

2025

State of Tech Talent

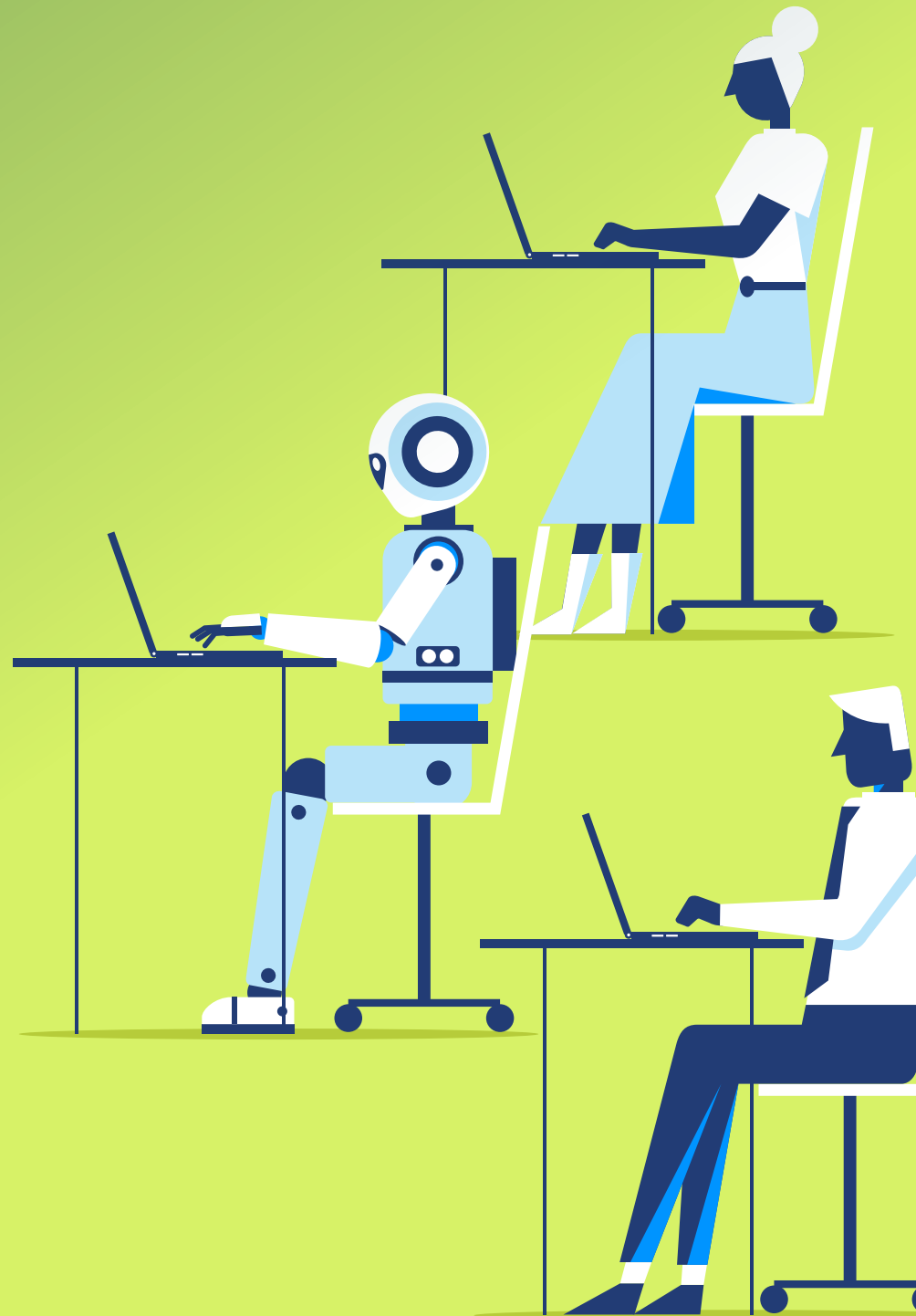
Truth vs. Vibe: The Not So Disruptive
Workforce Impact of AI

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2025 State of Tech Talent

Critical talent gaps

exist across organizations, with 68% understaffed in AI & ML, 65% in cybersecurity, and 61% in FinOps & cost optimization.



94% of organizations expect that **AI will deliver significant value** in core activities, increasing the need for a skilled workforce.

2.7x more organizations have **expanded** rather than reduced their **workforce due to AI**, with a net hiring effect of +21%, intensifying the talent shortage.



67% of organizations report that AI is **reshaping their technical work**, requiring upskilling of the existing workforce.

Organizations are **3.2x** more likely to **invest in upskilling existing talent** than recruiting externally, recognizing their team's untapped potential.



The **hiring-and-onboarding cycle takes 62% longer** than upskilling the existing workforce, translating to slower innovation and market response.



With **one in five new hires departing** within 6 months, organizations face substantial **sunk costs** in recruitment & onboarding.



91% of organizations recognize technical **training as an effective approach for retaining talent** and mitigating sunk costs.



71% of organizations consider **certifications important when recruiting new talent**, evidencing their role in validating professional competence.



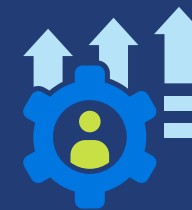
84% find **open source culture** highly effective for **talent retention**—providing both technical edge & career differentiation in an increasingly competitive market.



85% of organizations prioritize portfolios of practical work in hiring decisions, with **open source contributions providing transparent proof** of both technical ability & collaboration skills.



93% consider **technical growth opportunities** one of the most effective strategies for retaining valuable talent.



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Foreword

I'm pleased to share the 2025 State of Tech Talent Report, our annual look at what practitioners are saying. This year's data paints a clear picture: artificial intelligence is accelerating the evolution of technical roles—and widening the gap between talent supply and demand.

Across our survey respondents, organizations reported significant value from AI, especially in software development (54%), data analytics (52%), IT infrastructure monitoring (45%), and customer support (40%). These findings align with recent research showing measurable productivity gains: Google's internal trial found a 21% reduction in time spent on complex coding tasks with AI assistance¹, and developers using GitHub Copilot completed documentation up to 50% faster².

But AI isn't replacing people—it's transforming them. Rather than shrinking technical headcount, organizations are expanding it. Our data shows a growing net hiring effect from AI adoption, rising from +18% in 2024 to +23% projected in 2026. According to Deloitte, 75% of tech leaders are now adjusting their talent strategies around AI—most through upskilling, not layoffs³.

This shift is happening fast, and most organizations aren't ready. A lack of in-house AI expertise was cited as a top barrier to innovation in our survey—particularly in AI/ML, cloud, and cybersecurity. Bain & Company echoes this warning, calling the AI talent gap “a major roadblock to innovation”⁴.

To address this, organizations are doubling down on upskilling. We found that training current staff is now 62% faster than hiring and onboarding new talent—and 91% of organizations offering training report it's

1 Paradis et al., How much does AI impact development speed? An enterprise-based randomized controlled trial, arXiv, October 2024. <https://arxiv.org/abs/2410.12944>

2 Pandey et al., Transforming Software Development: Evaluating the Efficiency and Challenges of GitHub Copilot in Real-World Projects, arXiv, June 2024. <https://arxiv.org/abs/2406.17910>

3 Deloitte, State of Generative AI in the Enterprise, Q2 2024, as cited in CIO.com. <https://www.cio.com/article/2128420/it-leaders-ai-talent-needs-hinge-on-reskilling.html>

4 Bain & Company, Widening talent gap threatens executives' AI ambitions, March 2025. <https://www.bain.com/about/media-center/press-releases/20252/widening-talent-gap-threatens-executives-ai-ambitions--bain--company>



effective in retaining talent. That mirrors broader industry moves: Accenture plans to grow its data and AI workforce from 57,000 in 2024 to 80,000 by 2026 through in-house development⁵.

We're also seeing a shift in how skills are evaluated. This year's data confirms that employers value relevant experience, certifications, and performance-based credentials over traditional degrees. CompTIA reports that 80% of HR professionals rely on industry-recognized certifications⁶.

Finally, open source culture is proving to be a competitive edge. Our findings show that organizations embracing open source practices see stronger retention and skill development. Supporting this, a recent study links psychological safety and active participation in open source projects with long-term contributor engagement⁷.

Taken together, this year's data points to a new model for tech talent—one that rewards adaptability, continuous learning, and practical skill development. The organizations best prepared for the AI era will be those that invest in people, not just platforms.

Clyde Seepersad

Senior Vice President and General Manager

Linux Foundation Education

5 CIO Dive, Employees want generative AI training to help close talent gap, May 2025. <https://www.ciodive.com/news/AI-talent-upskilling-accenture/742741>

6 CompTIA, Workforce and Learning Trends 2023, June 2023. <https://www.comptia.org/content/research/workforce-and-learning-trends-2023>

7 Sesari et al., Safe to Stay: Psychological Safety Sustains Participation in Pull-based Open Source Projects, arXiv, April 2025. <https://arxiv.org/abs/2504.17510>

Executive summary

Our results reveal significant shifts in the technical workforce, particularly driven by AI adoption and a shortage of skilled professionals. A lack of skilled workforce remains one of the top three challenges to adopting new technologies, cited by 44% of respondents, following budget constraints (52%) and security/privacy concerns (45%).

