"AI in the Everyday: Current Applications and Future Frontiers in Communications and Technology"
Hearing Before the United States House of Representatives Energy & Commerce Committee
Subcommittee on Communications and Technology
June 4th, 2025
Written Testimony of Ronnie Vasishta
Senior Vice President of Telecom
NVIDIA

Chairman Guthrie, Ranking Member Pallone, Chairman Hudson, and Ranking Member Matsui, thank you for the invitation to speak with you today, and for your thoughtful engagement on artificial intelligence, telecommunications, and American competitiveness.

My name is Ronnie Vasishta and I am the Senior Vice President of Telecom at NVIDIA.

Many still think of NVIDIA as a chip company, but we are much more. NVIDIA is a full stack accelerated computing company. We've spent over three decades inventing the technology that powers modern AI. Our platforms support breakthroughs in healthcare, manufacturing, transportation, and energy. We serve over 40,000 companies and 6 million developers around the world.

We're proud to be an American company helping to drive American leadership and promote American infrastructure globally. AI is not just another app or algorithm. It is the engine behind a new industrial revolution. And just like the roads and grids of the past century, the countries that build AI infrastructure will define the rules, reap the rewards, and shape the next era.

Today, we are at an unprecedented point of inflection between this new AI-driven industrial revolution and the need to redefine how telecommunication networks are built and delivered. In this new era of AI, telecommunications infrastructure will continue to be critical national infrastructure, essential to any nation's productivity, security, stability, and global leadership but must evolve to meet changing demands. I am here today to talk about the necessary convergence of AI and telecommunications and the opportunity for renewed U.S. leadership it presents us.

Applying AI to telecommunications is not theoretical - it is happening today. In a recent NVIDIA-conducted survey of 450 telecom professionals, 80% of respondents said they believe

that AI is crucial for their company's future success, and two-thirds plan to increase spending on AI infrastructure this year.

Over the last few decades, the telecom industry has evolved based on standards defined by the international telecommunications community. The mobile wireless standards are commonly known as 2G, 3G, 4G, and most recently 5G. The international community is now working on 6G standards with a target completion date of 2030. While this may sound far into the future, the standardization process is well underway and initial field deployments may start as early as 2028. Whoever seizes the advantage in the development and deployment of AI-native wireless network infrastructure will win the 6G race.

Over time, the telecommunications equipment supplier base has consolidated. The United States invented the foundational cellular wireless technology and once led the world in its development but over the last few generations of standards we have lost an American wireless telecommunications infrastructure provider. Other countries have taken over this leadership role and now supply the vast majority of the world's critical telecom infrastructure, including here in the US. If we act now, AI offers a once-in-a-generation opportunity for the U.S. to reclaim leadership in mobile wireless networks.

Key implications of AI and telecommunications

Improved telecom operations: AI is extremely good at optimization. The application of AI to mobile network operations can increase energy efficiency, enhance security, and improve network resiliency. Another key benefit is improved spectral efficiency, which will enable more effective use of limited spectrum. These benefits are essential to the wireless networks of the future as consumers and businesses connect hundreds of billions of devices, including for mission critical applications.

Demand for delivery of new services: Traditionally, telecommunications networks delivered voice, data, and video. In the future, mobile networks will also be called upon to support a new kind of traffic—AI traffic. AI traffic will include the delivery of AI services to the edge, or inferencing at the edge. Mobile networks will support applications such as autonomous vehicles, smart glasses, generative AI services on phones or devices, holographic communication services, collaborative robots, and many more applications that we haven't thought about yet. The transmission of this massive increase in data needs to be resilient, fit for purpose, and secure.

Opportunities for economic growth: For the first time, the wireless ecosystem can spur economic growth without having to make costly investments in infrastructure that is specific to

mobile networks. Currently, telecommunications infrastructure, particularly the Radio Access Network, or RAN, are single-purpose, hardware-defined systems that are custom built for the sole purpose of delivering RAN services. Different vendors lack interoperability, and hardware upgrades are required for each new generation. Moving towards software-defined RAN architecture will enable the same infrastructure stack to run both mobile wireless services and AI applications. This is a game changer.

