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TREND REPORT

Data & AI Innovation

leveraging AI for service and value creation

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contents

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the big picture

The benefits that AI can bring to telecoms operators fall broadly into two categories. First, there are gains that result in greater productivity and efficiency. These help operators to lower their capex and/or opex. Secondly, there are benefits that can be categorized as value creation. These result in higher revenues, either as a result of growing legacy services or, on the other hand, selling new services.

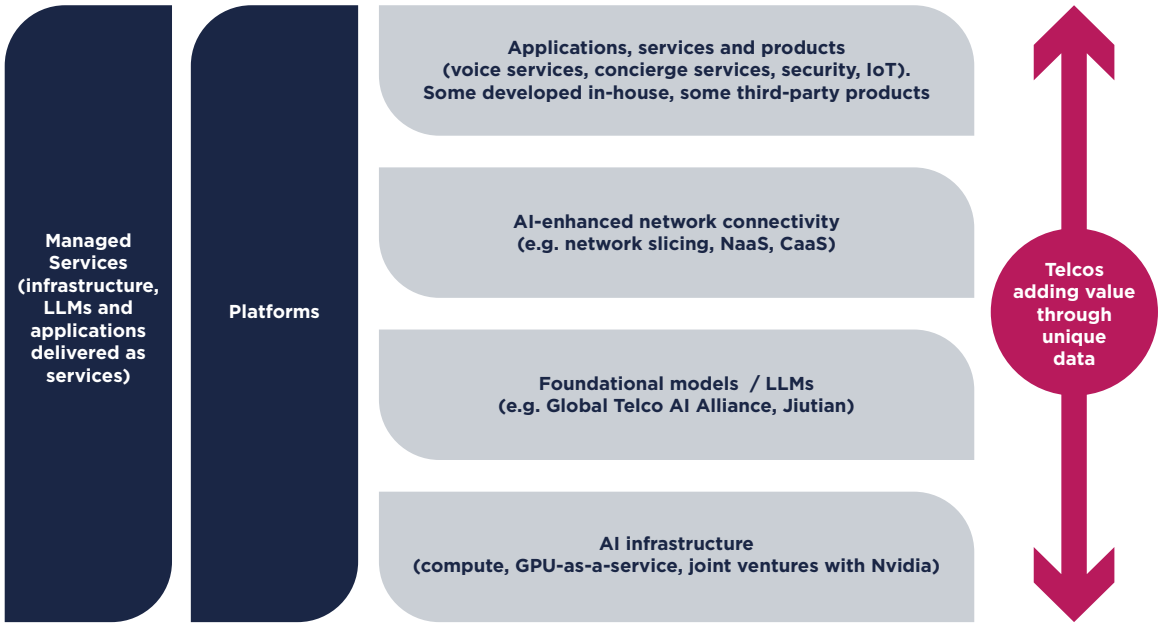
This research report focuses on the second category of value creation. However, it is not always possible to make a distinction between legacy and new. If AI adds value to an existing network – in terms of the value that it delivers to consumer or business customers – should this be seen as a legacy or a new service?

For the purpose of this report we consider a range of AI-infused services, both new and enhanced. We are interested, fundamentally, in the incremental revenues that communications service providers (CSPs) can generate from new or improved products and services.

Categorizing new products and services opportunities

It is still too early to detect distinct patterns and trends in relation to the AI-infused products and services that CSPs are building for their customers. Indeed, even the largest CSPs that we spoke to in the course of this research acknowledged that they were still in the relatively early stages of deciding where to put their efforts. However, we can glean enough from the announcements they have made and their partnerships with technology vendors to build a picture of where they believe the best opportunities lie. Those opportunities are shown in the graphic opposite and summarized in the rest of this section.

Operator AI product and service opportunities



TM Forum, 2024

The extent to which CSPs are investing in building their own internal capabilities – and in which part of the AI value chain – is the main determinant of the products and services they are bringing to market. A number of CSPs globally are participating in the AI arms race by building data and cloud infrastructure for AI. Many are partnering with Nvidia to build so-called AI factories. However, others have decided not to build AI infrastructure. These tend to be the same operators that have adopted a public cloud first approach to cloud computing.

Embedding AI solutions into the network, and into network operations, is something that all operators will eventually introduce, either using their own internally-developed automation tools or by partnering with vendors or systems integrators. While the main objective of network automation, and the push towards autonomous networks, currently comes from efficiency gains, AI can also help CSPs to develop more compelling networks and connectivity experiences. To monetize these experiences they will either need to charge higher prices, find new markets for connectivity in segments such as IoT, or bundle new products and services with connectivity.

Very few operators have chosen to build foundational models for generative AI. The two most notable exceptions are Korean telco SK Telecom and China Mobile. SK Telecom spearheads the Global Telco AI Alliance with Deutsche Telekom, e&, Singtel and Softbank. Their mission is to build a multi-language telco-focused large language model (LLM) which they will market to other operators and service providers.

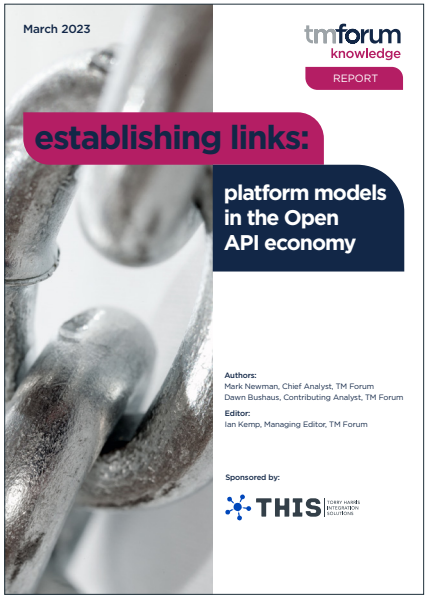
China Mobile's Jiutian initiative is a little different. It is building LLMs for a number of different vertical segments within China. However, many more operators which have built platforms that sit on multiple LLMs and for their own internal GenAI deployments, are making these available to their customers.

New operator opportunities

Applications, services and products is a broad category that includes new AI-enabled applications that CSPs are launching as well as enhancements to existing services such as voice and text-based communications. Some operators with strong in-house skills may try to innovate in this space, but a more likely scenario is that CSPs will resell third-party products and services in the same way that today they bundle video services or productivity tools with their communications services. We have identified enhanced voice services, concierge services, IoT and security as some of the most interesting new opportunities for operators.

When it comes to provisioning methods, platforms and managed services are two ways in which we see CSPs delivering different AI-infused services, particularly in B2B markets. CSPs including Indian operator Jio, Singtel, Orange and Vodafone have built platforms for the delivery of a range of AI applications, products and services. But their approaches – and the customer segments they are trying to target – are all different to some degree or another.

Read our report to find out more about operators' platform strategies:



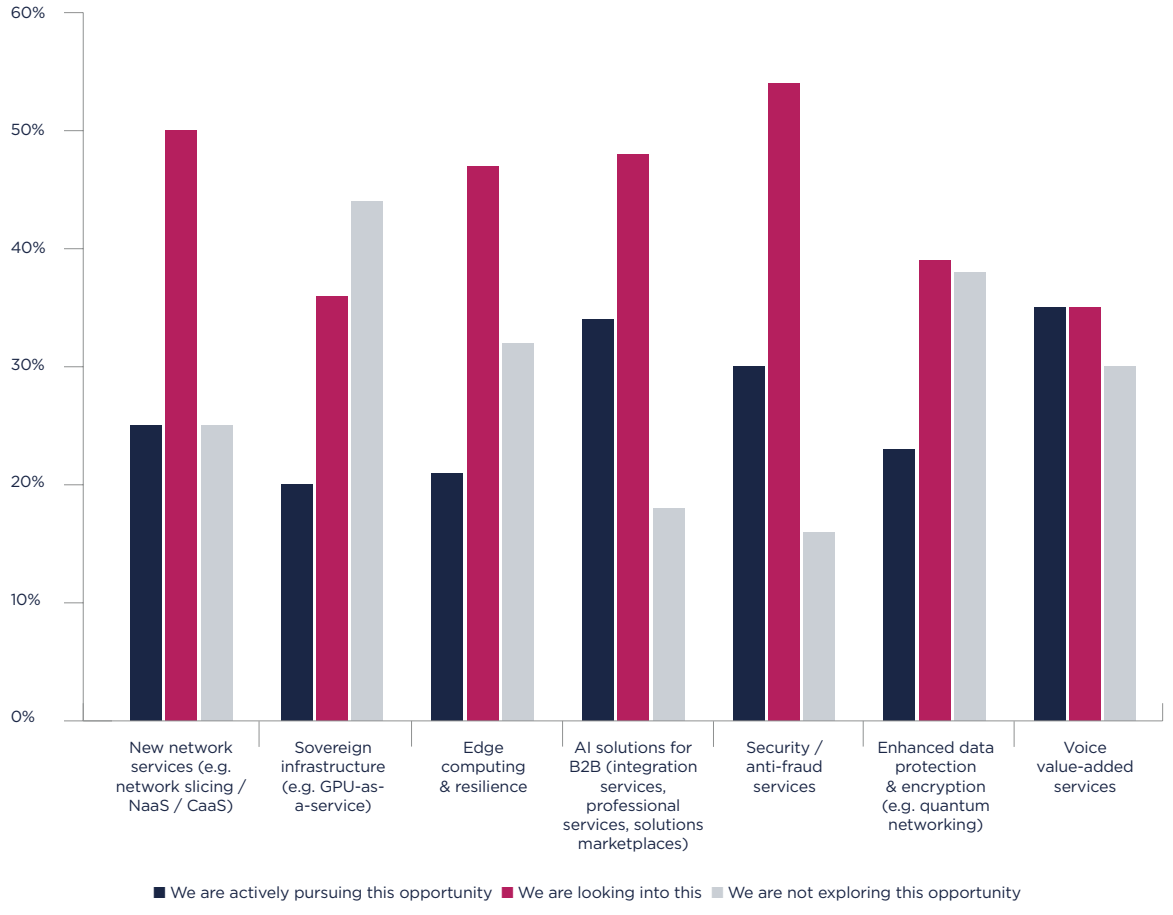
Managed services, meanwhile, is a category in which most CSPs with large B2B businesses are already active. But even they may need to recruit new skills if they are to deliver AI managed services to their customers. As such, they may need to partner with AI specialists and hyperscale service providers, and choose the market segments where they are most likely to be able to build a presence.

Data is the differentiator

Even if CSPs can create new AI-infused products and services, and bring them to market, they will need to persuade their customers that they are trustworthy, value-for-money providers. The greater the differentiation in the products and services they provide the easier it will be for them to compete in the AI services market.
But creating lasting differentiation in new products and services represents a major challenge for CSPs. The network itself is a differentiator, but more AI products and services will be delivered over the top. Where CSPs can distinguish their products is in the data that feeds AI services.

Any service built on data that is exclusive to the operator will offer differentiation. This could be data from the network itself, data built from the information that operators collect from customers that already sits in their IT systems, or the data that is captured from voice and text communications over operator networks. Even this may not be enough in itself, but if this data can be combined with – and integrated into – for example, the systems and services provided by hyperscale service providers, then operators stand a good chance of realizing the opportunity.

What plans do you have to use GenAI for building and enhancing products and services?