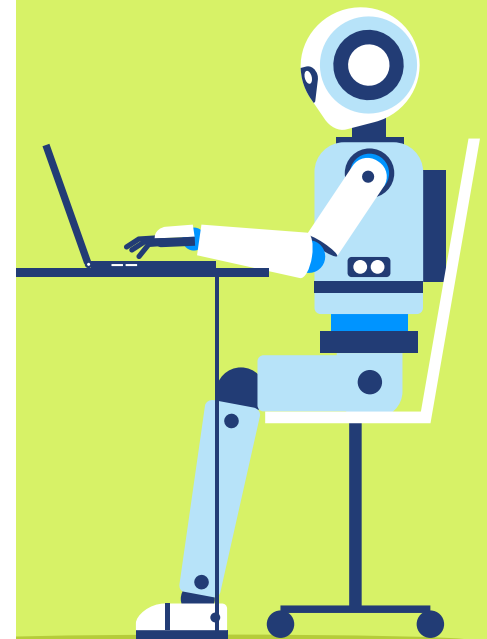
The talent shortage is especially acute in strategic domains, with organizations reporting significant understaffing in AI and ML engineering (68%), cybersecurity and compliance (65%), FinOps and cost optimization (61%), cloud computing (59%), and platform engineering (56%). This staffing crisis is particularly concerning given that 53% of organizations plan to increase public cloud adoption in the next 18 months and 94% expect AI to deliver significant value across core activities.

Contrary to widespread concerns about AI-driven job displacement, our research reveals a positive trajectory in workforce growth due to AI in the IT sector. The projected net hiring effect remains positive through 2026, expanding from 18% in 2024 to 23% in 2026, with remarkable consistency across regions. However, organizations face significant capability gaps in AI implementation, with core AI skills present in less than 50% of organizations. Even the most common AI capabilities—AI-assisted development and AI tool integration—are present in only 43% and 38% of organizations, respectively.

In response to these challenges, organizations are increasingly turning to internal talent development. Upskilling existing staff emerges as the leading strategy, with an impressive 97% of organizations rating it as strategically important. This preference is well-justified by efficiency metrics: while traditional hiring and onboarding processes consume an average of 8.4 months, organizations successfully upskill their workforce in just 5.2 months, representing a 38% reduction in time investment.

The effectiveness of this approach is further validated by retention data. Technical training shows 90% adoption and 91% effectiveness in employee retention. This is particularly significant given that 19.2% of newly onboarded technical staff exit their organizations within their first six months.

As technology continues to evolve at an accelerating pace, organizations that can effectively develop and retain their existing talent while strategically incorporating new expertise will be best positioned to thrive in an increasingly complex technical scenario.



Introduction

This report provides an analysis of the IT workforce and talent management strategies in the era of AI. Our insights draw on survey responses from 556 global participants responsible for hiring, training, and managing technical talent. The research explores how organizations navigate the intersection of talent management and technological innovation, specifically examining AI's impact on workforce dynamics.

The report is structured around three main themes: **the transformation caused by AI, the shortage of skilled IT professionals, and the role of upskilling to fill technological needs**. Our analysis shows how the talent shortage constrains technological innovation and explores successful talent management strategies, highlighting the potential of skill development programs, including upskilling (deepening existing capabilities) and cross-skilling (expanding expertise across domains). For consistency, we use the term “upskilling” throughout this report to reference both of these complementary training approaches.



The transformation caused by AI

AI creates more jobs than it eliminates

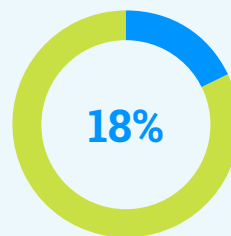
Despite widespread assumptions that AI's automation capabilities are reducing workforce demand and mitigating the IT talent shortage, our research reveals the opposite. Our survey data shows that AI adoption is contributing more to workforce growth than reduction. As observed in Figure 1, the projected net hiring effect remains positive through 2026, expanding from 18% in 2024 to 23% in 2026, indicating an increasingly competitive job market for technical talent. The net hiring effect is surprisingly consistent across regions, with the U.S. and Canada at +19%, Europe at +16%, and Asia-Pacific at +21%. It is also positive across organization sizes and industries.

FIGURE 1

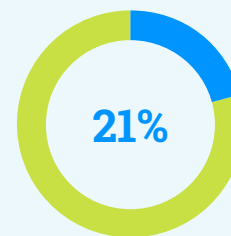
The net hiring effect from AI is positive and projected to increase year over year

2025 Tech Talent, Q22, DKNS & NA excluded (12% to 29%), Sample Size = 556.

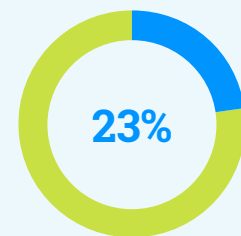
Net Hiring Effect = % of organizations reporting headcount increase — % reporting headcount decrease



Net Impact to the organizations in 2024



Net Impact to the organizations in 2025



Net Impact to the organizations in 2026

We also notice that the workforce is undergoing a transformation in the nature of technical work. As shown in Figure 2, organizations are simultaneously scaling their workforce up and down across different roles, creating a dynamic job market where new positions emerge in some organizations while older positions evolve or fade. We also notice a growing demand for AI-related professionals, as over 50% of organizations

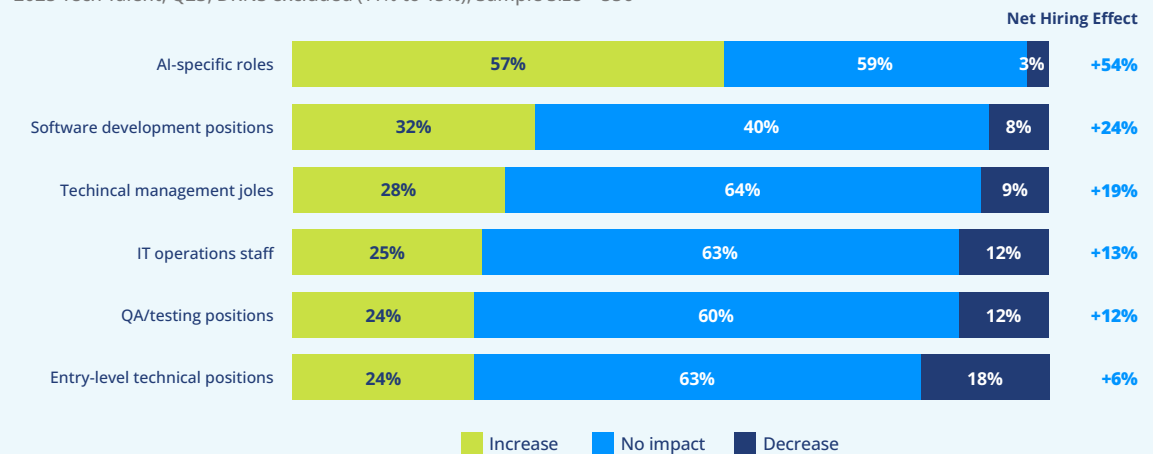


are expanding their AI-specific workforce, creating additional demands in an already constrained pool of skilled technical workers. Software development also experiences solid gains, with net hiring effects of +24%, indicating steady demand for core software engineering, contrary to the belief that AI is replacing software developers. Even entry-level technical positions show a net positive effect (+6%), although lower than others, pointing to early-stage opportunities for new talent despite automation concerns.

FIGURE 2: THE NET HIRING EFFECT IS POSITIVE ACROSS TECHNICAL POSITIONS

How has AI impacted your technical workforce in the following areas during 2024?

2025 Tech Talent, Q23, DKNS excluded (11% to 15%), Sample Size = 556



Overall, these findings challenge popular beliefs about AI-driven job displacement, reinforcing the idea that AI adoption is more often complementing than replacing technical roles. This pattern of job creation following automation has multiple historical precedents, both within and outside the IT industry. When ATMs were introduced in banking, tellers evolved into relationship managers as banks expanded their branch networks. Similarly, spreadsheet software transformed accountants from number crunchers into strategic advisors. In the IT sector, we've seen this pattern repeat with cloud computing: while it automated many traditional system administrator tasks, it created a surge in demand for cloud architects, DevOps engineers, and site reliability specialists. Similarly, when automated testing tools became widespread, many manual testers transitioned into automated testing engineers and quality assurance architects, focusing on test strategy and complex test scenario design rather than repetitive manual testing.

Recent studies support this transformative pattern. The Linux Foundation's 2024 AI study⁸ also reports a positive net hiring effect in the industry, with 19% of organizations increasing hiring due to generative AI, compared to 14% downsizing. The World Economic Forum's Future of Jobs Report 2023⁹ indicates that organizations expecting a positive AI impact on job growth outnumber those expecting a negative impact by 2.1 times. McKinsey Global Institute¹⁰ predicts a 23% surge in STEM job demand by 2025, with 12 million occupational transitions potentially needed by 2030. The International Labour Organization¹¹ also concludes that AI is more likely to augment than eliminate jobs.

