pwc

Perspectives from the Global Telecom Outlook, 2025–2029

Table of contents

The takeaways

• Global telecom traffic is soaring amid flat-to-down ARPU and modest revenue growth, making AI-enabled cost control and efficiency essential.

• AI and data centres are driving a new infrastructure investment super-cycle. Telecoms can capture growth by delivering AI-era connectivity and sovereignty solutions.

• To stay competitive, operators are adopting simpler ‘puretone’ portfolio models and AI-native ‘TelcOS’ operations.

01

Introduction: Opportunities amid adversity

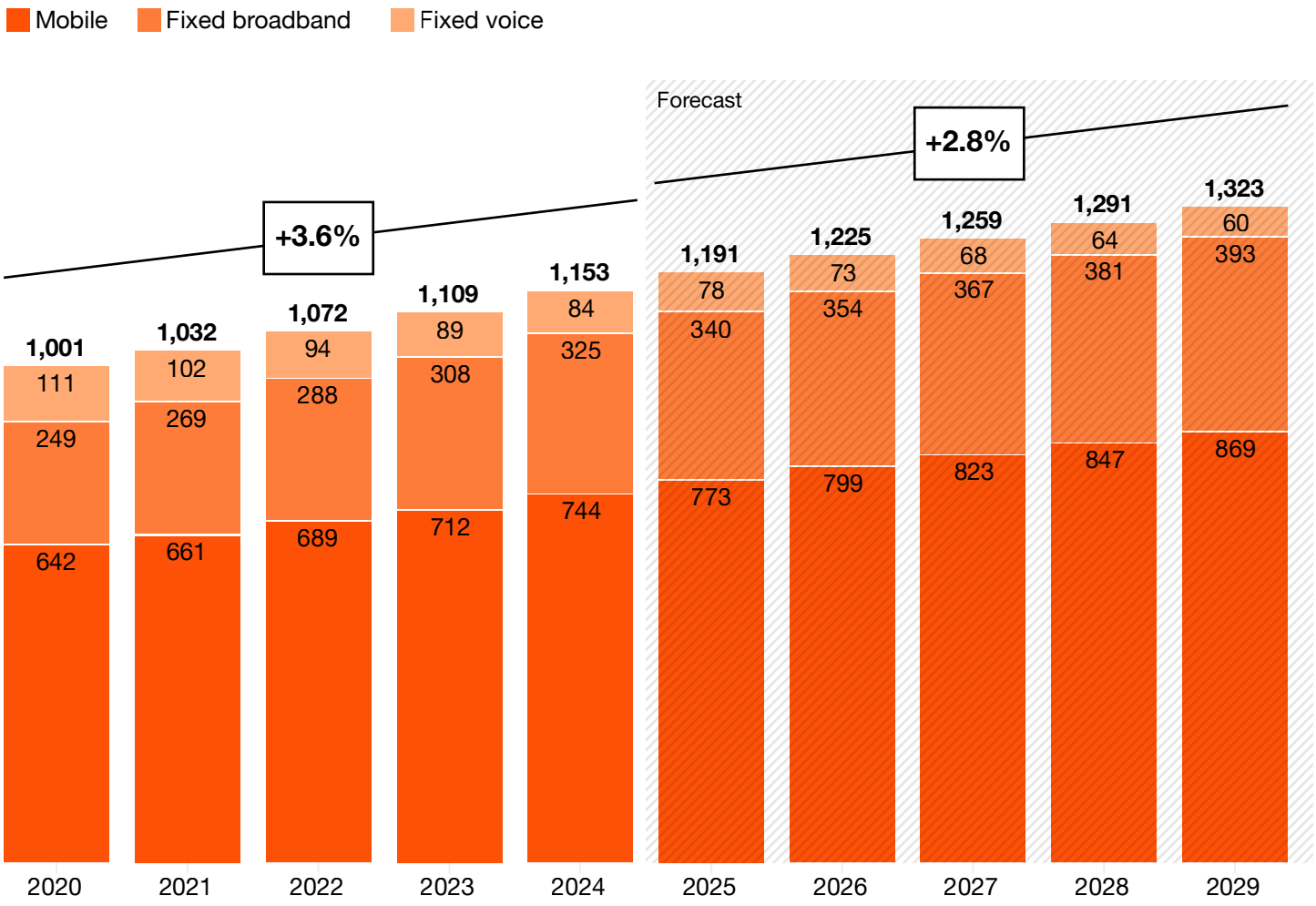
In recent years, telecom operators have paved new information highways in the form of 5G for mobile devices and fibre-optic lines for homes and businesses. Now those highways are becoming more crowded. With each passing day, billions of users stream more and sharper video, move data in real time, connect cars and factories, and increasingly use artificial intelligence (AI)-powered services. But in a continuation of a long-standing trend, while usage by all measures is soaring, revenue isn't. According to PwC's Global Telecom Outlook, global telecom service revenue is set to rise from US$1.15 trillion in 2024 to roughly $1.32 trillion in 2029, representing a steady, but unremarkable, compound annual growth rate (CAGR) of around 2.8%.

The underlying reason for the sombre revenue outlook? Consumers' flat-to-down willingness to pay. Although regional growth rates vary widely, monthly average revenue per user (ARPU) globally for mobile is expected to tick down marginally to $6.20 in 2029 from $6.32 in 2024. What's more, fixed broadband ARPU inched up to only $19.81 in 2024 from $19.73 in 2023, dampened by a decline in fixed voice revenue that will cause overall fixed ARPU to keep falling throughout the studied period. The combination of slow revenue growth and declining ARPU is a structural change, requiring a resetting of the telecom margin model. Integrating AI can help by lowering service costs, reducing downtime, improving capital allocation, and raising productivity—but only if paired with product simplification, legacy shutdowns, footprint reduction, and vendor consolidation.

Growth moderates

Global telecom revenue continues to grow steadily, though at a slightly reduced rate.

Global telecom revenue by service type (US$bn)