TM Forum, 2024

B2B services are generating most CSP interest

In the summer of 2024 TM Forum conducted a global survey in partnership with Amazon Web Services (AWS) to gauge operators' generative AI maturity. We identified a number of different product categories and asked AI decision-makers in CSPs to say whether they were actively pursuing these opportunities, looking into them or not exploring at the moment. Based on data from 203 AI decision-makers at 124 operators in 61 countries, the product lines that most CSPs said they are pursuing are voice services, and AI solutions for businesses such as professional and integration services (see chart on the previous page).

Read this report to:

- find out about the products, services and AI-infused solutions that CSPs are launching, or planning to launch, across their consumer and enterprise lines of business
- understand how CSPs can use AI to add value to network connectivity
- explore the different partnership opportunities that are available to CSPs as they strive to innovate with new AI-enabled services
- learn where CSPS have unique capabilities that they can use to create sustainable value and differentiation
- assess which new revenue growth strategies are most relevant and achievable for your business.

The product lines that most CSPs said they are pursuing are voice services and AI solutions such as professional and integration services.

section 1

AI-enhanced network connectivity and services

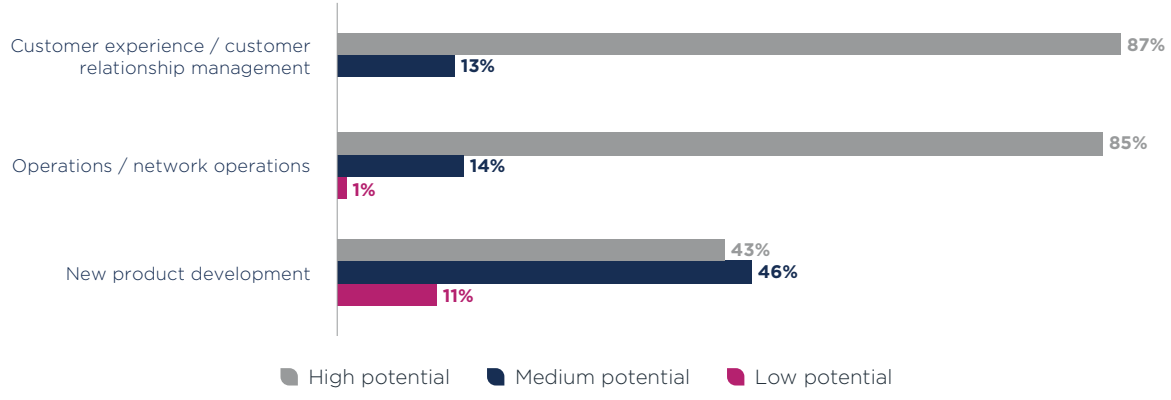
In this section we consider the impact that AI can make on the connectivity experiences that CSPs deliver to their customers and the opportunities for them to secure incremental and new revenues either by selling more, higher-priced, or services on top of, connectivity.

When CSPs consider how and where AI can benefit the network and network operations, generating new revenues ranks some way behind delivering efficiency and productivity gains and a better customer experience. That is illustrated in the graphic opposite, from our Benchmark report Building an AI strategy: telcos put the foundations in place, which included a survey based on responses from 104 executives from 73 CSPs globally.

Indeed, the use cases that CSPs have deployed in the network in recent years have all been aimed at driving greater efficiencies. In 2024, any discussion about the use of AI in the network is inextricably linked with the drive to greater automation and, ultimately, the creation of autonomous networks. Reducing the number of people required to manage and operate networks is the key business driver.

Whereas generative AI (GenAI) is emerging as the most promising and useful type of AI in many parts of the CSP business, it has tended to figure less prominently in discussions about network operations because of issues relating to accuracy and latency. Nevertheless, there are emerging use cases for AI in the network which will help to deliver greater value to network services.

Where does AI / machine learning have the most potential to positively impact the telecoms business?



TM Forum, 2023

We have identified three categories of these use cases:

Leveraging AI to help CSPs build new experiences and capabilities in the network services they offer their customers and for which they can charge higher prices or create new demand for connectivity

Using AI to help CSPs better utilize their network capacity and, at the same time, free up spare AI computing capacity to sell to third parties

Building new network (and compute) capabilities based on enterprises' requirements for originating and terminating AI traffic and monetizing this demand by selling new capacity and SLA-driven experiences.

There is, of course, huge overlap between these opportunities and trends. The new experiences and capabilities in network services that CSPs can offer their customers will help enterprises to better capture the opportunity to use AI in their businesses to deliver new and enhanced experiences to their customers. But it is useful to consider them separately to better understand the full spectrum of opportunities that are available to CSPs.

Delivering new network experiences

The two key initiatives for CSPs to deliver new network experiences sit under the categories of network-as-a-service (NaaS) and network slicing. NaaS is a new consumption model for enterprises that allows them to operate their (private) networks and achieve the outcomes they need from them without owning, building or maintaining their own infrastructure. Those CSPs that wish to provide NaaS must move their services and capabilities into the cloud and embrace new end-user pricing strategies and approaches that mirror infrastructure-, platform- and software-as-a-service.

Despite the enthusiasm of many CSPs for NaaS, enterprise adoption has been extremely slow because of uncertainty around cost and return on investment, and concern about how it will impact the day-to-day management of networks. However, analysts at ABI Research forecast that by 2030 more than 90% of enterprises globally will consume at least 25% of their network services via this model.

Network slicing is a business model and a network capability that was developed specifically within the context of 5G. The idea behind network slicing is that business users and different consumers have specific network requirements relating to location, time, speed, latency and throughput, and service-level-agreements more generally, and that until now mobile operators have been unable to meet these requirements. By migrating core network elements into the cloud, CSPs have the ability to meet these different requirements and, in doing so, deliver better experiences and, potentially, new revenues.

But network slicing has been slow to build momentum. This is in part because CSPs have been slow to deploy new 5G core networks – commonly known as 5G standalone (5G SA) – that allow them to deploy network slices.

The two key initiatives for CSPs to deliver new network experiences are network-as-a-service and network slicing.

According to Ericsson's November 2024 Mobility Report, of the 320 CSPs globally with commercial 5G services only 60 have launched 5G SA. But slow network slicing progress is also due to the fact that it is not clear that CSPs' public 5G networks can offer enterprises the SLAs they need.

The question, then, is whether CSPs can use AI to improve their NaaS and network slicing offers and address some of the issues that are hindering end-user adoption. In the case of NaaS, AI – and more specifically AI chatbots – can play an important role in helping enterprises to monitor and manage their networks.

"In the world of network troubleshooting, AI-powered chatbots are a valuable tool that can provide immediate and around-the-clock support," says Jamie McGregor, consulting manager at Deloitte in an article written for the website Medium. "Thanks to their ability to automate routine tasks and offer insights, AI chatbots can help streamline network management and optimisation. They play a key role in diagnosing and resolving network and cyber issues, reducing downtime, and improving overall network performance."

While the use of AI was not initially baked into the network slicing concept it is now emerging as a tool that is useful both to CSPs and their customers to ensure the best possible match between the user's requirements and what the slice delivers. The role of AI here is as an orchestrator, constantly analyzing and adjusting network parameters relating to factors such as latency, bandwidth and reliability to meet the specific requirements of the application.

Dual-purpose AI and 5G networks

The success of Nvidia, the world's largest provider of AI hardware and software, reflects the extent that CSPs are turning to AI in their network operations. Nvidia reported a 94% year-on-year increase in revenues to $35.1 billion for the third quarter to the end of October 2024 and a 110% year-on-year increase in operating profit to almost $21.9 billion. In the same period two years ago Nvidia's revenues were $5.9 billion and its operating profit just $601 million.

Nvidia financial results (GAAP)

($ millions)	Q3 FY25	Q2 FY25	Q3 FY24	Q/Q	Y/Y
Revenue	$35,082	$30,040	$18,120	+17%	+94%
Gross margin	74.6%	75.1%	74.0%	-0.5 pts	+0.6pts
Operating expenses	$4,287	$3,932	$2,983	+9%	+44%
Operating income	$21,869	$18,642	$10,417	+17%	+110%
Net income	$19,309	$16,599	$9,243	+16%	+109%

Nvidia has partnered with a number of companies including Nokia, T-Mobile, Microsoft and Softbank in an initiative, called the AI-RAN Alliance, to develop dual-purpose AI and 5G networks. The company is also partnering with operators to build AI data centers and create a GPU-as-a-service line of business. In its third-quarter results Nvidia reported record quarterly data center revenues of $30.8 billion, up 17% from Q2 and 112% compared to a year earlier.

AI-RAN takes CSPs' strategies for competing in the AI infrastructure arms race a stage further by embedding Nvidia compute technology in radio access networks (RANs). The basic premise for a combined AI-5G network is that traditional RANs only operate at about one-third capacity, as they need to be over-provisioned to handle peak traffic loads as and when required. With a dual-purpose computing capability provided by AI-RAN, Nvidia believes that telcos now have the opportunity to monetize the remaining two-thirds capacity forAI inference services and applications (see box opposite).

It would be up to each operator to target different enterprises and market segments with its AI compute services. Japanese technology and telecoms group Softbank, for example, has set up a trial to use Nvidia AI technology to build real-world AI inference applications, including autonomous vehicle remote support, robotics control and multimodal retrieval-automated generation at the edge.

What Is AI inference?

AI inference is the process of using a trained AI model to make predictions or decisions based on new, unseen data. In such instances the AI applies what it has learned during training to real-world situations.

This phase determines the effectiveness of AI in actual applications, ranging from recognizing speech to identifying objects in images. The inference phase comes after training, where the model learns from data sets by adjusting its parameters. AI inference can be used in applications such as predictive analytics, computer vision to understand the content of images and videos, LLMs to understand and generate human-like text, and fraud detection to analyze transactions.

Implementing AI inference typically requires powerful hardware such as CPUs, GPUs (graphics processing units) and application-specific integrated circuits (ASICs) – custom-designed chips optimized for specific AI models and tasks. They help variously with the speed, flexibility, performance and efficiency of AI inference implementation, but there are still challenges around latency, accuracy and scalability.

There are also different types of inference depending on application needs. Batch inference processes large datasets simultaneously, making it suitable for applications where real-time predictions are not needed. This approach is often used in periodic report generation and bulk email personalization. Online or real-time inference processes data as it arrives, providing immediate predictions or decisions. This type of inference is crucial in applications such as autonomous driving, where sensors continuously feed data to the AI system, or financial trading to enable systems to react to market changes in real time. And streaming inference handles continuous, high-velocity data streams, such as those generated by IoT devices, social media platforms or live video feeds, or in applications such as smart city monitoring.

Source: Run: ai

How AI is changing the face of telecoms networks

If the impact of AI on the digital lives of businesses and consumers is as big as the tech community expects, it will have a profound impact on the size, shape and direction of telecoms network traffic flows. But there are many questions and issues that we need to work through before we can consider whether this traffic growth, and changes in traffic flows, represents a monetizable opportunity.

They include:

- What will be the main applications that drive AI traffic growth?
- Will the AI traffic mainly be confined to businesses rather than consumer services and applications?
- Where will AI traffic originate and terminate?
- What types of AI will generate what types of traffic?
- Will AI bring the edge computing opportunity to the fore and do CSPs have a role to play?
- Does the growth in AI traffic help CSPs in the transition to NaaS and a gradual shift away from flat-rate monthly subscription pricing?