We can conclude that, as happened with other disruptive technologies, AI is reshaping roles rather than eliminating them, leading to shifts in skill demand and new opportunities for workforce growth. This scenario leads to a systemic gap in technical expertise, increasing the importance of proactive upskilling initiatives. The path forward lies not in resisting automation but in embracing it while ensuring workforce training through comprehensive upskilling initiatives. While AI may not replace professionals, those who are not able to operate in AI-enabled environments will certainly be replaced by those who do.

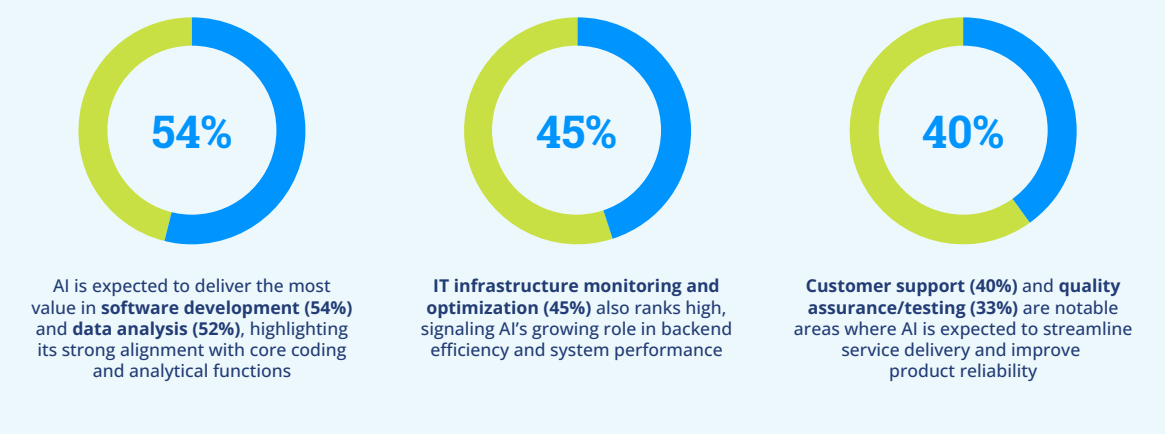
AI does not replace workers, but it reshapes their roles

As AI continues to drive the modernization of IT, our data reveals that organizations expect AI to deliver substantial value across their core operations. Only 6% of the organizations have no plans to use AI, while 94% expect AI to deliver significant value across core activities. Figure 3 presents the top areas where organizations expect significant value, while Appendix

FIGURE 3

Organizations expect AI to deliver significant value across core activities

2025 Tech Talent, Q24, Sample Size = 556, Total Mentions = 1,811, DKNS excluded (5%)



8 https://www.linuxfoundation.org/hubfs/LF%20Research/lfr_genai24_111924.pdf

9 <https://www.weforum.org/press/2023/04/future-of-jobs-report-2023-up-to-a-quarter-of-jobs-expected-to-change-in-next-five-years/>

10 <https://www.mckinsey.com/mgi/our-/generative-ai-and-the-future-of-work-in-america>

11 <https://www.ilo.org/publications/generative-ai-and-jobs-global-analysis-potential-effects-job-quantity-and>

A1 provides the full list. For a broader perspective on AI adoption, we refer the reader to the Linux Foundation 2024 GenAI report¹², which confirms significant AI-driven value in the IT industry.

The pervasive impact of AI is transforming the daily work of technical teams. Our results reveal that 67% of organizations already face significant changes in their technical work processes. These changes manifest in several ways, even for traditional roles. For example, 33% of organizations indicate developers are dedicating significant time to reviewing and validating AI-generated code, as illustrated in Figure 4.

FIGURE 4

67% of organizations report significant changes to their technical work due to AI

2025 Tech Talent, Q27, Sample Size = 556, Total Mentions = 866, DKNS excluded (11%). Full data available on Appendix A2.



AI is giving rise to a variety of **new roles**, which can help explain the net hiring effect evidenced in earlier figures.



33% of organizations report developers spending **significant time reviewing AI-generated code**.



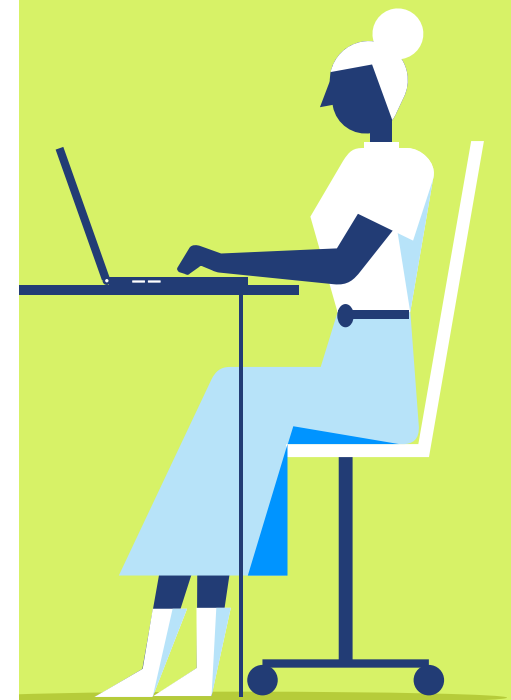
Retraining is underway, with 28% of organizations upskilling existing staff to effectively supervise and prompt AI tools



Traditional **entry-level tasks** are increasingly automated, with **24%** noting that AI tools now handle many of these tasks

Organizations also report that AI tools have automated many tasks traditionally performed by entry-level staff (24%). This automation of entry-level tasks, combined with the fact that AI proficiency is increasingly part of technical job descriptions (see Appendix A2), signals a fundamental reshaping of career entry points for new tech professionals, who must now be prepared to operate in an AI-driven environment from day one. To adapt to this evolving scenario, 28% of organizations are investing in upskilling their existing personnel to effectively supervise and interact with AI tools.

12 https://www.linuxfoundation.org/hubfs/LF%20Research/lfr_genai24_111924.pdf



This evidence shows the shift in job responsibilities rather than job elimination. As observed in Appendix A2, 22% are leveraging AI to automate IT operations tasks and only 33% of organizations have not yet observed significant changes in their work processes due to AI. This highlights both the deep integration of AI into core technical functions and the resulting shift in necessary technical skills.

The emergence of new AI-focused roles further demonstrates this transformation, representing a significant shift in organizational structures and talent requirements. As illustrated in Figure 5, companies are creating specialized positions to manage, implement, and oversee AI integration throughout their operations. AI & ML Operations Engineering leads this transformation at 64% adoption, followed by AI Product Manager (36%) and AI Quality Assurance Engineer (33%) roles. This diversification extends beyond technical implementation to include other aspects, with AI Governance Specialists (29%), Prompt Engineers (26%), AI Safety Engineers (20%), and AI Ethics Officers (16%) gaining prominence.

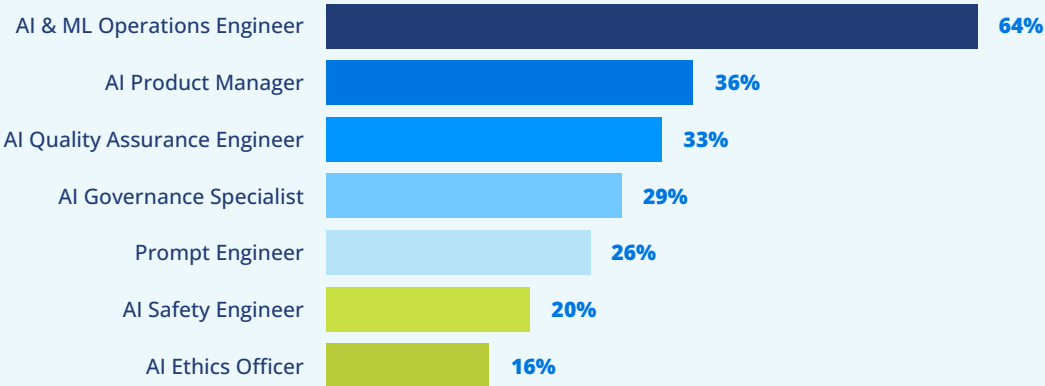
This trend highlights not only the technical expertise required for AI implementation but also the emphasis on responsible AI development, quality control, and ethical oversight. Organizations are recognizing that successful AI integration demands a comprehensive ecosystem of specialized talent to address both technological capabilities and the broader implications of AI deployment. In summary, AI is not simply automating tasks, but also creating demand for new expertise and job functions.

As with previous technological shifts like cloud computing, organizations that fail to modernize their infrastructure and incorporate AI capabilities risk falling behind their competitors. The pattern reflects a broader shift in skill requirements and job functions, where AI-enabled productivity gains are not merely automating tasks but catalyzing entirely new categories of technical work. These changes in team dynamics and organizational structure highlight how AI is not just transforming what work gets done, but also how it gets done and who does it. A balanced approach to AI adoption, considering both technical implementation and workforce transformation, will likely be essential for organizations seeking to maximize the value of their AI investments.

