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GenAI in the network:
CSP progress in adopting GenAI for network operations

A CSP benchmarking study

March 2025

Executive Summary

AI and GenAI capabilities are becoming crucial for communication service providers (CSPs) to achieve their strategic business and operational objectives, including digital transformation, service innovation and monetization and customer retention.

GenAI adoption is increasingly expanding within CSPs' network operations, evolving from experimentation to real-world implementations to support operational automation, network, and cloud modernisation, and to enable the transformation to new service and business models.

Google Cloud partnered with Analysys Mason in a study to evaluate the progress of GenAI in network operations, examining CSPs' use case priorities, implementation strategies, challenges, best practices, and organisational transformation efforts to support their GenAI initiatives.

This report showcases the main findings from the online survey and CSP interviews.

Geography

Asia-Pacific	30%
Western Europe	25%
North America	21%
Central and Eastern Europe	17%
Middle East and North Africa	5%
Sub-Saharan Africa	2%

98 respondents in total

CSP profile

Operates a mobile network 93%

Operates a fixed network 60%

>USD1 billion in revenue 58%

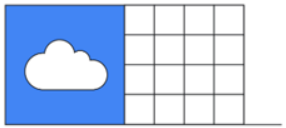
Respondent profile

CTO/CTIO or deputy CTO/CTIO 41%

Head of networks / network operations 38%

Head of new technologies and/or (network) AI 21%

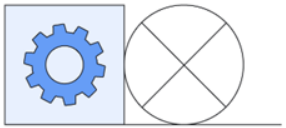
Key findings



Journey to GenAI in the network

- Improving customer experience through more optimized and efficient networks is CSPs' top priority.
- Most CSPs are still in the early stages of adopting GenAI in the network but trailblazers are emerging to lead the way toward commercial deployments.
- Hybrid cloud is the predominant choice for deploying CSPs' GenAI platforms.

Only 14% of CSPs have reached the technological and organizational maturity to set them on the path to large-scale operationalization of GenAI in the network.



Priority use cases

- Radio access network (RAN) and mobile core are the primary domains for GenAI use cases.
- While most implementations remain experimental, use cases like knowledge assistants for field operations, radio spectrum optimization, and automated test case generation are advancing to the early commercial stage.

82% of CSPs are trialing or using GenAI in at least one network operations area today, with 9% planning to do so within 2 years.

Next steps for progress

- The pace of GenAI adoption is strongly influenced by CSPs' investments and progress in organisational readiness.
- Employee skillsets to build, customise and manage GenAI models and use cases is the top organisational challenge.
- Data siloes and limited access to consistent, relevant data remains a barrier to successful implementations.

80% of CSPs struggle to achieve the expected accuracy from GenAI models, limiting use case scalability and ROI.

CSP GenAI maturity index for networks

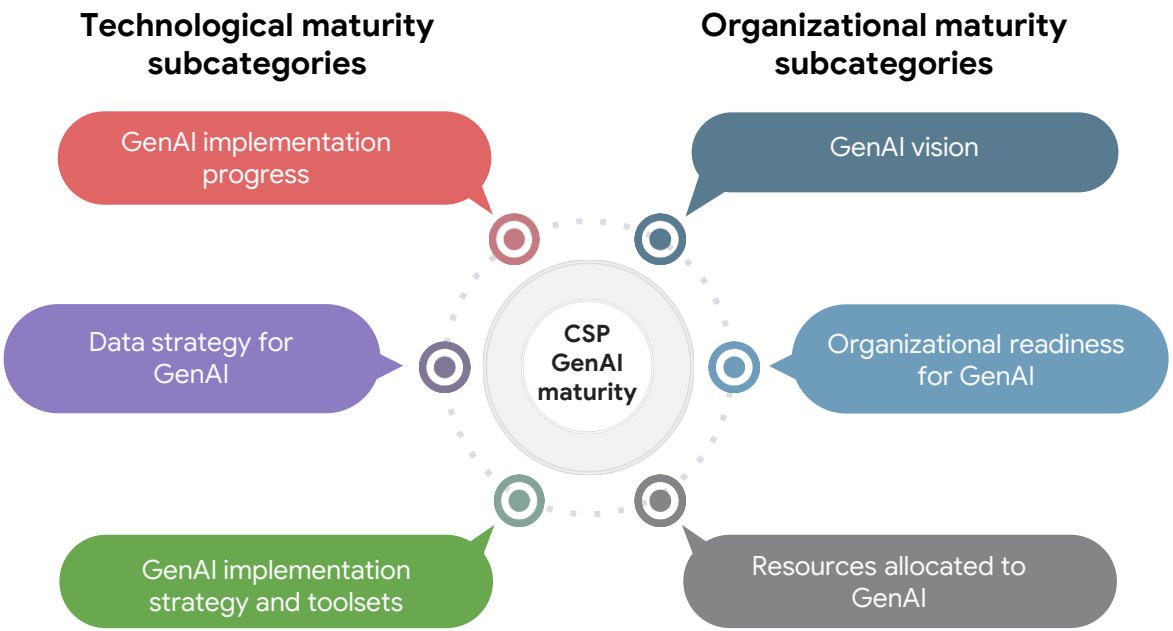
The GenAI maturity index for networks assesses CSPs' overall readiness and progress in adopting GenAI for the network

Technological maturity

- **GenAI implementation progress:** What are CSPs' timelines for implementing GenAI use cases?
- **Data strategy for GenAI:** Is high-quality, well-governed data available to support GenAI use cases?
- **GenAI implementation strategy and toolsets:** How sophisticated are CSPs' approaches to implementing GenAI?

Organisational maturity

- **GenAI vision:** How ambitious and immediate are CSPs' GenAI plans?
- **Organisational readiness for GenAI:** Do CSPs' people, processes and organisations support GenAI adoption?
- **Resources allocated to GenAI:** How much time and money is allocated to GenAI?



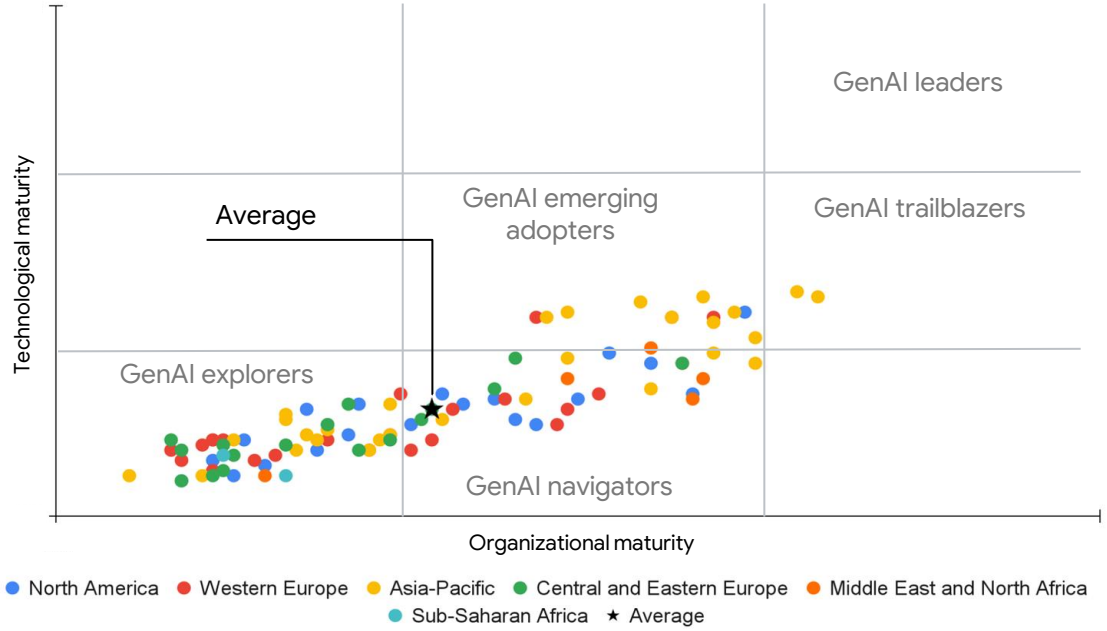
CSPs are at an early stage of GenAI adoption in the network but some are leading the way to large-scale operationalization

52% of CSPs are in the **GenAI explorers** category, still exploring GenAI in the network but yet to make major strategic or investment decisions.

