BROADBAND AND CLOUD DEVELOPMENT INDEX REPORT 2025

IDENTIFYING GLOBAL LEADERS AND BEST PRACTICE

WORLD BROADBAND ASSOCIATION

This report provides analysis of the Broadband and Cloud Development Index (BCDI) from the World Broadband Association (WBBA). The BCDI quantifies and ranks the performance of the two segments in major countries to identify leaders and best practices. This is to help industry stakeholders, including policymakers, regulators, service providers, and suppliers, support the development and growth of the broadband and cloud industries in their respective countries. WBBA members include the following companies.*

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ACKNOWLEDGMENTS

This report and the BCDI have been developed with the support and collaboration of many WBBA member companies. These organizations and individuals participated in a WBBA working group dedicated to creating the BCDI model and this report. Their contributions and insights have been invaluable.

The WBBA organizations and individuals that have provided valuable input to the BCDI model and report are acknowledged below in alphabetical order by organization:

- China Telecom – Huang Zhiyong, Liu Zhiyong, Shao Xinhua, Wang Yanchuan, Zhang Yuan
- China Telecom Research Institute – Fu Zhiren, Rao Shaoyang, Zhang Xuezhi, Xia Yan, Yun Liang, Yang Mingchuan, Shi Ying, Lei Bo, She Congguo, Lu Gang, Wang Feng, Chen Yan, Qin Xu, Lin Wenqi, Wang Yupei, Chen Zhonghua, Wang Lishan, Wu Yuting, Huang Zhilan
- Ookla – Kevin Hasley, Victor Zeng
- VerSe Innovation – Prashant Gondaliya
- WBBA – Martin Creaner

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SUMMARY

Following the launch of the Broadband and Cloud Development Index in 2023 and its significant expansion in 2024, the World Broadband Association has further expanded the geographical coverage of the index in 2025. This larger scope increases the relevance of the BCDI for regulators, service providers, and suppliers worldwide.

The 2025 edition of the BCDI includes 73 countries, up from 62 in 2024 and 21 in 2023. This means that the countries in the BCDI now account for over 95% of global GDP, compared with nearly 90% in 2024 and 75% in 2023, and more than 80% of the world's population, up from 75% in 2024 and 50% in 2023.

The BCDI quantifies and ranks the performance of the fixed broadband and cloud markets in major countries worldwide to identify leaders and best practices. This helps industry stakeholders, including policymakers, regulators, service providers, and suppliers, to learn from the success stories and challenges of markets worldwide to support the development and growth of these key sectors in their respective countries.

The direct economic impact of broadband and cloud is clear: the two segments combined generated more than $1tn in revenue worldwide in 2025. However, their indirect impact may be even greater, given that they are the key foundations of the digital economy that enable a wide range of digital applications and services that drive innovation, growth, and development globally.

KEY FINDINGS

- The country with the biggest improvement in rankings among all the countries in BCDI 2025 was Italy, which moved up 14 places to rank 25th in 2025. Italy saw its fiber broadband penetration of households increase to 23% in 2024 from 18% in 2023, which in turn led to a significant increase in its broadband scores in the BCDI. Business adoption of fiber broadband also increased significantly over the period, which helps to explain increasing enterprise adoption and spending on cloud in the country, leading its cloud scores to increase in 2025. The increase in fiber penetration can be explained in large part by the commitment of the Italian government to achieve gigabit connectivity for all citizens by 2026 as part of its new "Strategy for Ultra Broadband Toward the Gigabit Society."

- Switzerland also saw a major improvement in its ranking, climbing 10 places to number 12 in BCDI 2025. The country's scores improved across all broadband and cloud segments. Its broadband access score increased in part because fiber broadband penetration of households increased to 38% at end-2024, compared with 33% at end-2023, following the introduction of the country's Gigabit Strategy.

- The major improvements of Italy and Switzerland in the BCDI rankings over the last year highlight that well-designed government policies and regulations can provide the incentives the broadband and cloud industries need to drive rapid progress in markets, which will in turn drive wider economic and social benefits.

- The WBBA significantly increased coverage of Latin America in BCDI 2025 to 11 countries, up from 6 in BCDI 2024. The 11 Latin American countries in BCDI 2025 represent 85% of the region's population and more than 75% of its GDP. The top three countries in the region based on BCDI rankings are Chile, Brazil, and Mexico. The fixed broadband market across the region is increasingly driven by fiber as telcos and cable companies invest in fiber and phase out their existing broadband services based on copper and cable infrastructure. This has led Latin America to have a relatively high fiber penetration rate of 37% at the end of 2024, ahead of a host of other regions including North America, which had 28% fiber penetration at end-2024; the Middle East at 20%; Central & Southern Asia at 12%; and Africa at 3%.