FIGURE 5: AI IS CREATING DEMAND FOR NEW EXPERTISE AND JOB FUNCTIONS

Which new AI-focused roles have emerged in your organization?
(select all that apply)

2025 Tech Talent, Q28, answered only by Q23.6 (AI-specific roles) = "Increase",
Sample Size = 269, Total Mentions = 546, DKNS excluded (19%)



94% of organizations
expect that AI will
provide significant value
in key strategic areas

Organizations lack skills to support AI initiatives

While AI is reshaping workflows and redefining technical tasks, as observed in the previous sections, many organizations are not yet equipped with the skills needed to support these transformations. As observed in Figure 6, core AI skills are present in less than 50% of organizations, highlighting a significant barrier to effective AI implementation and scaling of intelligent technologies.

The highest concentration of AI capabilities centers around AI-assisted development (code generation, testing) at 43%, followed by AI tool integration at 38%. While these leading indicators suggest some organizations are building basic AI implementation capabilities, the fact that over half lack these fundamental skills points to a significant challenge in achieving broad AI adoption.

The capability gap becomes more pronounced when examining prompting and operations capabilities. 36% of organizations possess AI prompt engineering, while 31% have developed AI operations expertise. This suggests that while some organizations can initiate AI projects, many lack the operational skills to maintain and scale these initiatives effectively.

Security capabilities present another significant concern, with only 25% of organizations reporting AI security management capabilities. This shortage

is particularly alarming given the increasing sophistication of AI-related security threats and the growing regulatory focus on AI governance and risk management. The lack of security expertise could expose organizations to significant vulnerabilities as they deploy more AI systems across their operations.

Also noticeable is the moderate presence of AI model customization and fine-tuning capabilities at 28%. This limitation suggests that even among organizations implementing AI, many are confined to standardized solutions, potentially missing opportunities for competitive differentiation through customized AI applications.

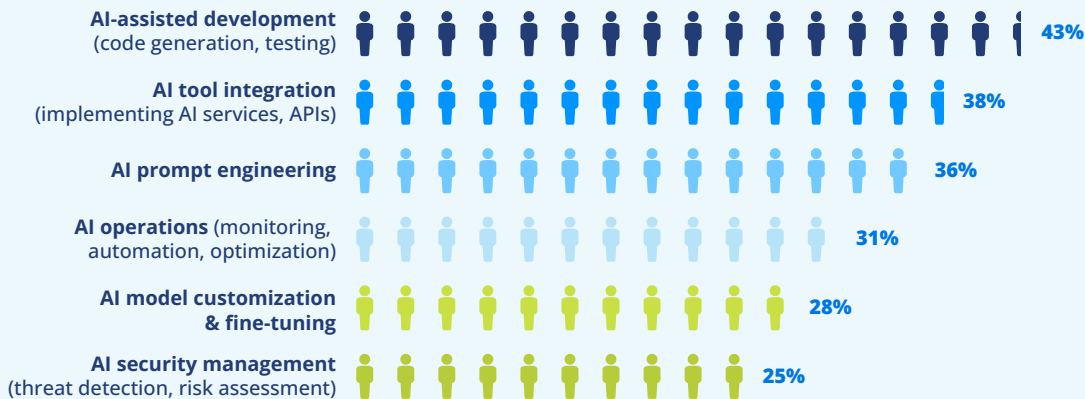
Looking ahead, organizations must take decisive action to address these capability gaps. This includes developing comprehensive AI skills development programs and prioritizing building security and operational capabilities alongside technical skills to ensure successful and responsible AI implementation.

Only 25% of organizations report AI security management capabilities

FIGURE 6: CORE AI SKILLS ARE MISSING IN OVER HALF OF ORGANIZATIONS

What AI-related skills does your organization currently have on staff? (select all that apply)

2025 Tech Talent, Q26, Sample Size = 556, Total Mentions = 1,236



The shortage of skilled IT professionals

The talent crisis poses a barrier to innovation

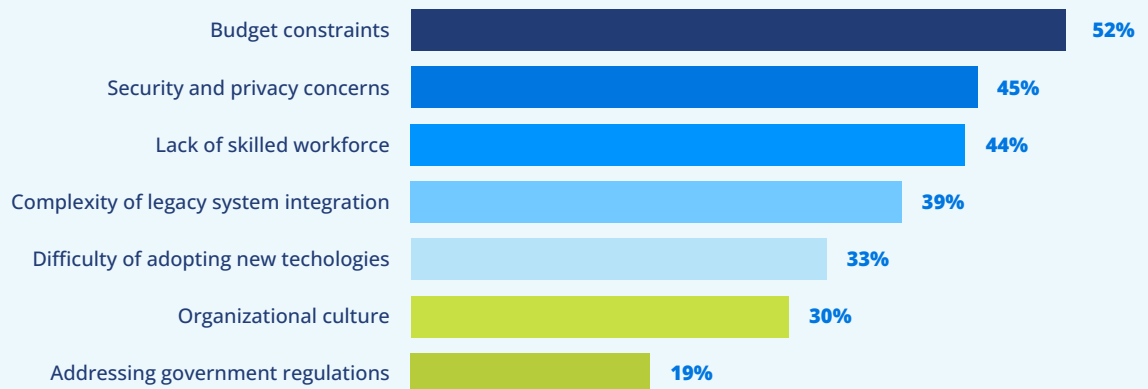
Consistent with last year's report¹³, the shortage of skilled workers remains a major barrier to technology adoption. As shown in Figure 7, 44% of respondents cited this challenge, ranking it third behind budget constraints (52%) and security/privacy concerns (45%). This barrier is consistently highly rated across organization size, region, and industry segments (see Appendix A3 for regional details). This suggests that IT modernization challenges for organizations are often centered more on human capital development than on the technological complexity, cultural transformation, or legal barriers.

Therefore, for technology adoption to succeed, investment in human capital must parallel, or even precede, investment in the technology itself. Unlike budget or security constraints, which can often be addressed with specific financial allocations or technical fixes, cultivating a skilled workforce is a continuous, long-term process requiring dedicated resources for training, upskilling, and fostering adaptability. Organizations that fail to strategically address this skills gap risk not only slower adoption but also the inability to fully leverage new capabilities, ultimately hindering innovation and competitiveness despite significant technological expenditure.

FIGURE 7: CITED BY ALMOST HALF OF THE PARTICIPANTS, LACK OF SKILLED WORKFORCE IS AMONG THE TOP 3 PRIMARY CHALLENGES FOR ADOPTING NEW TECHNOLOGIES

What are your organization's primary challenges in adopting new technologies? (select all that apply)