34% of CSPs are in the **GenAI navigators** category, experimenting with GenAI in a few use cases and starting to establish a strategy and allocate resources.

GenAI emerging adopters (**12%** of CSPs) are using GenAI to a limited extent to support some network operations but need to improve organisational readiness to overcome barriers to scaling up.

Two Asia-Pacific CSPs are **GenAI trailblazers**- similar to emerging adopters in implementation progress, but their stronger vision, robust data strategy, and greater investment in skillsets and capabilities position them to advance more quickly.



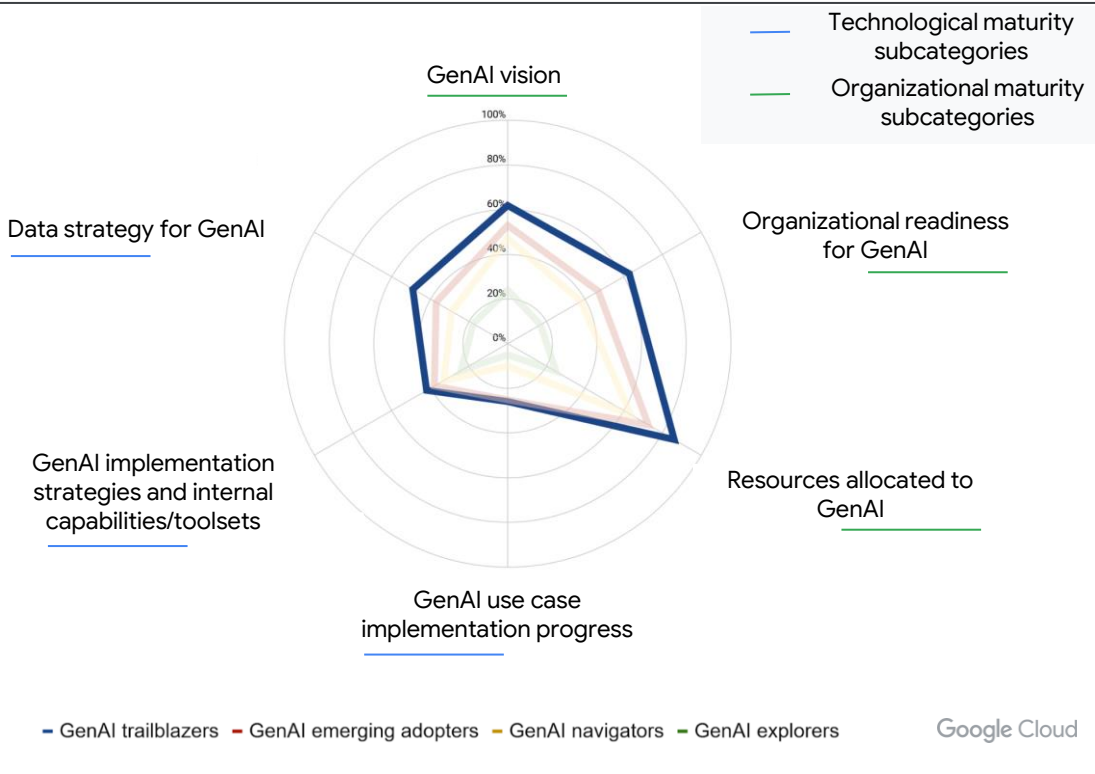
Source: Analysys Mason GenAI in the Network Survey
March 2025

GenAI trailblazers are advancing both technically and organizationally, preparing to bring GenAI into production

The **GenAI trailblazers** have a strong vision and C-level support to adopt GenAI in multiple network domains as well as for cross-domain use cases, with high confidence in ROI. This allows them to make significant investments in the technical and operational skills for GenAI.

They are more advanced in data strategy but not fully ready yet, as they are building common data platforms to support multiple use cases while implementing data governance and security measures.

The trailblazers have either a Centre of Excellence (CoE) dedicated to GenAI or one for general AI initiatives, fostering AI/GenAI skills and expertise across their organisations.



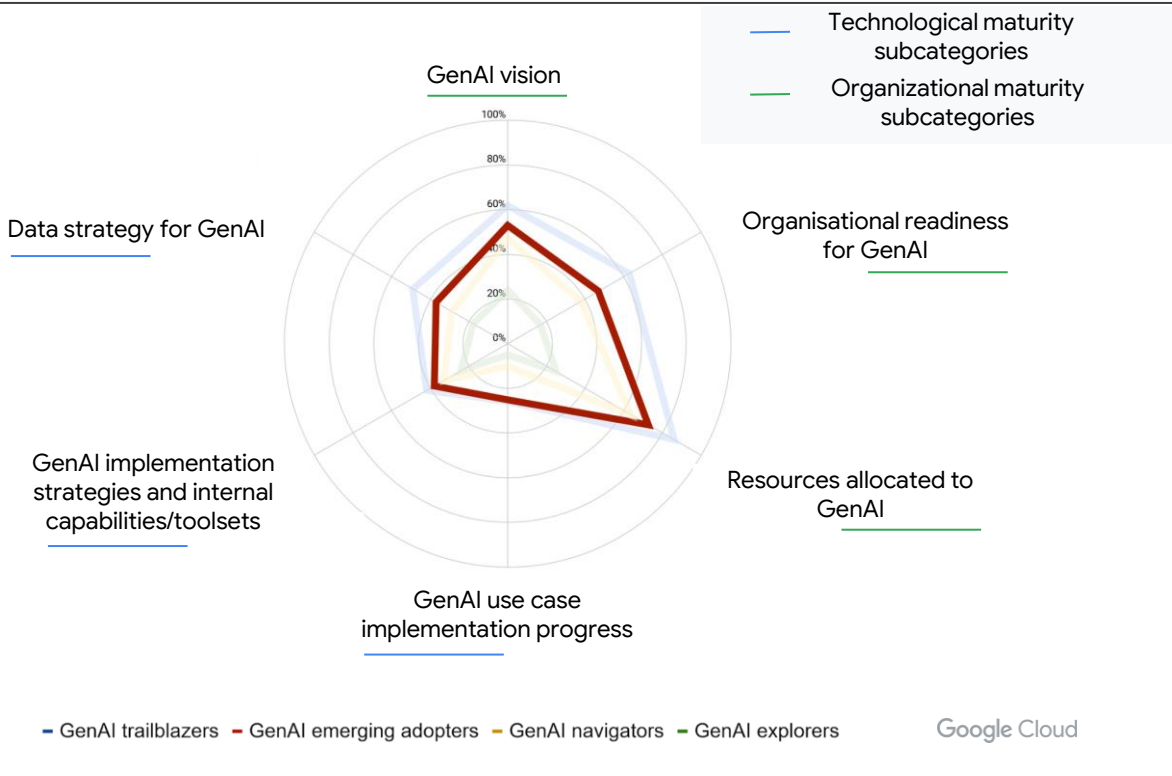
Source: Analysys Mason GenAI in the Network Survey
March 2025

The emerging adopters need to address a skillset gap and their data strategy to advance GenAI in the network

The **GenAI emerging adopters** are primarily CSPs from Asia-Pacific and Western Europe, with one from North America. While they match the trailblazers in GenAI vision and adoption, their organisational change is progressing more gradually.