For the next two to three years enterprises rather than consumers will be the main drivers of AI traffic growth as businesses consume new AI-infused products and services. These applications will primarily be used to automate low-value, repetitive tasks. B2B IoT services will also drive traffic growth in the emerging "sight as a sensor" category (see section 2). This B2B AI traffic growth will mainly be uplink traffic. But consumer AI traffic growth will inevitably follow as entertainment and collaboration applications use AI to deliver new experiences.

AI traffic originates and terminates in one, or more, of four locations:

- On a device such as a handset or a sensor
- On a premises, a company site and within a local cloud or data center
- At the edge, in a shared location
- In a regional or centralized cloud or data center.

CSPs have the opportunity to generate new revenues if this traffic a) is generated from new devices such as IoT sensors, b) creates a demand for new or expanded fixed and mobile private networks or c) creates a demand for new capacity to connect businesses either to an edge or a regional or centralized data center. But there may also be an opportunity to generate revenues from the SLAs that AI users (businesses) will need to guarantee the performance and the security of their AI traffic. The (re)emergence of the edge opportunity is a function of the need for some of the benefits offered by public cloud services in areas such as load balancing and high-volume traffic management, but combined with the low latency normally achieved with on-premises or public cloud computing.

Many CSPs are now dusting off their edge computing business plans and repositioning them in the AI traffic era. Verizon, for example, has struggled to generate interest in its mobile edge services. But within the past six to nine months CEO Hans Vestberg has been talking up the prospects for the emergence of a GenAI applications edge computing market.

In the next section we look at how CSPs can begin to create applications, products and services using AI.

For the next two to three years enterprises rather than consumers will be the main drivers of AI traffic growth.

section 2

Applications, services and products

Telecoms operators do not have a great track record when it comes to building new products and value propositions for their customers. Despite their very best efforts, most CSPs are still predominantly or completely dependent upon revenues from connectivity and communications services.

This is not to say that CSPs do not offer other services to customers. But these are mainly products and services developed and owned by other companies – for example, video platform services (Netflix, Disney Plus and so on); productivity, collaboration or security tools (such as Microsoft 365 and unified communications applications); or hardware products (mobile phones, routers etc.).

The main business rationale for selling these products and services is to help secure, or protect, revenues from CSPs' core products rather than to generate new revenue streams. Nevertheless, many CSPs are stepping up their efforts to bundle more third-party products with their own connectivity and communications services portfolio either through improved digital commerce capabilities or by creating their own marketplaces.

AI can help in two ways. First, it can help CSPs to generate greater insights into their customer needs. Secondly, the coming years will see an explosion in new AI-enabled products and services for CSPs to resell. In addition to selling services such as Microsoft Copilot to their customers, CSPs have the opportunity to partner with lesser-known companies and to use their market reach and trusted customer relationships to find a much larger market than start-up companies could achieve themselves.

We have identified a handful of product categories across B2B and B2C markets where CSPs may be able to provide new or enhanced services, either through their own innovation or working with partners.

Enhanced voice services

CSPs' voice service revenues have collapsed over the past 20 years as customers have migrated to IP services and applications. As such, the idea that operators might be interested in investing in their voice business does, at first sight, seem unlikely. However, the argument could also be made that CSPs need to do something to protect the voice business and revenues they still have, otherwise the drift will continue.

Operators' voice services – and text-based communications services – have remained unchanged for many years and have been overtaken in terms of functionality by VoIP offered through services such as WhatsApp for consumers and Microsoft Teams in the

The coming years will see an explosion in new AI-enabled products and services for CSPs to resell.

B2B market. The functionalities that these VoIP providers have added to their services include video calling, voice messaging, presence, group calling, call recording, transcription and summary.

As fixed-line operators migrate their voice services to IP, and as mobile operators deploy voice-over-LTE technology, they have the possibility of adding new features and functionalities. Some have committed to the Google-backed Rich Communications Services (RCS) messaging standard, the prospects for which have been massively boosted by Apple's decision to support it in its iOS operating system.

Microsoft, meanwhile, has been developing a suite of capabilities that enable CSPs to introduce "Teams-like" services to operators' fixed and mobile customers for use over their existing devices. For example, it has been partnering with BT since 2021 to develop new voice calling services.

But what do these types of services have to do with AI? IP voice services do not use or rely on AI technology. But they do create a capability to enable the telecoms operator – or the vendor supporting the operator's new IP voice services – to start offering new services that do use AI. This is achieved by using GenAI foundational models to use the natural language in voice calls that customers make and receive to deliver new services. This natural language can relate to the calls that a customer makes and receives and which can be recorded, transcribed or translated.

For example, GenAI could be used to protect customers against unwanted calls – a clear opportunity given the continued growth in scam and fraud calls. Microsoft Azure has built a product called Azure Operator Call Protection Preview which alerts customers via an SMS if the call they are making is likely to be a fraud or a scam. The service works by connecting the customer's (IP) call to an Azure Communications Gateway platform, thereby integrating the customer's landline or mobile voice network and the Call Protection service running on the Azure platform.

Concierge services

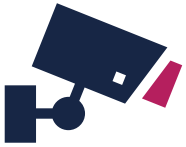
Concierge is an emerging category of GenAI-enabled services that can be offered by any company that can collect and use data relating to a person's, or an organization's, personal or work life (or both). A concierge, in this context, is a virtual assistant that is designated to an individual person to provide them with recommendations, or which goes a stage further and actually automates different aspects of that person's day-to-day life.

The more spoken or written content that a CSP can get access to, the better chance of it being able to deliver value in a concierge service. As such, if CSPs are to build such services they need to capture and act on the content of their customers' voice and text communications.

GenAI foundational models can use the natural language in voice calls that customers make and receive to deliver new services.

Integrating this content with other online tools – for example, email and calendar services offered by providers such as Microsoft and Google – allows the operator to offer services that go beyond mere advice and recommendations by automating scheduling and customer relations. Microsoft, for example, is building a suite of concierge services for small businesses in a range of different vertical sectors in partnership with Norwood Systems and its CogVoice voicemail and voice services platform. Japanese telco Rakuten, meanwhile, is trialling a concierge service, Rakuten AI Assistant, for its mobile business and is leveraging data captured from its customers' usage of other Rakuten services.

It is unlikely that operators will be able to charge a fee for concierge services in the consumer market. However, there are clearly opportunities in B2B, either as standalone services or as a service that is bundled into a high-end mobile subscription. That said, operators often struggle to demonstrate the value of dedicated mobile and broadband price plans in the SME sector, and users are often content with using standard consumer packages.



From IoT to AIoT

The term artificial intelligence of things (AIoT) has already been coined to describe new AI-enabled IoT services. While IoT essentially is about devices talking to each other via the internet, AI helps these devices to learn from their data and their experiences.

Vodafone IoT has already adopted the term Sight as a Sensor for a category of IoT applications that use still or video images to generate data that is then fed into an AI model to get results that help deliver insights. For example, Vodafone has been running a trial with pest-control firm Rentokil that uses images and connected sensors to provide earlier signs of rodent infestations than would previously have been possible.

A broader opportunity is opening up in the use of 5G connected CCTV cameras to help protect critical national infrastructure. A new class of video cameras is now able to function for as long as a year without the need to replace or recharge batteries.

CSPs have long aspired to deliver greater value in IoT than merely connectivity, which generates less than 10% of total IoT revenues. By delivering the IoT device/sensor and analytics, in addition to connectivity, we estimate that CSPs have the chance to capture 50% or more of total solutions revenues.

There are clearly opportunities in B2B concierge services, either standalone or bundled into a high-end mobile subscription.

(Cyber)security services

Managed security services have emerged as an important and fast-growing line of business for many tier-one CSPs. Large B2B service providers such as Orange, which employs 3,000 cybersecurity experts, derive 2% or more of their total revenues from security services in B2B (Orange Business is targeting €1.3 billion in cybersecurity revenues in 2025).

CSPs will most likely work with their existing security software and services partners or with hyperscalers to integrate AI into their cybersecurity services. AI can analyze vast amounts of data, detect patterns and predict future cyber threats. When it comes to responding to security threats, for example, AI can enable automated incident response and deliver managed services to address threats without manual intervention.

In the next section we look at how CSPs are working on large language models (LLM) and whether that presents commercial opportunities.

CSPs will likely work with their security software and services partners or with hyperscalers to integrate AI into their cybersecurity services.

section 3

monetizing large language models

The last two years has seen an explosion in new large language models (LLMs) developed by both established tech players and start-ups. Operators are not significant players in the training of new LLMs. Most are using techniques such as fine-tuning to take existing models and inject them with their own data from customer operations, the network and other parts of the organization.

But a handful of operators have committed to training their own models. They will use these LLMs for their own internal purposes, but part of their business model is also to generate revenues by making them available to third parties. We have identified three main approaches to the monetization of LLMs from these operators, and which are distinct from reselling GenAI services:

- **Creating LLMs** that are specific to the telecoms business and, most likely, in a specific domain such as customer operations or network
- **Training an LLM** that can then be tuned for specific market segments within that country
- **Building an LLM** dedicated to a specific language and where there is a belief / confidence that linguistic and cultural empathy and accuracy provides a unique selling point.

Telco-specific LLMs

The Global Telco AI Alliance – comprising SK Telecom, Singtel, Softbank, e& and Deutsche Telekom – is developing multilingual LLMs using telecoms operator data. The early focus of the work from the alliance has been contact center operations, providing agents with real-time information during calls and post-call automation resolutions. But more recently, SK Telecom has been assessing the potential to use LLMs in the network and how to move beyond text-based output to multimodal content including visual and audio output based on unstructured data.

Given that the initiatives of the alliance are designed to address issues specific to operator businesses, other CSPs could use its solutions as an alternative to more generic LLMs. However, the alliance itself has not specifically stated that its aspirations lie beyond meeting the needs of its founding members.

Another opportunity for the alliance would be to partner with business and operational support system (BSS/OSS) vendors. It could help both vendor and operator communities address issues around complexity and interoperability when CSPs use vendor solutions based on different LLMs.

Read these reports to learn more about telcos' AI and GenAI strategies:

Training LLMs for specific market segments

China Mobile is another operator that has trained its own LLM, Jiutian. This has been developed both for its own internal usage and as a product and capability to generate new revenues. China Mobile is adapting Jiutian to build many different LLMs to address horizontal business functions such as customer care, telecoms-specific LLMs including the network and IoT, and vertical market LLMs such as for healthcare, entertainment and smart cities.

Unlike SK Telecom and the Global Telco AI Alliance, China Mobile has been quite explicit about the monetization of Jiutian being a key KPI by which its success will be judged. In its first-half 2024 results presentation the company said it had deployed high-performance industry-specific LLMs in 40 sub-sectors: "In the first half of 2024, we have released 17 self-developed Jiutian industry-specific large models, implementing the applications of large-scale models across multiple industries such as public administration, IoT-enabled irrigation, and social general administration and governance." The operator said it had launched 23 AI+ products and 20 AI+ DICT (digital, information and communications technology) industry applications.

Japanese telco NTT has also developed a local language LLM called tzuzumi, specifically for Japanese businesses, which it will start offering in March 2025. In an effort to reduce the costs to businesses of training, inference and tuning, NTT has introduced lightweight versions of the model with parameters that are a fraction of the size of, for example, OpenAI's LLMs.

One of the verticals targeted by NTT is healthcare, and more specifically the analysis of medical data and drug development. In November 2024 NTT announced the general availability in Japan of tsuzumi on Microsoft's Azure cloud computing platform through what it calls model-as-a-service (MaaS). The pay-as-you-go pricing model is designed to make tsuzumi accessible to businesses looking to develop advanced AI capabilities at scale.