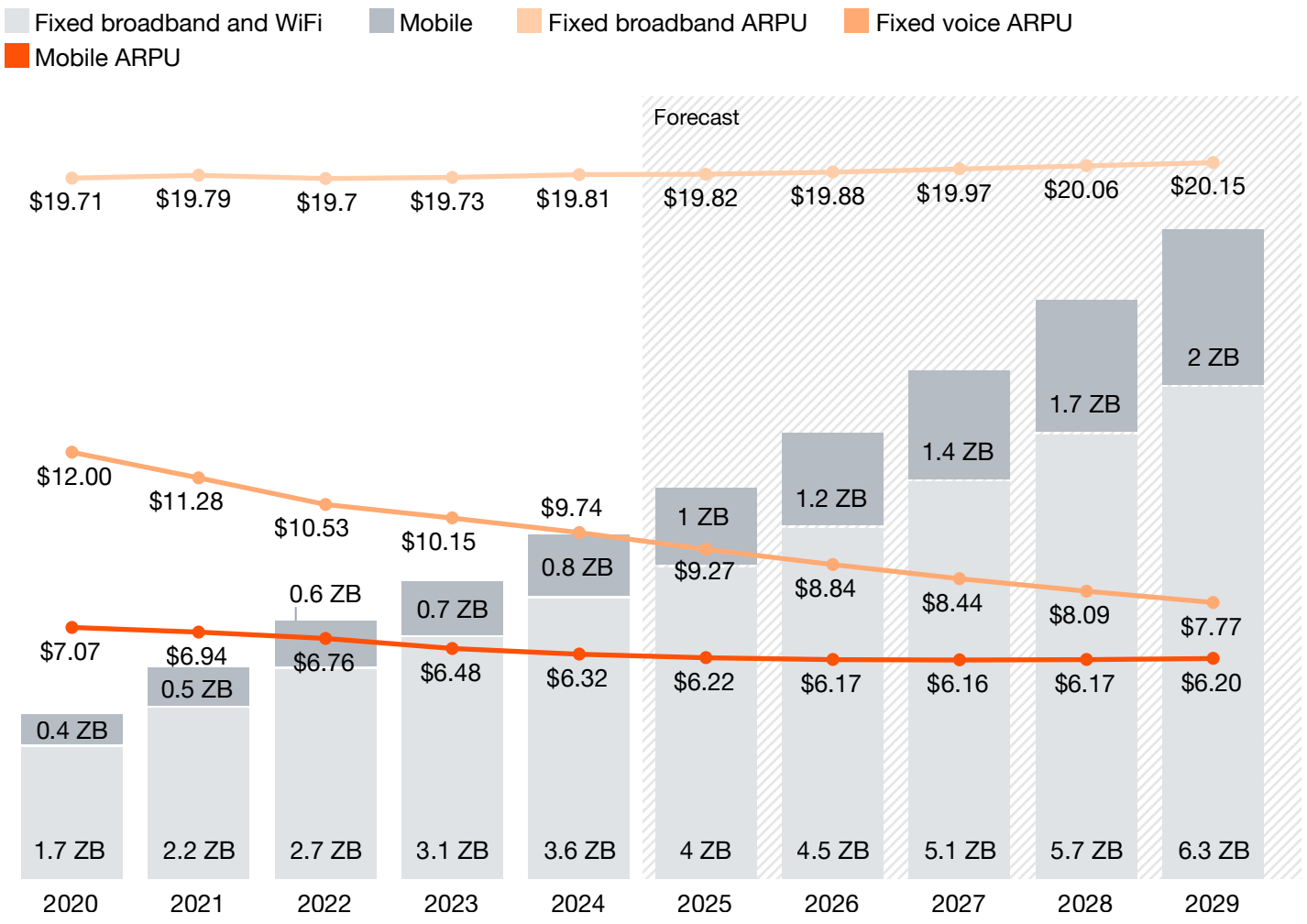


Note: Totals may not equal sums shown due to rounding.
Source: PwC's Global Telecom Outlook 2025–2029, Omdia

Usage outpaces revenue

Network usage is accelerating far faster than ARPU, widening the monetisation gap

Telecom data consumption (zetabytes) and average revenue per user (ARPU, US$)



Source: PwC's Global Telecom Outlook 2025–2029, Omdia

Meanwhile, with **value in motion across the global economy**, two other parts of the digital landscape are accelerating at a head-snapping pace: AI and data centres. Hyperscalers and investors are racing to build large compute clusters that require high-capacity, low-latency, reliable interconnection. They will secure connectivity the fastest and cheapest way possible: buy fibre from operators—or build their own.

Here's the fundamental risk: Telecoms' capex spending on long-lived assets like towers, radios, and fibre as a share of revenue stepped down from 26.9% in 2022 to 22.9% in 2024, though we expect it to register a marginally positive 0.62% CAGR later in the period as 5G-Advanced and early 6G roll out. But if backhaul and data centre interconnect don't keep pace, the compute economy will grow around the networks operators built.

This shift creates a choice. Defend a shrinking margin pool or reposition around AI infrastructure. That means investing where traffic and capital are concentrating, simplifying the portfolio, and aligning the operating model to capture data centre, fibre, and edge demand.

Despite these significant challenges, the AI and data centre story presents tremendous opportunities for efficiency, growth, and fundamental reinvention. In this article, we explain how telecom operators can leverage AI and the associated infrastructure buildout to accelerate their growth. We share where the money will flow; what to build (and where); and why many telecoms are reshaping themselves into simpler, more focused businesses to match where value is shifting.

02

Five forces shaping the telecom industry

Telecoms are striving to maintain their position and relevance in the **connect and compute** value chain and increase the value they create. It's a tough ask, one that's made more challenging by widely differing market dynamics and growth rates in worldwide territories. (See "Regional and country trends" on page 12.)

As telecoms look to develop their strategies for success in this fragmented global environment, they must take account of five forces fundamentally reshaping the economics of the telecom industry.

Fibre first—with FWA as a filler. Globally, fibre is now the upgrade path of choice, with fixed wireless access (FWA) serving as a bridge technology that uses headroom capacity on 4G/5G mobile networks to provide fixed broadband connectivity wirelessly to homes and businesses. For operators, the goal with FWA is to ride the fibre wave and tap into monetisation opportunities beyond the pure speed that fibre offers. For consumers, this might mean pairing multi-gig tiers with managed Wi-Fi, cybersecurity, smart home, and gaming/assured-latency bundles. For enterprise customers, it means leaning on software-defined wide area networks (SD-WAN), secure access service edge (SASE), and edge security.