These CSPs have C-level support and budget but are still early in re-skilling employees and attracting data science and GenAI talent, often relying on vendors to fill these gaps. Some find ROI more challenging than trailblazers, potentially slowing their progress.

They are advancing their data strategies to support GenAI but still lag trailblazers in overcoming data siloes.

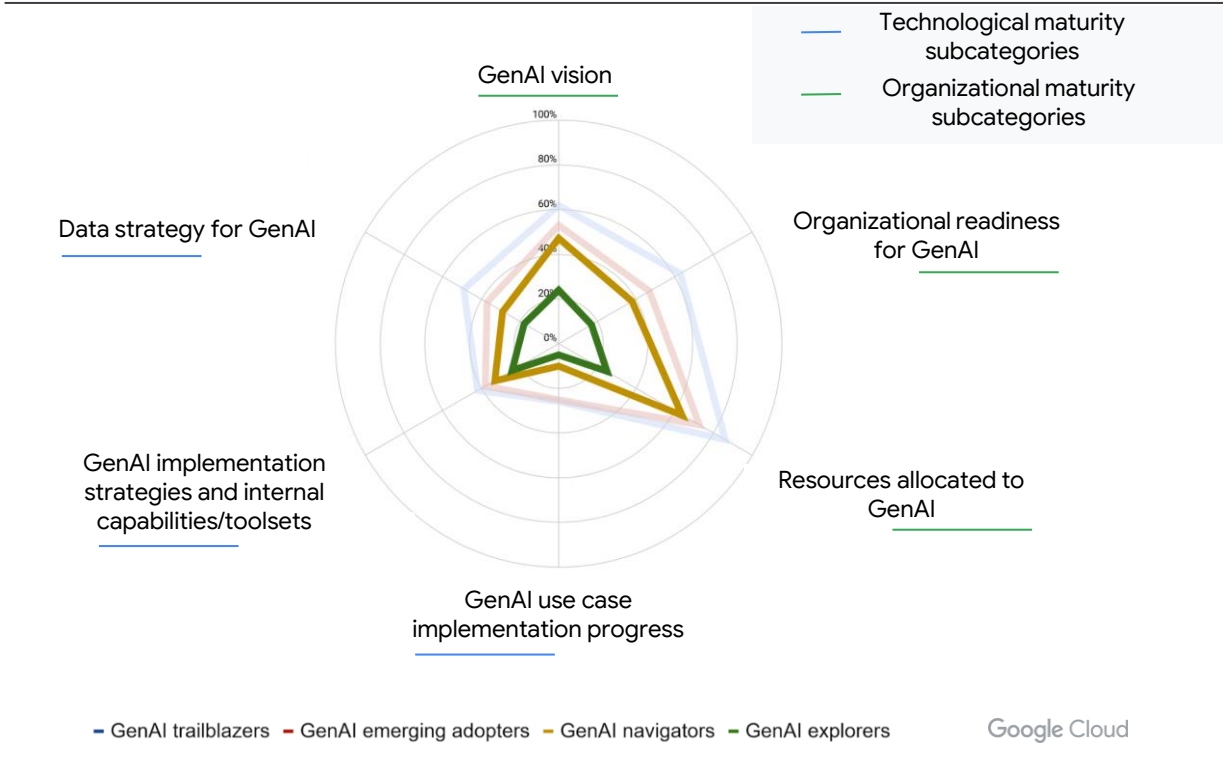


Source: Analysys Mason GenAI in the Network Survey March 2025

86% of CSPs are either GenAI navigators or explorers, assessing the technology and network use cases before major investments

GenAI navigators are focusing on assessing the technology's value across multiple operational areas with proof-of-concepts (PoCs)/trials to identify key use cases for near-term investment. However, more advanced CSPs in this group are starting to develop implementation strategies, dedicate more resources and invest in both operational and organizational transformation.

GenAI explorers are at an early stage of GenAI adoption in the network, with most conducting small, tactical PoCs in a single or a few areas, and are yet to develop a well-defined vision or strategy for GenAI in the network.



Source: Analysys Mason GenAI in the Network Survey March 2025

CSP GenAI strategies for the network

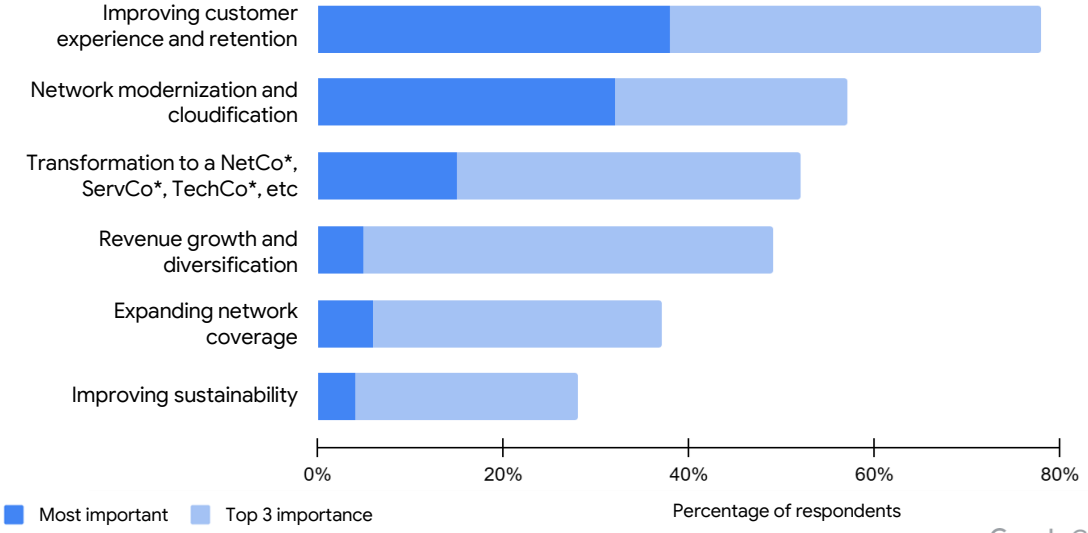
CSPs view GenAI as a strategic technology within the network to enhance customer experience and drive transformation

GenAI's potential to deliver quality-of-experience (QoE) improvements through more personalised services and reliable, optimized networks positions it in CSPs' minds as a cornerstone for business objectives such as improved customer retention and more efficient and monetizable networks.

Many CSPs see GenAI as a key enabler of:

- Autonomous, cloud-based network transformation initiatives (**57%** of CSPs).
- The transition to new business models like NetCo/ServCo and their evolution into more digitally driven organisations (**52%** of CSPs).

Q. Please rank the importance of GenAI to your organization for achieving the following network strategic objectives



* NetCo = Network company, ServCo = Service company, TechCo = Technology company

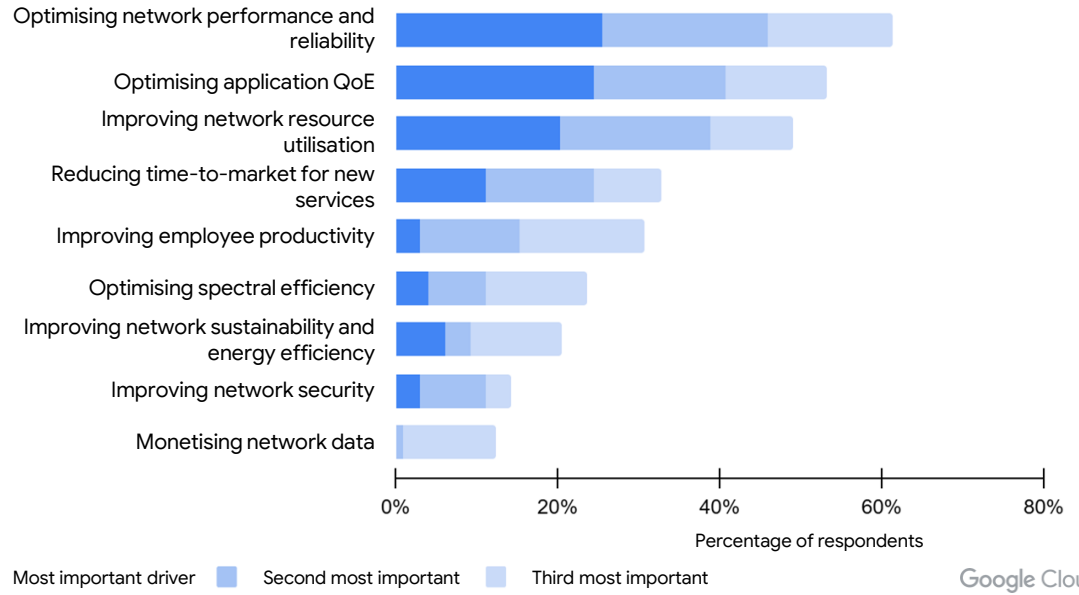
Source: Analysys Mason GenAI in the Network Survey March 2025

GenAI is evolving from being a productivity tool to becoming a key technology underpinning network operations

CSPs view GenAI as much more than just an employee productivity improvement tool within the network.