- The growing capabilities of artificial intelligence (AI) will put immense pressure on computing and connectivity infrastructures. Current and planned investments in AI data centers are a well-established trend that will be accompanied by an expansion toward more distributed architectures driven partly by the changing techno-economics of AI and partly by demand for sovereign AI. Multi- and hybrid-cloud environments will add complexities that can only be resolved by effective orchestration across workloads. At the same time, telecom operators will have to build and manage networks to satisfy the emerging requirements of AI workloads. They will have to prepare their networks with flatter topologies and with increased flexibility and scalability in mind.

- There is a need for many developed countries around the world to build AI in a more sovereign way so the global market in AI does not become a single-nation duopoly, which could have an impact on the growth of cloud computing as a platform for AI development.

- There is a strong positive correlation of 77% between BCDI scores and GDP per capita by country, underlining the importance of the broadband and cloud industries for economic and broader social development. The strong correlation between BCDI scores and GDP per capita by country also validates the methodology of the BCDI and its ability to help stakeholders assess global best practices to drive improvements in their broadband and cloud markets and broader economies.

- It is difficult to directly compare the results of one country with those of another because of the wide variety of countries in the index, their different stages of development, and the many unique characteristics of their broadband and cloud markets. To address this, the BCDI organizes the countries into the following three clusters:

    - **Cluster 1:** Countries where both the broadband and cloud markets have above-average scores in the BCDI. There are 27 countries in Cluster 1 with an average GDP per capita of $46,266, ranging from the US and China at the top of the cluster to Mexico and Poland at the bottom.
    - **Cluster 2:** Countries where either the broadband or cloud market has an above-average score in the BCDI, but the other market does not. Cluster 2, which has 23 countries with an average GDP per capita of $19,560, ranges from New Zealand and Saudi Arabia at the top to Egypt and Indonesia at the bottom.
    - **Cluster 3:** Countries where both the broadband and cloud markets have scores that are average or below average in the BCDI. This cluster, which includes 23 countries with an average GDP per capita of $6,204, ranges from Croatia and Turkey at the top to Ghana and Tanzania at the bottom.

- The US ranks first in the BCDI, thanks to its leading performance in broadband and a strong showing in cloud. The US is the global leader in broadband usage and application with top scores in online video users and views. The country's performance in broadband access has improved because of the US government's recent investments in the segment, but its ranking in broadband potential dropped significantly because broadband affordability has been hit by government moves including the closure of the Affordable Connectivity Program.

- China ranks second in the BCDI and stands out as the only country to achieve a top ranking despite having a GDP per capita well below the index average. It has benefited from successful government and industry initiatives that have made it a leading broadband and cloud market: 95% of households in the country subscribe to fiber broadband services, one of the highest rates among countries in the BCDI.

RECOMMENDATIONS

Through the creation of the BCDI and analysis of its results, the WBBA has developed the following recommendations to support the evolution of the industry to maximize economic growth and social benefits:

- **Learn from the success stories in BCDI 2025 to drive improvements in your markets and organization.** Italy jumped 14 places in the BCDI rankings from 2024 to 2025, and Switzerland moved up 10 places after both countries implemented national broadband plans with an emphasis on gigabit fiber adoption. There are lessons to be learned in both countries, not just about the design and implementation of the government initiatives but also about how service providers and suppliers can win new contracts to increase coverage and adoption of gigabit broadband services, which in turn drives adoption of cloud services.

- **Realize that AI is driving profound changes in computing and connectivity markets that will require new strategies and new levels of collaboration.** In a period of dramatic change driven by AI, no single player can succeed alone: the challenges are too big and opportunities too novel. Collaboration will be key to adapting to the era of AI through the sharing of experiences and research, developing and advancing technologies powered by AI, and going to market with partners when required. The WBBA is playing a critical role in driving such collective effort and filling a gap in the market by supporting collaboration to identify the usage and monetization opportunities AI creates for broadband and cloud operators.

- **With the explosion of AI workloads, telecom operators need to rethink how they plan, design, deploy, and manage their networks.** Telecom operators recognize the need to adapt their networks and computing resources to the requirements of the inevitable growth of AI traffic and workloads. At the same time, AI is creating new opportunities to enhance the performance of their networks and promising unprecedented gains in efficiency and productivity by helping telcos optimize and automate many processes.

- **Understand and plan for the increasing importance of sovereignty.** As cloud-based AI increasingly becomes a source of competitive advantage for nations and economies, the concept of sovereignty has grown in importance. Sovereign AI, which builds on the increasing importance of sovereign cloud, can be broadly defined as the ability of a country or other entity to control, create, and deploy AI models using its own data, infrastructure, labor, and networks. It is a dynamic that could have a significant impact on where AI processing will be located across the world, leading to a more distributed computing topology worldwide as each nation aims to build, host, and run its own AI models within its borders.