Enhanced Cybersecurity: In the 6G era, cybersecurity enters a new dimension—where artificial intelligence (AI) becomes a necessary requirement across the topology of the network as well as deeply embedded into every layer of the 6G stack. As 6G networks become decentralized and connect billions of IoT devices, AI is essential for real-time threat detection and automated remediation and incident response. It processes massive data streams to quickly identify and neutralize attacks, whether they are occurring on the device, at the network edge, or in the cloud. Together, AI and AI driven cybersecurity ensure that our hyper-connected world remains resilient, secure, and adaptive.

The convergence of AI and wireless infrastructure will fundamentally reshape the global telecommunications landscape. Fortunately, the U.S. is poised to lead in the development and deployment of these next generation networks.

NVIDIA is uniquely positioned to help drive this evolution. We are working closely with partners across the telecommunications industry and academia to provide tools and platforms to drive American innovation for the global ecosystem. Through our free 6G research software and tools running on accelerated computing hardware, NVIDIA provides a platform for the 6G developer ecosystem to simulate, develop, test and validate groundbreaking algorithms and methods that were not previously possible due to lack of data, tools, and hardware acceleration. Our 6G research platform is empowering thousands of researchers globally, including major universities, startups, and 6G research institutions in the United States. As these developers use this tool, it drives software improvements and builds a global ecosystem around U.S. platforms.

Today, mobile network operators around the world are investing in multi-purpose AI infrastructure that is monetizable and software upgradable, enabling them to run AI training and inferencing alongside mobile wireless services. We are working with T-Mobile in the United States, SoftBank in Japan, and others to validate the commercial, performance, and other benefits of software defined Radio Access Networks running on AI infrastructure

We recently announced the AI WIN Project, along with Booz Allen Hamilton, Cisco, MITRE, the ORAN Development Corporation (Cerberus/ODC), and T-Mobile. AI aims to deliver an

American, AI-native, full-stack, software-defined and secure wireless platform that will enhance spectral efficiency and lower operational costs on a unified, accelerated infrastructure, thereby enabling U.S. global leadership in 6G and beyond.

Conclusion: Ensuring U.S. leadership in next generation wireless networks requires immediate action to ensure U.S. companies lead the way in setting the standards, developing the infrastructure stack of the future, and deploying AI-native network solutions.

Congress and the U.S. government can help ensure U.S. leadership in next generation wireless networks by:

- Supporting R&D and continued innovation, with a focus on software defined networks. This includes supporting telecommunications work at the National Science Foundation, the National Telecommunications and Information Agency, and the Department of Defense's Office of Research and Engineering.
- Encouraging U.S. companies to participate in international standard making bodies, such as 3GPP, to promote technologies developed in the US,
- Enabling U.S. companies to win at every layer of the AI native wireless stack both domestically and in deployments around the world.

The telecommunications industry is facing a fundamental evolution with the adoption and deployment of AI and U.S. companies are working together to drive innovation and lead globally in the development and deployment of this new network architecture.

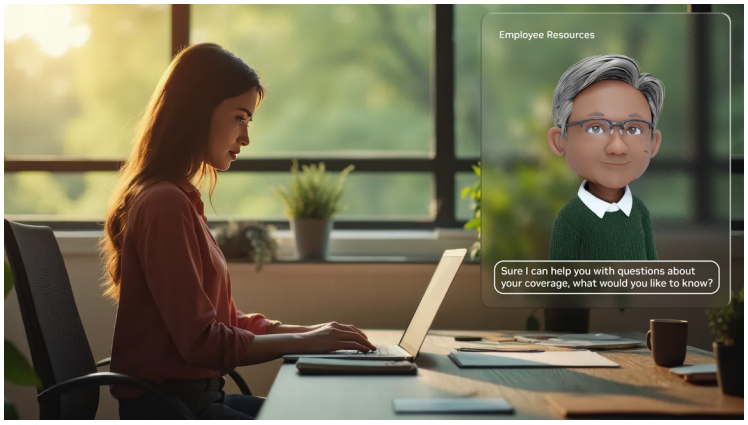
Thank you for the opportunity to speak to you today and I look forward to your questions.