The majority of CSPs are investing in GenAI to embed the technology deeply into the network operations to support automation of workflows; thereby enhancing both network and application performance, increasing network reliability, and optimizing resource utilization.

Q. Please select the top 3 drivers for investing in GenAI for the network domain



Source: Analysys Mason GenAI in the Network Survey March 2025

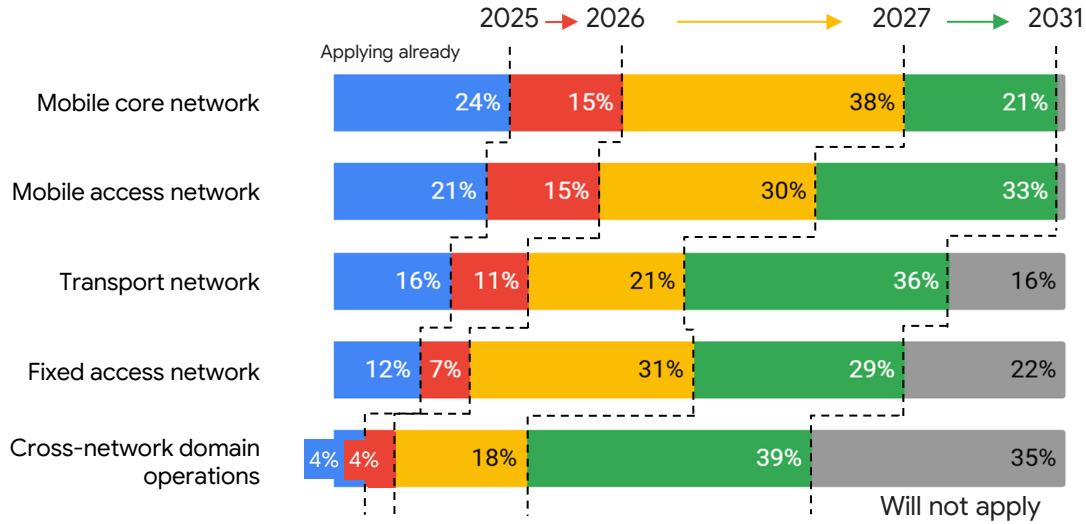
CSPs are prioritizing mobile core and RAN for GenAI in the network and plan to extend it to other domains in the near term

24% of CSPs are already applying GenAI in the mobile core network and an additional **53%** are planning to adopt it in the next 2 years.

The mobile access network is also a top priority for GenAI use cases, with **21%** of CSPs having deployed the technology and another **45%** expected to do so within 2 years.

The maturity index leader has already implemented GenAI across mobile core, mobile access, and transport networks. Alongside another GenAI trailblazer, they are planning to move beyond domain-specific implementations to support cross-network domain operations within the next 2 years.

Q. What is your organization's timeline for applying GenAI technologies to the operations of the following network domains?



Source: Analysys Mason GenAI in the Network Survey March 2025

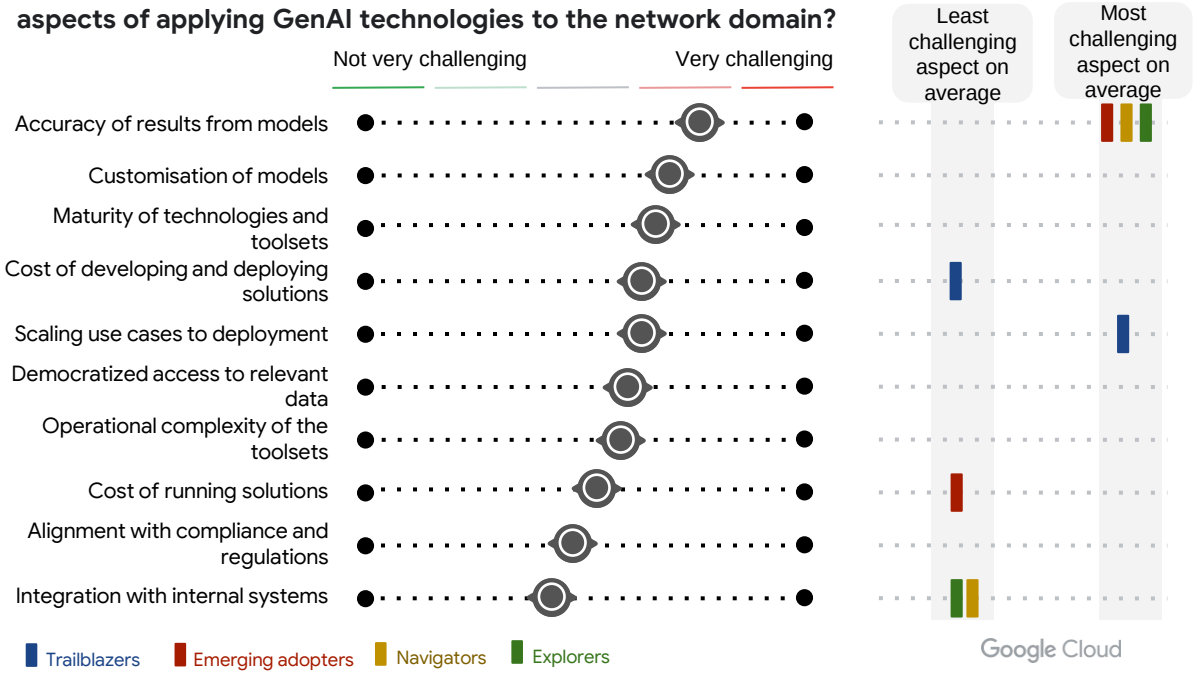
Model accuracy is the biggest technical challenge for CSPs, with four out of five struggling to achieve expected results

80% of CSPs find it difficult to achieve the expected accuracy from GenAI models, hindering use case scaling and ROI.

- Many CSPs, including emerging adopters, navigators, and explorers, have yet to fully address the data requirements for GenAI, which significantly affects result accuracy.
- CSPs also report challenges in customizing models to meet their specific needs, which affects accuracy.
- While **57%** see the technology and tools as immature, customization and accuracy issues also arise from limited in-house skills. Trailblazers, however, don't view accuracy as a major challenge and can customize models internally.

Source: Analysys Mason GenAI in the Network Survey
March 2025

Q. How challenging are each of the following technical and operational aspects of applying GenAI technologies to the network domain?



CSPs face challenges in GenAI skillsets, ROI, and budgets, but strong C-level and vendor support should help alleviate them

CSPs feel generally confident in managing the organizational challenges of adopting GenAI in the network, despite the technology and its adoption being in its early stages.