2025 Tech Talent, Q18, Sample Size = 556, Total Mentions = 1,489, some options were omitted due to low response rate



¹³ <https://www.linuxfoundation.org/research/open-source-jobs-report-2024>

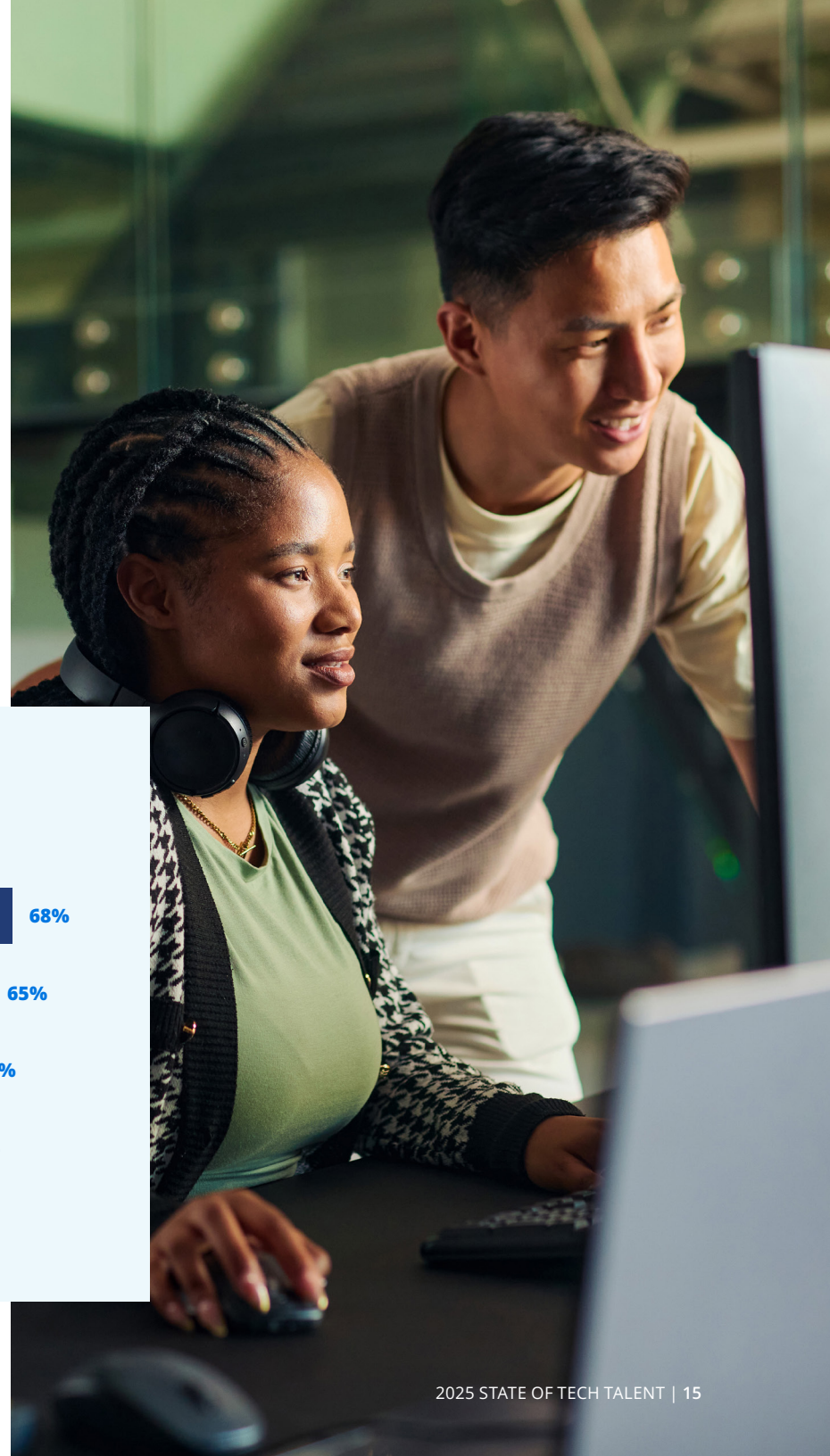
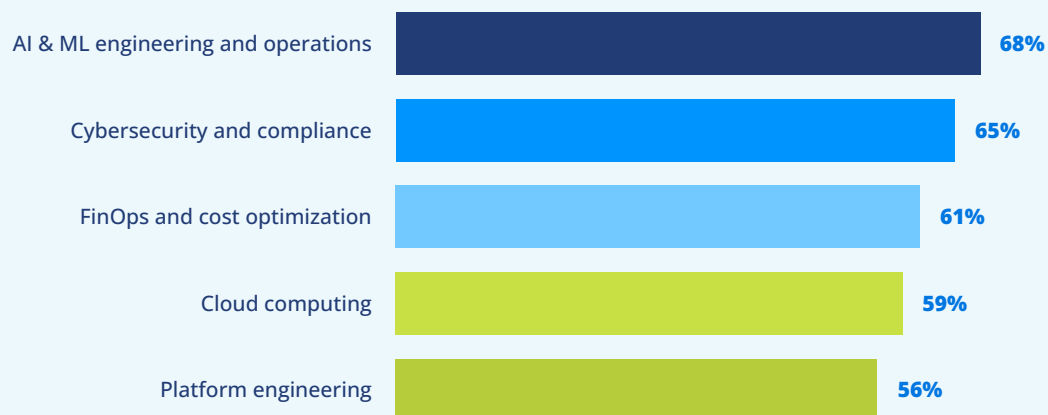
Strategic domains are understaffed in most organizations

Workforce challenges significantly impede progress, particularly in AI and IT modernization. As observed in Figure 8, the talent shortage is especially acute in AI and ML engineering and operations, where 68% of organizations report being understaffed, followed closely by cybersecurity and compliance (65%). This staffing crisis extends across other strategic technical domains, with most organizations reporting significant understaffing in FinOps and cost optimization (61%), cloud computing (59%), and platform engineering (56%). These high rates of understaffing are particularly concerning given that 53% of organizations plan to increase public cloud adoption in the next 18 months (see Appendix A4) and 94% expect AI to deliver significant value across core activities. Without addressing these fundamental workforce challenges, organizations may struggle to fully capitalize on these transformative technologies and realize their strategic digital ambitions.

FIGURE 8: ORGANIZATIONS ARE UNDERSTAFFED IN KEY TECHNOLOGICAL AREAS

% of understaffed organizations:

Source: 2025 Tech Talent, Q19, Sample Size = 556, DKNS excluded (3% to 15%)



Upskilling as the key strategy to develop the workforce

Organizations prefer to upskill existing talent

Organizations needing to modernize their infrastructure face a dilemma: hire new talent or upskill the existing workforce. Our results reveal a clear trend. As observed in Figure 9, upskilling existing staff is the top strategy, used by 72% of organizations, highlighting a strong reliance on internal workforce development rather than external hiring.

FIGURE 9: UPSKILLING IS THE LEADING STRATEGY TO MEET TECHNICAL SKILL DEMANDS

How does your organization ensure that its technical staff have the necessary skills to fulfill the technological needs of the organization?

2025 Tech Talent, Q29,
Sample Size = 556, Total Mentions = 1,204.
Cross-skilling and upskilling merged.



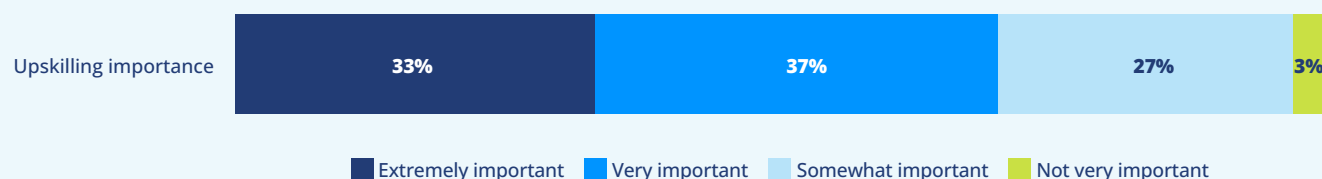
These findings are also corroborated by Figure 10, which reinforces that organizations view upskilling as a strategic priority, with a combined 97% rating it as important, and 70% rating it as very or extremely important. No significant differences were observed when analyzing responses by region, organization size, or industry, indicating that the importance of upskilling is a universally valued strategy, regardless of organizational context, further validating its role in talent planning and workforce development.



FIGURE 10: 97% OF ORGANIZATIONS RECOGNIZE UPSKILLING AS A STRATEGIC PRIORITY

How important is upskilling as a strategy to address technical talent needs? (select one)

2025 Tech Talent, Q30, DKNS excluded (6%), Sample Size = 556



The preference for developing internal talent also emerges as a top strategy when examined across technical domains. As observed in Appendix A5, organizations prefer upskilling existing talent over new hires by a factor of 3.2 and over consultants by a factor of 3.5. In cloud computing, for example, organizations opt for upskilling existing staff 70% of the time, more than four times the rate of hiring new talent (16%). As cloud infrastructure becomes increasingly interwoven with legacy systems, security frameworks, and business processes, organizations recognize that their existing workforce, armed with deep institutional knowledge, is best positioned to drive cloud transformation when equipped with new skills.

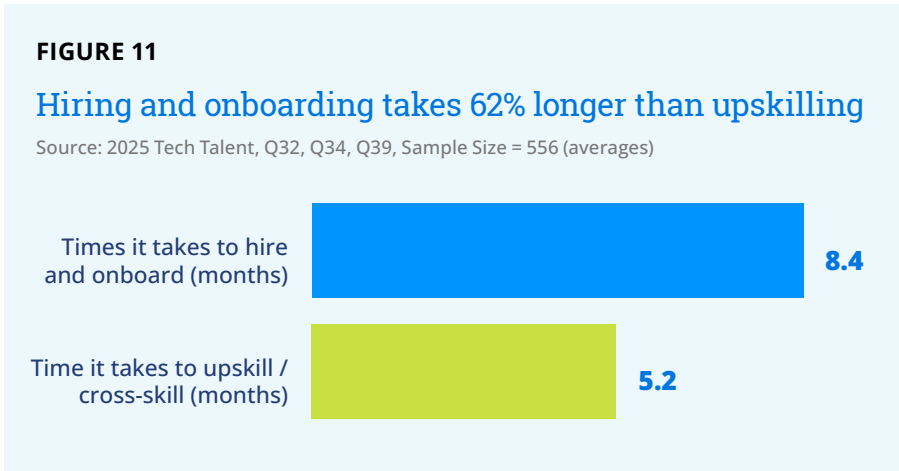
For AI and machine learning, while the preference for upskilling remains strong at 56%, the higher proportions for new hiring (27%) and consultants (17%) suggest a recognition of AI's unique challenges. Organizations appear to be crafting a hybrid approach that leverages existing talent while strategically injecting new expertise. Organizations are finding out that their existing talent pool, when properly developed, can drive innovation more effectively than external recruitment alone.

This strategic focus on internal talent development may prove to be one of the most significant organizational adaptations to the digital age, fundamentally altering how companies build and maintain their technical capabilities. As technology continues to evolve, the ability to rapidly upskill existing talent becomes the primary differentiator between organizations that thrive and those that stagnate in an increasingly complex technical scenario.

