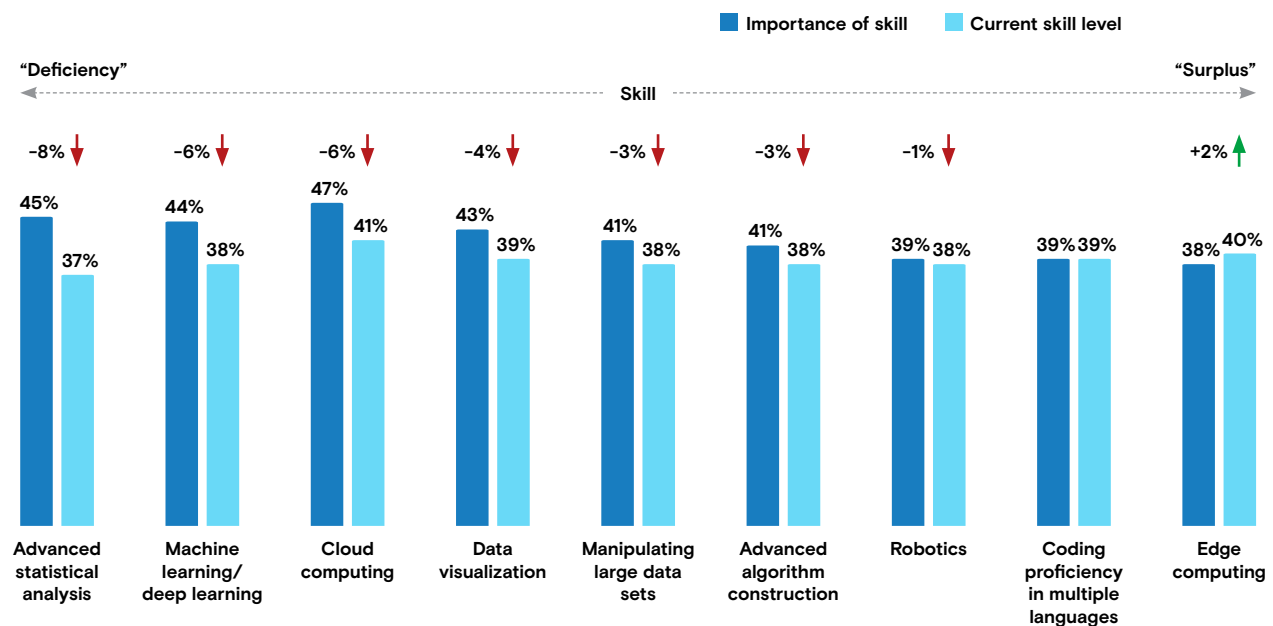
To determine where the challenge is most acute, researchers looked at the in-demand skills cited by survey respondents and those where they said the gap was prominent, to derive a “skill deficiency” score (Figure 5). Based on this, they found that the areas with the largest need for training are advanced statistical analysis (8% gap), machine/deep learning (6%) and cloud computing (6%). While the first two are critical to the development of advanced AI systems, the deficit in cloud skills more than a decade into the cloud revolution highlights the difficulty

of building a workforce capable of meeting both current and emerging technology needs (edge computing, which requires a similar skill set to cloud, showed a “skill surplus” of 2%, due to a lower demand for these capabilities among respondents). Until businesses are able to adequately address the capabilities required to maintain basic infrastructure, such as their cloud deployments, expanding their workforce competencies to include more sophisticated AI-related skills is going to remain a significant challenge.

**“Despite the decade-long dominance of cloud computing, a considerable skills gap does exist. The rapid evolution of cloud platforms and diverse cloud technologies, coupled with a scarcity of qualified talent and fierce competition, make it increasingly difficult for businesses to find the right cloud talent. Businesses can bridge this gap by upskilling existing employees, building diverse talent pipelines, offering competitive packages and promoting cloud career opportunities.”**

— ANANT ADYA, EXECUTIVE VICE PRESIDENT, INFOSYS COBALT

**FIGURE 5**  
The Most Training Is Needed in Advanced Statistics



Source: The Future of Technology Skills Survey, Infosys, October 2023. Base: Total respondents, n=1,009. Q. Please indicate how important you think each of the following skills are for today’s workforce to have. Q. To the best of your knowledge, please indicate how skilled your current employees are in each of the following. Gap = numeric difference of Very Skilled minus Very Important.

To keep up with the shifting landscape, respondents say they are moving away from hiring or training workers based on expertise in a single technology. Instead, they are seeking talent proficient across multiple disciplines. Over three-quarters (77%) of respondents agreed that they prefer an employee who is knowledgeable in many different technologies rather than an expert in just one, and a similar percentage said they considered coding skills in multiple languages a priority.

To address these needs, 66% of respondents say they're increasing spending on employee upskilling and training. Additionally, 75% recognize the efficacy of tech boot camps and online certification programs as an alternative to traditional academic degrees. These findings point to a major shift in organizational recruiting and training strategies, advocating for a more dynamic and continuous learning model to bridge the widening skills gap.

**“Boot camps and certifications are good for people who are motivated by self-learning and can bootstrap on desired skills. However, these programs lack application and practical exposure in enterprise environments and working with teams, which is a huge critical success factor with client programs. Companies should consider graduates from these programs in conjunction with relevant experience, soft skills and application knowledge.”**

— LAX GOPISETTY, VICE PRESIDENT, BUSINESS APPLICATIONS, INFOSYS



## CONCLUSION

The pace of technological advancement is accelerating, requiring companies to continually adapt to leverage emerging innovations. As executives develop strategic plans and priorities for the next several years, technologies like AI, robotic process automation and cloud computing are reshaping operations, products and business models.

But significant gaps exist between the importance companies place on key technology skills and employees' current capabilities. The ability to utilize advanced analytics, machine learning and cloud computing requires further development across workforces. This skills deficiency is hindering adoption, with lack of technical expertise cited as the main barrier to fully capitalizing on new technologies.

To close these gaps, leading companies are increasing budgets for upskilling initiatives. Hands-on training in AI, ML, advanced analytics and cloud technologies will be critical to ongoing success, and this highlights the need to balance skills required for basic infrastructure, such as the cloud, with those needed for emerging technologies such as AI. Companies that invest effectively in developing their workforces' technical skills will boost innovation and harness digital transformation.

Finally, businesses must adapt to changing workforce dynamics. Valuing hands-on skills over specific degrees and being open to candidates from boot camps recognizes that how people gain skills is evolving. Motivating employees to gain proficiency across technologies will be imperative.

The companies that embrace this new landscape, upskill employees and effectively leverage emerging technologies will gain a competitive advantage. By combining adaptable policies, strategic technology investments and workforce development, leaders can drive their organization's success in 2024 and beyond.

## ABOUT THIS STUDY

### CREDITS AND METHODOLOGY

This report, conducted on behalf of Infosys, presents the key findings of a survey of 1,009 senior executives at large U.S. companies (over \$500 million in revenue).

### RESPONDENT PROFILE:

- *Sample size:* 1,009 respondents; CEO or equivalent, 10%; chief operating officer or equivalent, 13%; chief financial officer or equivalent, 12%; chief technology officer/ chief information officer or equivalent, 12%; chief information security officer or equivalent, 12%; divisional president or equivalent, 20%; executive vice president/ senior vice president or equivalent, 12%.
- *Industry:* Finance: Banking, Finance, Capital Markets, 13%; Health Care & Life Sciences, 13%; Manufacturing, 12%; Retail & Consumer-Packaged Goods, 12%; Insurance, 12%; Energy & Utilities, 12%; Telecom, 12%; High Tech, 12%.

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