"This model delivers efficient Japanese AI capabilities that excel in summarization, content generation and information retrieval that makes it easy for customers to build innovative AI solutions," said Stephen Boyle, Global Leader, GSI, ESI and Advisory Partners, at Microsoft at launch of the service.

Building a language-specific LLM

Most AI models to date are trained using English, and other languages are sometimes overlooked due to the lack of content available for training purposes. For operators in countries with languages for which there is a lack of available content this presents both a challenge and an opportunity.

Korea Telecom is building a local-language LLM for Thai technology group Jasmine Technology, while French telecoms group Orange is partnering with OpenAI and Meta to train LLMs with natural language content in several west African countries. Natural language is the most compelling GenAI-enabled customer service interface in countries with low levels of literacy. Training or fine-tuning LLMs in these languages can help reduce the risk that societies miss out on the benefits of new AI services and applications.

Training LLMs with natural language content can help reduce the risk that societies miss out on the benefits of new AI services and applications.

The Global Telco AI Alliance, meanwhile, is training LLMs in a range of languages including Korean, English, German, Arabic and Bahasa. At DTW24-Ignite in June 2024 the alliance members shared a stage with their hyperscaler partners to explain their LLM tailoring strategies.

"We're probably working with about 20 different sovereign governments right now to build specific LLMs for that country or region," said Sameer Vuyyuru, Director, Global Business Development for Telecom, Amazon Web Services, in an interview with TM Forum's Inform.

In December 2024 Deutsche Telekom launched an open-source AI LLM that supports all 24 official European Union languages. The operator says it is the first commercial offering using OpenGPT-X's Teuken 7B model and is designed to provide secure digital sovereignty solutions for businesses and public authorities.

"Providing Teuken as an open-source model has multiple advantages," said Dr. Nicolas Flores-Herr, Project Lead at Fraunhofer IAIS, one of the partners in the consortium that developed the model. "Companies can tailor the model to their needs, developing specialized applications. They can also choose to run the model locally on their infrastructure or with a trusted cloud provider of their choice. This allows sensitive data to remain within the organization."

Getting a return on LLM investments

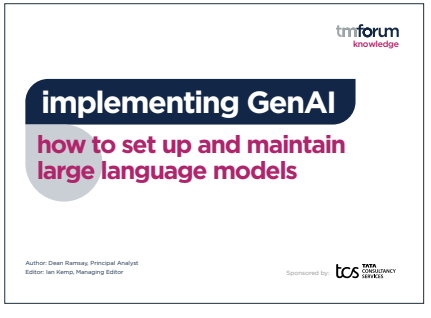
But it is difficult to see how CSPs can generate a return on investment in LLMs based on external monetization using standard token-based charging principles. "There's some evidence that it is a race to the bottom because the price per token of generated LLM output has dropped 100x in the last year, which is much faster than Moore's law," said Marc Andreessen, general partner of venture capital firm Andreessen Horowitz, at a tech event in October. As such, CSPs will need to find other commercial models or justify investment based on improvements in productivity or customer experience.

Rather than building their own models some CSPs are seeking to collaborate with hyperscalers and other leading developers of LLMs. Korea Telecom, for example, is partnering with Microsoft and plans to develop customized AI models including OpenAI's GPT-4.o and Microsoft's Phi 3.5 small language models. These AI models will be co-developed and rolled out to KT's customer services – such as chatbots – and industry-specific AI solutions for B2B sectors. As part of the deal, Microsoft will pay Korea Telecom to use its cloud infrastructure.

The five-year multi-billion dollar deal aims to drive AI innovation. It includes the establishment of an AI-focused company to deliver AI transformation to enterprises in Korea, joint R&D through a co-innovation center, development of industry-specific AI models, development of sovereign cloud solutions, and upskilling of KT's workforce. In November KT also announced it would restructure to pursue its focus on AICT services.

In the next section we look at how CSPs are starting to use platforms to deliver AI products and services.

Read our e-book to find out more about how to set up and maintain LLMs:



section 4

using platforms to deliver products and services

The term platform is used a lot in CSPs' statements about their strategies for monetizing AI. Allied to this are many different products, services and value propositions. For the purpose of this piece of research we define platform simply as a means for CSPs to deliver different AI-infused products and services.

Platforms represent a means by which telcos can insert themselves between the fast-moving, chaotic AI product and services landscape and customers who may not have the capability or desire to buy directly from new, untried providers. In many cases CSPs' platforms have been developed first for internal use cases and applications and only subsequently exploited for external users.

This is the case with Live Intelligence services, launched by Orange Business at the end of November 2024 and which was road tested by 50,000 of its own employees for a year. A multi-LLM, GenAI software-as-a-service offering, it aims to help employees of enterprises and local authorities improve operational efficiency through the safe and managed use of GenAI. It does this by providing access to a library of pre-set prompts to address common business GenAI use cases, such as analyzing a document, extracting important information from an email chain, writing meeting minutes or drafting an agenda.

Orange Business sees data security and data sovereignty as key selling points of Live Intelligence, which initially launched in France but will be extended to other areas of Europe. Not only does it provide an alternative to uncontrolled adoption by employees of free online GenAI tools that could provoke data breaches, but the data it uses will also remain in Europe. And it comes with a dashboard to monitor how employees are using GenAI, including the type of LLM.

By inserting a platform between its own users and the LLM itself, an organization can ensure that it retains the knowledge captured from inputs and outputs from different models. This can help efforts to fine-tune different models and, potentially, make more intelligent use of different LLMs to manage costs. There is also an opportunity for CSPs to play the role of broker, offering bundles of services from different vendors at price points that match their usage.

Spanning the AI value chain

Many CSPs are trying to use AI to enhance their 5G value propositions and help build compelling B2B services. JioBrain is a GenAI-enabled platform integrated with 5G to enable advanced network management and service delivery capabilities. It has been developed by Jio Platforms, a subsidiary of mobile operator Reliance Jio, and is initially being deployed for internal use cases and for other Reliance companies. The plan is then to offer it to other companies.

There is an opportunity for CSPs to play the role of broker, offering bundles of services from different vendors at price points that match their usage.

Singtel is another company with big AI ambitions. In October it announced RE:AI, a group of products and services that aims to make AI available to enterprises. Singtel describes it as an AI development and deployment platform.

One of RE:AI's offers is cloud-based enterprise AI capabilities delivered over 5G, using Paragon, its in-house 5G service orchestration platform for enterprises. According to Singtel it combines compute infrastructure such as graphics processing units (GPUs) and storage, workspaces and tools with 5G, fixed and quantum-safe networks.

"Many enterprises and public sector customers have shown keen interest to bring AI into their operations," said Bill Chang, CEO of Singtel Digital InfraCo, in a launch statement. "However, the high costs and long lead times for GPUs, the need for special environments to host them due to their intense energy utilization, the complexity of AI technology and the lack of talent are key friction points in their respective journeys."

Japanese telecoms group KDDI has launched a "business platform" called WakonX (pronounced Wakon-Cross), which brings together its networks, computing and data resources and its AI and vertical market knowledge into a single proposition for a monthly subscription. WakonX has a strong focus on IoT and 5G. It is developing "standardized tools" and solutions across multiple vertical sectors including mobility / automotive, retail, logistics and entertainment. KDDI says AI is central to the three layers of its WakonX platform: network, data and vertical.

Collaborating to develop new AI use cases

There is also a platform element to the AI factory strategies that are being pursued by a number of CSPs in collaboration with Nvidia and which we explored in section 1. At the launch of its AI factory and the onboarding of its first customer in November, Scandinavian telecoms group Telenor said it would serve as "a collaborative platform" combining the operator's infrastructure and expertise with partner companies to accelerate the adoption of AI across industries.

As we have seen already in this report – in developments from Korea Telecom and the Global Telco AI Alliance, for example – collaboration is key to many platform developments. Two years ago Vodafone announced the launch of its AI Booster AI / machine learning platform. It uses Google technology to enable and automate the deployment of AI use cases such as optimizing customer experiences and product recommendations.

Built entirely on Google Cloud, using the Vertex AI development platform for building GenAI applications and machine learning models, AI Booster is a fully managed cloud-native platform that integrates with Vodafone's Neuron platform, a data ocean also built on Google Cloud. One of the options now open to Vodafone is to use AI Booster to build new products using its own network, customer and operations data.

In the next section we look at how CSPs are placed to build managed AI services businesses.

There is a platform element to the AI factory strategies that are being pursued by a number of CSPs.

section 5

building an AI managed services strategy

Managed services are an important line of business for any operator that has a large established B2B function. Most managed services revenue comes from network services, with large national and multinational corporations using a mixture of private and public infrastructure. But the managed networked services business is stagnating as enterprises transition to cloud and IP connectivity.

As such, operators are relying on revenues from new managed services such as cloud and security to deliver topline growth. These businesses typically are growing at 10%-15% per year on a global basis.

Managed AI services represent another potentially high-growth opportunity. Gartner predicts that 80% of enterprises will have used GenAI APIs or deployed GenAI applications by 2026, but they face several challenges in deploying this technology. High entry costs, technical complexity and concerns about data leaks are significant barriers to adoption, for example.

Delivering professional services to these companies is already a fiercely competitive market dominated by systems integrators, specialist managed service providers and technology vendors. Telcos will need to figure out which solutions and which market segments offer them the best chances of success.

CSPs need to address a range of issues as they consider building a managed services capability in data and AI:

- Are they building the necessary internal skills and tools to make them credible providers of AI services?
- Do they have the consulting skills to deliver such services?
- Which specific services from a solution perspective should they seek to develop?
- Which market segments offer the best opportunities?
- Who should they partner with?
- Do they need to make acquisitions to establish a presence and a capability?
- How do they define success in terms of revenues, EBITDA margin and profits?

Large B2B operators have already built teams of experts in different fields to become credible providers of managed and integration services. For example, Orange has 3,000 cybersecurity experts worldwide. But the race for AI talent has heated up in the past two years as a result of generative AI, and operators are using a combination of retraining, recruitment and partnering with systems integrators or hyperscalers to bring in the right skills.

High entry costs, technical complexity and concerns about data leaks are significant barriers to GenAI adoption for enterprises.

In the previous section, for example, we saw that part of KT's major new partnership deal with Microsoft involved upskilling the operators' employees in AI technologies and services.