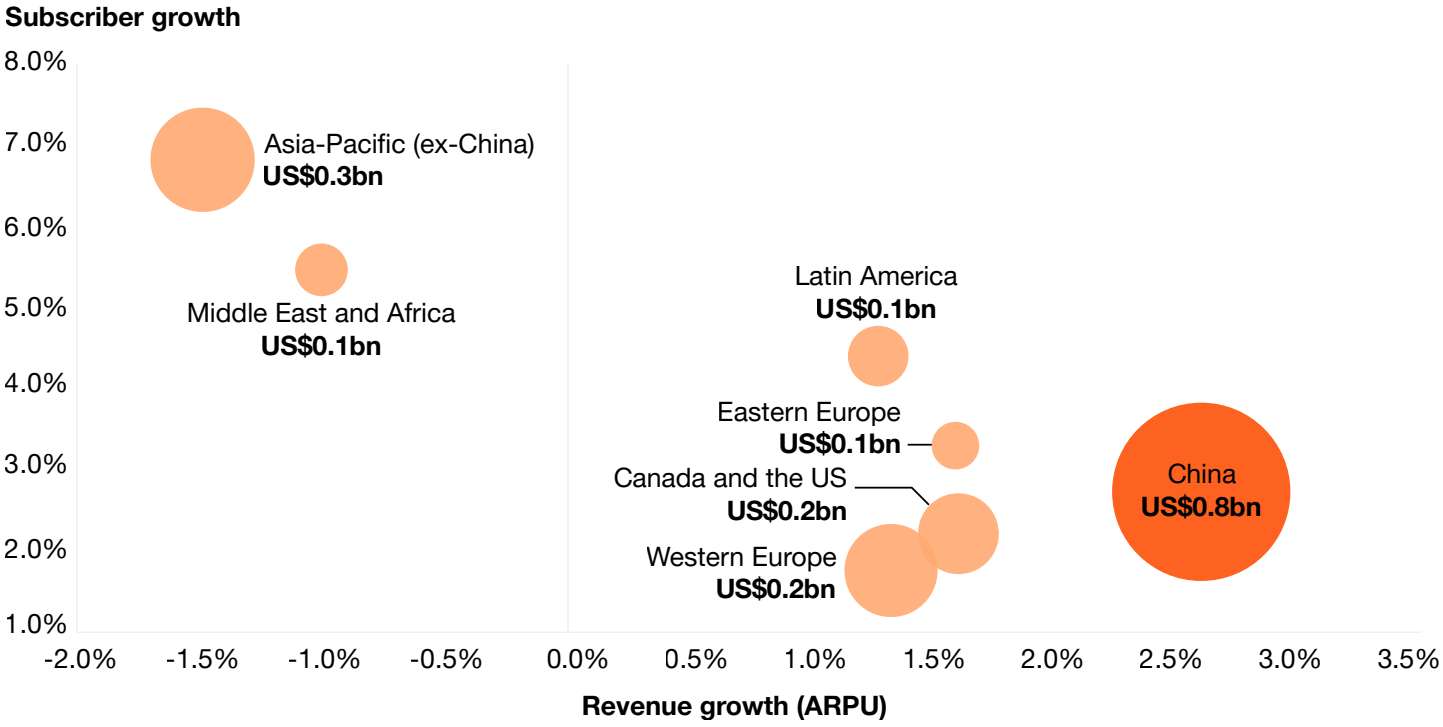
The migration to fibre is being led by countries such as Singapore, now an all-fibre nation pushing towards 10 gigabits per second (Gbps), and China, which has 206.8 million gigabit fibre users and 10 Gbps pilots underway. Ongoing fibre expansion in markets such as France, Japan, the UAE, and Switzerland further underlines the readiness for 5–10 Gbps positioning.

Fibre reshapes regional markets

China stands out with unmatched fibre penetration and scale economics.

Bubble size = forecast 2029 total subscriptions (US$bn)

Fixed broadband subscriptions vs. ARPU (as CAGR, 2024-29)

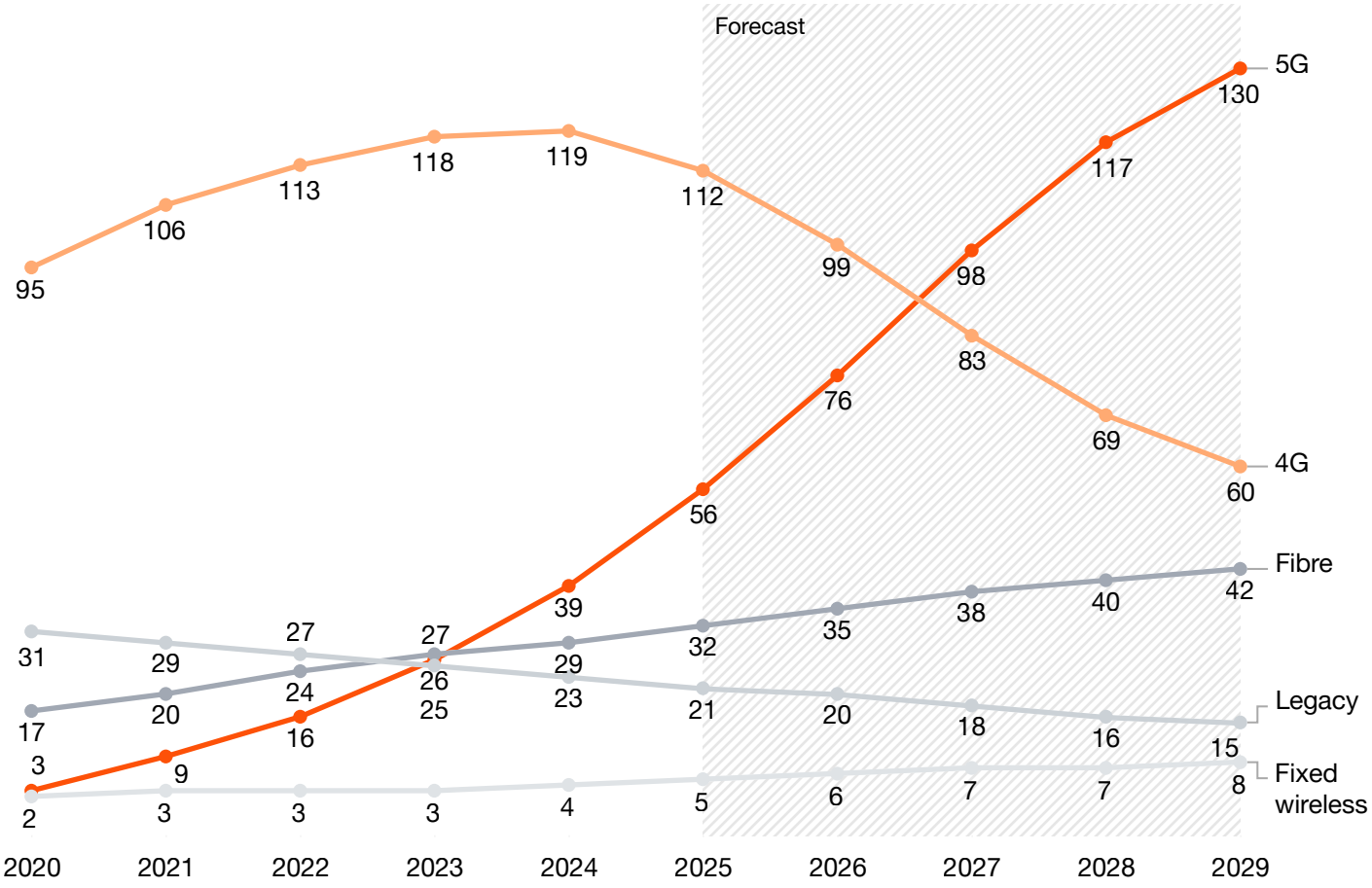


Note: Latin America is representative of Mexico, Central America, and South America.
Source: PwC's Global Telecom Outlook 2025–2029, Omdia

5G and fibre rise

Emerging access platforms are rapidly becoming dominant as legacy technologies fade.

