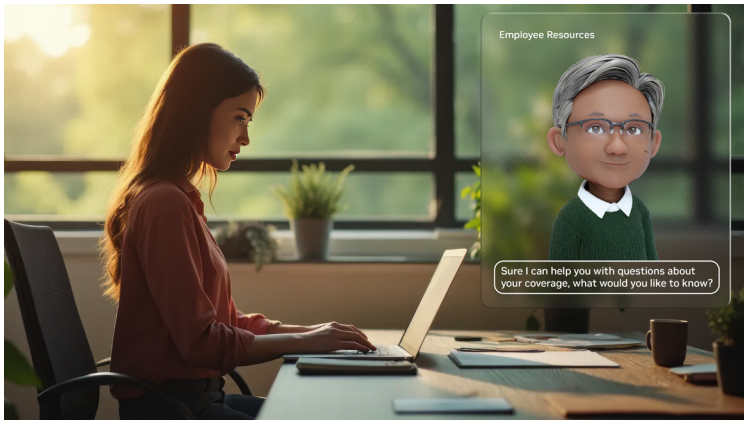
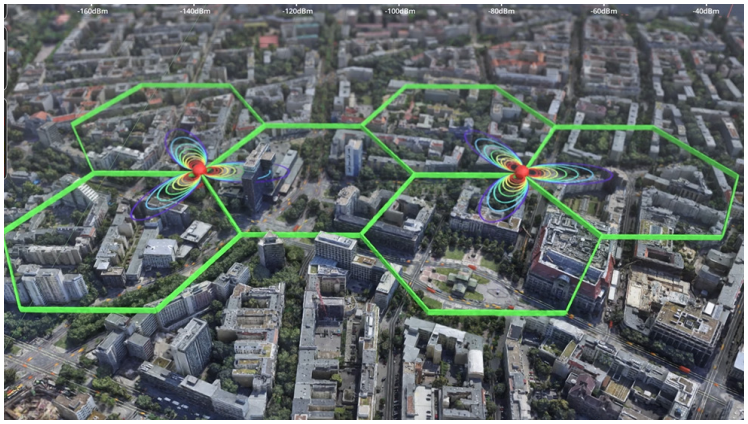
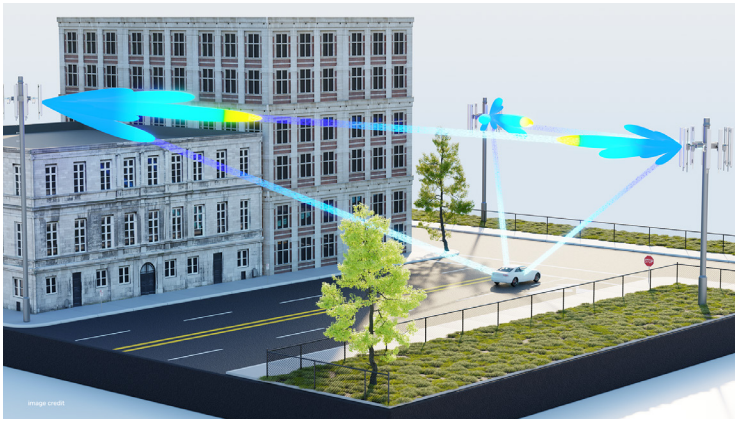
Survey Report

State of AI in Telecommunications: 2025 Trends







The Trends Driving AI in Telecommunications

For the third annual edition of NVIDIA's ***State of AI in Telecommunications*** report, we surveyed 450 telecom professionals across the globe to evaluate how the industry is investing in, deploying, and benefiting from AI. Results indicate that the industry has embraced AI throughout diverse lines of business, from external solutions such as virtual customer service assistants to integrating AI into the radio access network (AI-RAN).

The survey found that 97 percent of telecom respondents are assessing or adopting AI with the goals of enhancing customer experiences and employee productivity, improving network operations, reducing costs, and opening new business opportunities. Specifically, generative AI adoption has grown within the telecom industry, with half of respondents saying that they've already implemented their first generative AI use case.

AI investments continue to expand within the industry, with 65 percent of respondents indicating an increase in 2025. The industry expects to prioritize these investments across building AI infrastructure, accelerating adoption through third-party AI solutions, and training staff on AI skills.