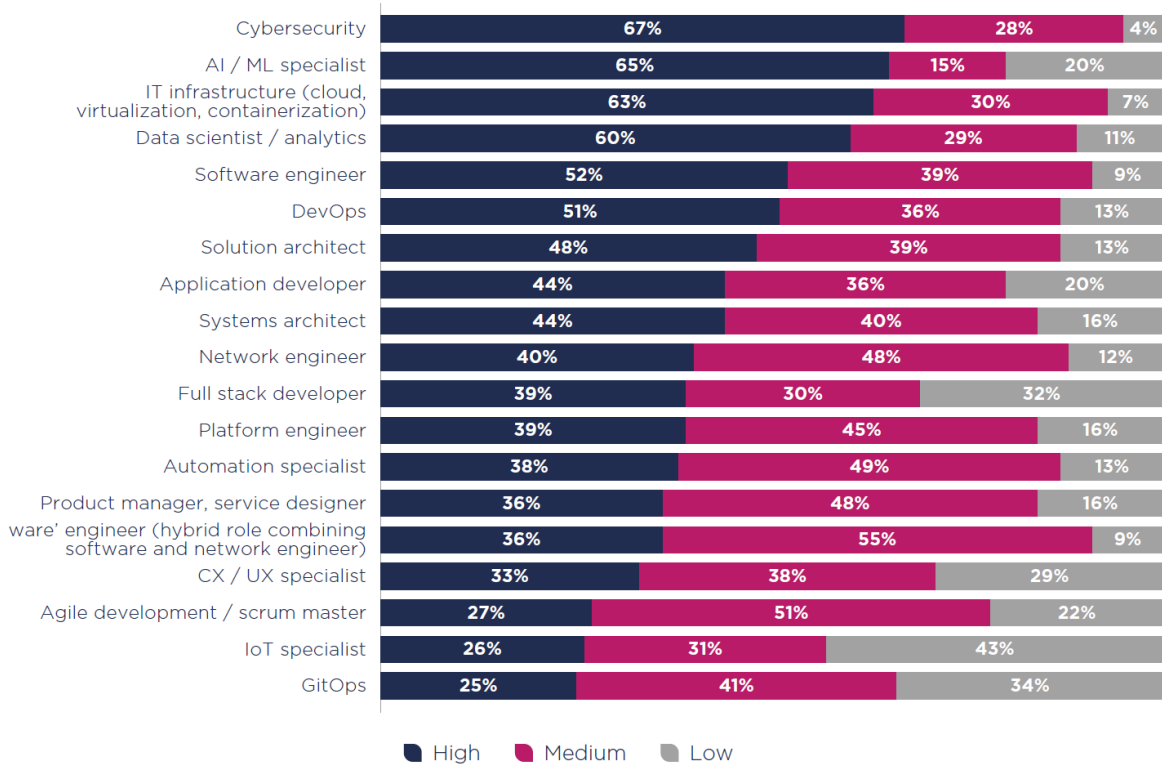
A TM Forum survey of 40 CSPs conducted in the first half of this year revealed that cybersecurity and AI / machine learning are the skills in most demand across the telecoms sector (see graphic). "[CSPs] can live with outsourcing at the engineer level, but at the architect level it's insourcing – and especially for these key areas of cloud, AI, cybersecurity," explained Ashish Yadav, Senior Director, Engineering, at Capgemini, in our report Finding skills for the future: inside the telco talent revolution.

The main requirement for skills comes from the internal technology functions rather than the line of business. Becoming AI-enabled is now a strategic imperative for most CSPs, and in the skills survey it was cited as the most important reason for insourcing talent. Conversely, insourcing talent to help drive revenue growth – be it for data monetization, reselling platform capabilities or for managed services – ranked as the least important business drivers (see graphic on the next page).

An inside out model

If CSPs are to build a managed (AI) services business they will first need to build skills, products and systems for their own internal requirements. For example, some of the CSPs that are most advanced in their adoption of GenAI have built platforms for their own internal teams that allow them to use many different LLMs and a range of different techniques. These include retrieval augmented generation (RAG) – a way to improve the output of an LLM – and

Which skills are in highest demand?



TM Forum, 2024

prompt engineering – the process of refining LLMs with specific prompts and recommended outputs – to optimize results. Could CSPs then make this platform capability available to their own customers?

This is precisely how Orange has gone about commercializing its Live Intelligence multi-LLM GenAI platform and service that was launched at the end of November 2024 as we saw in section 4. "The solution was originally conceived by Orange innovation teams to transform its own work practices and increase its efficiency by providing access to the latest AI solutions," the company said at launch.

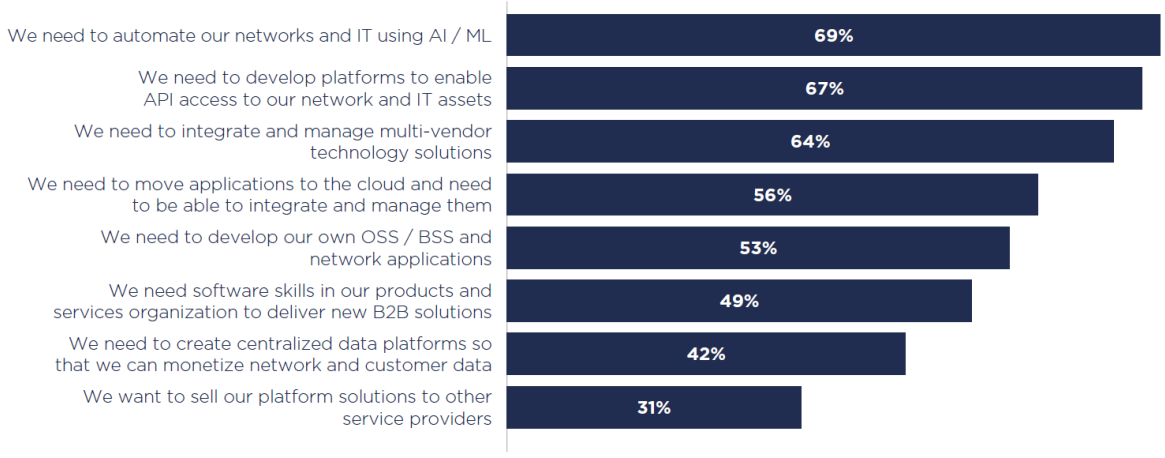
Orange Business has ambitious targets to build AI capabilities. Its intention is to have 3,000 AI experts within the next five years.

Swisscom is another telecoms group which believes that building its own internal skills and capabilities is a requisite for setting up an AI managed services practice. There was some surprise from industry commentators when the company entered into a strategic partnership with Nvidia at the start of this year and committed to investing SFr100 million (about $113 million) in an AI Factory to deliver services to customers in Switzerland and Italy.

Isa Mueller-Wegner, Head of Strategy and Business Development at Swisscom, stresses the importance of seeing the partnership (and the investment) in the context of Swisscom's role as the largest provider of IT services in Switzerland. "The Nvidia partnership is really more about how we help our customers make the most of [AI]," she says. "And the context here is that lots of people tell us, hey, look, this all sounds very exciting, but I'm nervous about where my data is going, I'm nervous about knowing what data my models are trained on, and I'm nervous about where my information is held. And we'd really quite like you to come and help navigate this, because I'm not comfortable sticking my data into a machine which potentially goes way outside of our sovereign areas."

In the first commercial developments from that partnership, Swisscom in November 2024 launched its Swiss AI Platform, which provides AI-focused sovereign data storage and processing in data centers in Switzerland. Targeting enterprise users in verticals including finance and the public sector, customers can source AI services

CSPs' reasons for insourcing talent



TM Forum, 2024

from Swisscom ranging from consulting through to the development of AI applications, implementation and operation. The platform is based on what it calls the Nvidia SuperPOD System (full-stack supercomputers).

Initial applications include GPU-as-a-service; an AI work hub designed for data scientists and machine learning engineers; and, from spring 2025, a studio to give companies access to GenAI services via API interfaces on the Swiss AI Platform, which they can use to create their own AI solutions. Swisscom says it has 400 AI and data specialists working alongside Nvidia experts to provide tailored AI solutions.

Hyperscaler partnerships

Operators have been talking for many years about their desire to build partnerships with hyperscale service providers that go beyond simple buyer-seller relationships. Managed AI services offer a good opportunity to build such relationships.

The best opportunities for both CSPs and hyperscalers are likely to be in the SME market where operators have already built trusted customer relationships, where large professional services firms do not generally have a presence, and where there is often a lack of knowledge and skills about how to leverage new technologies such as AI. But to address this market effectively and profitably, CSPs will need to scale products down to make them affordable and easy to use.

Orange certainly has its eyes firmly on the SME market. "Live Intelligence aims to accelerate the managed adoption of GenAI for all businesses, including SMEs that represent the core of the European economy," said the operator at launch of the software-as-a-service offering.

In the final section we summarize the report findings and give some recommendations for CSPs looking to leverage AI for service and value creation.

Read our report to find out more about the skills landscape in the telecoms sector, including the potential impact of AI and automation on skills and jobs:

section 6

key findings and recommendations

Operators are at the very start of their journeys to build products, services and solutions that are enabled by, and fused with, artificial intelligence. As such it is too early to identify strategies that have been successful and those that have failed. However, in this section we have 10 recommendations for CSPs as they consider how to build and execute a strategy for generating new product and service revenues from AI. These recommendations are based on learnings from CSPs' attempts to enter the cloud business 10-15 years ago and from a broader understanding of their capabilities in the ICT services market.

Build your internal capabilities first

If CSPs want to persuade enterprises they are capable of helping them to use AI in their businesses they will first need to demonstrate that they have built, and are using, their own internal platforms and capabilities. For example, many businesses want to use generative AI to transform their customer service operations to deliver a better, customized experience, ideally at a lower cost. CSPs will only be considered as partners for such projects if they can demonstrate that they have successfully used GenAI to improve customer service for their own customers.

Create roles and accountabilities for AI value creation

In many CSPs responsibility for AI sits either within the technology function or is divided between many different functions with nobody seeing it as one of their priorities. Furthermore, the primary benefit of AI, to date, is seen as a productivity and efficiency tool rather than a driver of business value. CSPs either need a CXO role which is dedicated to realizing the benefits of AI for both efficiency or value creation and / or they need a function within the commercial or product organization which is fully focused on AI monetization.

CSPs will only be considered as partners if they can demonstrate that they have successfully used GenAI to improve customer service for their own customers.

Improve your partnership capabilities
Operators have been talking up the importance of partnering for many years, but the evidence to date is that they are not truly serious or simply do not have the right culture or skills to partner effectively. But to be successful in the AI era, and in value creation, effective partnering will be a necessity not a choice. Partnering will be needed to bring new third-party products, services and applications to market and to bolster CSP skills in delivering managed AI services to B2B customers. That collaboration will be possible across the entire AI value chain: from infrastructure to platforms, to AI models to AIOps services and tools, and to products for consumers and business customers.

Pick your battles
In recent years – and more specifically since the launch of GenAI services at the end of 2022 – large professional services companies have built formidable teams of data and AI experts. Competing with these companies is likely to be a thankless task for CSPs. However, these companies are only targeting the very high end of the large business, multinational and public sectors. This leaves plenty of opportunity for CSPs to compete in the SME space – a market they already serve but which might not consider operators to be providers of AI services. However, operators' reputations as reliable service providers could count in their favor if they can present themselves as trustworthy partners to navigate the complexities and risks of the AI technology sector.

Become a retailer of IT products and services
The coming years are going to see an avalanche of new AI products and services. Many of these will come from leading digital brands and service providers. Operators will have the opportunity to resell these products, but are unlikely to secure a large profit margin. However, there may be opportunities to resell products from lesser known companies and brands that are prepared to offer them bigger profit margins because of their ability to reach deep into consumer and B2B market segments.

Leverage your key assets: data
It is a given that CSPs will leverage their own data – from the network, from their customers and from functions across the organization – to build AI use cases. But these use cases will mainly be for internal purposes rather than for customer products and services. There may be opportunities to use this data – on an aggregated basis and without breaching rules relating to security and privacy – to build either new products or to enhance existing ones.

To be successful in the AI era, and in value creation, effective partnering will be a necessity not a choice.

Leverage your key assets: networks

It is still too early to know precisely where AI workloads will fall most heavily on telecoms networks. It will be a function of where AI models run and their requirements for low latency. But if we assume that AI has the kind of impact on business and society that we expect, it is a reasonable assumption that it will change telecoms network traffic flows. If this is the case, opportunities will inevitably arise for CSPs to help businesses – AI users or AI service providers – to achieve better results.

