

Next-generation telcos:

Powered by generative AI



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Key takeaways

- With generative AI, telcos have the opportunity to reimagine the value chain.
- Harnessing generative AI's potential to enable sustained performance requires multidimensional strategy and an enterprise architecture optimized for cost, quality, security, and privacy.
- Built on the principles of an industry-led, data-fueled, and ecosystem-enabled foundation, we offer an AI approach designed to make generative AI consumable for an enterprise-grade transformation.

A new territory

From customer care to marketing and sales, from field operation opportunities to network design, generative artificial intelligence (GenAI) can reimagine the telco value chain.

The timing is advantageous by any measure. Telcos stand at an important crossroads with fierce competition, plateauing revenue streams, and heavy investments necessitated by the accelerating adoption of 5G, edge computing, and gigabit network technologies. With market dynamics and economic circumstances demanding further efficiency and optimization, AI is not just a technological option, it's a strategic imperative.

AI: Then to now

Initially, AI focused on recognition tasks, like identifying objects in images. Its next iteration involved reasoning; analyzing what is happening, why it is happening, the likely outcomes, what we should do about it, and decision-making based on that understanding.

The most transformative shift occurred with the advent of generative or operative capabilities, exemplified by large language models (LLMs) like generative pre-training transformer (GPT), language model for dialogue applications (LaMDA), and large language model meta AI (LLaMA). These models leverage predictions made during the reasoning stage to make decisions and propose actions.

GenAI and large language models can potentially extract insights from unstructured content. Foundational models, such as GPT, LLaMA and open-source alternatives, are 'world-wise,' able to integrate common knowledge that may exist offline, such as in books or in art. By combining such models with 'enterprise-wise' ones and traditional AI-ML techniques, telcos can create a knowledge superstructure.



Gaining a foothold

The convergence of reasoning and recognition intelligence into generative models marks a pivotal moment for telcos.

In the TCS 2023 Global Cloud Study ¹, about 77% of telecom respondents said they increased investments in artificial intelligence (AI) and machine learning (ML) in the past one to two years. The same number (77%) of respondents said they planned to invest in AI-ML in the next one to two years.

Communications service providers (CSPs) are experimenting with AI technologies, incorporating reasoning and recognition forms of intelligence (see sidebar). Generative AI use cases across the value chain for telecom companies are in:

Customer engagement: Natural language processing (NLP) models can guide customer interactions through customized up-selling and cross-selling recommendations, while dynamic pricing and hyper-personalized targeted campaigns can deliver better conversion rates. Generative AI can also help efficiently monitor and analyze customer sentiment across multiple channels for product and service improvements (see Figure 1).

Customer care: In an industry with high churn risk, AI can help telcos better predict at-risk customers and capture the moments of truth that differentiate service levels. Contextual knowledge repositories, call and chat summarization, and intelligence assistance can guide agents with the next best course of action, troubleshooting support, and decision-making. Further, predictive service assurance ensures that customers avail uninterrupted performance, earning their loyalty.

Order fulfilment and service provisioning: Intelligent order assistance can validate new orders and SLAs for efficient order fulfilment, including real-time support and guidance for field technicians. Historical and location data analysis enable telcos to assess complex orders and pre-emptively address challenges.







Network lifecycle and operations: AI can accelerate network planning and design across the network lifecycle by generating recommendations for greater resilience and efficiency. It can detect and forecast anomalies to ensure seamless operations and optimal performance.

Billing and payments: Through streamlined billing and automated analysis and summary, GenAI can help telcos eliminate billing errors and subsequent customer complaints. In addition, GenAI can provide intelligent triggers to detect fraud and anomalies faster, leading to financial loss prevention.

Enterprise functions: Telcos can transform core enterprise functions such as supply chain, HR, finance, procurement, and legal through GenAI-infused capabilities. Autonomous finance capabilities can enhance productivity by freeing employees from lower-value tasks, while AI-powered forecasting and spend analytics can improve decision-making. Contract generation and intelligent assistance can efficiently guide teams to streamline and expedite the contract lifecycle.