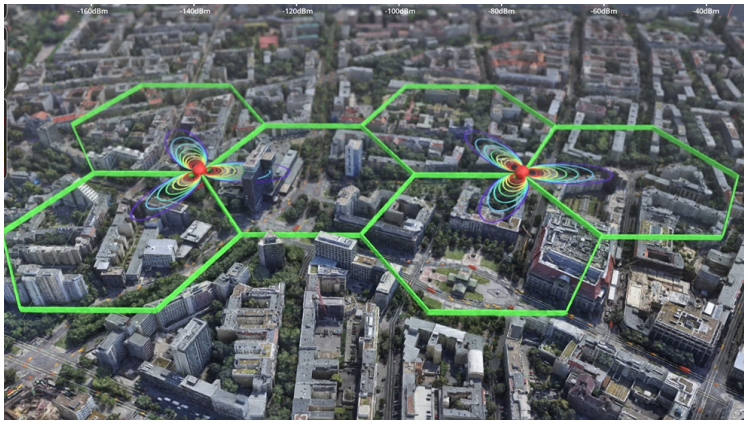
Attachments:

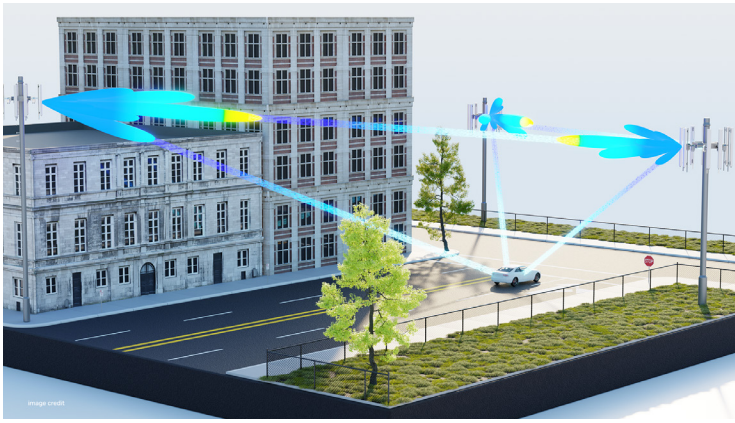
State of AI in Telecommunications: 2025 Report

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.

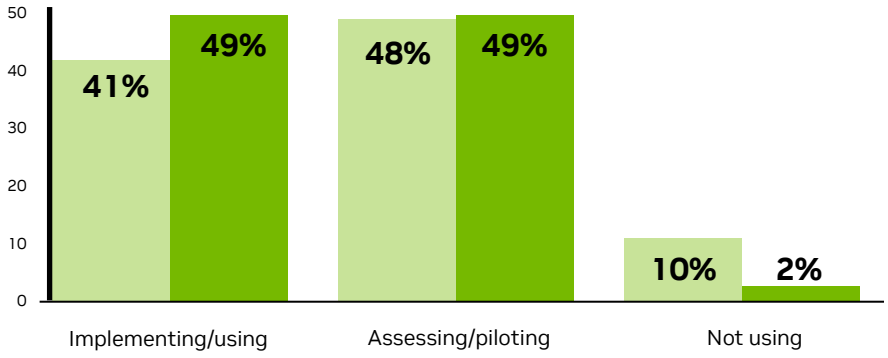
Adoption of AI Reaches an All-Time High in Telecom

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%

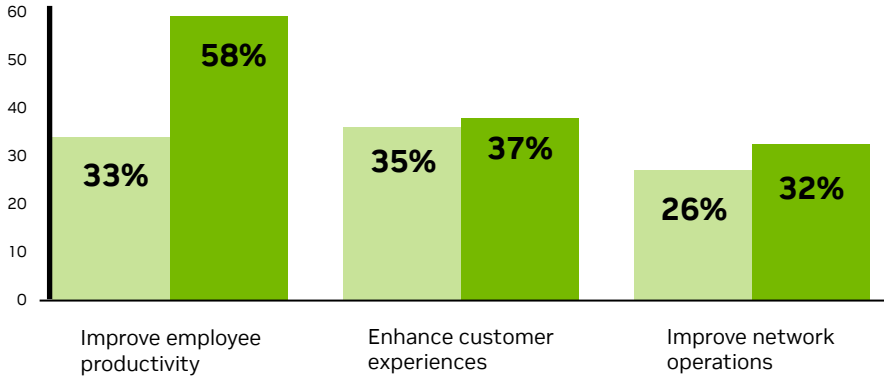
of respondents said generative AI was the most popular deep learning workload.