Leverage your key assets: trust, reliability, nationality

CSPs' traditional reluctance to innovate, to take risks and to extend their product reach outside of their home markets could work in their favor in the emerging AI economy. Enterprises will naturally be cautious when it comes to deciding where to store their data, what models their data is trained on and whether they can rely on the results. As national service providers, CSPs can give businesses assurance that the data will be kept within national borders. When it comes to providing assurances about the accuracy from foundation models, CSPs can offer customer access to the same platforms and tools that they use internally.

Rethink your edge strategy

Five years ago edge computing – in combination with 5G connectivity – was seen as an attractive new business opportunity for mobile operators. But the market has failed to gain traction. Many operators have launched so-called public MEC (multi-access edge computing) services, but demand for a shared computing platform located close to business premises has never materialized. Some CSPs are now dusting off their edge computing strategies in the hope that AI will create a demand for edge processing. But is the result going to be any different second time around, or do operators need to rethink whether there is genuine business value in 5G + edge + AI? Is edge computing satisfying a genuine business need, or is it just a technology looking for a market?

Don't get swept up in the AI infrastructure arms race

There is a huge AI arms race taking place across the world as tech companies and data center firms seek to build the next generation of cloud computing infrastructure that is optimized for AI. But should CSPs be participating? If a CSP has been successful in operating a data center or a public cloud business in the past, it may have good reason to believe that it can do so in the AI era. But for those CSPs investing in cloud and data center infrastructure for the first time, the risk is that they use technology which will become outmoded before they are able to create a return on their investment.

As national service providers, CSPs can give businesses assurance that their data will be kept within national borders.

Unlocking AI-powered telco product and service creation

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When it comes to creating new products or promotions, most telcos still face great difficulty in translating marketing ideas into the corresponding BSS/OSS configuration.

A new idea might struggle to make it off the drawing board simply because everyone assumes that it will take too long to build, test and launch, stifled by the perception of complex implementation, lengthy development cycles, and the inertia of legacy systems.

As digital transformation continues, CSPs are looking to harness AI for ways to open up new business use cases and revenue streams, optimise operations and deliver personalised services.

Facing increasing pressure from both traditional competitors and more agile digital-native providers, AI has the potential to be an accelerator for CSPs at risk of falling behind in competitiveness and innovation. No longer are telcos constrained by outdated processes and rigid systems – AI is helping organisations to automate business processes, overcome technological limitations, and reimagine their whole operational ecosystem.

There is now a huge opportunity for telcos to integrate AI-infused products and services into their offering portfolios.

Enhanced network services
CSPs are increasingly deploying AI-powered solutions for 5G network optimisation and management, analysing network performance data to predict potential failures in real-time, and optimise network services.

New network capabilities, such as network slicing and low-latency services, can be further enhanced with AI to create more differentiated services and custom solutions for specific industry use cases.

Whether you're a remote worker requiring consistent video conference quality, a gamer demanding ultra-low latency, or a smart city infrastructure manager needing reliable IoT connectivity, your network experience can be precisely tailored to your requirements using AI.

By shifting from an internal efficiency perspective to a focus on optimisation of the customer experience, AI can redefine how people interact with and rely on their communications services.

Customer experience and service delivery
Modern GenAI solutions are reinventing the digital experience, speeding up how CSPs build and launch new products and services, and how customers find, buy, personalise and consume them.

Powered by AI, CSPs can:

- Develop hyper-personalised service packages, dynamic pricing and targeted marketing strategies
- Rapidly create new promotional offers, launch new bundles and add-ons, including third-party products and services via marketplaces
- Predict and proactively address potential issues with the products and services they are selling

New network capabilities, such as network slicing and low-latency services, can be further enhanced with AI to create more differentiated services.

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- Create more intuitive and responsive customer engagement platforms to track customer sentiment and enhance overall satisfaction
- Automate the complete Lead-to-Cash process with GenAI providing the decision-making on what are typically manual steps, as well as identifying anomalous and unusual actions before they're executed

Underpinning this journey is the discovery of new products and services through natural language interactions with AI-powered virtual assistants and chatbots. These might be initiated by the customer during the sales process – "please find the best broadband package to meet my needs"; or suggested by the virtual assistant during a customer service request – "I noticed that your contract expires next month, we have some special offers available if you renew today…"

CSPs can now leverage AI to analyse customer behaviour patterns, including their engagement across all touchpoints and consumption data, to create hyper-personalised service offerings and custom tariffs.

With unprecedented precision, based on personal usage patterns and lifestyle contexts, these models understand needs and preferences, suggesting products accordingly using the customer's requirements and situational context, and opening the door to more cross-selling and upselling opportunities, resulting in improved satisfaction scores.

AI-as-a-Service

With AI embedded into the products and services they sell, as well as their own operations, the next vanguard for CSPs is AI-as-a-Service, leveraging their trusted brands to expand beyond traditional connectivity services.

CSPs can take the lead in offering AI-as-a-Service solutions to their B2B customers, combining AI technology partnerships with their own cloud capabilities, data security and BSS/OSS assets to help businesses to quickly launch and monetise their own AI-infused products and services. For example:

- Computer vision solutions
- Natural language processing
- Predictive maintenance
- Data analytics platforms
- Fraud prevention and cybersecurity

We can expect to see even more innovative applications and business models emerge, further cementing AI's role as a critical driver of growth and innovation in the telecommunications sector.

The CSPs that will thrive in this AI-driven future are those that can effectively balance innovation with practical implementation, while maintaining a strong focus on customer value and operational excellence.

CSPs can take the lead in offering AI-as-a-Service solutions to their B2B customers, combining AI technology partnerships with their own cloud capabilities.

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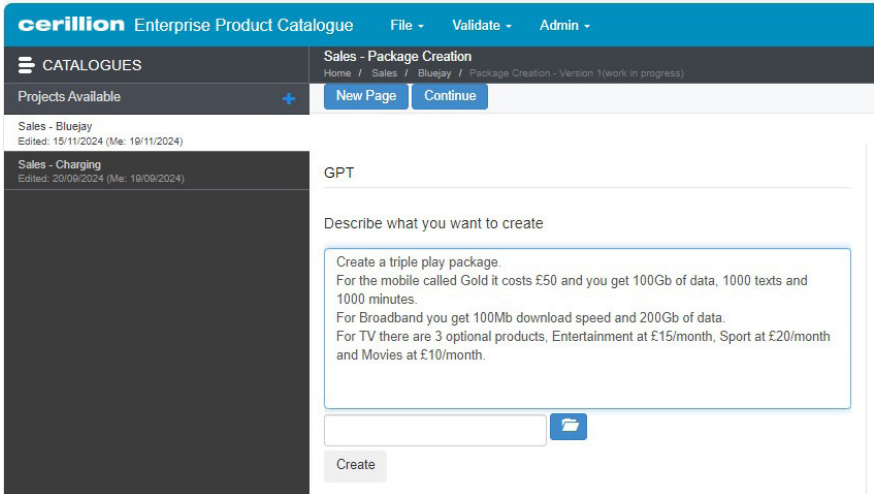
How Cerillion can help

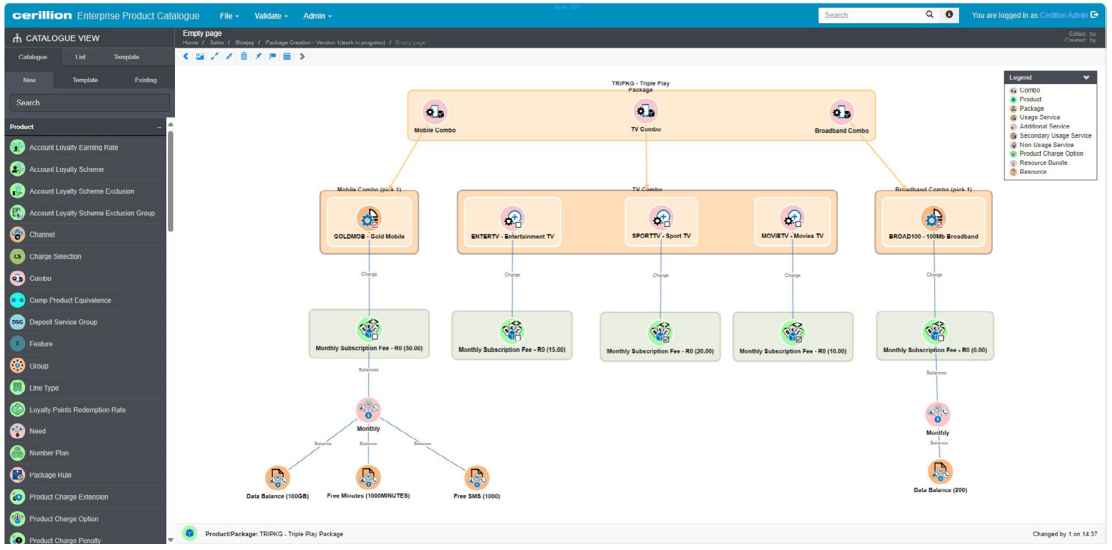
Today, AI has provided a target rich environment and many possible use cases, but all requiring work to deliver the predicted benefits. Few CSPs have the luxury of dedicated resources assigned to assess and deploy AI, either at a companywide level or within the departments and teams.

As a technology partner, Cerillion has been at the forefront of AI adoption in the telecoms industry since late 2022, both as an early adopter in the BSS/OSS vendor community, embedding GenAI capabilities throughout our product suite, and by deploying these tools and approaches within the wider company.

Our GenAI-enabled Enterprise Product Catalogue allows instant translation of ideas into fully configured services, automatically creating new products, packages and workflows based on natural language and image recognition, dramatically simplifying the product development lifecycle and democratising access to the product catalogue.

Natural language text and voice processing means users simply describe what they want to create in their own words. With image recognition, users can also upload pictures and diagrams from which new products or packages will be automatically created, cutting the product development cycle by as much as 95%.





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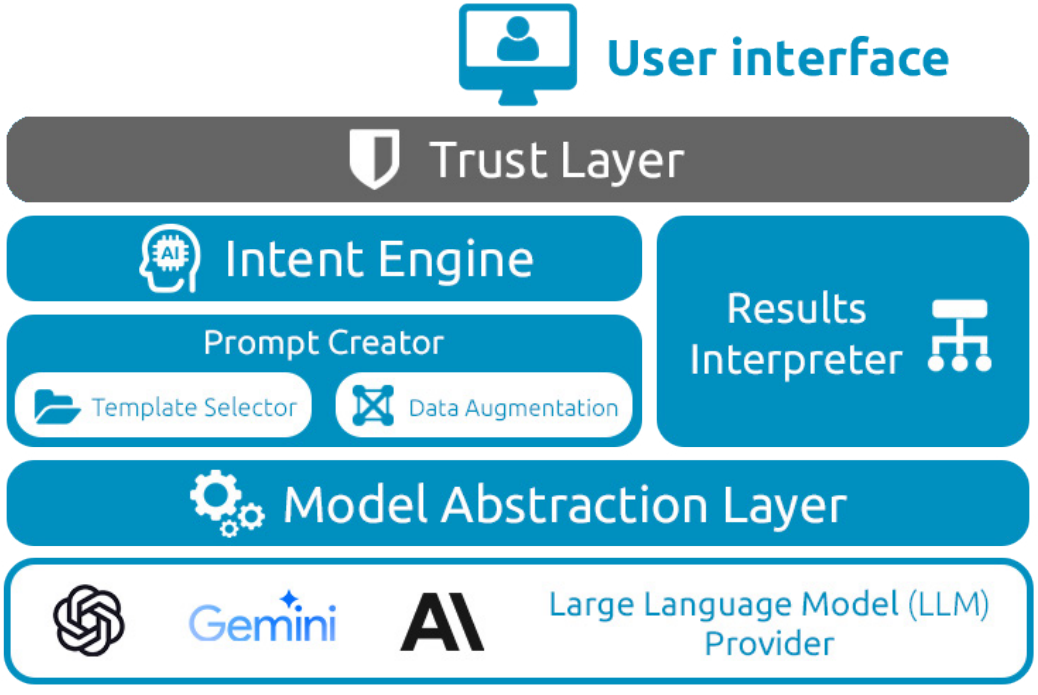
And by combining image recognition and natural language instructions, users can further modify or accelerate their product ideas – e.g. "copy this triple-play package but make the monthly fee 10% cheaper".