- **Evaluate the relative performance of Latin American countries in the BCDI to understand best practices that could have a positive impact in your markets.** Latin America is a hugely diverse region where fiber has become the dominant fixed broadband technology: it represented close to 65% of total fixed broadband subscriptions in 2024, up from 22% in 2019. This increase has been driven to varying degrees by a combination of government policies and private investment, for example, in Brazil, where regulator Anatel created a straightforward process for providers to acquire licenses to offer broadband services. Partly as a result, thousands of internet service providers (ISPs) have deployed fiber broadband services across the country, often in previously underserved areas, and together they now account for more than 54% of all fixed broadband connections in the country.

- **Assess the performance of your key markets in the BCDI to understand both their rankings and best practices that could drive improvements.** One of the key aspects of BCDI 2025 is that there is a strong positive correlation between BCDI scores and GDP per capita by country. In fact, in statistical terms, there is a 77% positive correlation between the two. While that relatively strong positive correlation provides validation for the methodology and results of the BCDI, the wide range of the relationships between BCDI scores and GDP per capita in individual countries can also be used to better understand the rankings of individual markets and to uncover best practices to improve them.

KEY TRENDS IN FIXED BROADBAND AND CLOUD DEVELOPMENT

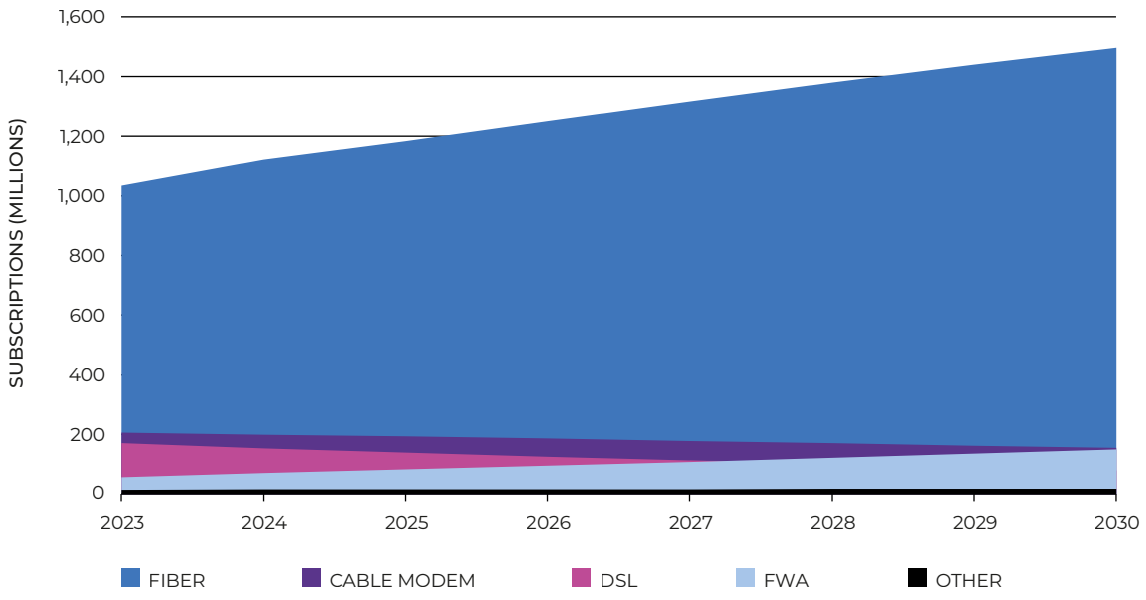
Research for the BCDI has uncovered several key trends in the broadband and cloud industries that help to drive the performance of countries in the index, including the increasing adoption and quality of broadband services, the socioeconomic benefits of broadband, ongoing technology innovation, telco business model transformation, the convergence of broadband and cloud networks, and the increasing importance of cybersecurity and sustainability.

FIBER ADOPTION DRIVES BROADBAND MARKET GROWTH

One of the most fundamental aspects of the fixed broadband market at the global level and in most countries is that it continues to grow as an increasing number of people understand that broadband is so indispensable that some think it has already reached the status of a utility that should be considered a basic necessity everyone should be able to access to participate in our economies and societies, which are increasingly digital.

In fact, the global fixed broadband market grew 5% to reach 1.6 billion subscriptions in 2024 and is on track to continue growing 3–4% per year through 2030, according to Omdia's forecasts. Over the same period, global fixed broadband service revenue will grow at a CAGR of 4% from $350bn in 2024 to $441bn by 2030.