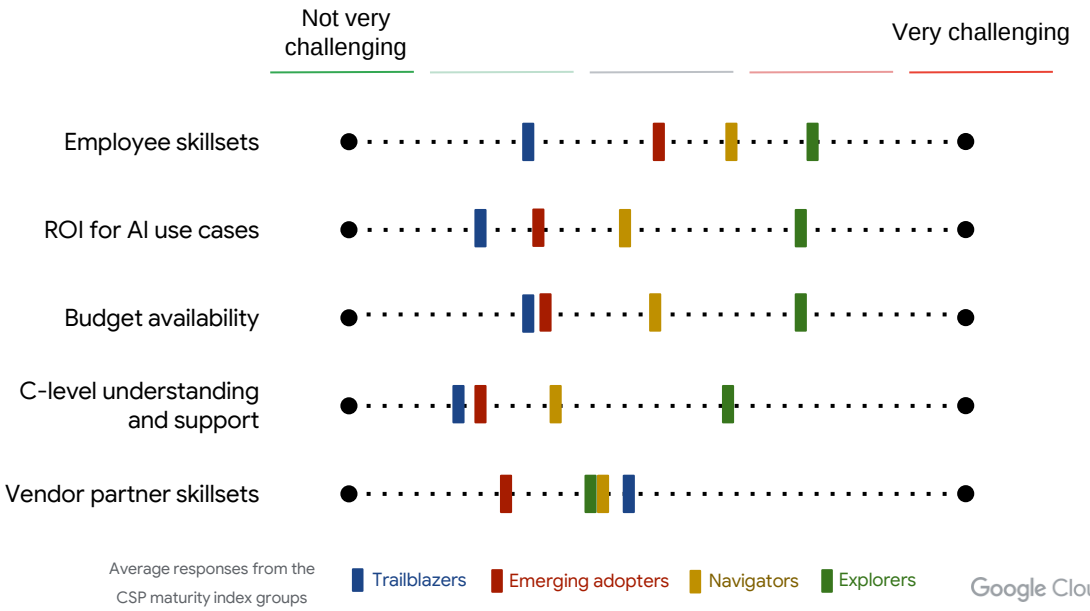
- Only one area (employee skillsets) is rated as a major challenge by more than **50%** of CSPs.

Employee skillsets is the area where CSPs struggle the most, as many are still in the process of developing in-house expertise in data science, GenAI, and other related fields.

44% of CSPs, mainly GenAI navigators and explorers, consider ROI a major challenge, which in turn affects budget availability and investment in organizational transformation.

Source: Analysys Mason GenAI in the Network Survey March 2025

Q. How challenging are each of the following organizational aspects of applying GenAI technologies to the network domain?



GenAI use case adoption in the network

The AI adoption journey in the network is well underway for CSPs; GenAI is now a key catalyst for 82% of them

AI in network operations is not new. **99%** of CSPs are trialling or using traditional AI* technologies, such as predictive AI, in at least one network operations area.

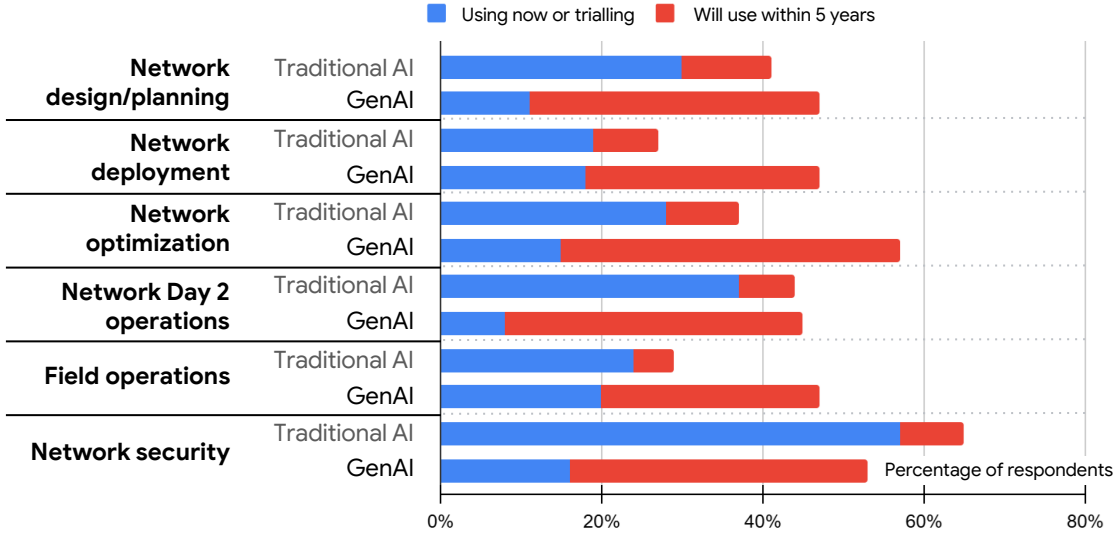
- Security (**58%**), Day 2 operations (**38%**) and design and planning (**30%**) are the top areas for these AI investments.

GenAI and LLMs are now accelerating CSPs' AI activities and investments in the network.

- **82%** of CSPs are trialling or using GenAI in at least one network operations area today, with **9%** planning to do so within 2 years.
- **67%** of CSPs that are not trialling or using GenAI today are Tier 2 or 3 CSPs.

Source: Analysys Mason GenAI in the Network Survey
March 2025

Q. When does your organization plan to implement traditional AI or GenAI use cases to each of the following network operation activities?



*Traditional AI refers to systems outside GenAI that analyze and interpret existing data to make predictions, decisions or classifications for narrow problem domains. These technologies use small, task-specific models.

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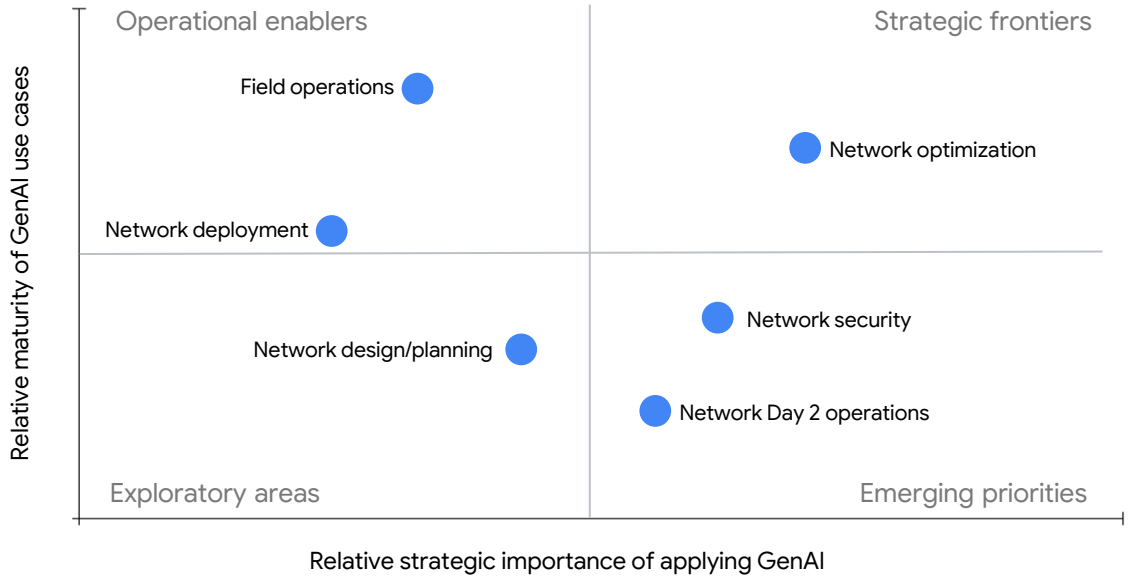
Network optimization is the top priority for GenAI adoption; field operations is also emerging as one of the fastest advancing areas

CSPs are most advanced in GenAI use cases for **field operations** (e.g., knowledge assistants for technicians). Together with **network deployment** (e.g., testing and validation), they see these as key enablers for more efficient operations.