¹ Tata Consultancy Services (TCS) conducted a global cloud study from 6 January to 14 February 2023 on the theme of cloud-enabled innovation. TCS surveyed 972 C-suite and IT senior executives and decision makers from companies with +\$1 billion in annual revenue, across UK & Ireland, Continental Europe, North America, and APAC (India, Japan, Australia, NZ). The C-suite and IT senior executives and decision makers included 43 respondents in the Telco industry.

In Figure 1, we list these six value streams, and relevant use cases of generative AI for a telco. It is important to note that in most of these examples, intelligent technologies are digital assistants for humans, not their replacement. Artificial intelligence will augment humans in their day-to-day work, empowering them to make consistently better decisions and innovate in a way that transforms the entire organization.

						
	Customer engagement, marketing and sales	Customer care and service assurance	Order fulfillment and service provisioning	Network lifecycle and operations	Billing and payments	Enterprise functions
Use case areas	<ul style="list-style-type: none"> Social media sentiment analysis Customer segmentation Guided up-sell and cross-sell, optimized pricing strategy Targeted, hyper-personalized campaigns 	<ul style="list-style-type: none"> Intelligent conversational bots Agent assist with contextual info retrieval, call and chat summarization Churn prediction Predictive service assurance 	<ul style="list-style-type: none"> Intelligent order assist Virtual assistant for field technicians Order complexity predictor based on historical or location analysis Order notes: Classify and suggest next best action 	<ul style="list-style-type: none"> AI-augmented network planning and design Network test automation Building self-optimized networks Network performance management: Detect and forecast network anomalies 	<ul style="list-style-type: none"> Bill explanation, analysis and summary Billing error detection Credit risk evaluation Financial anomaly or fraud detection and prevention 	<ul style="list-style-type: none"> Contract management solutions Enhance employee experience Cognitive finance operations Autonomous IT delivery
Target personas	<ul style="list-style-type: none"> CMO, marketing manager CSO, sales rep Chief customer officer 	<ul style="list-style-type: none"> Customer services representative (agent) Service quality analyst Contact center ops manager 	<ul style="list-style-type: none"> Customer services representative (agent) Order fulfillment specialist Field technicians 	<ul style="list-style-type: none"> Network engineer NOC analyst Network planning specialist and designers Network security specialist 	<ul style="list-style-type: none"> Billing specialist Credit analyst Fraud investigator Revenue assurance manager 	<ul style="list-style-type: none"> CFO, finance managers Procurement managers CHRO, HR managers CIO, IT managers Legal counsel
Potential benefits*	<ul style="list-style-type: none"> Enhanced marketing campaign effectiveness Increased customer conversion rates 	<ul style="list-style-type: none"> Increase CSAT, NPS Superior customer experience Reduced customer churn 	<ul style="list-style-type: none"> Reduced order cancellation Faster provisioning Efficient field ops and desk ops (reduced truck rolls) 	<ul style="list-style-type: none"> Resilient networks Higher quality of service High CSAT Efficient operations 	<ul style="list-style-type: none"> Eliminate billing errors and customer complaints Reduced call volumes and complaints Improved CX 	<ul style="list-style-type: none"> Improved employee experience Efficient contract management Reduced IT ops

*Based on experiential knowledge

Figure 1: GenAI focus areas for telcos



Our GenAI vision

Transforming the potential of GenAI into sustained performance requires a multidimensional strategy and an enterprise architecture optimized for cost, quality, security and privacy.

In short, it requires a tailored fit, not a one-size-fits-all solution.

The journey is complex, demanding meticulous preparation in terms of data, environment, and the potential creation of purposive agents tailored for specific tasks or activities. Choosing the right mix of intelligence, such as large language models or predictive AI, involves numerous decisions, making the solution-building process intricate.

Drawing on our extensive experience in working with hundreds of global telcos, we take a best practice approach to help telcos master the delicate balance of opportunity and risk to ensure successful outcomes. Built on the principles of an industry-led, data-fueled and ecosystem-enabled foundation, we offer an ‘enterprise-wise’ approach designed to make AI consumable for an enterprise-grade transformation (see Figure 2).