AI Is Driving Tangible Business Impact in Telecommunications

AI Boosts Employee Productivity and Improves the Bottom Line

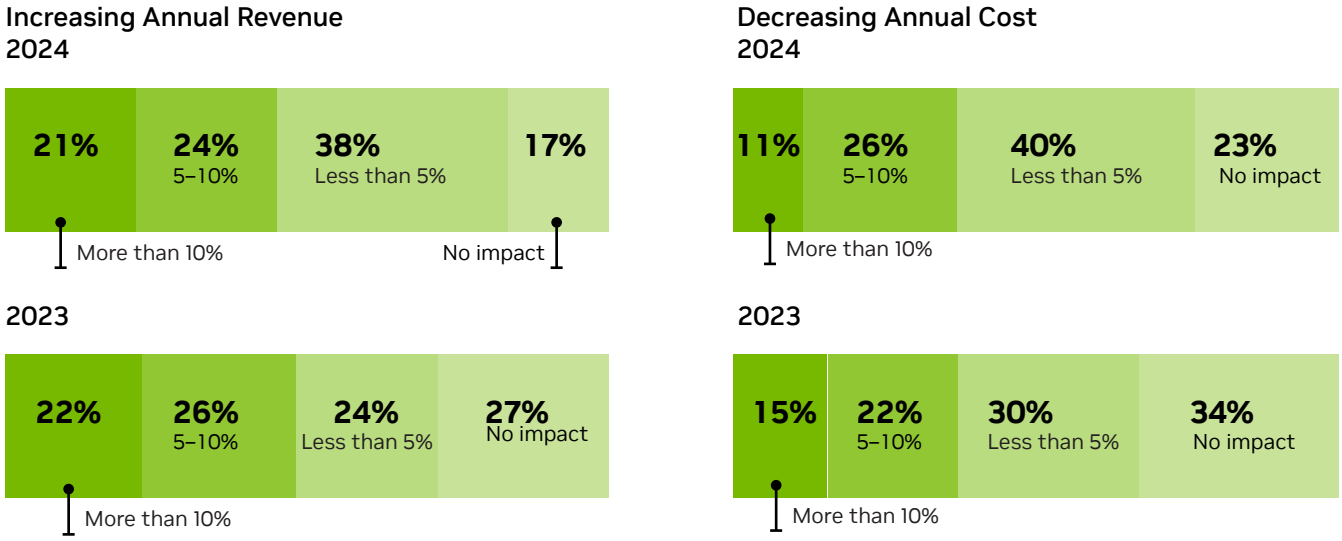
The greatest impact of AI in the telecommunications industry has been on employee productivity, according to 58 percent of respondents, up from 33 percent in 2023. Enhancing customer experiences was the second-highest response on how AI has helped improve business operations, according to 37 percent 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."