FIGURE 1: GLOBAL FIXED BROADBAND SUBSCRIPTIONS BY TECHNOLOGY, 2023–30



SOURCE: OMDIA

As **Figure 1** illustrates, one of the other fundamental features of the fixed broadband market is the increasing dominance of fiber broadband. Fiber represented 72% of total fixed broadband subscriptions worldwide in 2024, and Omdia forecasts its share will increase to 79% by 2023. This means the number of fiber broadband subscriptions worldwide will increase from 1.1 billion in 2024 to close to 1.5 billion in 2030.

Although the numbers paint a positive picture of the broadband market at a global level with an increasing number of households worldwide gaining access to advanced fiber broadband services, the status of the broadband market naturally varies dramatically, not only from country to country but also from region to region within a country. This is in fact one of the purposes of the BCDI: to quantify performance and identify best practices at country level in diverse broadband markets around the world.

CLOUD ACCELERATES WITH AI AND SOVEREIGN CLOUD

As its name suggests, the BCDI also examines the development of the cloud market at country level in order to compare performance and identify best practices in the segment. Since many cloud providers are global players, the BCDI quantifies the cloud market at country level based largely on enterprise spending on and adoption of cloud services by country.

Like the broadband market, the cloud market is growing with enterprise spending accelerating because of AI. Omdia forecasts that in just the public cloud segment, including infrastructure as a service (IaaS) and platform as a service (PaaS), global enterprise spending on cloud services will jump from $374bn in 2025 to $564bn in 2028. Enterprises are also expected to spend a similar amount globally on software as a service (SaaS), which is increasingly driven by rapid adoption of AI technologies.

The move from on-premises to the public cloud, including IaaS and PaaS, is now a longstanding trend that continues to grow. In fact, Omdia estimates that 50% of all workloads will run in the public cloud in 2025. Migration to the public cloud is now uniform in the type of workload organizations plan to move. There is also uniformity in those workloads that they are not planning to move to the cloud. However, the cloud market is not a simple binary choice of on-premises or a single public cloud. It has spawned many innovations, including hybrid multicloud, edge cloud, AI cloud, and sovereign cloud.

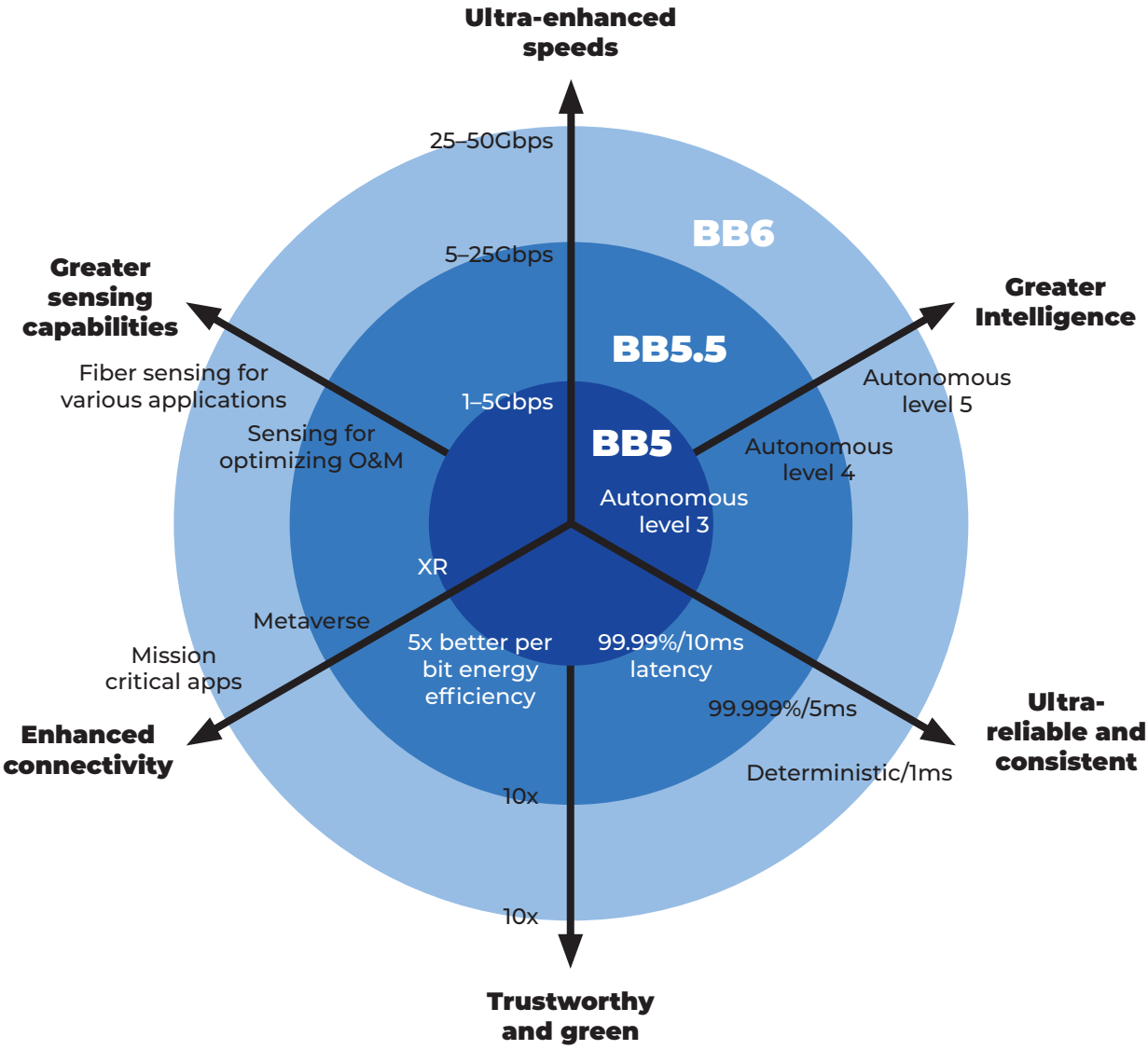
Today, most organizations use cloud computing in some form, and most of these use more than one cloud provider. The two hot topics in cloud computing in 2025 are AI cloud and sovereign cloud. Over the past two decades, organizations have established cloud computing strategies and understand the workloads best suited to cloud computing and those where the business case is unclear. Omdia expects cloud computing to remain the dominant form of computing for enterprise customers. However, it faces significant challenges from the shift in thinking by nation states since the US administration's declaration of tariffs. There is a need for many developed countries to build AI in a more sovereign way so that the global market in AI does not become a single-nation duopoly, which could have an impact on the growth of cloud computing as a platform for AI development.