Global telecom subscription penetration for 5G, 4G, fibre, legacy, and fixed wireless (%)



Note: Fibre data excludes China. Legacy data is a combination of DSL and cable.
Source: PwC's Global Telecom Outlook 2025–2029, Omdia

Surgical deployment of 5G SA and 5G-Advanced. Given the tight return on invested capital (ROIC), operators are carefully pacing their rollouts of 5G Standalone (5G SA). They're mostly choosing to invest in cases where slicing/FWA, campus networks, and enterprise service-level agreements (SLAs) can provide a decent payback. Here, different territories are offering tactical cues on both building scale and aligning capex with regulation. On scale, China is piloting 5G-Advanced widely, with 4.2 million 5G sites and concerted commercial promotion efforts; India has moved early to conduct one of the few nationwide SA deployments to date. On capex/regulatory alignment, 5G SA in Germany is being marketed as "5G+," reflecting the **government's commitment** to becoming a leading market for 5G networks and applications.

Capex discipline and asset-light models. As capex intensity declines and capital costs rise, operators need to keep balance sheets flexible and aligned with infrastructure time horizons. Actions targeted to achieve these goals include expanding TowerCo, neutral fibre, sharing strategies, and wholesale models. Asset separations can also play a role, as with the 2024 Telecom Italia SpA TIM NetCo carve-out in Italy that set a precedent for Europe. And selective consolidation is set to continue to reset market structures and support efforts to lift 5G quality in some territories. Examples to date include the 2025 Vodafone–Three merger in the UK, and two mobile mergers in Taiwan, province of China, that created a three–mobile network operator (MNO) market from 2023.

IOT stacks climbing towards platforms. As IOT solutions evolve and escalate to the platform level, the reality remains that most growth in IOT value tends to accrue to application enablement platform (AEP) and consulting providers, not to telecom operators. PwC's Global Telecom Outlook projects a roughly 31% CAGR for AEPs from 2024 to 2029 and nearly $250 billion in revenue in 2029 as connectivity revenues hold steady for the period, below $10 billion in annual revenues. To counter this imbalance, telecoms are looking to move beyond pursuing relatively low-margin connectivity. They are instead seeking to prioritise AEP-led solutions and vertical plays in such segments as smart cities and automotive. This shift will build momentum for embedded SIMs (eSIM/iSIM), hybrid terrestrial–satellite coverage, and lower-complexity 5G connectivity for IOT devices using Reduced Capability (RedCap) and enhanced Reduced Capability (eRedCap) profiles, as 5G SA coverage expands. Regional leaders in

the evolution of IOT include the US (AEP implementation at scale), Germany (AEP implementation at pace), and the UAE and South Korea (fast growth rates off relatively smaller bases).

AI everywhere—as both lever and load. AI can bring enhanced efficiency and effectiveness to every functional domain: marketing and sales, customer operations, IT, software development/engineering, network and field operations, and the back office. In fact, AI will ultimately become the operating fabric on which telecoms run. Yet it also adds demand from AI-related services and applications. An important consideration here is the bifurcated impact of data traffic driven by AI inference (i.e. user-originated and agent-to-agent traffic) and model training (i.e. traffic between hyperscale/large compute clusters). AI inference doesn't yet add much traffic on public networks, as it mainly shifts patterns from 'mostly download' to 'more balanced upload and download.' But it does have a more meaningful second-order effect on data centre interconnect (DCI) networks, as user requests trigger clusters talking to one another. By contrast, AI model training is driving massive traffic growth and upgrades in the backbone. But this growth generally stays within the data centre networks, and doesn't impact the public networks operated by telecoms—and hence doesn't show up in their capex agenda.

Regional and country trends

Differing growth rates worldwide are mirrored by varying market trends and pressures at a regional and country level. In **Asia-Pacific**, China has the world's largest footprint in both fibre and 5G; its downwards pressure on mobile ARPU is offset by growing enterprise demand. And although India is still underpenetrated on fixed broadband at just 15.5% in 2024, fixed broadband subscriptions will nearly double to 95.8 million by 2029, driven by fibre and 5G fixed wireless access (FWA).

Meanwhile, in **North America**, the US is approaching a tipping point from cable to fibre, with once-dominant cable connectivity steadily ceding market share and on a downwards path to lose first place during 2026. Canada is marginally ahead in this regard, with fibre having overtaken cable in 2025.

The rise of fibre is also a consistent theme in **Europe**: France already has 73% fibre subscriptions and a planned copper switch-off by 2030; the UK is set to see fibre subscriptions accelerate towards 70% by 2029 amid consolidation among altnets; Germany will see fibre's share of subscriptions rise from 16% at the end of 2024 to nearly 50% by 2029 (though it will be slowed by VDSL/DOCSIS incumbency); and in Romania, fibre already accounts for 80.5% of subscriptions.

In the **Middle East and Africa**, the UAE has 100% 5G coverage and the fastest IOT revenue growth of any market (40.1% CAGR), and 5–10 Gbps fibre-to-the-home (FTTH) retail plans have also launched. In Saudi Arabia, FWA is the fastest-growing fixed segment, and both fibre and the IOT are being lifted by the country's ambitious smart-city agenda. And in South Africa, fibre and FWA are expanding rapidly, with fixed subscriptions set to grow at an 8.1% CAGR to 13.1 million by 2029.

Meanwhile, in **Latin America**, Brazil's 36.3 million FTTH connections (74% of fixed lines) make it the world's third biggest FTTH market. In Mexico, high spectrum fees are curbing 5G, and total sector capex is set to fall at a –0.7% CAGR through to 2029.

The geo-economic kickers: Tariffs, fragmentation, and sovereignty influence where to invest

The change drivers outlined here are now being overlaid by the impacts of geopolitical factors—as trade policy, tariffs, and restrictions emerge as structural drivers of where telecom and tech value chains get built. **PwC's latest analysis** highlights a fracturing geo-economic environment: Accelerating equipment bans, shifting tariff schedules, sovereignty requirements, and regionalisation are pushing companies to friend-shore/near-shore manufacturing and localise data/storage. For telecoms and data centres, that translates into higher costs for servers, optics, cooling, and backup power; more complex sourcing; and the need to redesign network and facility architectures for resilience.

The tariff overhang is material. Under current proposals, **PwC estimates** that annual US tariff measures affecting technology, media, and telecommunications (TMT) supply chains could rise from around $76 billion to nearly $697 billion, before accounting for any retaliation on the part of other countries—raising hardware costs, elongating lead times, and complicating capital planning. In the face of these shifts, **PwC's analysis** highlights five strategic actions that telecom and tech leaders can take now to help withstand tariff disruption and derisk supply chain vulnerabilities: map the company's exposure across all dimensions; build scenario resilience through response playbooks; rethink vendor strategy and relationships; embrace software-first design to reduce dependency on specialised hardware; and integrate sustainability into strategy, including adopting circular models.