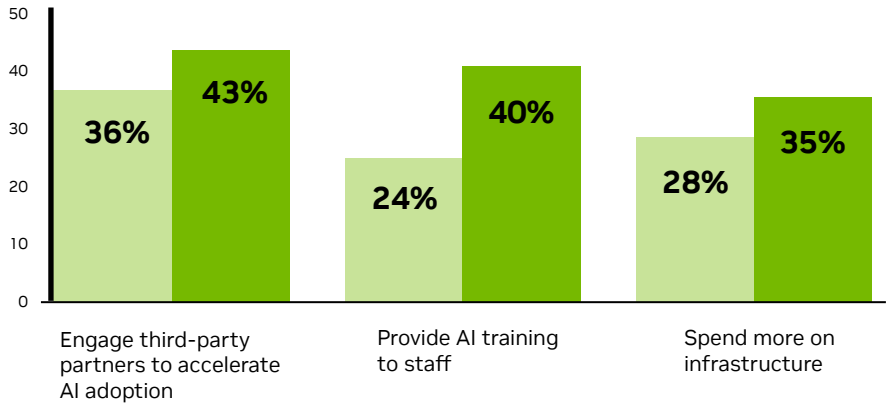
65%

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

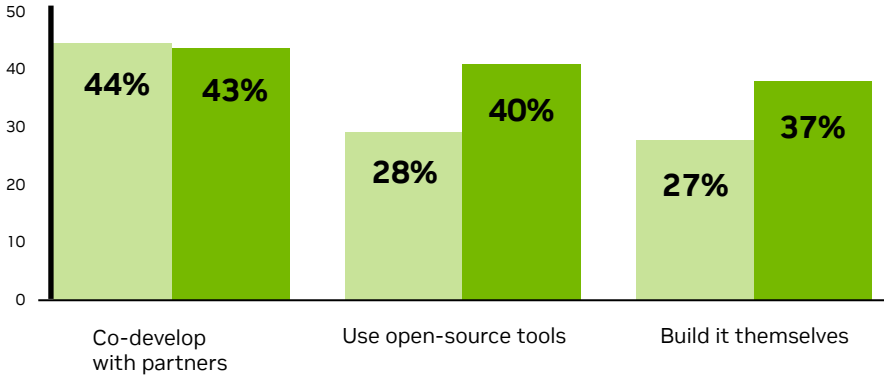
previously mentioned—lack of in-house AI expertise. Thirty-five percent of respondents said they'd spend more on AI infrastructure next year, while 34 percent are ready to invest in identifying additional AI use cases.