GenAI use cases for **network optimization** are CSPs' top strategic priority, with significant progress in adoption. RAN optimization use cases are particularly popular, including energy management, dynamic spectrum usage, and self-healing/self-optimization capabilities.

CSPs also place strong focus on security and Day 2 operations but these are still maturing.



Source: Analysys Mason GenAI in the Network Survey
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Several GenAI use cases for the network are advancing from trials/PoCs to the commercial deployment stage

Matrix showing GenAI maturity for each network use case

	Conceptual	Exploration	Experimentation	Emerging commercial	Mainstream commercial
Network design/planning	• Capacity planning	• Capacity forecasting • Coverage planning			
Network deployment	• Installation fault detection • Fibre deployment		• Automated network configuration	• Automated generation/ validation of MoPs* • Automated generation/ validation of installation tests	
Network optimization	• Dynamic spectrum allocation	• Radio parameter optimization	• Self-optimising networks • KPI forecasting • Energy usage optimization	• Radio spectrum optimization	
Network Day 2 operations	• Anomaly detection • Alarm management • Performance prediction	• Root-cause analysis • Energy management			
Field operations	• CPE* quality audits • Route planning	• Troubleshooting and root cause analysis	• Field resource allocation	• Work order processing • Knowledge assistants for technicians	
Network security		• Security automation		• Threat detection	

No GenAI network use case has reached the **mainstream commercial** stage, which is characterized by large-scale commercial deployments across at least a third of CSPs.

Source: Analysys Mason GenAI in the Network Survey March 2025

*MoPs = a method of procedure is a standardized, step-by-step guide detailing how to implement, maintain, or modify network infrastructure while minimizing risk and ensuring compliance.
*CPE=Customer premises equipment

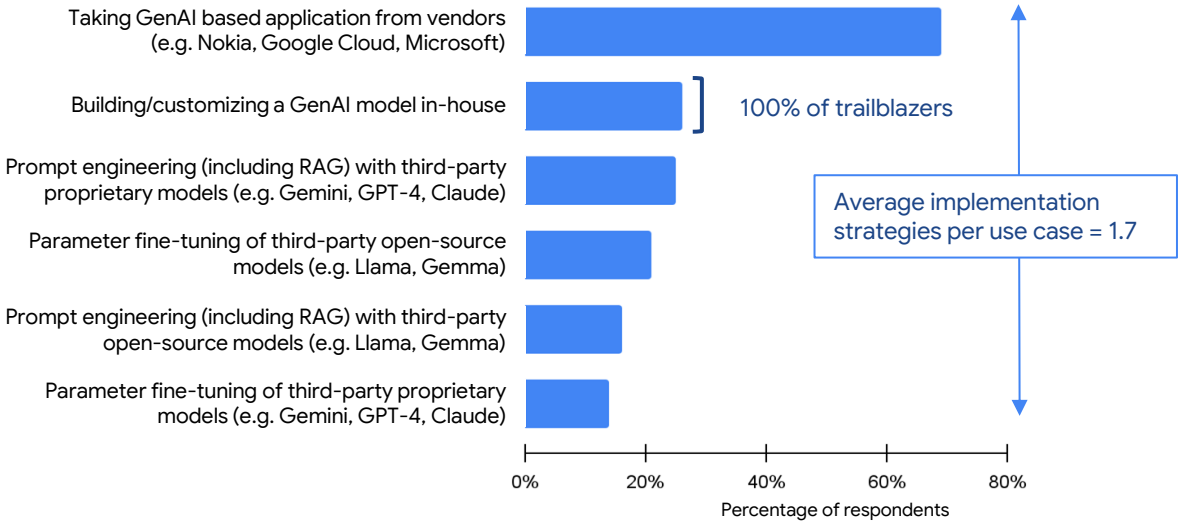
Strategies for implementing GenAI in the network

CSPs are mainly using vendor applications for network-related GenAI use cases but want the flexibility to customize the models

CSPs are exploring a mix of approaches to implement their highest-priority GenAI use cases in the network, often combining vendor-provided applications with DIY methods.

Primarily, CSPs rely on applications from their network or IT/cloud/analytics vendors that come with embedded GenAI capabilities and business logic, as this offers a simpler, faster time-to-market solution. However, they also seek to customise the models using techniques such as fine-tuning and prompt engineering to better align the applications with their specific requirements.

Q. How is your organization implementing/planning to implement GenAI capabilities for its most impactful/highest priority network-related GenAI use cases?



Source: Analysys Mason GenAI in the Network Survey March 2025

*RAG = Retrieval Augmented Generation is an AI framework that enhances responses by retrieving relevant external data before generating outputs, improving accuracy and contextual relevance.

CSPs choose their GenAI platforms based on ease of access to LLMs and integration with data platforms

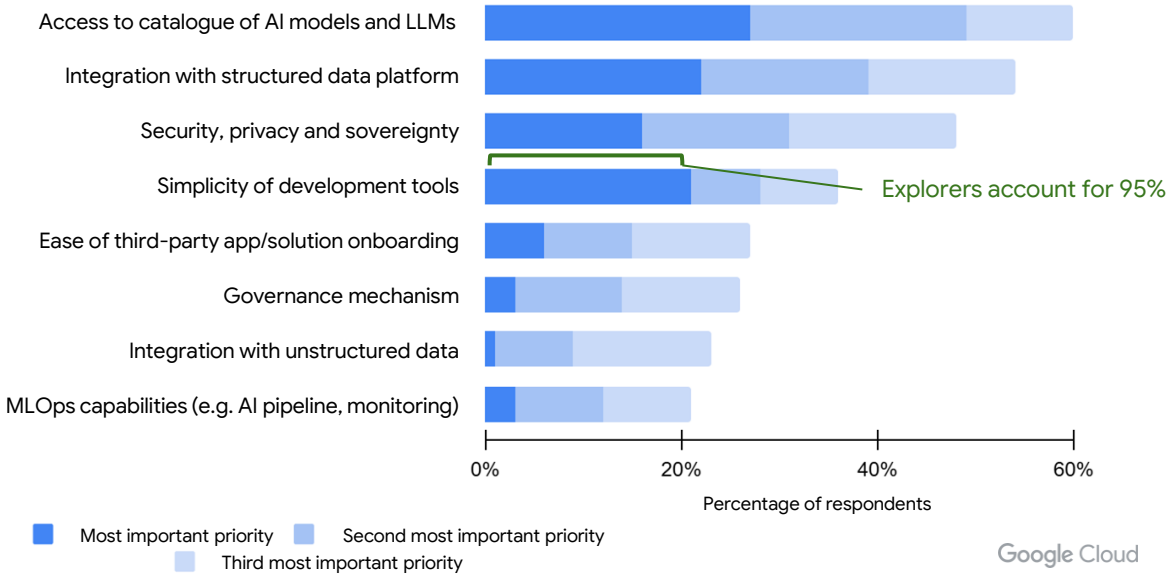
Network operations have diverse demands due to varying complexities and objectives. For example, recommendations for traffic management or dynamic allocation of resources can benefit from models that work with just textual data while use cases enabling field operations may require multi-modal capabilities, using data in multiple formats.

As such, CSPs are looking to deploy a common GenAI platform with access to a broad catalogue of models to deploy the most suitable model for each use case.

CSPs prioritize structured data integration, but the underlying data platform should support both structured and unstructured data assets.

Source: Analysys Mason GenAI in the Network Survey March 2025

Q. What are your organisation's top 3 priorities when selecting an AI / GenAI platform to support network operation use cases?



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Hybrid cloud is the predominant deployment choice for CSPs' GenAI platforms for network operations

The majority of CSPs are deploying their GenAI platforms for network operations use cases in hybrid cloud environments, usually with a larger share hosted in private clouds than in public clouds.