As technology continues to evolve, the ability to rapidly upskill existing talent becomes the primary differentiator between organizations that thrive and those that stagnate in an increasingly complex technical scenario.

It is faster to upskill existing talent than to hire

Upskilling existing employees delivers substantial time advantages over hiring new talent. While traditional hiring and onboarding processes consume an average of 8.4 months, organizations can successfully upskill their workforce in just 5.2 months, as illustrated in Figure 11, representing a 38% reduction in time investment. This efficiency gap is particularly striking in the Asia-Pacific region, where upskilling is 89% faster than traditional hiring (see Appendix A6 for a geographic breakdown). Globally, no significant difference was found when analyzing by organization size and industry. The dramatic time savings help explain why organizations increasingly favor upskilling strategies over external recruitment to address their talent needs.



This difference can be even wider for more senior positions. Table 2 illustrates a correlation between position seniority and time-to-hire. Executive positions require the longest hiring and onboarding periods, averaging almost one year (11.7 months). This hiring and onboarding timeline gradually decreases through director (11.5 months), manager (10.1 months), and senior technical roles (10.0 months). These findings further emphasize why organizations increasingly favor upskilling internal talent—the considerable time investment required for external hiring across all position levels creates operational gaps that internal development can substantially reduce.

TABLE 2

Time to hire and onboard is proportional to seniority

2025 Tech Talent, Q33, DKNS excluded (8% to 37%), Sample Size = 556.

The average onboarding time was added to all positions.

ROLE	AVERAGE HIRING AND ONBOARDING TIME (MONTHS)
Executive Level	11.7
Director Level	11.5
Manager Level	10.1
Senior Technical Level	10.0
Mid-Level Technical	8.7
Entry-Level Technical	7.6

In an era where competitive advantage often hinges on rapidly adapting to technological change, the ability to transform existing talent nearly twice as quickly as acquiring new talent represents a significant strategic advantage. Beyond mere time efficiency, upskilling capitalizes on existing employees’ familiarity with organizational culture, established processes, and institutional knowledge. Organizations can achieve their workforce transformation goals more rapidly while preserving valuable institutional expertise by prioritizing internal talent development over external recruitment.

Upskilling is effective for retaining talent

The risks of hiring new talent extend beyond just lengthy recruitment cycles. Our data reveals a concerning pattern of early departures: 19.2% of newly onboarded technical staff exit the organization—through resignation or termination—within their first six months (see Appendix A7). This substantial early turnover creates a costly cycle of recruitment, training, and replacement. When combined with the extended hiring periods shown in Figure 11, these early departures represent a significant drain on organizational resources and productivity, further emphasizing why investing in existing employee development offers a more stable and efficient talent strategy. Retaining top talent helps preserve institutional knowledge, maintain team cohesion, and create the relevant expertise that comes from sustained organizational experience.

As illustrated in Figure 12, our survey reveals the success of technical training (90% adoption, 91% effectiveness) in employee retention. As observed in Appendix A8, while competitive compensation packages maintain their importance (92% adoption, 95% effectiveness), their similar levels of effectiveness compared to development-focused initiatives align with the previous findings, evidencing the importance of workforce development initiatives.

Our survey also reveals the effectiveness (84%) of open source culture initiatives in retaining tech talent, recognizing that modern technical talent seeks more than just competitive salaries—they desire participation in broader technical communities and knowledge sharing. This holistic approach to talent development—combining technical growth, workplace flexibility, and community engagement—creates a compelling environment that both attracts and retains high-performing technical staff.

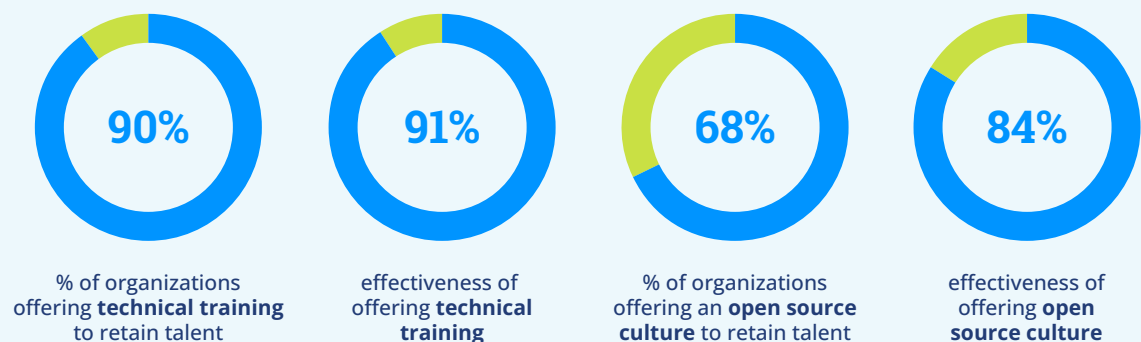
On average, **19.2%**
of the new hires leave
within 6 months

“Modern technical talent seeks more than just competitive salaries—they desire participation in broader technical communities and knowledge sharing.”

FIGURE 12

Upskilling and open source are effective strategies for retaining talent

Source: 2025 Tech Talent, Q31, DKNS excluded (3% to 6%), Sample Size = 556



Benefits and challenges of upskilling the workforce

The data reveals a compelling value proposition for upskilling programs, with over half (55%) of respondents recognizing its potential to enhance job satisfaction through career development opportunities, as illustrated in Figure 13. This strong endorsement is further supported by the fact that 48% of organizations find upskilled employees more effectively redeployable than new hires, suggesting that internal talent development yields better operational flexibility than external recruitment. The emphasis on expanding junior technical staff capabilities (47%) also indicates that organizations are increasingly viewing upskilling as a strategic pathway for building sustainable technical talent pipelines.

FIGURE 13

Top benefits and challenges for upskilling technical staff

2025 Tech Talent, Q40, Sample Size = 556, Total Mentions = 1,693 (top three shown), 2025 Tech Talent, Q41, Sample Size = 556, Total Mentions = 1,226. (top three shown)

BENEFITS	CHALLENGES
Presents career development opportunities to staff members, potentially leading to higher job satisfaction (55%)	Creating and nurturing an environment for continuous learning takes effort and time (41%)
Produces employees with varied skillsets who can be redeployed more effectively than new hires (48%)	Upskilling takes time and can be ineffective at training for complex roles (39%)
Provides an ideal pathway for junior technical staff to expand their capabilities (47%)	Resources are pulled away from other priority areas (37%)

Our respondents also report challenges of upskilling technical staff, which primarily center around the practical implementation of training programs. The most significant challenge, cited by 41% of respondents, is the substantial effort and time required to create and maintain an environment conducive to continuous learning. This is compounded by the difficulty in effectively training for complex roles (39%), highlighting the limitations of traditional upskilling approaches when dealing with sophisticated technical positions. Additionally, the resource allocation dilemma is evident, with 37% reporting that upskilling programs divert resources from other priority areas, forcing organizations to carefully balance their investment in talent development against other strategic priorities.



Strategies to hire new talent

Our survey also identified how the technology sector evaluates technical skills (see Figure 14). Hands-on experience emerged as the most valued factor at 95% importance. This strong preference for practical experience suggests that companies might find more success in upskilling their existing workforce rather than hiring new talent, as they already have detailed visibility into their current employees’ hands-on experience and can more easily validate their practical capabilities through internal projects and assignments.

The high value placed on portfolios and previous IT project accomplishments (85% importance) reinforces the significance of demonstrable skills over theoretical knowledge. This insight has important implications for both personal and organizational development strategies. For individuals, contributing to open source software projects represents an excellent opportunity to build a publicly verifiable portfolio of work. OSS contributions not only demonstrate technical proficiency but also show collaboration skills, code quality, and the ability to work within established development frameworks — all while creating a permanent, public record of one’s capabilities that potential employers can evaluate.

Certification of skills ranks as the third most important factor at 71%, indicating that formal validation of knowledge is valuable for most organizations. Certifications serve as a standardized way to verify expertise in specific technologies, frameworks, or methodologies, making them an essential component of technology professionals’ credentials. They are particularly valuable for demonstrating mastery of specific technical competencies, validating up-to-date knowledge of new technologies, and providing employers with confidence in a candidate’s theoretical understanding and practical capabilities. Organizations should actively support and encourage certification programs as part of their professional

“Training and certification opportunities are highly effective in retaining technical talent.”

development initiatives, especially because, as shown in Appendix A8, training and certification opportunities are highly effective in retaining technical talent.

Interestingly, formal college or university degrees rank significantly lower at 65% importance. This reinforces that the technology sector values practical capabilities over academic credentials, suggesting that companies should prioritize experience-based training initiatives and hands-on skill development programs. For organizations considering upskilling programs, this data supports structuring such initiatives around practical project work and portfolio building, potentially incorporating certification milestones while maintaining the primary focus on developing real-world experience and demonstrable capabilities.