Perspectives From the Field

The survey focuses on telecommunications professionals who are the primary agents responsible for investing, implementing, and delivering AI to their companies. The survey was fielded from October to November 2024 and included a mix of single-choice and multiple-choice questions. Respondents represented a global mix of telecommunications companies, including network operators, system integrators, internet service providers, network equipment providers, independent software vendors, and more. Sixty percent of respondents are senior executives and directors, while 40 percent are individual contributors. In terms of roles, 80 percent of the respondents represent engineering, network operations, architects, data engineering, cloud ops, and IT. This year, the survey includes a dedicated section on the adoption, implementation, and challenges of generative AI solutions.

Key Insights on AI in Telecommunications

Increased AI Adoption and Investment

97% said they're adopting or assessing AI in their operations.

49% said they're actively using AI in their operations, up from 41 percent in 2023, indicating a growing trend of AI integration in the telecom industry. And 65 percent of respondents said that they plan to increase spending on AI infrastructure in 2025.

Integrating AI Into Network Operations Gains Traction

37% cited network planning and operations, including AI-RAN, as an investment priority.

Investing in AI solutions for network infrastructure has become a growing priority within the telecom industry. Network planning and operations, including integrating AI into the radio access network, was cited by 37 percent of respondents as an investment priority, while another 33 percent said they're investing in AI for field operations optimization. Future areas of investment include using AI to monetize 5G and research and development of 6G networks.

Improving Customer Experiences the Top Use Case

44% said optimizing customer experiences has been a priority,

making it a top investment priority for the third year in a row. While using AI for customer experiences is still a top use case, other priorities have begun to catch up, especially investments in AI-enabled network infrastructure.

Generative AI Goes Mainstream

49% of respondents said they've actively adopted or are assessing generative AI use cases.

Of respondents who have shown interest in adopting generative AI, 84 percent are planning to offer generative AI services to their customers, indicating that they're looking toward generative AI as a business opportunity.

Increase in Open-Source AI Solutions

40% indicate they plan to use open-source tools,

an increase from 28 percent in 2023. Respondents noted a trend toward using multiple approaches for AI development. In-house AI solutions also grew from 27 percent to 37 percent year over year. And engagement with third parties to codevelop AI solutions will continue, according to 43 percent of respondents.

AI's Biggest Business Impact? Employee Productivity.

58% reported employee productivity as the biggest benefit of AI.

This was one of the most significant findings of this year's survey, up from 33 percent in 2023. In terms of business metrics, 83 percent of respondents agreed that AI had a net positive revenue impact, and 77 percent confirmed AI helped to reduce costs.

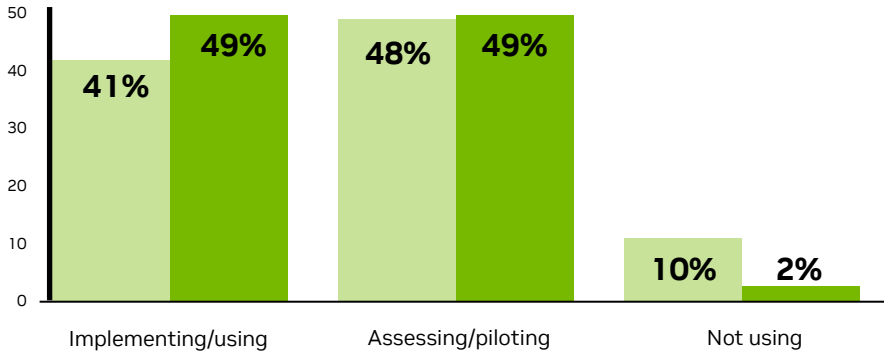
Adoption of AI Reaches an All-Time High in Telecom

The telecom industry has shown increased interest in adopting AI and continues to take steps to integrate it across infrastructure and lines of business. Overall, 97 percent of respondents said that their companies are engaged with AI, up from 90 percent in 2023. Respondents are split in terms of active implementation and assessment of AI, with 49 percent actively using it and another 49 percent in an assessment phase of trials or pilots. Respondents who said they're not using or planning to use AI fell from 10 percent in the 2023 survey to just 3 percent this year.

97%

of telcos are adopting AI. Nearly half are already deploying it.