The large language model (LLM) interprets these instructions and creates the corresponding product configuration in a matter of seconds, ready for validation, testing and launch, completely transforming how CSPs can design and build new products and services.

These capabilities can also be extended to key business processes including order management, service orchestration and network service delivery. Users can create new workflows straight from pictures or swim-lane diagrams, reducing provisioning errors on complex products, and bringing down time-to-market considerably.

All this is accomplished through a generic architecture, that allows for integration with multiple LLMs via API, including GPT, Claude and Gemini, based on business needs.

What's next for telcos?
Artificial intelligence is increasingly determining competitive advantage in the industry, and how communications services can be delivered and experienced. As LLMs continue to evolve, we can anticipate even more sophisticated, adaptable and powerful AI-infused products and services, accompanied by a lower cost of entry for using these new tools.



CSPs have an unprecedented opportunity to create more intelligent, responsive and value-driven ecosystems, as the technologies underpinning these systems mature. Successful CSPs will be those that don't view AI as a standalone technology, but as a core component of their digital transformation strategy – one that will speed up how new products and services are built and launched, creating new opportunities for value while addressing longstanding operational challenges.

Unlocking AI-powered telco product and service creation

Furthermore, with the speed of evolution of the open source LLMs, we expect that these will soon be sufficiently powerful for CSPs to easily run their own private LLMs to incorporate customer and internal data, while ensuring that data sovereignty is maintained.

By removing the dependency on IT and technically minded teams, GenAI can streamline the product creation process and put business users in full control of the product lifecycle, empowering them to easily build and configure new offerings, accelerating time-to-market and enhancing the user experience. Yet without significant investment in modernising core systems and acquiring or training the necessary talent, CSPs will face challenges integrating AI into their legacy systems; CSPs can address this through partnering with AI-focused companies to accelerate adoption and bridge the technology and talent gaps that currently impede their digital transformation strategies.

Cerillion brings productised capability and real-world industry experience of how these tools can turn ideas into revenue and cost savings. Incorporating GenAI into the process of building and launching new products and services is a practical first step towards wider AI integration within CSP businesses, offering measurable outcomes and tangible benefits, rather than buzzword compliance.

Contact us now at: **www.cerillion.com**

About Cerillion

Cerillion is a leading provider of business and operations support systems (BSS/OSS) with 25+ years' experience delivering solutions to mobile, fixed, cable and multi-service communications providers worldwide. With 80+ customers in 45+ countries, Cerillion has a proven track record of delivering cost effective solutions to the billing, charging and CRM challenges of today and tomorrow.

We combine leading edge products with highly skilled and experienced staff, to provide long-term solutions to your business challenges. From fully integrated systems to managed services and SaaS, we offer a range of approaches and business models to suit your needs now and in the future.
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The New Imperative: Transforming Telecommunications for the AI Era

With the telecommunications industry investing over $140 billion annually in R&D, the transformation to AI-enabled services represents a critical pivot point for future growth. Despite powering the digital revolution that has transformed virtually every sector of the global economy, Communications Service Providers (CSPs) face an existential challenge: their own business models have failed to keep pace with the very innovation they enable. While Over-the-Top (OTT) services continue to thrive on the infrastructure CSPs have built and maintained, the industry's traditional revenue streams show a persistent decline.

The Productivity Paradox

The root of this paradox lies not in a lack of technological capability, but in how that technology is deployed and orchestrated. With 60-80% of IT budgets locked in legacy systems and siloed AI implementations, CSPs find themselves in a situation that echoes economist Robert Solow's famous observation about the computer age: revolutionary technology is everywhere except in the productivity statistics.

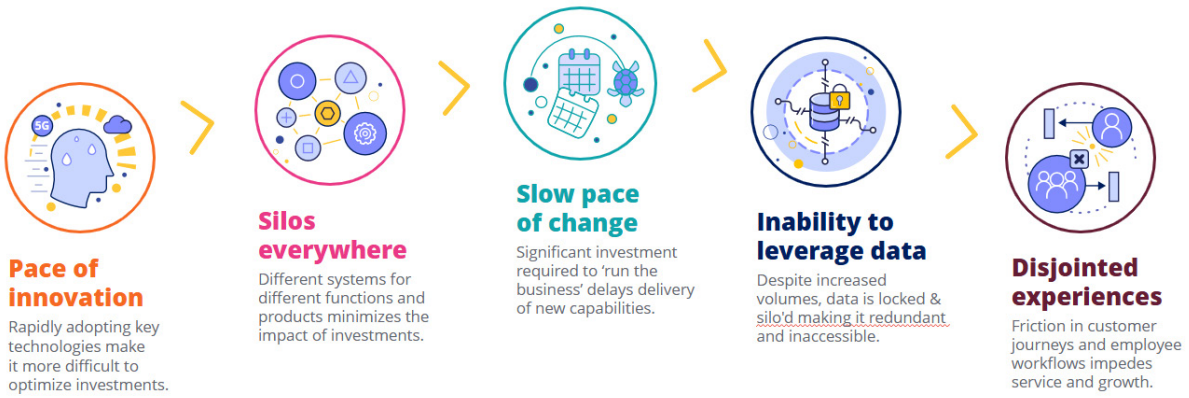
Traditional approaches of ripping and replacing systems have consistently fallen short, with only 56% of transformation programs achieving their intended goals. The complexity of migrating to modern platforms has been consistently underestimated, leading to 18-24-month roadmaps that deliver only basic capabilities. Meanwhile, approximately 70% of CSPs' investment capacity remains tied up in maintaining network infrastructure, servicing debt, and paying dividends.

Strategic Imperatives in Communications

Network Excellence	New Growth Pathways	Customer Experience	Operational Efficiency	Employee Experience
Modernizing networks for improved service and reliability	Monetizing partnerships & expanding to new products/markets	Deliver personalized digitized services with consistent CX	Streamline operations to reduce costs & improve margins	Develop new skillsets to keep the pace with rapid technology advances

Familiar imperatives & approaches leave telcos struggling

15+ years into digital transformation journey



The industry's transformation efforts have often resulted in fragmented solutions that create "shadow silos," leaving organizations struggling with disconnected systems and disjointed customer experiences.

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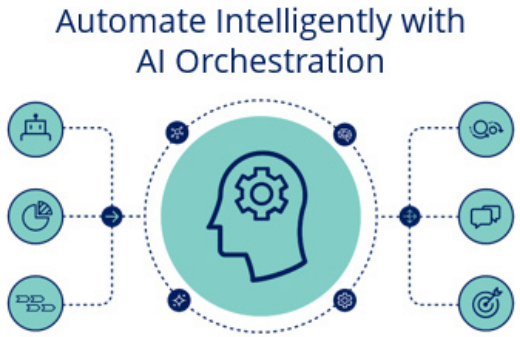
With Orchestrated AI, the industry is set to return to growth across new AI-infused products and services and B2B managed services offerings. To achieve this growth, CSPs must change how they think about introducing new technologies into their environments and focus on creating bridges, not silos.

The Path Forward: Beyond Traditional Transformation
The path forward requires a new paradigm that enables CSPs to break free from decades-old cycles of incremental improvement and embrace a model of continuous innovation. This new model is composed of three key elements:

1. **Orchestrated AI Integration**
   - Converting multiple AI silos across predictive, adaptive, generative, and agentic capabilities into a unified system



Use the right AI at the right time to solve the right problem to connect people, processes, and data across your organization.

   - Focusing on meaningful business outcomes rather than isolated technological achievements
   - Enabling real-time decision-making and automated optimization

2. **Partner Collaboration for Growth**
   - Creating seamless integration pathways with internal and external partners
   - Building standardized APIs and microservices architectures
   - Establishing secure and scalable data-sharing frameworks

3. **Rapid Value Realization**
   - Delivering measurable ROI within 3-6 months
   - Implementing modular solutions that can be rapidly deployed and scaled
   - Creating feedback loops for continuous improvement

Through this comprehensive approach to transformation, CSPs can finally break free from traditional constraints and create new paradigms of value creation in the digital age.

With Orchestrated AI, the industry is set to return to growth across new AI-infused products and services and B2B managed services offerings.

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Pega's Proven Record

Pega's leadership in the communications industry, the world's largest 10 Telcos, is continually strengthened by the capabilities delivered by the platform. As recognized in Forrester's latest Wave™ reports, Pega continues to set the standard for enterprise transformation. We've achieved the highest scores in both "Current Offering" and "Strategy" categories for Real-Time Interaction Management (RTIM), with our Customer Decision Hub praised as the centralized "brain" orchestrating billions of real-time interactions across channels. In addition, Forrester just released their Wave™ report for Task-Centric Automation Software (Q4 2024), and Pega has been recognized as a "powerhouse in the task-centric process automation market." We've achieved the highest scores of all vendors evaluated in both the "Strength of Offering" and "Strength of Strategy" categories, validating our leadership in delivering sophisticated automation solutions specifically designed for communications service providers. Orchestrated AI is achieved when real-time customer interactions can be resolved in the back office by the best AI-powered automation software in the industry.

Our industry leadership is further demonstrated in our groundbreaking Ignite '25 Catalyst project, "Precognitive Network Orchestration," which promises to revolutionize network operations through:

- A reusable CSP-wide framework delivering beyond 30% EBITDA improvement
- Quantum leaps in network orchestration through AI-powered transformation
- Integration of predictive, adaptive, generative, and agentic AI with Pega's Blueprint to lay the fou2ndation for Level 4 & 5 autonomous network maturity
- An orchestrated AI approach combining Pega's capabilities with third-party AI for precognitive autonomy

TM Forum DTW Conference
Award Winner '23
Finalist '24

Furthermore, our commitment to innovation is evident in our recent TM Forum Catalyst award-winning projects:

1. "GenAI Genie Redefines CX" (M24.0.634) - Focused on increasing customer lifetime value through generative AI, bridging gaps between the customer, customer service, and network operations

> We've achieved the highest scores in both "Current Offering" and "Strategy" categories for Real-Time Interaction Management (RTIM), with our Customer Decision Hub.