FIGURE 14: HANDS-ON EXPERIENCE AND PORTFOLIO OF ACCOMPLISHMENTS ARE KEY TO EVALUATING TECHNICAL SKILLS

How important are the following education and experience factors when assessing a candidate’s technical skills?

Source: 2025 Tech Talent, Q36, DKNS excluded (1 to 2%), Sample Size = 556



The role of upskilling and open source in implementing AI

As illustrated in Figure 15, the dominance of upskilling as the top AI implementation strategy (49%) reveals how organizations view the AI revolution: not primarily as a technology acquisition race, but as a human capital transformation. This preference for upskilling existing workers rather than replacement suggests that companies recognize that domain expertise and institutional knowledge are irreplaceable assets that need to be augmented, not discarded, in the AI era. It also indicates a pragmatic response to the global shortage of AI talent. Rather than competing in an expensive and limited market for AI specialists, organizations are betting on their ability to evolve their current workforce’s capabilities.

Leveraging open source frameworks, models, and tools is the second most common strategy (40%). The strong preference for open source represents a significant shift in how enterprises approach AI adoption, marking a departure from the traditional enterprise software model of proprietary vendor solutions. This embrace of open source frameworks and models suggests that organizations are prioritizing flexibility, customization, and cost-effectiveness over out-of-the-box solutions. More importantly, it indicates a recognition that AI development benefits from community-driven innovation and shared knowledge bases — the same factors that made Linux and other open source technologies dominant in enterprise computing. Organizations appear to be learning from historical technology adoption patterns, recognizing that open source’s collaborative nature is particularly well suited to the rapidly evolving field of AI.

“AI development benefits from community-driven innovation and shared knowledge bases – the same factors that made Linux and other open source technologies dominant in enterprise computing.”

FIGURE 15: UPSKILLING AND OPEN SOURCE STRATEGIES ARE THE TOP PRIORITIES FOR AI IMPLEMENTATION

How does your organization plan to address its AI core activities? (select all that apply)

Source: 2025 Tech Talent, Q25, Sample Size = 556, Total Mentions = 1,392 (top 5 responses shown)



Conclusion

Our findings evidence a critical shortage of skilled IT workforce professionals, which impacts new technology adoption, particularly AI. While AI is creating a net positive hiring effect, it is also reshaping roles and requiring new expertise. Our findings also reveal that upskilling existing talent is a preferred and faster strategy for organizations to meet technical skill demands and improve retention, compared to the lengthy process of hiring new employees.

Key recommendations include:

- **Prioritize internal talent development:** Upskilling existing employees takes just 5.2 months compared to 8.4 months for traditional hiring and onboarding, representing a 38% reduction in time investment. Organizations can achieve their workforce transformation goals more rapidly while preserving institutional expertise by prioritizing internal talent development over external recruitment.
- **Foster a continuous learning environment:** Upskilling is strategic for organizations, with 97% rating it as important, and 70% rating it as very or extremely important. To implement upskilling effectively, organizations should create and maintain a continuous learning environment, which helps retain their talent.
- **Emphasize practical experience and certification:** Organizations should focus on hands-on experience (95% importance) and portfolios (85% importance) when evaluating technical skills. Certification of skills (71% importance) should be actively supported as part of professional development initiatives. This is particularly important as the technology sector values practical capabilities over academic credentials.
- **Leverage open source culture:** Organizations should embrace open source culture initiatives, which show 84% effectiveness in retaining tech talent. This recognizes that modern technical talent seeks more than just competitive salaries—they desire participation in broader technical communities and knowledge sharing.
- **Prepare for AI integration:** Organizations should approach AI implementation through a combination of upskilling existing workers (49%) and leveraging open source frameworks, models, and tools (40%), evolving the workforce's capabilities and leveraging open source for community-driven innovation and shared knowledge.





Methodology and demographics

About the survey

This study is based on an online survey conducted by Linux Foundation Research in March 2025. The survey aimed to understand trends in technical hiring and the effects of AI disruption on the workforce. We broadly advertised the survey to Linux Foundation subscribers, members, partner communities, and social media. To mitigate sampling biases, we also hired a panel provider. We addressed data quality through extensive prescreening, survey screening questions, consistency checks, and data quality review to ensure that respondents had sufficient professional experience to answer questions accurately on behalf of their organization. We only considered complete responses to the survey. After the data quality filtering, our final sample comprised 556 valid responses.

The survey comprised 42 questions that addressed screening, respondent demographics, AI's impact in organizations, and ways to address talent management needs. The dataset driving the analysis in this report and survey frequencies can be found on Data.World (see below).

The target audience included respondents who met the following criteria:

- Must be responsible for hiring, recruiting, or training information technology (IT) professionals
- Must pass an attention check question.
- Must be currently employed by an organization.

A total of 3,237 respondents began the survey and 603 completed the survey. After data quality screening, the analyzed data set comprises 556 responses. The margin of error for this sample size is +/- 3.50% at a 90% confidence level and +/- 4.16% at a 95% confidence level. The data was primarily segmented by region, organization size, and industry.

Although respondents were required to answer nearly all questions in the survey, a provision was made when a respondent was unable to answer a question. This is accomplished by adding a "Don't know or not sure" (DKNS) response to the list of responses for every question. However, this creates a variety of analytical challenges. One approach was to treat a DKNS just like any other response so that the percentage of respondents who answered the DKNS is known. This approach has the advantage of showing the exact

distribution of the data collected. The challenge with this approach is that it can distort the distribution of valid responses, i.e., responses where respondents could answer the question. Therefore, most of the analyses in this report exclude DKNS responses. This is because we can classify the missing data as either missing at random or missing completely at random. Excluding DKNS data from a question does not change the distribution of data (counts) for the other responses, but it does change the size of the denominator used to calculate the percentage of responses across the remaining responses. This has the effect of proportionally increasing the percentage values of the remaining responses. Where we have elected to exclude DKNS data, the footnote for the figure indicates “DKNS responses excluded from the analysis.”

The percentage values in this report may not total exactly 100% due to rounding.

Data.World access

LF Research makes each of its empirical project datasets available on Data.World (<http://data.world/thelinuxfoundation>). Included in this dataset are the survey instrument, raw survey data, screening and filtering criteria, and frequency charts for each question in the survey. Access to Linux Foundation datasets is free but does require you to create a data.world account.

Respondent demographics

Figure 16 presents the respondent demographics. Most respondents (70%) are hiring managers for technical teams. The vast majority (89%) are employed full-time. Professionally, they are most heavily concentrated in software development (29%) and systems operations (22%), with C-level executives making up 8% of respondents. These professionals work predominantly for Asian-Pacific (39%) and European (31%) organizations, followed by North Americans (22%). They are spread across organizations of varying sizes, with 38% working in smaller companies (1-249 employees), 34% in mid-sized companies (250-4,999 employees), and 28% in large enterprises (5,000+ employees). Most respondents work for technology-focused companies, with 51% working for organizations whose primary revenue comes from IT products or services, while 40% work for companies providing industry-specific products or services.

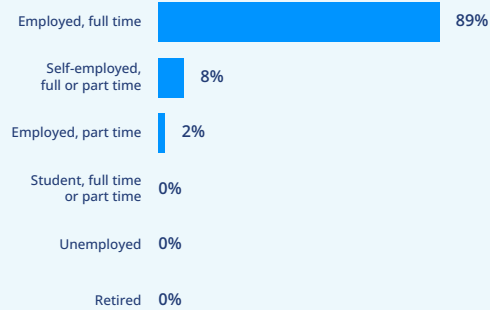
Some demographics have been regrouped to facilitate a more insightful analysis. For the original source data and study frequencies, please see the data.world dataset and access as described above.

FIGURE 16: RESPONDENT DEMOGRAPHICS

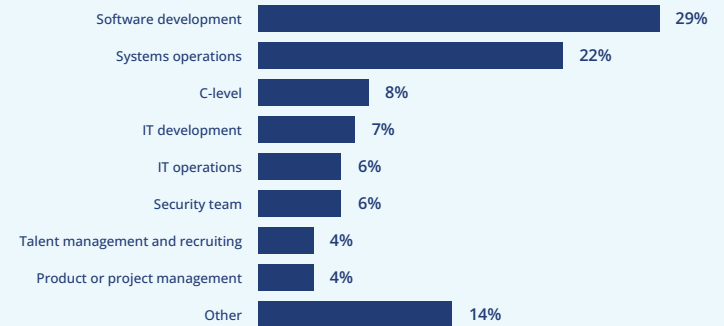
What type of hiring or sourcing person are you?



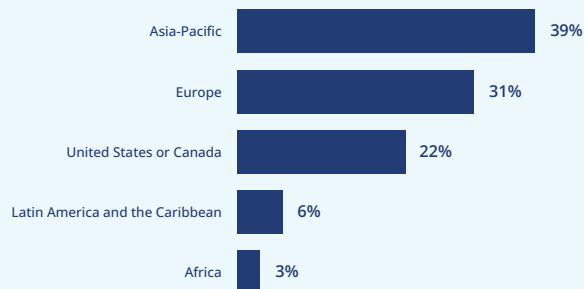
What is your current employment status?