Current AI Stage 2023 2024



Globally, data analytics was the most common computational workload for AI among survey respondents, with 61 percent saying they're using or assessing its use. At 49 percent, generative AI was the most popular deep learning workload.

49%

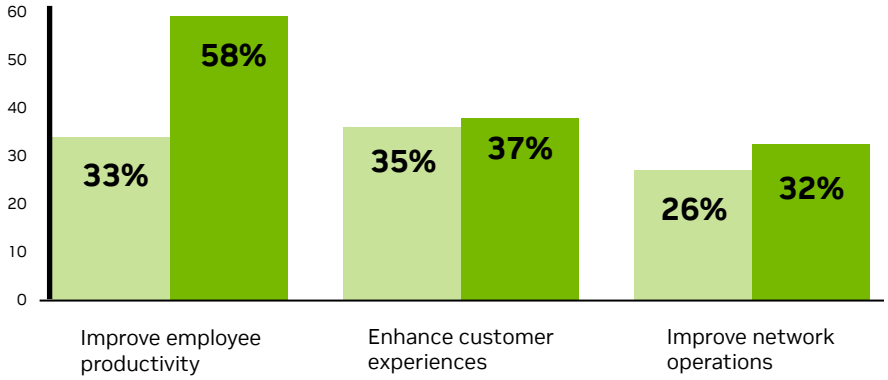
of respondents said generative AI was the most popular deep learning workload.

AI Is Driving Tangible Business Impact in Telecommunications

AI Boosts Employee Productivity and Improves the Bottom Line

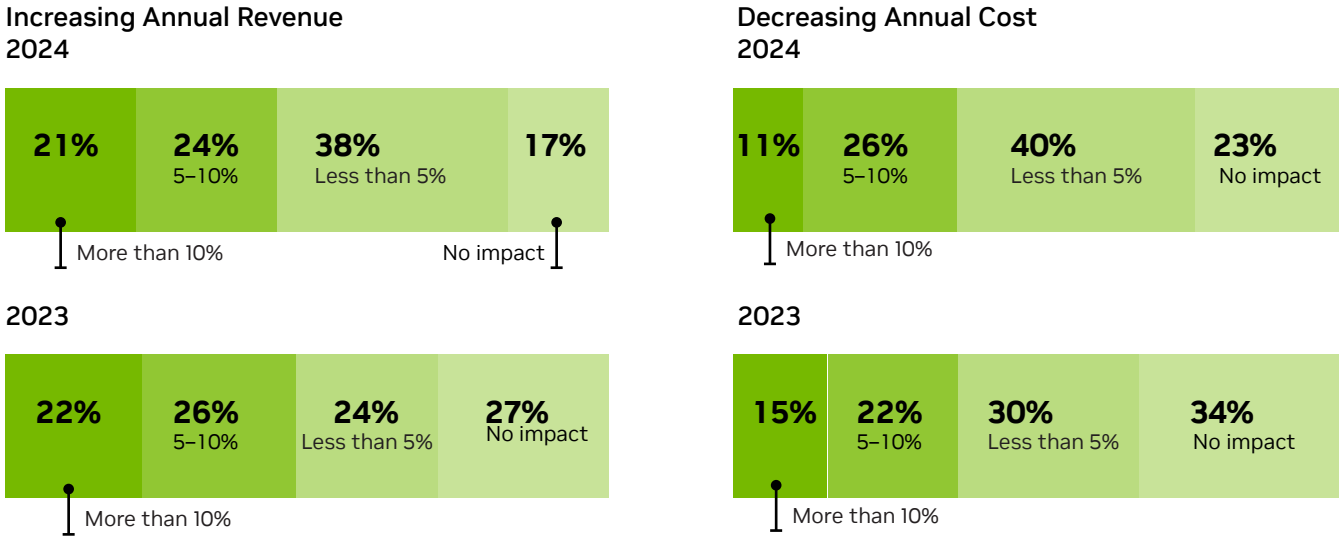
The greatest impact of AI in the telecommunications industry has been on employee productivity, according to 58 percent of respondents, up from 33 percent in 2023. Enhancing customer experiences was the second-highest response on how AI has helped improve business operations, according to 37 percent of respondents. Thirty-two percent agreed that AI helped improve network operations, as AI-defined networks become more commonplace.