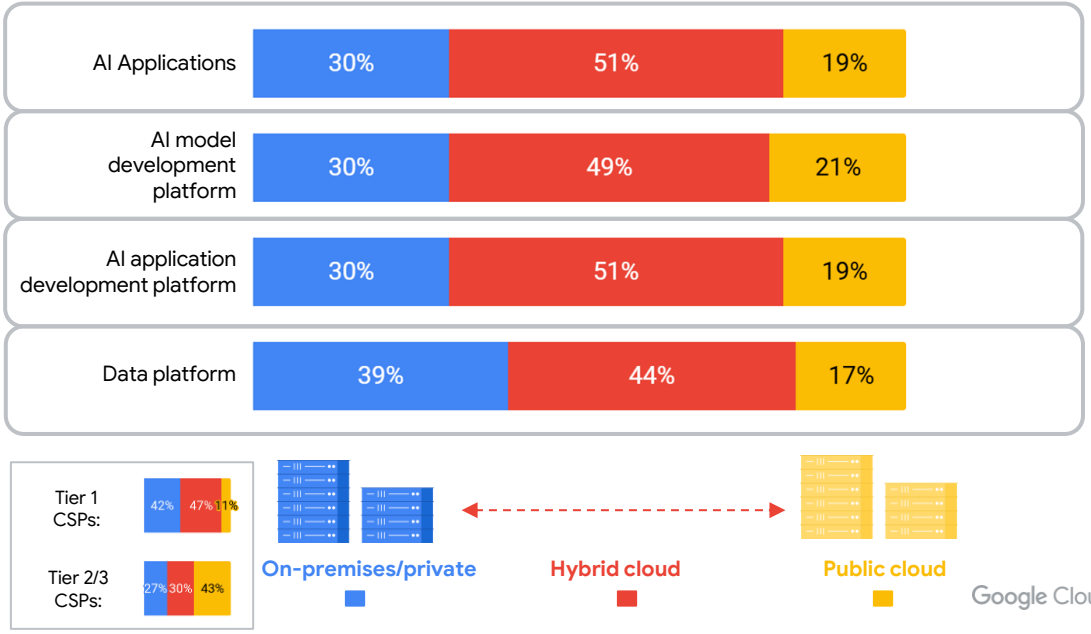
CSPs show a stronger preference for keeping data platforms on-premises/in a private cloud compared to other components of the GenAI stack.

- While **30%** of CSPs favour a private cloud-only approach for most components, this increases to **39%** for data platforms.

Tier 2/3 CSPs favour public cloud more than Tier 1s – on average, **43%** of them are opting for a public-cloud only deployment model.

Source: Analysys Mason GenAI in the Network Survey March 2025

Q. Which components of your AI/GenAI stack are deployed on-premises/in a private cloud and which components are deployed in the public cloud?



Organizational readiness for GenAI in the network

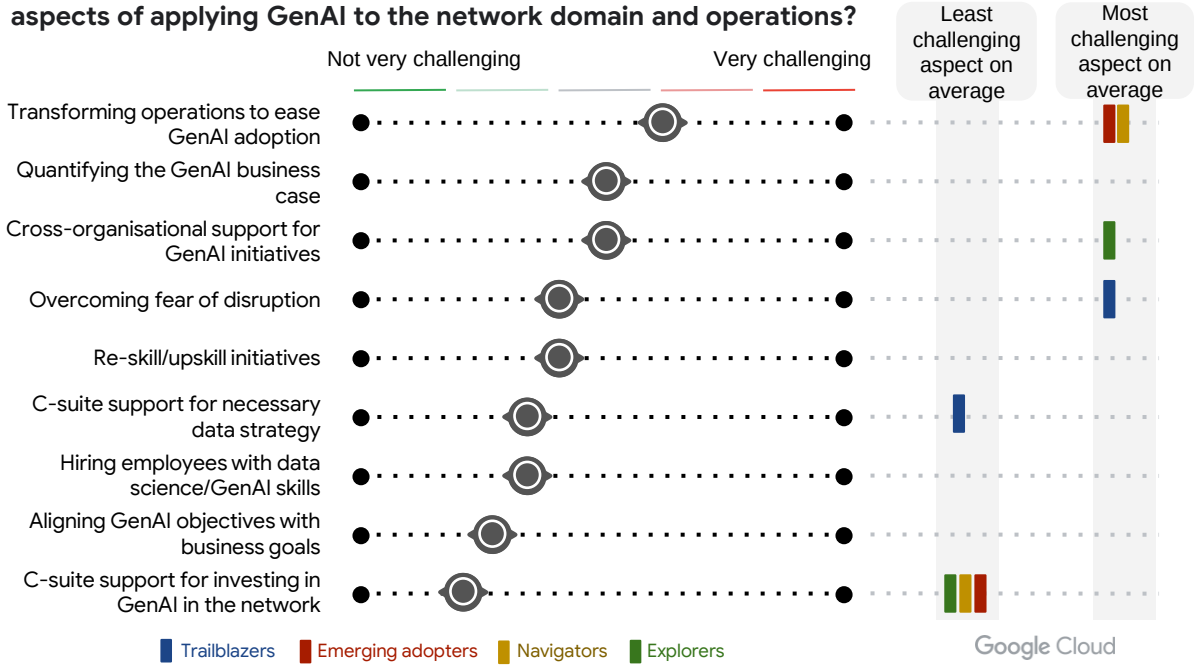
Increasing organizational alignment in GenAI indicates potential for rapid progress, but further efforts are still required

53% of CSPs ranked C-suite support for GenAI in the network as the least challenging, indicating strong leadership backing. They also believe that their current and targeted use cases will have significant commercial impact. This early alignment between technology and business may signal fast-approaching progress in GenAI adoption in the network.

However, many CSPs still have substantial work to do in organizational transformation, including initiatives to enhance GenAI skillsets, foster cross-organisation collaboration, and address cultural barriers to disruption. Developing a robust business case to justify these investments will be a crucial catalyst for progress.

Source: Analysys Mason GenAI in the Network Survey
March 2025

Q. Please rank how well your organisation scores in the following organisational aspects of applying GenAI to the network domain and operations?

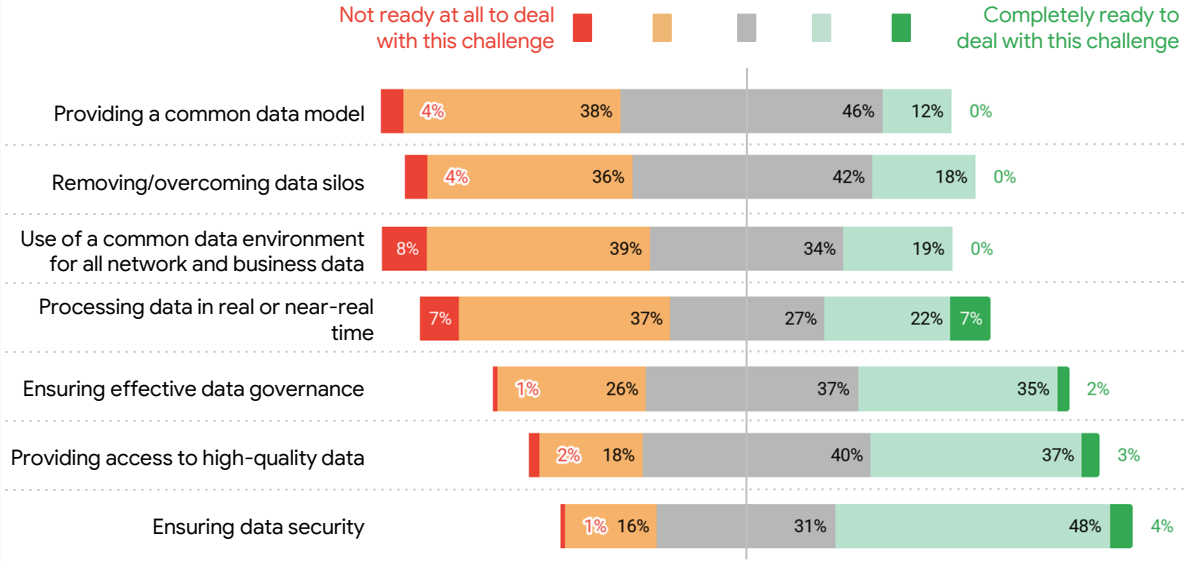


A common data platform strategy is emerging as an essential prerequisite for advancing GenAI in the network

CSPs are making progress in meeting data requirements for network-related GenAI use cases. However, data silos and near-real-time processing-related challenges are prevalent across all operators. Issues with the accuracy of model results suggest further improvements are still necessary.