The rapid adoption of AI and its increasing impact on both the cloud and broadband markets will be explored in more detail in a later chapter.

TECHNOLOGY INNOVATION

One of the key drivers of both the broadband and cloud markets is innovation and development of the technologies driving the segments. For broadband technology, the WBBA organizes technology capabilities into generations, as detailed in its report "Next-Generation Broadband Roadmap 2023 to 2030." The WBBA defines its next-generation broadband roadmap for 2023–30 along six dimensions (**Figure 2**).

FIGURE 2: WBBA'S NEXT-GENERATION BROADBAND ROADMAP



SOURCE: WBBA NEXT-GENERATION BROADBAND ROADMAP 2023 TO 2030

The six dimensions are as follows:

- **Ultra-enhanced speeds:** Application bandwidth has been growing by approximately 40% per year, and this trend is expected to continue. Omdia forecasts that by 2030, more than 40% of consumer broadband subscriptions will offer speeds of 1Gbps or higher.
- **Ultra-reliable and consistent:** The emergence of ultra-high-definition (UHD) immersive experience services is a major driver in reducing network latency. Other important drivers include industry applications where communication is mainly between machines and requires immediate action-reaction times.

- **Enhanced connectivity:** Both the network scope and number of endpoints are expected to be increased to support more services and coverage, along with the ongoing cloud-network synergy built on the underlying network. From now through 2030, shipments of connected devices are projected to rise by over 40%, while the number of installed consumer Internet of Things (IoT) products is projected to increase by 210%. Additionally, the types and capabilities of connected devices will change with most shipments of display devices featuring full-high-definition (FHD) or UHD capability and shipments of virtual-reality-capable devices overtaking those of game consoles.

- **Trustworthy and green:** As networks and applications become ubiquitous in the future, the network attack surface will grow exponentially and change constantly. Security must respond quickly to changes in the network and service environment while protecting user privacy. The transition to green energy is a global challenge. Information and communications technology (ICT) and, specifically, future broadband networks can contribute significantly to a more sustainable world. This can be achieved directly by shifting to more energy-efficient network technologies and indirectly by enabling more energy-efficient practices in other sectors.

- **Greater intelligence:** To operate computer-integrated networks effectively, the levels of autonomy must be increased to a high standard. This allows for self-configuration, self-healing, and self-optimization in network operations, thereby improving user experience and service quality.

- **Greater sensing capability:** Optical sensing technologies provide networks with a greater awareness of their surrounding environment and fiber infrastructure. This will improve network operations and add value to network resources by facilitating the development of new services.

CLOUD-NETWORK INTEGRATION

Delivering on the potential of the next-generation broadband roadmap will require not only technology innovation but also the increasing integration of broadband and AI-enabled cloud networks.

Network infrastructure has been transitioning from proprietary architectures to open standards and is now incorporating advanced automation based on AI. At the same time, cloud computing has been evolving from a focus on resource pooling to distributed intelligence. This convergence of network infrastructure and cloud computing is known as cloud-network integration and includes elements of communication technology, information technology, and AI.