Top 3 Improvements With AI 2023 2024



Respondents said that their companies have seen AI positively affect their bottom line, with most agreeing that AI has helped to increase revenue and reduce costs. Eighty-three percent of survey respondents confirmed that AI is helping to increase annual revenue, with 21 percent saying that AI had contributed to a more than 10 percent increase in specific areas of business. Seventy-seven percent agreed that AI helped reduce annual operating costs.

AI Impact on Revenue and Cost



Challenges in AI adoption persist, with the three main challenges from our 2023 survey either increasing or remaining at the same level in 2024.

The need for AI experts—such as data scientists, engineers, architects, and developers—has been the key obstacle to AI adoption at scale in telecommunications, according to 43 percent of respondents, up from 34 percent in 2023. Inability to quantify the return on investment (ROI) was cited by 38 percent as the main challenge, up from 33 percent in 2023. Lack of budget for AI adoption was cited by 30 percent, the same as 2023.

43%

of respondents say the need for AI experts has been the key obstacle to AI adoption at scale in telecommunications.

AI Investment to Increase in 2025

Telecommunications Companies Are Looking to Ecosystem Partners to Scale Enterprise AI

The maturation of AI within the telecom industry will lead to more AI investment in the coming year.

At 65 percent, roughly two-thirds of telecom respondents are planning to increase their AI infrastructure budget in 2025. This is also underscored by the industry's confidence in AI's role for driving business success—77 percent of respondents agreed that "AI will be a source of competitive advantage for my company" and 80 percent agreed that "AI is important to my company's future success."

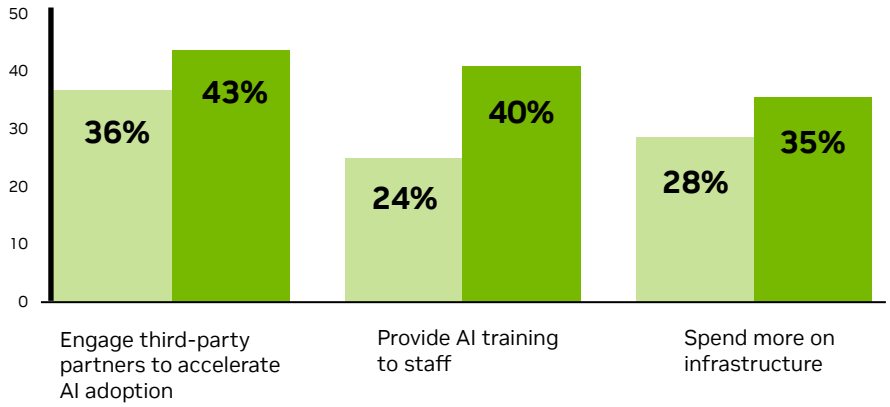
65%

of respondents say they're planning to increase their AI infrastructure budget in 2025.

Investment in AI will be spread across different priorities, but the primary theme is that spending will be concentrated on resources for further development and adoption of AI at scale. The top investment priority in the coming year, cited by 43 percent of respondents, will be to engage third-party partners, such as independent software vendors, global system integrators, and service delivery partners, to accelerate AI adoption. The next-highest priority will be investing in AI training for employees to take advantage of the productivity companies can gain with AI solutions. This is also in response to one of the main challenges

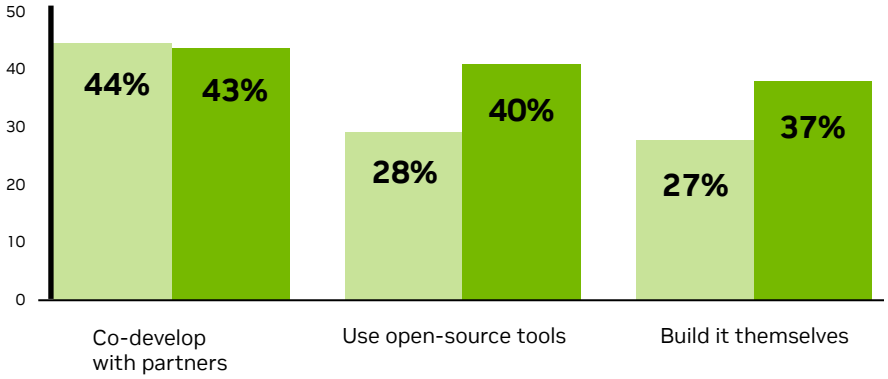
previously mentioned—lack of in-house AI expertise. Thirty-five percent of respondents said they'd spend more on AI infrastructure next year, while 34 percent are ready to invest in identifying additional AI use cases.