The geopolitical situation is not just an abstract or emerging risk to operators. Their responses to these risks are already apparent in actions such as capex phasing (network softwarisation to reduce hardware exposure), vendor diversification, and new regional build choices. The **data centre side** is reacting in kind, through moves such as pairing siting decisions with grid participation (demand response, on-site generation) and emphasising local economic multipliers to secure permits and power.

03

Capitalising on the AI infrastructure investment super-cycle

As we highlighted earlier, over the next five years, we will see two capex cycles diverge.

Telecoms' capex intensity is easing after a decade of 5G and fibre build. According to the Global Telecom Outlook findings, capex will lag revenue growth through 2029 as many markets approach the end of their 5G non-standalone (NSA) and first-wave fibre cycles.

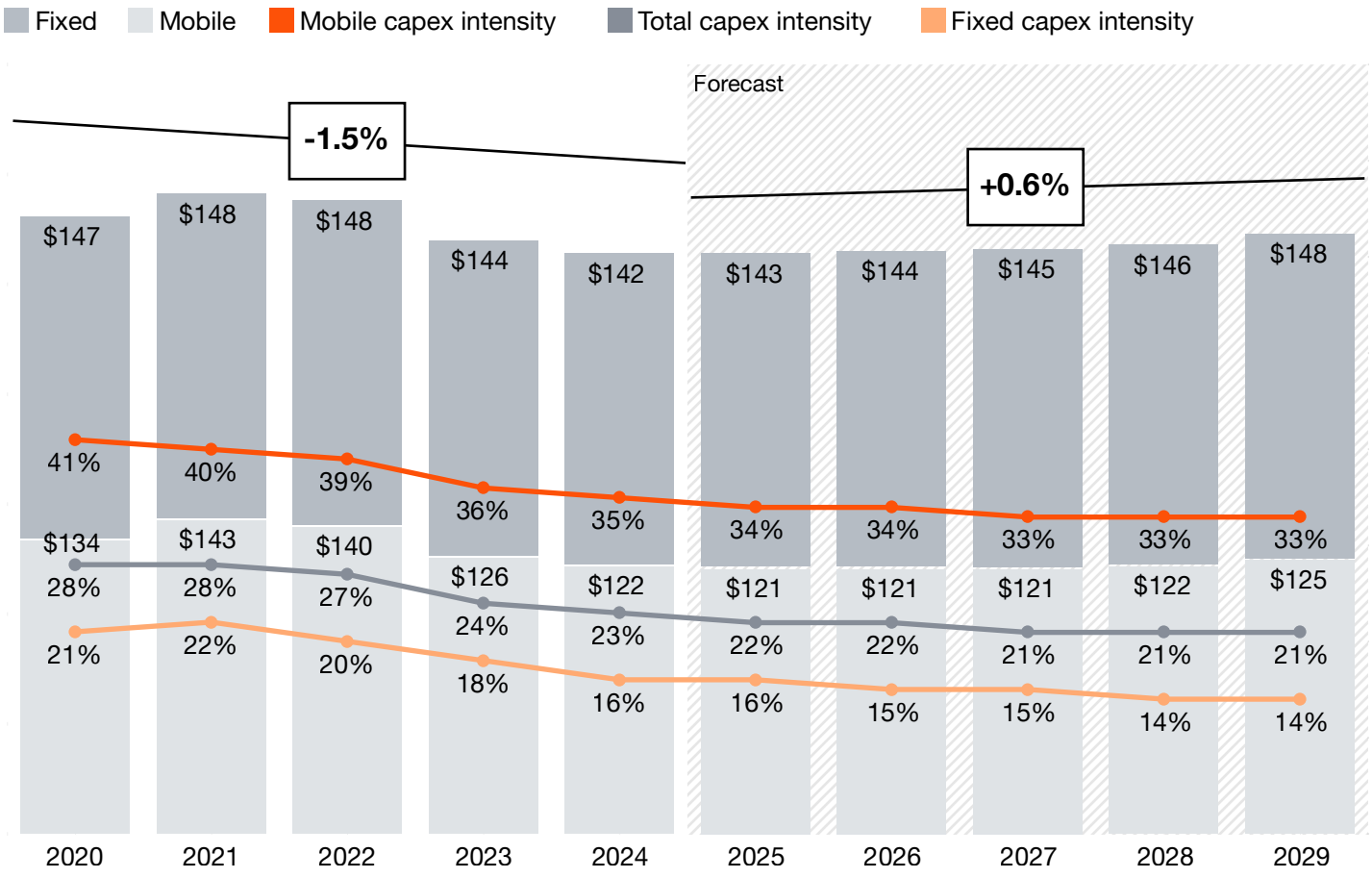
On the other side, AI infrastructure is accelerating into a multiyear super-cycle. Capital is flowing into hyperscale campuses, power-hungry AI clusters, and adjacencies such as grid interconnects and onsite power generation. Data centres are now **framed as 'backbone' infrastructure** for the digital economy, with investors pushing to scale quickly while hardening against supply chain and power constraints. The recent series of large-ticket deals underscores the trend, and points to **continued private-capital interest** in AI-ready capacity.

Examples include the $500 billion Stargate Project AI infrastructure investment in the US, involving OpenAI, Oracle, Japan's Softbank, and the UAE's MGX; the EU's €20 billion (US$23.5 billion) InvestAI and AI Gigafactory programme, backed by the European Investment Bank; and Saudi Arabia's $100 billion Project Transcendence, focused on making Saudi Arabia a world leader in AI and analytics.

Capex cools

Operators are moderating capex intensity as 5G and fibre deployment cycles mature.

Global telecom capex ($USbn) and capex-to-revenue ratio (%) for fixed broadband and mobile



Source: PwC's Global Telecom Outlook 2025–2029, Omdia

At first glance, the mismatch between the telecom network and AI infrastructure capex cycles looks dramatic, threatening to decouple compute from connectivity. However, overlay these contrasting cycles with today's geopolitical fracturing and advancing sovereignty agenda, and what emerges is a once-in-a-generation opportunity for legacy carriers.

One play here for telecoms is participating in the AI infrastructure super-cycle not just as providers of DCI, but as investors in assets such as data centres and edge infrastructure. But more importantly, factors that used to be constraints for telecoms globally—territorial licence, regulatory oversight, universal service obligations—are now becoming assets. In a world where sovereign AI infrastructure, AI models, and supply chains are increasingly mandated or strongly preferred, operators can carve out national 'mega-scaler' roles that global platforms cannot easily penetrate or replicate.

We see four arenas where telecoms have both a right to play and—with the appropriate degree of focus—a good chance of winning:

Enterprise and wholesale connectivity for AI-era workloads. Telecoms can build and price for east-west traffic, while also prioritising 10/400 Gbps backhaul upgrades, DCI wave services, dark-fibre/managed wavelength products, and low-jitter metro rings tuned for AI training/serving. Where grid and planning allow, they might co-site edge rooms (Tier 2/3, 100–500 kW) on their own premises to terminate DCI and host latency-sensitive micro-clusters.