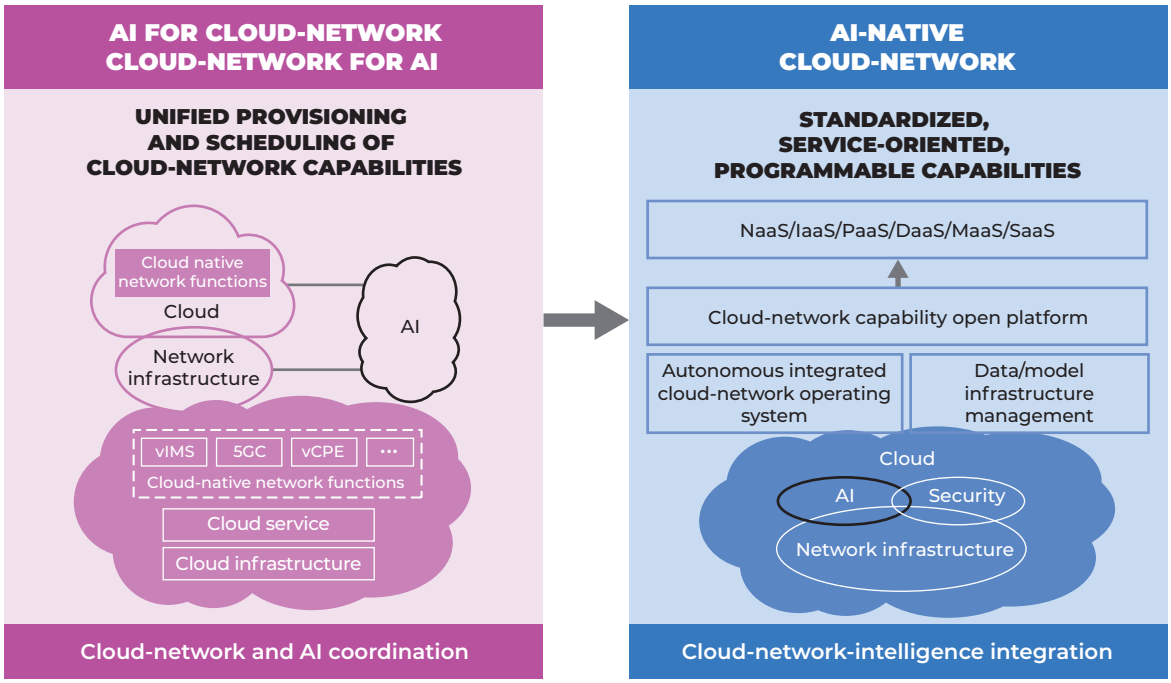
Driven by rapid advances in AI and large model technologies, global network infrastructure is becoming more service oriented through the following:

- A paradigm shift from centralized general-purpose computing to ubiquitous intelligent computing, which involves unified management, dynamic monitoring, and intelligent scheduling of computing resources including CPU, GPU, and field programmable gate array (FPGA) to match tasks with hardware resources and meet the diverse demands for computational power of AI training and inference tasks

- Upgrading of network connections between data centers to ultra-broadband speeds of 400Gbps, 800Gbps, and even 1.6Tbps to meet the escalating bandwidth demands of AI while also upgrading the bandwidth of wide area networks to improve end-user access to data centers

- Deep integration of AI capabilities to enable cloud-network infrastructure to become the core enabler for ubiquitous connectivity and intelligent computing with core capabilities including edge cloud, intelligent operations, and openness in addition to integration of supply, operations, services, and the ecosystem

FIGURE 3: FROM CLOUD-NETWORK COORDINATION TO INTEGRATION



SOURCE: CHINA TELECOM

For telecom service providers, cloud-network integration has the potential to enhance data protection, privacy, and sovereignty; optimize resource utilization and reduce operational costs; accelerate business innovation and iteration; increase competitiveness with cloud providers; improve user experience and enhance service quality; and contribute to sustainability.

AI DRIVES INNOVATION IN BROADBAND AND CLOUD MARKETS

OVERVIEW

The rise of AI is real, rapid, and arguably unprecedented in its impact. Since large language models (LLMs) became available to mass markets toward the end of 2022, not only have many generative AI models seen swift growth in usage, but other forms of AI (such as those based on predictive models or earlier machine learning algorithms) have also experienced a strong resurgence.

AI ADOPTION

The staggering take-up statistics demonstrate how quickly and broadly AI has permeated lives. OpenAI's ChatGPT is estimated to have reached half a billion active weekly users less than three years after its introduction, while the top five AI applications[1] from China have collectively gathered more than 400 million monthly active users (as of April 2025, excluding website visits). Among these applications, DeepSeek's monthly web traffic has soared to around 400 million visits within just six months of its launch in January 2025. Canva AI, a design platform that leverages several generative AI models to create visual outputs (e.g., images, videos, presentations), has grown to around 200 million monthly active users, an approximate quadrupling of its base since 2021; the platform attracted more than 900 million web visits in July 2025. These are just a few examples within an ever-expanding library of AI applications that people have come to rely on in their personal and professional lives.