Top 3 AI Spending Priorities



Telecommunications companies utilize a mix of internal resources and external partners to develop their AI solutions. Forty-three percent of respondents noted that they co-develop AI with partners, while 37 percent said they build it themselves. Forty percent of telecom professionals surveyed use open-source tools.

How They Develop AI Solutions Today—Top 3

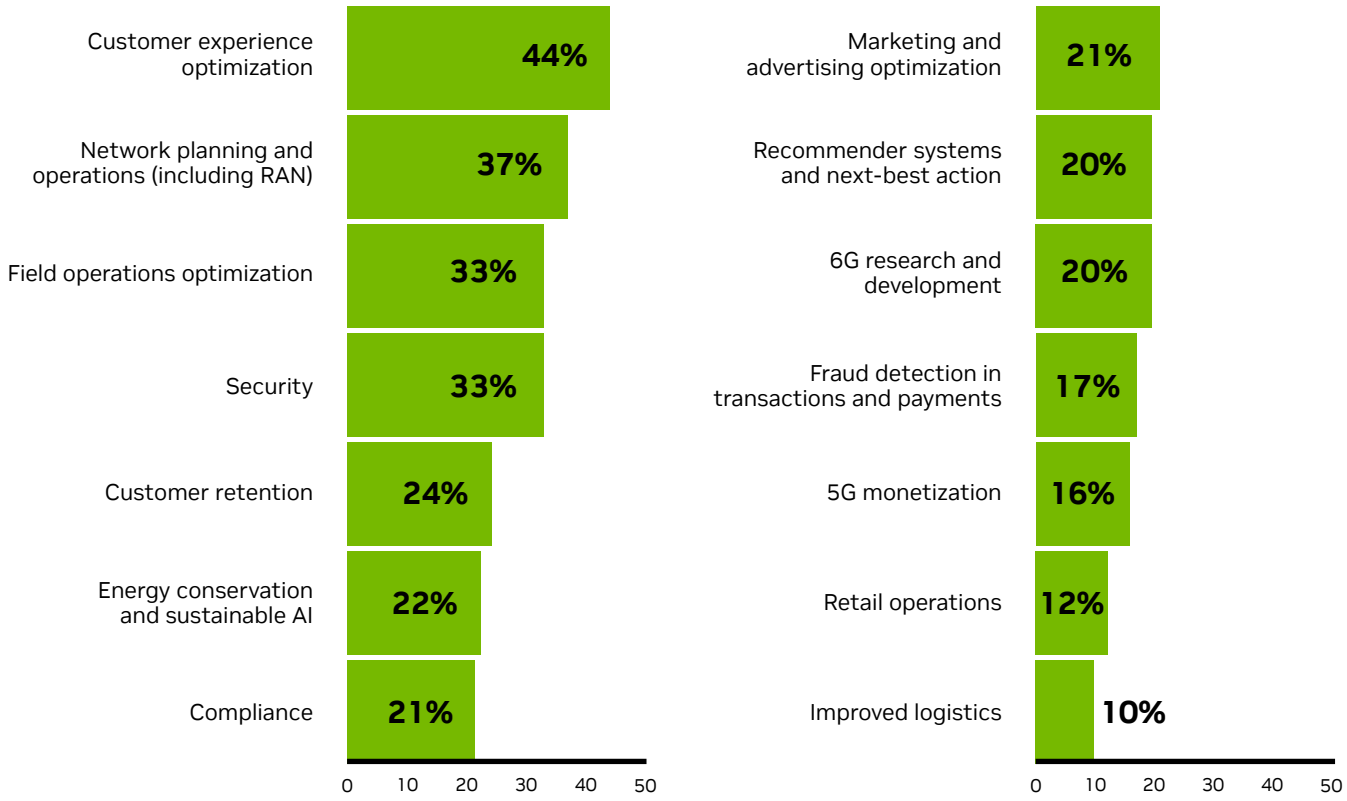


Integrating AI Into Telecommunications Network Infrastructure

AI Is Finding Its Way Into the Full Operational Stack

AI adoption is spreading throughout telecommunications lines of business, as evidenced by the wide range of use cases that companies have invested in. The top investment priority for AI has been customer experience optimization at 44 percent. Network planning and operations, including integrating AI into RAN infrastructure, was the second-most-cited investment area at 37 percent. Similarly, 33 percent of respondents said they invested in AI to optimize field operations in the last year.