Converged consumer/small- and midsize-business broadband as the national access fabric. To play in this space, telecoms can continue migrating households and small businesses to gigabit-class fibre and 5G, including FWA, using mobile/fixed network convergence and bundle economics to bolster ARPU in a flat macro environment. Governments and investors value this ubiquitous, regulated layer, seeing it as critical to domestic AI adoption and national productivity. The global data shows broadband ARPU is stable or slightly rising as fibre's share climbs—underlining the fact that quality can still be monetised. All this points to the opportunity to integrate AI into the converged bundle value proposition. Operators are already adding AI applications to their subscription bundles as perks in the same way they offer various streaming services.

Sovereign cloud, GPU-as-a-Service (GPUaaS), and trusted edge for resilience, national security, and regulatory needs. Telecoms can partner with sovereign capital and national clouds to complement, not replace, hyperscalers—providing domestically sited capacity that satisfies national security and defence needs as well as residency, sectoral, and security controls in sectors such as

health, finance, and government. **PwC's deal and macro signals** indicate that investor appetite for AI infrastructure remains high. Telecoms can capitalise by anchoring the connectivity-plus-compliance layer that makes sovereign AI usable at scale. Additionally, rising defence spending, especially in Europe, means the sovereign information and communications technology (ICT) opportunity for telecoms will accelerate given the pivotal role digital and communications technology plays in military and defence applications, including cybersecurity.

Hybrid terrestrial–non-terrestrial connectivity as a resilience layer. Steps here can include securing satellite capacity to harden rural backhaul and critical routes, while preparing for direct-to-device augmentation to enhance population coverage, public safety, and IOT continuity. Telecoms might also bundle satellite with multiprotocol label switching (MPLS)/SD-WAN and 5G slicing to deliver SLA-backed reach for distributed AI data ingestion and inference. Activity and investment involving satellite communications is on the rise globally. Examples include the acquisition of a growing number of national satellite spectrum licences by Elon Musk's Starlink; Saudi Arabia's creation of the Neo Space Group; and the agreement between Airbus, Leonardo, and Thales to jointly create a leading European player in satellite and space systems manufacturing and services. The technology sovereignty agenda clearly plays a role in some of these initiatives, as territories look to secure their position and autonomy in the future satellite ecosystem.

Implications for capital, partnerships, and operating model

Playing in any or all four arenas has significant implications for telecoms in areas as varied as capex, ecosystem collaboration, and operating models. One important change is shifting capital allocation towards 'AI-adjacent' transport, targeting spending at domains with clearer pass-through to enterprise revenue; these include backhaul, DCI and metro fibre densification, coherent optics, and synchronisation upgrades. Another important change is building a tariff-ready, sovereign supply chain, with dual-sourced vendor stacks across domains like optics, routers, power, and cooling. **PwC's tariff guidance** emphasises integrating customs, transfer pricing, and vendor selection into the same decision loop.

Further enabling actions in securing a domestic mega-scaler role include co-investing at the edge. Where permitting and power are constraints for hyperscalers, telecoms can contribute sites, rights-of-way, and interconnects, while partners bring construction equity and long-term offtake. Community-integrated models can also unlock siting—at the same time strengthening the **social licence** to expand.

Finally, telecoms should look to make speed a measurable advantage by tackling slow decision processes and risk aversion. One way to do this is by embedding a stage-gate 'time-to-light' metric across build programmes and using portfolio rebalancing to kill or double down on initiatives quickly. Another way is for telecoms to adopt **a 'puretone' approach** by reconfiguring their business unit and functional structures to create clearer organising logic around their various and integrated business models. The defining feature of puretone business model archetypes is that they sharpen focus while enabling proximity to demand—two characteristics that align with both the telecom industry's trajectory and the AI infrastructure cycle.

04

Reinventing telecom business models

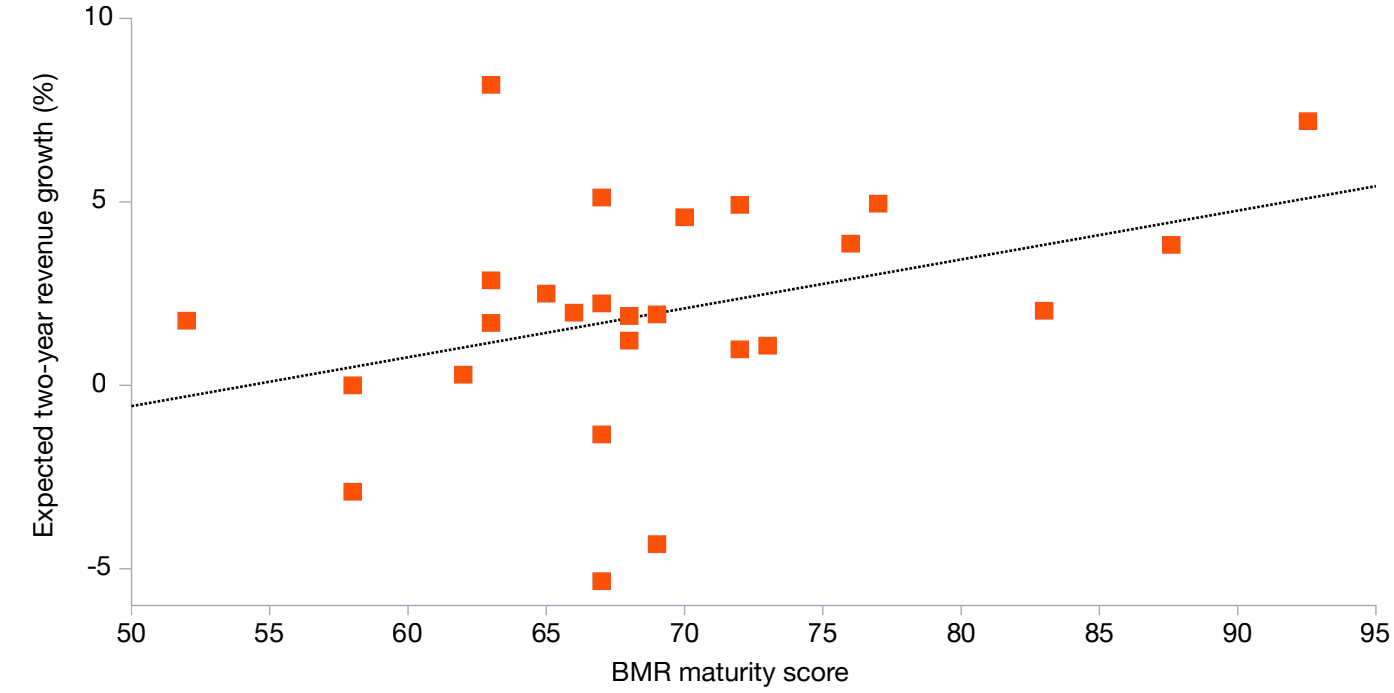
Capitalising on the AI infrastructure opportunity is one of several imperatives compelling telecoms to shift to a puretone model. Another is the performance and capital constraints mentioned earlier. A third is the benefits such a shift offers from a cost-discipline perspective. The clarity and separation of puretone businesses forces greater P&L transparency and exposes areas where cost structures are not competitive—or perhaps are artificially distorted through internal cross-charges, transfer prices, or internal subsidies. The effect is that the puretone approach provides a clear and honest open-book view of the business's economics and enables it to focus on realigning cost to optimal levels.