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

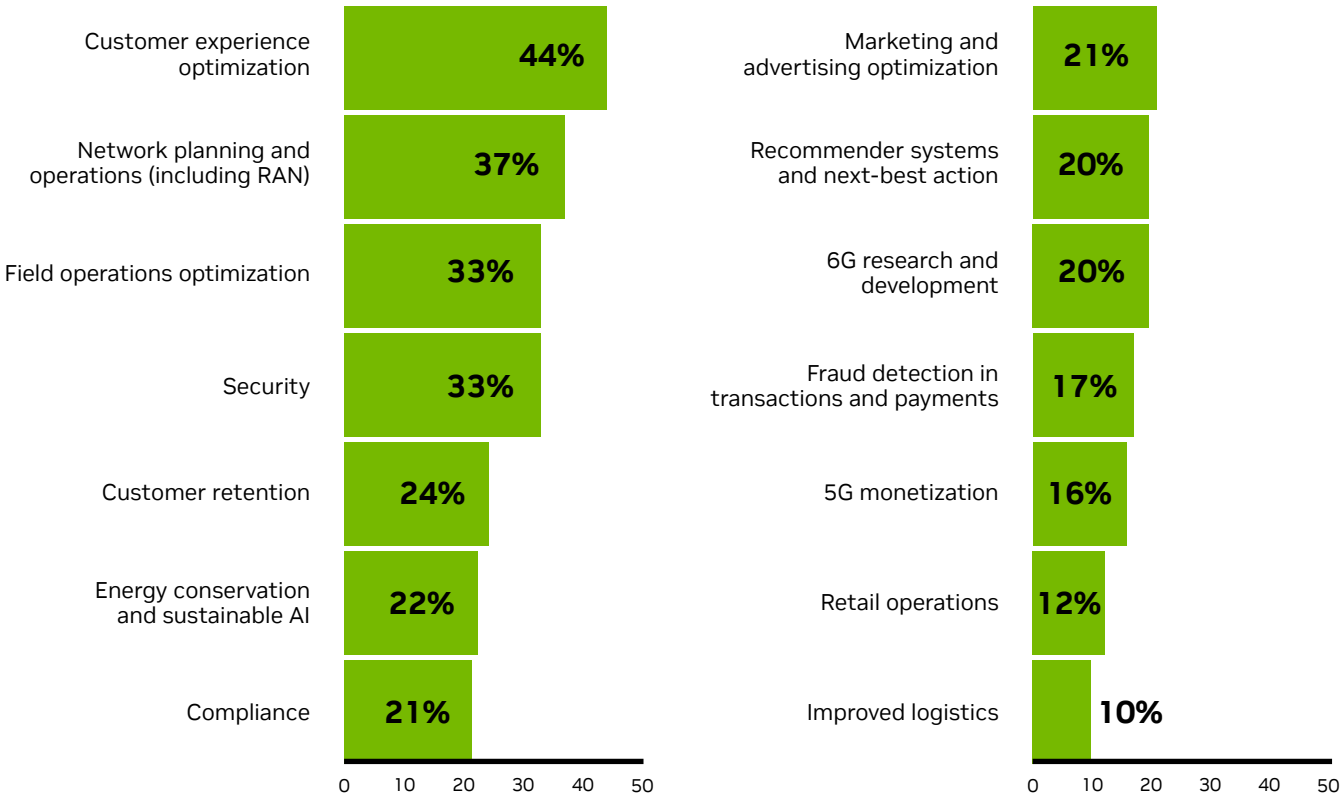


Integrating AI Into Telecommunications Network Infrastructure

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.

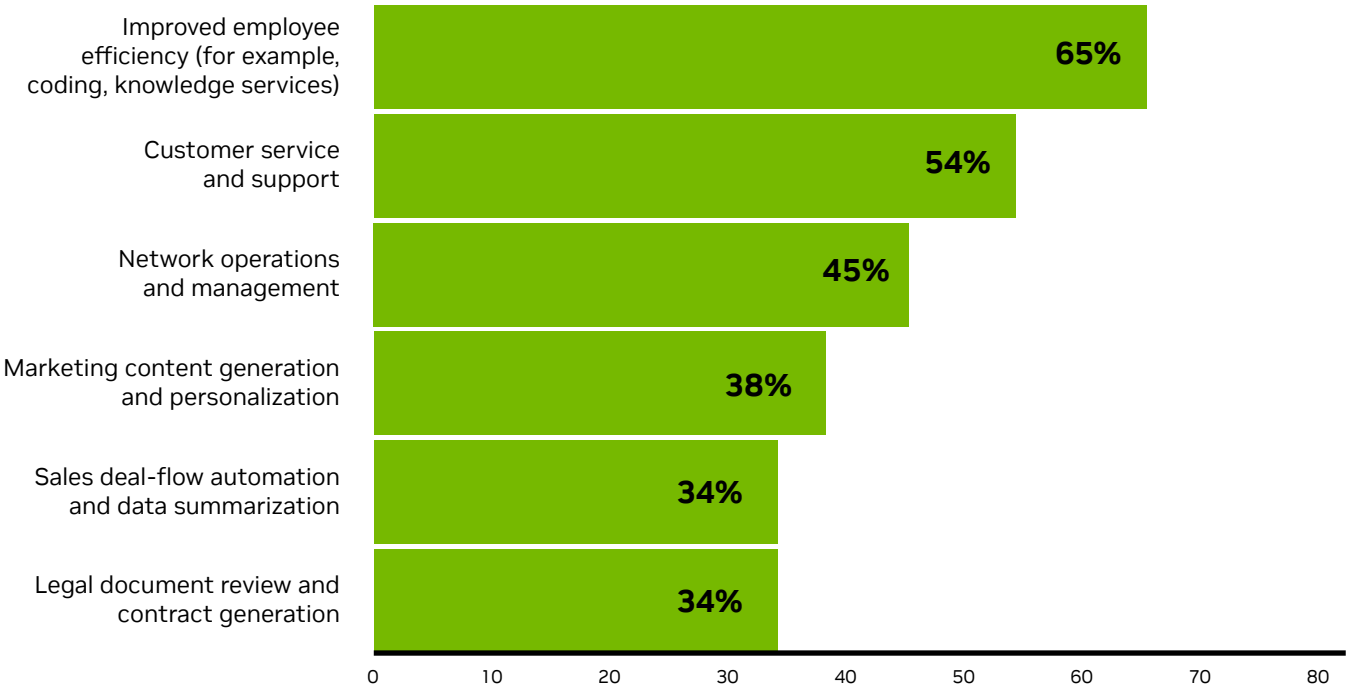
Employee productivity and efficiency, such as coding or content-generating assistants, is the most prominent use case of generative AI, according to 65 percent of respondents. Customer service and support is the next-most-cited use case of generative AI at 54 percent.

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

NVIDIA