[1]Quark (by Alibaba), Doubao (by ByteDance), DeepSeek (by DeepSeek), Yuanbao (by Tencent), and Kimi (by Moonshot AI).

Adoption is also booming among enterprises. According to McKinsey, the share of organizations that use AI in at least one of their functions has grown since 2017 from 20% to 78%, while the share using generative AI increased from 33% to 71% in just two years. More conservative statistics from the European Commission suggest that in 2024, more than 40% of large enterprises in the EU had adopted some form of AI in their operations.

Though AI has already had a profound impact on the everyday lives of citizens and the operations of enterprises and governments worldwide, we are only scratching the surface of possibilities in terms of both application areas and technological capabilities. There are already some key changes within the visible horizon, some of which are listed below.

TABLE 1: AI CHANGES AND DESCRIPTIONS

CATEGORY OF CHANGE	DESCRIPTION
MULTIMODAL AI	Usage is evolving beyond text-based interactions toward multimodal AI models that are capable of understanding and generating different types of information such as images, video, and speech (in addition to text). This will further enhance the quality and quantity of personal and professional interactions with AI.
AGENTIC AI	With agentic AI systems, a new level of autonomy is arriving. Agentic AI systems are being designed to preempt human intent, make decisions, and act independently (but also interdependently with other AI agents) in multistep activities.
HIGH-ACCURACY MODELS	The accuracy of AI models is improving with each iteration and so is end-user confidence in using them for a wide variety of purposes. This will continue to spur adoption, especially among enterprises whose needs are often stricter and exceed "best efforts."
VERTICAL AI	Vertical AI models are being developed to meet the specific needs of different industries. Whether built from scratch, augmented, or fine-tuned, vertical AI will accelerate uptake among enterprises.
SMALL LANGUAGE MODELS / "TINY AI"	Smaller language models and tiny AI are being built to run tasks for which using larger models would be inefficient technically and economically. These smaller models are very capable of delivering well-defined tasks in much less demanding computing environments, such as edge hardware and end-user devices such as PCs and smartphones.
AI IN THE PHYSICAL WORLD	AI is entering the physical world with new foundation models built specifically to enhance the capabilities of robotic agents, including humanoids, and the ways they behave in the physical world.
REGULATING AI	Ethical, societal, and regulatory implications of AI are under increasing scrutiny with most discussions taking place around access, democratization, sovereignty, privacy, intellectual property, misuse, workforce evolution, and supply chain dynamics.

SOURCE: OMDIA

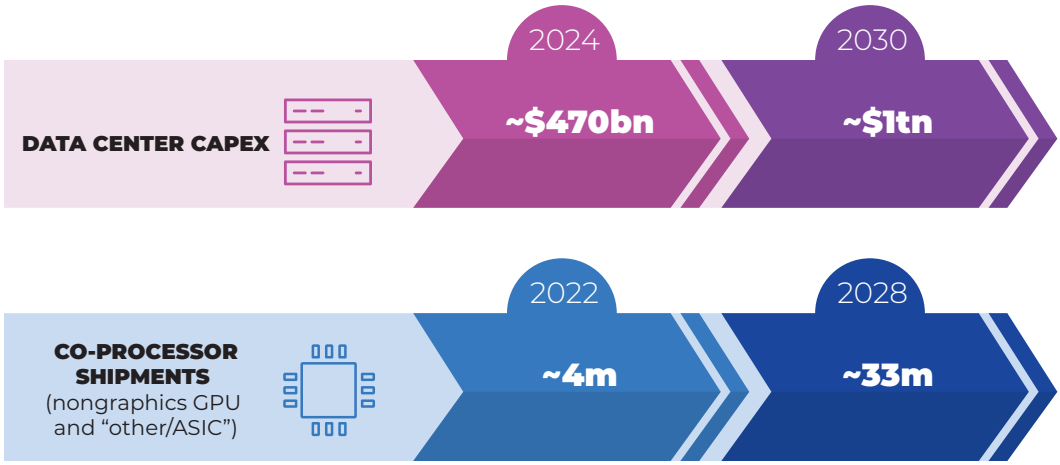
IMPLICATIONS OF AI FOR COMPUTING INFRASTRUCTURE

In the AI era, perhaps nothing is as clear as the need for high-performance computing built on sustainable and economically feasible infrastructures. Training AI models typically requires large clusters of high-end GPUs for parallel processing, while inferencing demands always-on computing power to process inputs and generate responses closer to end users.