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2. "GenAI Hyper-personalized Customer Experience" (C23.0.497) - Delivering award-winning results:
- Up to 35% increase in customer lifetime value
- Revenue growth up to 24%
- 20% reduction in churn through AI-powered personalization

The telecommunications industry cannot afford to wait for the future – it must create it. By adopting an agile, intelligence-driven approach to transformation, CSPs can:

- Accelerate product launches from months to weeks
- Turn partnerships into immediate growth opportunities
- Build sustainable cycles of innovation
- Ensure long-term competitiveness in an increasingly dynamic market

The transition to an autonomous enterprise powered by orchestrated AI represents a strategic evolution rather than a technological leap. This transformation enables:

- Intelligent Decision Distribution: AI handles routine, data-driven decisions at scale while human expertise focuses on strategic, non-routine decisions
- Strategic Alignment Through AI: A unified AI engine coordinates operations, service, and engagement, optimizing every transaction for strategic outcomes
- AI-Powered Operational Excellence: Automated workflows execute in seconds, driving hyper-personalization and increased productivity within existing resources

Conclusion:
Pega is your partner for growth. With Pega, you will deploy the foundation and prove Pega's capabilities within 90 days; configure high-value use cases in 90 days; and scale over the next 18 months. This iterative approach enables you to address challenges with data privacy, legacy system integration/replacement, and workforce adaptation while achieving incremental value along the way.

The telecommunications industry stands at a crossroads. The path forward requires more than technological advancement – it demands a fundamental transformation in how CSPs operate, innovate, and deliver value. By embracing the principles of the autonomous enterprise and implementing orchestrated AI solutions, CSPs can break free from traditional constraints and create new paradigms of value creation in the digital age.

About Pegasystems

Pega is The Enterprise Transformation Company™ that helps organizations Build for Change® with enterprise AI decisioning and workflow automation.

Many of the world's most influential businesses rely on our platform to solve their most pressing challenges, from personalizing engagement to automating service to streamlining operations. Since 1983, we've built our scalable and flexible architecture to help enterprises meet today's customer demands while continuously transforming for tomorrow.

For more information, please visit us at **www.pega.com**

Paving the way to new revenue with an open and scalable AI platform

Author: Volker Tegtmeyer, Principal Product Marketing Manager, Telecommunications, Red Hat

As communications service providers (CSPs) look to harness the power of AI to develop new products and services for their customers, they face multiple challenges. Addressing them starts with a comprehensive AI strategy that encompasses applications, platform and organizational change.

Most large telcos are already using hundreds of AI models across their businesses, with new generative AI (GenAI) among the most promising. To avoid creating new and disconnected technology stacks, a holistic view of these applications and use cases is necessary to understand how various departments are using them.

Starting on the right foot with a vision and strategy for AI is critical to addressing the three key challenges operators are facing:

- Ensuring independence from closed AI platform providers so that service providers can tap into a broad ecosystem of partners and capitalize on their own unique ability to deliver network-as-a-service (NaaS)
- Developing a robust data foundation and strategy that can improve intelligent automation and operational efficiency
- Integrating new AI technologies and applications with a vast number of legacy processes and systems.

1. Maintaining control over a flexible AI platform
The most critical challenge to address is establishing independence from proprietary AI platform providers. CSPs need to be able to train AI models on their own data (see sidebar on the next page) and leverage the integration of AI services from cloud providers as well as open-source models. And they need to be able to train, deploy, run and scale these models anywhere – from on-premises locations to edge environments to all types of clouds including public, private, hybrid and sovereign.

Such an approach balances data security and sovereignty, provides the right level of compute power needed for simple and advanced AI models, and therefore helps manage the costs of using AI. It also empowers telcos to build a more competitive ecosystem of solutions tailored to their specific business and technical needs. For example, a startup AI vendor might offer new methods of hardware acceleration, which the operator could then use to create innovative services for enterprise customers.

2. Leveraging data and increasing automation
Another challenge operators face in becoming AI-driven lies in the development of a comprehensive data strategy. AI thrives on data, and CSPs possess vast amounts of unique data, both telco and non-telco related. However, the data is often stored in individual databases and spread out across different parts of the organization, making it difficult to access, leverage and monetize.

To avoid creating new and disconnected technology stacks, a holistic view of AI applications and use cases is necessary.

Paving the way to new revenue with an open and scalable AI platform

To be useful in AI models, data needs to be cleansed and normalized, and barriers between databases need to be eliminated. In addition, it's critical that AI solutions provide observability tools for ingesting and processing data at speed and scale. These tools enable real-time monitoring and analysis, ensuring that data flows seamlessly across systems.

With a strong data foundation in place, CSPs can use AI to increase automation and operational efficiency. AI algorithms and AI-based applications need speed and scale: CSPs need to train, deploy and re-train models quickly; scale the number of models; and manage data across multiple locations. This requires intelligent automation beyond the data center and including the network (for example, being able to automate fault management or network optimization across multiple network domains).

3. Integrating AI with existing technology
CSPs must also consider how to integrate their new AI applications and platforms with existing technology in order to minimize risks and increase innovation. This will allow operators to leverage their internal network-as-a-service transformations to offer NaaS as a capability to customers. These services could range from 5G network slicing to on-demand connectivity to compute-as-a-service.

One way to integrate AI with legacy technology is to use APIs that allow the transfer of information from legacy systems into new ones and vice versa.

Turkcell builds an open platform for AI innovation

Turkcell is a good example of a CSP with an AI vision and strategy, enabled by an open platform. The company, which serves nearly 40 million subscribers in Turkey, has been building its AI platform for more than three years, with goals of improving customer experience, increasing operational efficiency and enabling innovation.

One area where Turkcell is hoping to capitalize on innovation is with AI chatbots. Today, most commercially available large language models (LLMs) such as OpenAI's ChatGPT and Google's Gemini are trained using English language. But Turkcell serves customers whose primary language is not English. For this reason, the company wanted to use its own data to train chatbots using Turkish language.

In the video below, Serkan Öztürk, who recently retired as Turkcell's CIO, explains the company's approach to AI and the role for new tools like computer vision, speech and speech-to-text capabilities, and chatbots. He notes that the aim with chatbots is to build "not just a sole chatbot, but a chatbot-as-a-platform that we can also serve and offer outside of Turkcell."

Öztürk adds: "In order to support your [AI] activities...in the market, you need to establish a strong platform. We wanted to offer our developers, our coders, a nice environment – a comfortable environment – for all these coding activities. And the cloud is the best choice to fit this purpose... For scalability, for high availability, for efficiency, for efficient resource usage, this is best with the microservice architecture. So, we started to build our platform based on these necessities."

Watch the video to learn more:

Paving the way to new revenue with an open and scalable AI platform

Another approach is cloud-native application development, which allows the addition of microservices into legacy applications. In either case, CSPs are able to take an evolutionary path to becoming AI-driven and offering NaaS capabilities beyond connectivity.

For example, AI algorithms that monitor an enterprise customer's network performance could suggest the addition of a location-based service or a better way to route traffic. CSPs could also offer new edge capabilities such as AI- or GPU-as-a-service, where AI compute capacity in edge locations is provided as a service to customers.

Summing it up

While tackling all these challenges, CSPs will need to make organizational transformation a priority. This includes expanding teams' skill sets, because selling AI to enterprises and advising them on leveraging AI requires unique expertise.

Service providers should focus on differentiating their businesses through an open AI platform that will give them the independence they need. Support from a partner like Red Hat can help maximize the value of cloud-native, hybrid-cloud and AI technologies, and set service providers on the right path to become AI native.

Learn more about Red Hat's AI product portfolio, community projects, partners, training and more. Get in touch to discuss how Red Hat can support you in building your AI strategy and journey.

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tm forum
open digital architecture

TM Forum Open Digital Architecture - A blueprint for intelligent operations

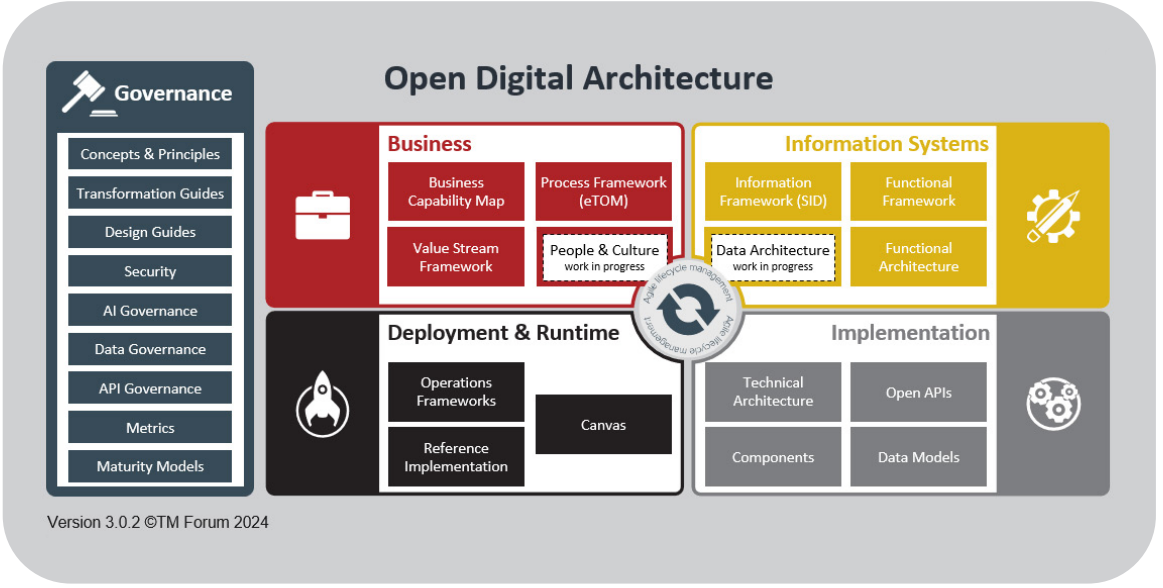
The TM Forum Open Digital Architecture (ODA) provides a migration path from legacy IT systems and processes to modular, cloud-native software orchestrated using AI.

ODA comprises tools, code, knowledge and standards (machine-readable assets, not just documents). It is delivering business value for TM Forum members today, accelerating concept-to-cash, eliminating IT & network costs, and enhancing digital customer experience.

Developed by TM Forum member organizations through our Collaboration Community and Catalyst proofs of concept, ODA is being used by leading service providers and software companies worldwide.

ODA includes:

- An architecture framework, common language, and design principles
- Open APIs exposing business services
- Standardized software components
- A reference implementation
- Guides to navigate digital transformation
- Tools to support the migration from legacy architecture to ODA
- Maturity models and readiness checks to baseline digital capabilities.



Goals of the Open Digital Architecture

The aim is to transform business agility (accelerating concept-to-cash), enable simpler IT solutions that are easier and cheaper to deploy, integrate and upgrade, and to establish a standardized software model and market which benefits all parties (service providers, their suppliers and systems integrators).

Learn more about collaboration

If you would like to learn more about the project or how to get involved in the TM Forum Collaboration Community, please contact George Glass.

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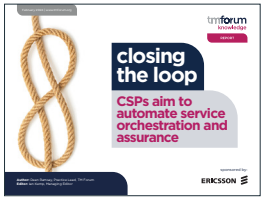
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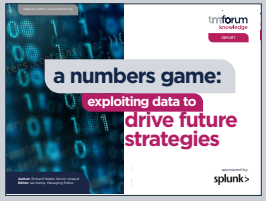
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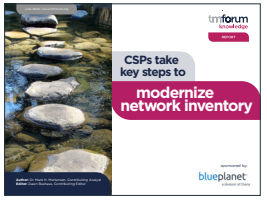
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