AI Use Cases Today—2024



Infrastructure will remain a priority use case in the coming year, with 37 percent citing network planning and operations as the top use case for investment in the next 12 months. Using AI to fortify cybersecurity was next at 36 percent, followed by customer experience optimization at 35 percent.

Among those that noted they're investing in AI for 5G monetization and/or 6G research and development, about two thirds of respondents—66 percent—confirmed they're investing or considering investing in deploying AI services on the RAN for operational and user needs. Fifty-three percent are investing in using AI to enhance spectral efficiency for the RAN. And 50 percent are investing in colocating AI and RAN applications on the same infrastructure. These are the themes of AI-RAN, which combines accelerated computing into the network infrastructure stack, providing a software-defined, accelerated platform that can power RAN and AI from the same infrastructure.

5G and 6G Investment Priorities

66%
deploying AI services on the RAN for operational and user needs.

53%
using AI to enhance spectral efficiency for the RAN.

50%
colocating AI and RAN applications on the same infrastructure.

Generative AI Adoption, Benefits, and Challenges

Telcos Are Leveraging Generative AI to Support Internal and External Business Goals

Telecommunications companies have embraced generative AI, spreading it throughout their operations and lines of business, including customer-facing solutions, back-office assistants, and within-network infrastructure. Generative AI is a new application of AI that uses neural networks to identify patterns and structures within existing data to generate new and original content, such as text, images, video, audio, 3D assets, and more.

Of respondents who are assessing or have deployed generative AI, 54 percent said they've already deployed their first generative AI service or application, with another 34 percent saying they'd do so within the next year.

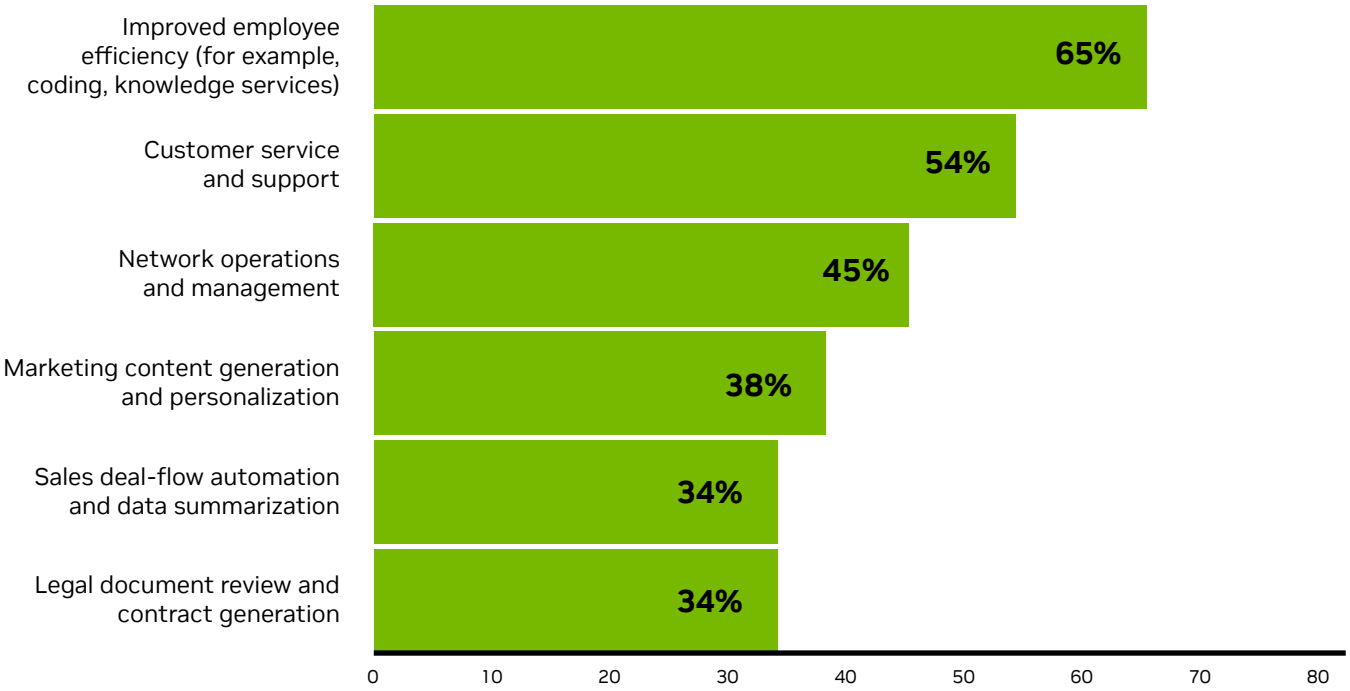
Employee productivity and efficiency, such as coding or content-generating assistants, is the most prominent use case of generative AI, according to 65 percent of respondents. Customer service and support is the next-most-cited use case of generative AI at 54 percent.