PwC's Business Model Reinvention (BMR) Pressure Index shows current reinvention pressure at a level on par with that of the dot-com era, driven by declining returns, technology shifts, and regulatory scrutiny. **Across more than 30 carriers we analysed**, the operators progressing furthest on unbundling into **puretone** businesses and diversification commanded EV/EBITDA premiums of 30% to 50% over traditional integrated peers. Examples include Telstra's 2020 InfraCo separation and Jio Platforms's ecosystem build in the same year, attracting more than $20 billion of strategic capital.

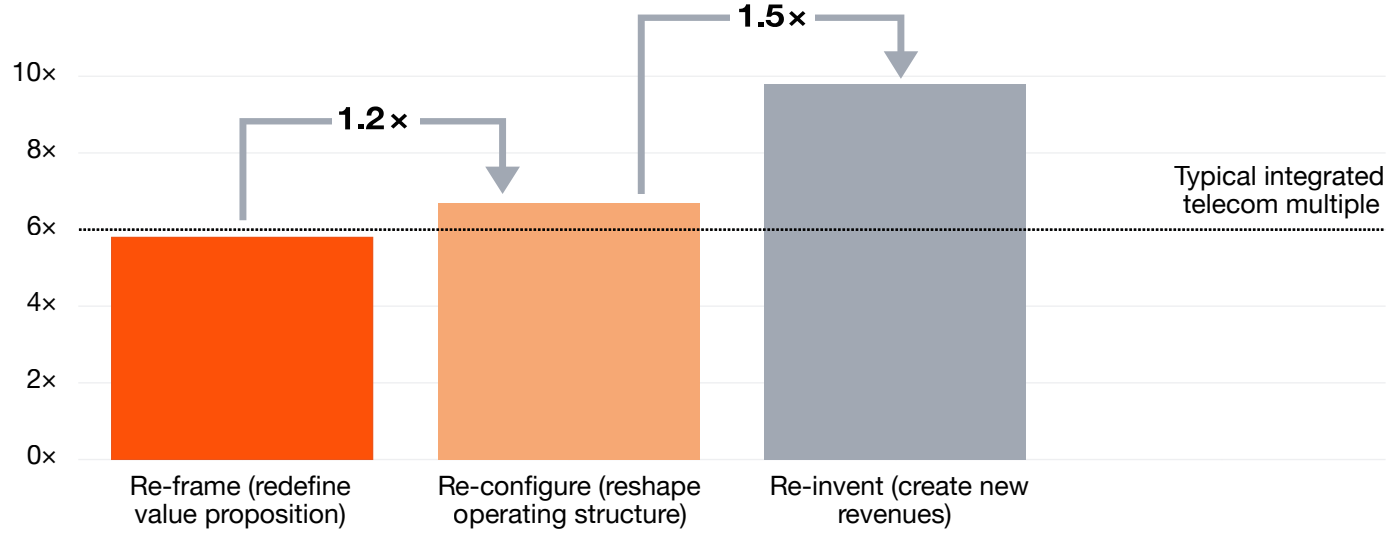
The market rewards reinvention

Telecoms that reinvent their business models see higher multiples of revenue growth.

Revenue growth expectations vs. BMR maturity score



Forward EV/EBITDA multiples for each BMR stage



Source: PwC analysis, Capital IQ

Reinvention is about choosing where to play and creating the right model with the right capital and operating autonomy. As the digital infrastructure cycle unfolds and telecoms seek ways to derive value from it, they should consider four main puretone archetypes:

Targeted InfraCo/NetCo: Put capital where proximity and wholesale demand are provable. The data centre (DC)/AI cycle will proceed with or without telecoms, and owning the inter- and intra-DC connective fabric provides access to a contractable, growing wholesale value pool. The InfraCo/NetCo model directs infrastructure capital at open-access fibre, metro rings, dark fibre, and DCI. It can be financed via co-ownership to optimise capital costs while preserving service access for ServeCo and SolutionCo.

SolutionCo (enterprise and public sector): Prioritise outcomes over access. The enterprise buyer wants assured connectivity with security and observability. The SolutionCo model packages managed connectivity, SD-WAN/secure access service edge (SASE), zero-trust security, and life-cycle automation with clear SLAs and site-specific economics. It extends into private 5G/local area network, industrial Wi-Fi, and edge computing to deliver latency-sensitive outcomes in manufacturing, logistics, healthcare, and utilities. And where sovereignty matters, it brokers sovereign cloud and AI linked to compliant networks.

ServeCo (direct-to-consumer): Defend ARPU, grow lifetime value. In a world of flat mobile ARPU, modest fixed-broadband uplift, and eroding speed-based differentiation, ServeCo wins by converging fibre and mobile and attaching digital services like premium wi-fi/mesh, security, entertainment, cloud storage, and home support. Fibre migrations boost ARPU, while bundles reduce churn. BMR Index evidence shows ServeCo patterns scaling via super-app-style aggregation and embedded finance in markets with wallet penetration. Examples include M-Pesa, MoMo, and STC Pay.

PlatformCo/BrokerCo: Aggregate what customers already buy. Multi-cloud and hybrid architectures increase complexity; buyers will pay to simplify sourcing, governance, and observability. This archetype acts as a neutral marketplace for the likes of wholesale broadband, cloud/edge, and security, curating multi-vendor services under a single contract. Fast-growing segments include GPU-as-a-

Service and global business services (GBS)-as-a-platform. Vodafone Intelligent Solutions and Orange/Deutsche Telekom's BuyIn are among the telecoms externalising capabilities as a revenue line.

How to build and operate the reinvented portfolio

Deals are the operating lever for reinventing to puretone models. Some examples? In fixed network separation, TIM sold its fixed NetCo to KKR in 2024. In portfolio rationalisation, Telefónica exited most of Latin America over the last several years, and Vodafone sold operations in Spain, Italy, and Hungary from 2023 to 2025. And in tower monetisation, the TowerCo wave (Totem, Vantage, Telxius, GD Towers) of the 2020s reflects softwarised networks' lower need to own sites.

Once the reinvented puretone business has been created, operating it successfully requires three sets of interconnected attributes:

Autonomy with accountability. Our BMR Index diagnostics show that the strongest drivers of reinvention progress are accountable leadership and clarity in mission. These are design choices, not outcomes.

Resilience and sovereignty. To navigate tariff and policy volatility, portfolios need supply chain and data/AI sovereignty options. SolutionCo can bundle sovereign-compliant workloads; InfraCo contracts should anticipate policy swings; PlatformCo's brokerage can diversify vendor exposure.