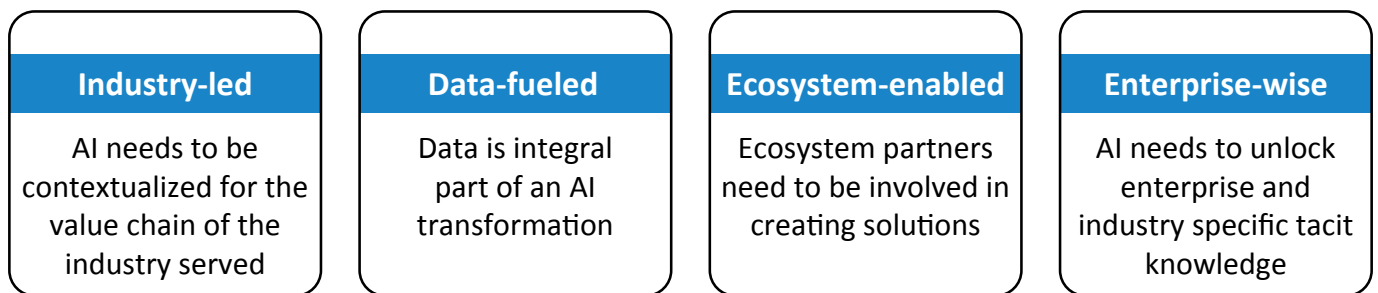


Figure 2: “Enterprise-wise” AI adoption approach

These four principles underpin our approach to converting AI potential to performance, a continuum that builds upon and reinforces each stage: assist, augment, transform (see Figures 3).