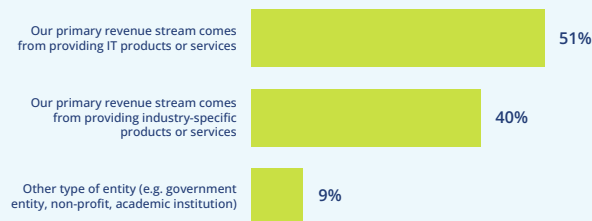
Professionally, which role or field do you most closely identify with?



In what country or region does your organization have its headquarters?



Which option best describes the company or entity you work for?



Please estimate how many total employees are in the company or entity you work for.



Appendix

Appendix A1

WHERE DOES YOUR ORGANIZATION EXPECT AI TO DELIVER SIGNIFICANT VALUE ACROSS THE FOLLOWING CORE ACTIVITIES? (SELECT ALL THAT APPLY)	%
Software development (e.g., code generation, testing)	54%
Data analysis and reporting	52%
IT infrastructure monitoring & optimization	45%
Customer support and helpdesk services	40%
Quality assurance and testing	33%
System maintenance and updates	27%
Network management and security	26%
Project management tasks	26%
Sales and marketing	26%
No plans to use AI	6%
Other (please specify)	2%

2025 Tech Talent, Q24, Sample Size = 556, Total Mentions = 1,811, DKNS excluded (5%)

Appendix A2

HOW HAS AI CHANGED YOUR TECHNICAL TEAM'S WORK IN 2024? (SELECT ALL THAT APPLY)	%
Our developers spend significant time reviewing/validating AI-generated code	33%
We haven't seen significant changes in work processes from AI yet	33%
We retrained existing staff to supervise/prompt AI tools effectively	28%
Many traditional entry-level tasks are now handled by AI tools	24%
We now require AI tool proficiency in our technical job descriptions	22%
We're automating IT operations tasks using AI (monitoring, incidents, capacity)	22%

2025 Tech Talent, Q27, Sample Size = 556, Total Mentions = 866, DKNS excluded (11%)

Appendix A3

WHAT ARE YOUR ORGANIZATION'S PRIMARY CHALLENGE(S) IN ADOPTING NEW TECHNOLOGIES? (SELECT ALL THAT APPLY) BY IN WHAT COUNTRY OR REGION DOES YOUR ORGANIZATION HAVE ITS HEADQUARTERS? (SELECT ONE)	NORTH AMERICA	EUROPE	ASIA-PACIFIC
Budget constraints	58%	56%	45%
Security and privacy concerns	54%	42%	45%
Lack of skilled workforce	48%	44%	43%
Complexity of legacy system integration	45%	39%	34%
Difficulty of adopting new technologies	26%	24%	43%
Organizational culture	34%	36%	24%
Addressing government regulations	16%	24%	16%

2025 Tech Talent, Q18 by Q9 regrouped. Sample Size = 556, Total Mentions = 1,489

Appendix A4

OVER THE NEXT 18 MONTHS, HOW WILL THE USE OF EACH OF THESE COMPUTING ENVIRONMENTS CHANGE?	INCREASED USE	NO CHANGE	DECREASED USE	NET INCREASE
Public cloud	53%	39%	8%	45%
Private cloud	43%	49%	9%	34%
High performance computing	35%	61%	4%	31%
On-premise distributed systems	24%	49%	27%	-3%
Other environments	14%	77%	9%	6%
On-premise mainframe systems	13%	66%	21%	-7%

2025 Tech Talent, Q17, DKNS excluded (6 to 28%), Sample Size = 556

Appendix A5

FOR THE FOLLOWING TECHNOLOGY AREAS, WHICH APPROACH WOULD YOU PRIORITIZE IN 2025 TO MEET THE ORGANIZATION'S NEEDS?	HIRE NEW TECHNICAL STAFF	UPSKILL EXISTING TECHNICAL STAFF	HIRE CONSULTANTS
Cybersecurity	21%	61%	17%
Cloud, Containers & Virtualization	16%	70%	14%
DevOps, CI/CD & Site Reliability	21%	66%	13%
AI, ML, Data & Analytics	27%	56%	17%
Privacy & Security	17%	65%	18%
Web & Application Development	31%	55%	14%
System Engineering	18%	69%	13%
Platform Engineering	22%	63%	15%
System Administration	17%	70%	12%
Networking & Edge	17%	68%	15%
Safety-Critical Systems	17%	62%	20%
Open Source & Compliance Best Practices	12%	66%	22%
Linux Kernel	21%	56%	23%
Supply Chain	18%	56%	26%
IoT & Embedded	26%	56%	18%
Open Source Program Offices (OSPO)	19%	57%	24%
Open Hardware	21%	57%	21%
Visual Effects	25%	49%	26%
Blockchain	23%	48%	29%

2025 Tech Talent, Q42, DKNS excluded (5% to 16%), Sample Size = 556. Sorted in order of priority.

Appendix A6

ON AVERAGE, HOW LONG DOES IT TAKE TO HIRE A HEADCOUNT TO FILL AN OPEN TECHNICAL POSITION IN YOUR ORGANIZATION? (SELECT ONE) + HOW LONG DOES THE ONBOARDING PROCESS TAKE FOR A NEW TECHNICAL HEADCOUNT TO REACH NORMAL PRODUCTIVITY? (SELECT ONE) VS. ON AVERAGE, HOW LONG DOES IT TAKE TO UPSKILL OR CROSS-SKILL AN EXISTING EMPLOYEE TO REACH NORMAL PRODUCTIVITY IN A NEW TECHNICAL ROLE? (SELECT ONE)	HIRING + ONBOARDING	SKILLING	FACTOR
Overall	8.4	5.2	62%
United States or Canada	7.2	5.9	22%
Europe	7.8	5.3	47%
Asia-Pacific	10	5.3	89%

2025 Tech Talent, Q32, Q34, Q39, Sample Size = 556

Appendix A7

ON AVERAGE, WHAT PERCENTAGE OF NEW TECHNICAL STAFF HIRES RESIGN OR WERE ASKED TO LEAVE WITHIN 6 MONTHS OF BEING ONBOARDED? (SELECT ONE)	%
0 to 20%	72%
21 to 40%	15%
41 to 60%	9%
61 to 80%	4%
81 to 100%	0%

2025 Tech Talent, Q35, Sample Size = 556, DKNS excluded (13%)

Appendix A8

WHAT STRATEGIES DOES YOUR ORGANIZATION EMPLOY TO RETAIN TECHNICAL TALENT? RATE THE EFFECTIVENESS OF EACH:	OFFERED	EFFECTIVENESS
Work environment benefits (e.g., remote work, flexible hours)	92%	95%
Technical growth (e.g., cutting-edge technology involvement)	91%	93%
Compensation (e.g., salary increase, performance bonus, stock options)	86%	92%
Technical training (e.g., training and certification opportunities)	90%	91%
Career growth (e.g., clear career paths, conference speaking opportunities)	88%	91%
Open source culture (e.g., dedicated OSS contribution time, OSS policy)	68%	84%

2025 Tech Talent, Q31, DKNS excluded (3% to 6%), Sample Size = 556,

Effectiveness = Very effective + Somewhat effective

About the authors

MARCO GEROSA is a full professor of Computer Science at Northern Arizona University and a research analyst at LF Research. His research on software engineering and open source software has resulted in over 300 publications in top-tier venues. He serves on the program committee of renowned conferences and as a reviewer for several journals. Dr. Gerosa has a Ph.D., a master's in Informatics, and a B.S. in Computer Engineering. He is a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE) and the Association for Computing Machinery (ACM). He supervised several Ph.D. and M.Sc. students who are now researchers in top institutions. He also has more than 20 years of teaching experience. For more information, visit <http://www.marcoagerosa.com>.

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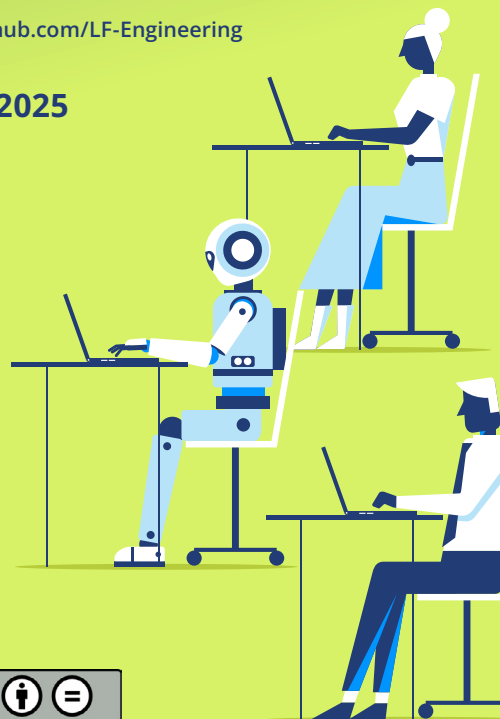
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