AI-native operations ('TelcOS'). By embedding AI across their operations, telecoms can leverage the technology to simultaneously plan, run, and assure networks—in terms of predictive maintenance, dynamic spectrum, closed-loop assurance—and compress cycle times in sales, care, and field operations. This model is central to ServeCo's cost-to-serve, SolutionCo's SLA delivery, and InfraCo's energy and utilisation economics. We take a closer look at TelcOS in the next section.

05

Shifting to AI-native operations with ‘TelcOS’

The combination of modest revenue growth outlook and ongoing commoditisation is intensifying the pressure on telecoms’ differentiation, cash generation, and costs. Given that 35% of new passes in the US are now funded by private equity, incumbent carrier margins are under further pressure. And 55% of the telecom CEOs in **PwC’s 28th Global CEO Survey** said they believed their company would no longer be economically viable a decade from now if it continued on its current path, compared with just 42% of all CEOs globally.

The solution to these challenges lies in building AI-native operations. Future-focused telecom executives aren’t treating AI as the final step in a transformation road map. Instead, they’re using AI agents today to simultaneously reduce costs, boost efficiency, improve customer and employee experiences, and modernise legacy systems.

These strands of AI-enabled reinvention combine into a model for the AI-native telecom business that we’ve termed ‘TelcOS.’ It represents AI acting both as a demand driver—raising the bar for automation, assurance, and cost control—and as the means to manage and satisfy that demand.

Adopting TelcOS offers major upgrades across a telecom company’s operations, including in areas such as network planning and design, network management and assurance, field and supply operations, customer operations, sales and product, and security and trust.

The benefits of TelcOS extend across the value chain

Business area or activity	Primary impacts
Network planning and design	With TelcOS, machine learning (ML) models optimise coverage/capacity, site placement, spectrum utilisation, and rollout sequencing—bringing benefits including shorter time-to-service, lower build costs, and greener, more energy-efficient designs.
Network management and assurance	Closed-loop assurance, anomaly detection, and causal AI tools reduce fault mean time to repair (MTTR), improve quality of experience, and reduce truck rolls by working across radio access network/transport/core, public cloud, and edge.
Field and supply operations	Reinforcement learning by AI helps telecoms optimise the supply of spares and route technicians more efficiently, while computer vision improves fibre build quality assurance and agentic copilots generate method-of-procedure documents (MOPs) and log outcomes for audit.
Customer operations	Telecoms are already seeing significant impacts from generative AI (GenAI) on service quality, with generative agents helping reduce handling time, resolve billing/service issues end-to-end, and personalise retention offers using churn propensity and margin logic.
Sales and products	GenAI accelerates individualised ‘segment-of-one’ offers and pre-populates enterprise solution designs, while generative agent triage can be used to lead and coauthor bids. AI can enable consumer product innovation as well (e.g. Deutsche Telekom’s AI phone).
Security and trust	AI augments cybersecurity detection and response; GenAI helps remediate misconfigurations and draft compliance artifacts—activities in which getting governance right is mission-critical, including formal LLMOps/MLOps and risk controls.

Source: PwC analysis

The data and platform foundations for TelcOS

The TelcOS operating model depends critically on putting the right data and platform underpinnings in place. A data-first approach using AI agents helps telecoms avoid two common missteps: (1) automating broken processes, and (2) waiting years for a clean slate on which to effect reinvention. Instead of relying on siloed applications and legacy databases, operators can now build a unified architecture that puts data and intelligence at the centre, over time replacing traditional tools like static billing platforms with AI agents that work across domains using shared context and standard models. This shift moves enterprise tech from simply recording what happened to detecting what's happening across the enterprise and triggering the next best action in real time.

Operators can lay the foundations for TelcOS reinvention by taking three steps:

Renew the data environment. A clean, modern digital core—anchored by an ERP backbone and unified data—lets both people and agents act safely, consistently, and at speed, thereby enabling end-to-end transformation. And most AI failures in telecom can be traced back to issues with data, such as silos, latency, lineage gaps, and quality debt. To avoid such problems, TelcOS needs the following:

- **Cloud-first data** (lakehouse) with low-latency ingestion from OSS/BSS (operations and business support systems) and IT/OT (information and operational technology), unified identity resolution (subscriber, device, service, location), and governance-by-design.
- **A semantic data fabric** over telemetry, orders, trouble tickets, inventory, topology, and finance—so agents can reason over meaning, not just columns.
- **Streaming/event backbones**—such as Kafka or Pub/Sub—for real-time signals into planning, assurance, and customer experience loops.

The industry is already moving in this direction: in **PwC's cloud and AI business research**, most tech/TMT companies reported GenAI adoption in "a few or many" operational areas—a precondition for scaling an AI data plane.

Move to microservices. Legacy stacks tend to fragment processes (assurance vs. care vs. billing). TelcOS favours domain microservices (catalogue, quote, order, inventory, policy, charging), exposing consistent APIs/events with common policy, identity, and 'golden' reference data. This removes handoffs, enabling closed-loop automation with human-in-the-loop governance.

Orchestrate vendor-agnostic agentic workflows as a 'human + agent' enterprise. Discrete chatbots won't move the P&L dial. Agentic operations require an 'OS for agents' that can enable cross-vendor agents to collaborate with one another and with human teams on complex, cross-functional workflows behind secure gateways. This calls for new roles, new governance, and a model in which people and agents operate as a system, with a clear process for determining who does what. A practical way to organise and orchestrate this process is to use the **TM Forum's enhanced Telecom Operations Map (eTOM) model**, which can help leaders decide where people should remain central, where agents can take the lead, and where seamless coordination between people and machines is required. TelcOS leaders are anchoring AI value to the P&L with 'autonomous value loops' linked to a clear outcome metric, targeting high-yield areas like network energy optimisation through cutting radio access network (RAN) power in low-load windows and zero-touch service assurance based on self-healing incidents with guard rails.

The bottom line? TelcOS is not a 'nice to have.' It is how carriers will protect margins, absorb AI-driven traffic growth, and create distinctive customer experiences **in a market where ARPU growth lags inflation**. The strategic question is no longer whether your telecoms will become AI-native; it's how fast you can progress AI from pilots to a new operating system for the business. This is the direction of travel needed to secure the **future of your business** through 2026 and beyond. The time to start is today.

Subscribe to the Global Telecom Outlook *for access to detailed additional data and commentary for fixed, mobile, capex, and IOT segments across 53 countries and territories.*

Author

Florian Gröne
Global Telecommunications Leader,
PwC United States

The author would like to thank Jens Niebuhr, Russell Taylor, Maria Teresa Copabianco, Chase Bice, Lori Driscoll, and Mahmoud Makki for their contributions to this article.

Perspectives from the Global Telecom Outlook, 2025–2029

pwc.com/gx/en/industries/tmt/telecom-outlook-perspectives.html