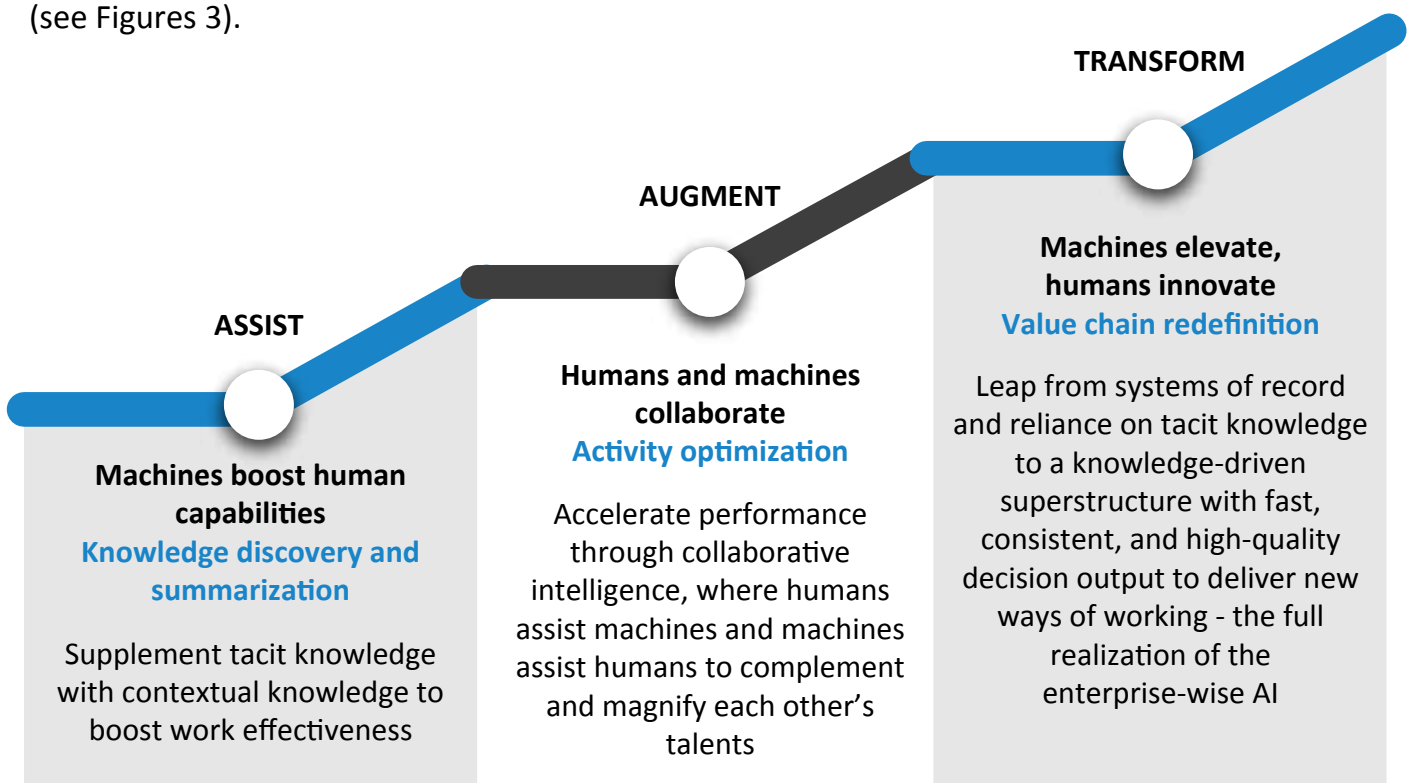



Figure 3: TCS AI continuum for telcos

An AI evolution in action


Assist



In an example business scenario, a broadband customer contacts the communication service provider's contact center to complain about the poor internet connectivity. The agent attending to the customer must understand the context and know the troubleshooting steps to fix the issue.

A GenAI-based assistant retrieves the customer profile, context, and previous call history to help the agent better understand the customer and assists with the relevant resolution process and frequently asked questions (FAQs) from the knowledge base.


Augment



In the same business scenario, the agent explores the customer's network issue more deeply, which requires initiating network diagnostic tests, scheduling a service technician visit, and other tasks as part of the resolution process. The agent will also need to post a summary of the resolution and update the records for closure.

GenAI augmentation automates these actions, including initiating the network diagnostic tests, auto-scheduling a technician field visit, summarizing the call resolution details, and updating the service desk.

Transform



Using the same business scenario, when the customer connects with the contact center to discuss network issues, the GenAI-powered bot directly interacts with the customer using natural language processing. The bot understands the issue by analyzing the customer's account data, network activity in their area, and historical service requests.

It then automatically diagnoses the potential cause, like high traffic or a modem issue, and provides personalized responses. These can include self-guided troubleshooting steps with clear instructions and video demonstrations, along with options to schedule a technician visit with real-time availability slots. The virtual assistant pre-populates the work order with the identified issue and temporarily boosts the internet speed if possible, and flags potential network anomalies to the telco.

Freed from all but exceptional customer calls, the human agents and network engineers can analyze the flagged report, recommending updates to prevent future outages.



Case in point: Customer experience transformation

Figure 4 provides an illustration of TCS CX Transformer for Telcos, an AI-powered service framework that helps in enhancing the experience across every touchpoint of the customer's journey, improving customer satisfaction (CSAT), customer retention, and net promoter score (NPS) and maximizing the customer lifetime value.