The biggest year-over-year jumps in how respondents reported using generative AI have been within sales and legal teams. Thirty-four percent reported using generative AI for sales deal-flow automation and data summarization, up from 22 percent in 2023. And 34 percent said they've used generative AI in legal document review and contract generation, up from 21 percent last year.

54%

of respondents said they've already deployed their first generative AI service or application.

Top 6 Gen AI Use Cases—2024



Overall, 84 percent of telecom respondents said that their companies plan to offer generative AI solutions externally to customers. Providing generative software-as-a-service (SaaS) solutions was the top use case at 52 percent. A little more than a third of survey respondents, 35 percent, said they'll offer generative AI as a platform for developers, including compute services, while 34 percent said they're planning on offering generative AI compute infrastructure.

Telecom companies are realizing a wide range of ROI in generative AI. The top was improved employee efficiency, such as coding assistants or knowledge services (for example, creating content based on a user query from a specific data source). Customer service and support had the next-greatest ROI, followed by network operations and management.

The most important factor when inferencing generative AI models was accuracy of the results, according to 39 percent of respondents, far and away the leading answer in the survey. Flexibility of deployment and data residency and compliance were the next-most-important factors, cited by 14 percent of respondents each.

Similar to the challenges faced in general AI adoption and implementation, a third of respondents, 34 percent, said that their main challenge in implementing generative AI was an inability to quantify ROI. A lack of AI experts to implement generative AI was also cited by about a third of respondents at 32 percent. And 21 percent said that a lack of budget was their main challenge in adopting generative AI.

Looking Forward

AI is embedding itself into the telecommunications industry. Our third annual survey revealed how development and deployment continue to grow as AI transforms telecom companies in nearly all aspects, from networks to operations.

Adoption of AI is especially important for telecom companies, because of their unique placement in the daily lives of nearly every person on the planet. Not only are they key enablers of foundational services such as voice and internet, but they're also the trusted source of local infrastructure, becoming a platform for innovation and adoption of all kinds of software, including AI. Telecom operators will be both adopters of AI and the engine that pushes AI solutions to billions of customers in nearly every country on the planet.

We can see this clearly in how the telecommunications industry is adopting AI into the network stack. The next evolution of software-defined networks is AI-native networks, where AI enables both wired and wireless networks to become more energy- and cost-efficient and offer the flexibility to adapt to varying workloads and conditions.

In wireless cellular networks, AI is helping to drive the monetization of 5G networks, while also playing a critical role in the research and development of 6G technologies. And with AI-RAN in wireless cellular networks, telecom operators can both be the primary users of AI and the hub for how AI is deployed at the edge in local regions and territories.

Generative and agentic AI have the potential to spread to all aspects of the telecommunications industry—increasing employee productivity, reimagining customer experiences, unlocking new revenue opportunities, and building a future-proof platform for network operators to further develop domain-specific applications.

As AI adoption matures in telecommunications, the benefits will become more widespread. It will help drive new revenues, increase ROI, and deliver powerful new applications and services while boosting network performance and operational efficiency.

Ready to Get Started?

To learn more about how innovative telecom companies are using AI and generative AI, visit nvidia.com/telco-ai

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