Many CSPs have already started undertaking data modernization projects, but the demand for GenAI is now accelerating these efforts. Advanced CSPs, including trailblazers and emerging adopters, are in the process of transitioning to common data platforms and implementing robust governance and security measures.

Q. Please rank your organization's network data strategy in terms of how it has prepared your organization to deal with the following data-related challenges



Source: Analysys Mason GenAI in the Network Survey
March 2025

Google Cloud

The substantial resources dedicated to GenAI in the network reflect CSPs' strong commitment to its development and adoption

CSPs, particularly trailblazers and emerging adopters, are dedicating significant internal resources to support their GenAI activities in the network.

- The average number of FTEs involved in network-related GenAI projects is planned to increase from **38** FTEs today to **56** FTEs over the next 2 years.

It should also be noted that it is not just about the sheer number of resources; the skills and capabilities of these resources are equally important. CSPs will need to invest in GenAI expertise and, where necessary, partner with vendors to ensure efficiency in their network-related GenAI initiatives.

Source: Analysys Mason GenAI in the Network Survey
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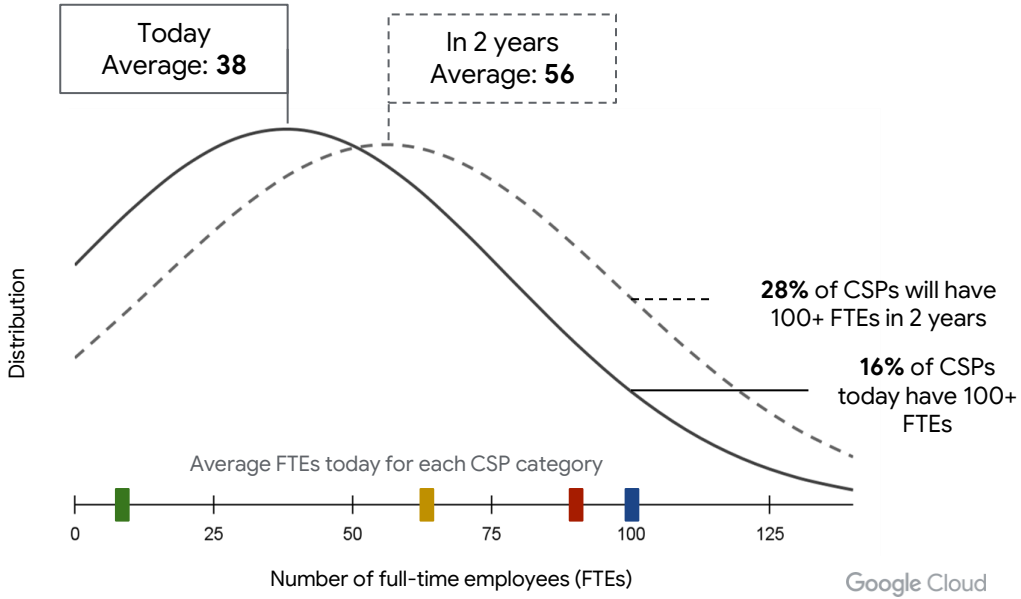
Q. How many full-time employees (FTEs) does, and will, your organization allocate to design, develop and implement AI and GenAI use cases for the network domain?



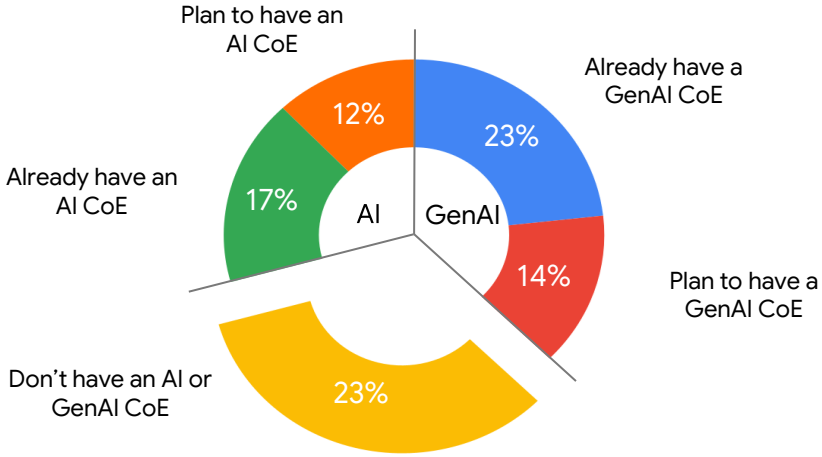
Most CSPs recognize the importance of a ‘Center of Excellence’ to advance GenAI in the network

The GenAI maturity index for networks indicates that establishing a center of excellence (CoE) enhances CSPs' organisational readiness for GenAI in the network, as demonstrated by trailblazers and advanced emerging adopters.

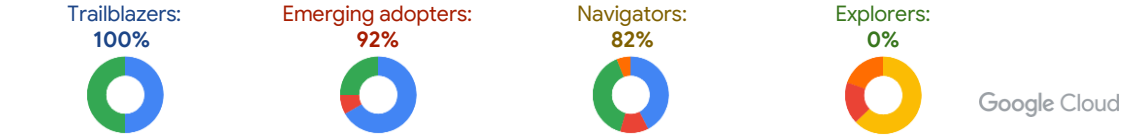
Most CSPs acknowledge that a CoE that is focused on tracking and establishing best practices, policies, and common toolsets can accelerate progress toward their GenAI objectives in the network.

- Currently, **40%** of CSPs have a CoE for AI or GenAI, with an additional **26%** planning to create one.

Q. Does your organization have an AI or GenAI center of excellence (CoE)?



GenAI or AI CoE today:



Source: Analysys Mason GenAI in the Network Survey
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Recommendations

Recommendations for CSPs

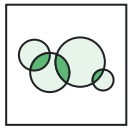
A C-level-supported GenAI adoption plan with a robust data strategy, organizational transformation, and strong vendor partnerships, will help CSPs to overcome challenges to large-scale implementation and ROI.

Identify network-related GenAI use cases that align most closely with business objectives and organizational readiness, and can deliver strong, near-term ROI

With a long-term strategy and roadmap in place, focus on early-win use cases that align with existing capabilities, deliver near-term results, and enable incremental expansion across broader network operations.

Transform organizational structure, processes and skillsets

Make significant investments in upskilling and reskilling initiatives, recruit GenAI talent, and establish or enhance a Centre of Excellence to drive best practices in implementation and governance across the organization.



Develop a robust data strategy and position it at the core of all network AI and GenAI initiatives

Develop a common data architecture and platform that mitigates siloed data environments, supports diverse network AI, and GenAI use cases, and ensures well-governed yet democratised access to clean, consistent, and relevant data.

Choose suitable strategic vendor partners to help with the network-related GenAI journey

Seek partners with extensive AI and data expertise who can offer solutions and services to support diverse GenAI use cases in the network, a broad range of LLMs and toolsets, and flexible operations in a hybrid cloud environment.

End