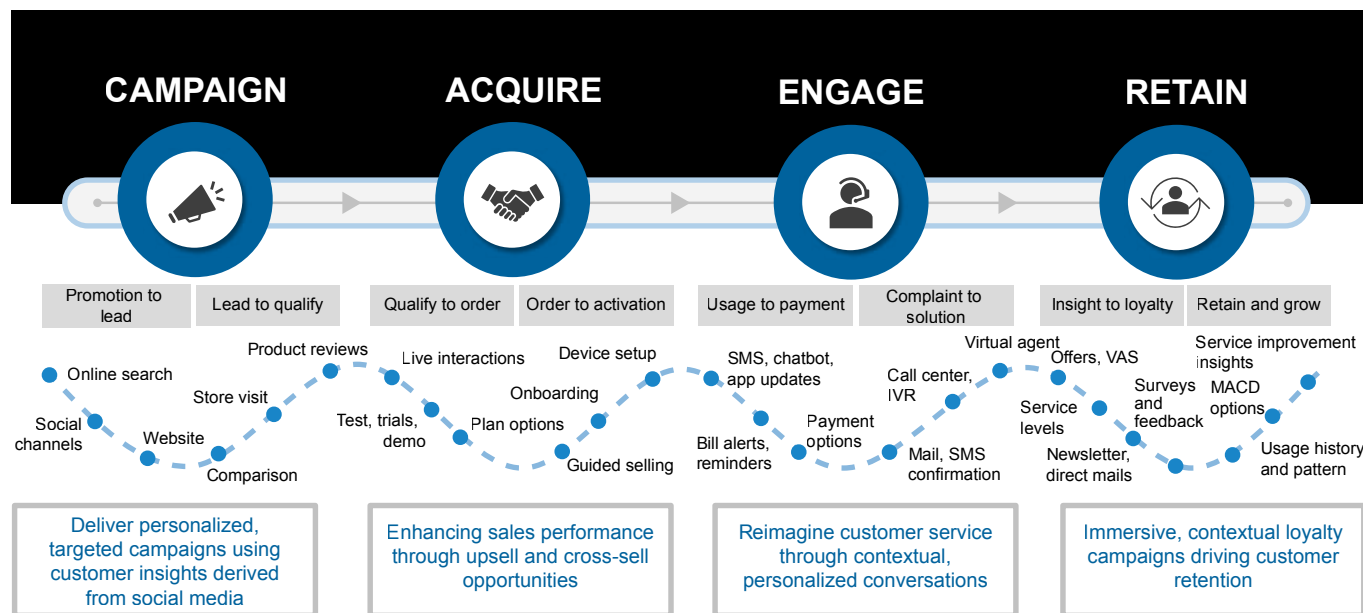


Figure 4: GenAI infusion for transforming CX across the telco customer journey



Navigating the complexity: A multi-layered approach

It can be challenging to develop a robust business case, when it's difficult to quantify the business benefits and cost of AI.

Any AI solution must start with the opportunity to augment business value, prioritizing use cases instead of starting with technology adoption. For telcos to fully unlock AI's potential, they need access to a multi-tier architecture (see Figure 5) and integration with the enterprise systems.

Figure 5 shows the TCS enterprise architecture framework for telcos.

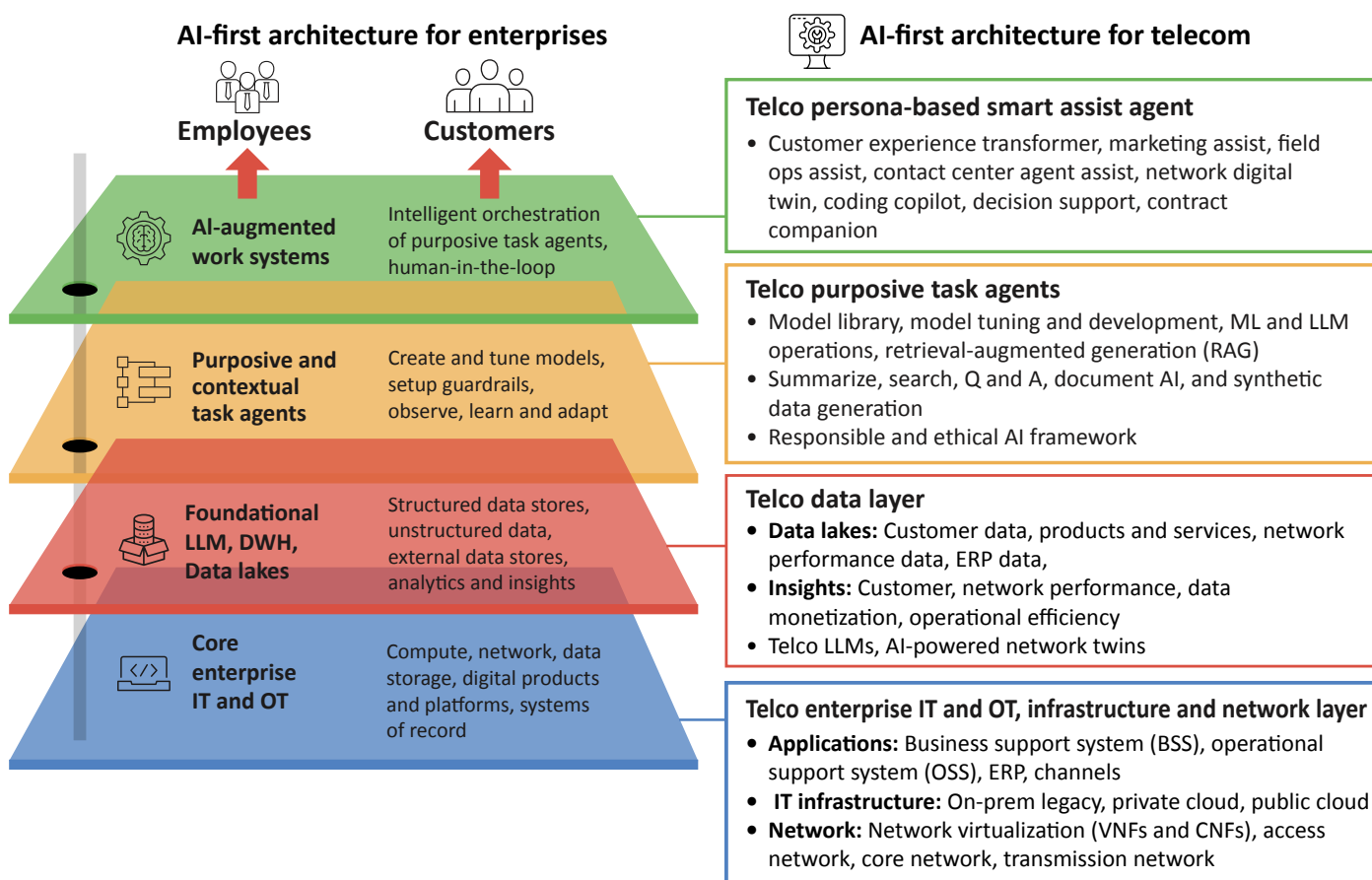


Figure 5: TCS AI architecture for telcos

In our proposed multi-tier approach:

- The bottom-most layer predominantly enables the compute, network, and application as a foundation, and the existing enterprise IT and telco systems of record such as business support systems (BSS), operations support systems (OSS) and enterprise resource planning (ERP) systems.
- The next layer enables foundational LLMs for a variety of knowledge management use cases, such as network twins embedded in a frictionless DevSecOps ecosystem.
- The layer above that constitutes GenAI enabled purposive and contextual task agents to enable various moving parts of AI. This includes fine-tuning of AI models on an ongoing basis, establishing the necessary guardrails for responsible and ethical implementation of AI, and a strong ML and LLM ops capability for continuous learning by the models.
- The final layer comprises task agents that interact with each other in a seamless fashion with a human-in-the-loop for validation, verification, and disambiguation.

The TCS advantage

Our strong partnerships help telcos successfully navigate GenAI transformations to drive sustained performance.

Deep domain and contextual expertise: Well-established product and enterprise knowledge and technological expertise across the telecommunication value chain – such as network operations, customer service, and OSS and BSS – enable robust AI applications and support for leading global telcos.

Cross-industry experience: Working with customers across industries like manufacturing, transportation, retail, and insurance brings an end-to-end holistic view of enterprise business functions and knowhow.

Partner ecosystems: Scale and accelerate the path to value through a network of joint solutions, a broad spectrum of vendors for devices and core networks, established hyperscaler partnerships, collaboration with leading CSPs in dozens of countries around the world, an extensive TCS CoIN™ network, co-innovation facilities such as TCS Pace Port™, and co-creation with TM Forum.

Enterprise AI at scale: Our 3P strategy — patents, products, and platforms — and more than 150,000 trained associates help us enable enterprise AI at scale.

Evolving capabilities: TCS offers multiple areas of capabilities that infuse predictive and GenAI interventions to assist and augment the telco value streams. TCS CX Transformer for Telcos, for instance helps CSPs enhance customer experience across multiple touch points using AI and generative AI solutions.



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A part of the Tata group, India's largest multinational business group, TCS has over 601,000 of the world's best-trained consultants in 55 countries. The company generated consolidated revenues of US \$29 billion in the fiscal year ended March 31, 2024 and is listed on the BSE and the NSE in India. TCS' proactive stance on climate change and award winning work with communities across the world have earned it a place in leading sustainability indices such as the MSCI Global Sustainability Index and the FTSE4Good Emerging Index. For more information, visit www.tcs.com

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