RISE OF AI FACTORIES

The most obvious evidence for the impact of AI on computing can be seen in the recent and planned deployments of AI data centers. These "AI factories" host thousands of GPUs utilized in tandem to train AI models as well as computing capacity to run inferencing workloads. According to Omdia, annualized data center capex is set to grow from ~$470bn in 2024 to ~$1tn in 2030. Cumulatively, this will correspond to a total spend of nearly $5tn over the next five years. Omdia forecasts on coprocessor shipments also reinforce these expectations: shipments of nongraphics GPU and ASIC coprocessors (both used mostly for AI workloads) will increase from around 4 million units in 2022 to nearly 33 million in 2028.

FIGURE 4: RISE OF AI COMPUTING (CAPEX AND CO-PROCESSORS) TOWARD 2030



SOURCE: OMDIA

This explosion of capex is not surprising given the massive investments already undertaken and encouraged by combinations of private and public institutions around the world. For instance, in the US, the Stargate project seeks to commit $500bn to AI alone (mostly data centers) over the next four years, a value that excludes individual investments by hyperscalers such as AWS, Google, and Meta. In Europe, the InvestAI initiative by the European Commission is aiming to allocate $200bn into AI, tens of billions of which are set to go into "AI gigafactories" that will host around 100,000 latest-generation AI chips. Similar amounts are likely to be spent in China in a combination of public funding and private investment by companies such as Huawei, Alibaba, ByteDance, and the major telecom operators. Technology companies in Japan, South Korea, and Singapore are spending heavily on the regional expansion of AI data centers, while public and private investors in the Gulf region are building out significant GPU capacities in markets such as the UAE and Saudi Arabia.

EVOLUTION AND EXPANSION TOWARD THE EDGE

The change in the computing landscape brought about by AI will not just be a boost of capacity: the technical and economic evolution of AI processing is also likely to drive a spread of computing beyond centralized data centers toward the edge, closer to end users and with low latency. The key drivers of this evolution will be constant improvements in the cost-to-performance ratios of AI processing hardware and the shrinking sizes of AI models. Massive, centralized AI factories with high-performance GPUs will still likely be responsible for training large foundation models, but inferencing can run on more lightweight hardware and is therefore suitable for distributed computing at the edge.

GROWTH OF "NEOCLOUDS"

Whether for training or inferencing, the growth in AI computing has led to the emergence of specialist data centers, focusing mostly on providing GPU as a service (GPUaaS)[2] and acting as training hubs for AI model developers and inferencing points for nearby users of these models. These early movers and owners of GPUs, such as CoreWeave, Genesis, Lambda Labs, Together AI, and Crusoe, complement the AI ecosystem by ensuring computing resources are available where and when they are needed.

[2]GPUaaS is a service commercially similar to IaaS but with an emphasis on renting out GPU capacity, often on bare-metal servers.

INCREASING IMPORTANCE OF SOVEREIGNTY

As AI increasingly becomes a source of competitive advantage for nations and economies, the concept of sovereignty has grown in importance and in practice. Sovereign AI can be broadly defined as the ability of an individual nation (or jurisdictional region) to control, create, and deploy AI models using its own data, infrastructure, labor, and networks. It is a dynamic that can have a significant impact on where AI processing will be located across the world and lead to a more distributed computing topology worldwide as each nation aims to build, host, and run its own AI models within its borders.

MORE MULTICLOUD, MORE HYBRID CLOUD, BETTER ORCHESTRATION

Another potential impact of AI on computing is the growing reliance on multiple and hybrid clouds. First, different AI models are hosted and run on different clouds. For example, Microsoft Copilot may run on a local Azure zone, Canva may require AWS, and a third application may use resources in a different physical and logical computing environment. Furthermore, enterprises may demand control over some of the data and AI models, which they can achieve on private cloud, while they may opt for public cloud for other, less critical data and applications. These nuances will add to the complexity of operations and to the need for effective orchestration of AI workloads.

SUSTAINABLE, AVAILABLE AND AFFORDABLE ENERGY SUPPLY

The expansion of AI and the related growth of data centers need energy infrastructures to run high-performance computing. The International Energy Agency (IEA), in its base-case forecast, projects energy generation to supply data centers to grow from 460TWh in 2024 to over 1,000TWh in 2030. However, achieving this growth will be easier said than done. Not only is power availability already a problem in some markets, but lengthening lead times in energy supply chains (e.g., equipment, labor), input prices, and delays in grid interconnections have started acting as bottlenecks to the building of several new data centers. Moreover, rising carbon emissions are a serious concern, and reaching carbon-free goals will necessitate careful thinking about energy policies and innovation. These challenges are significant, but they also represent opportunities for Tier 2 markets with adequate energy infrastructures to host new AI factories.

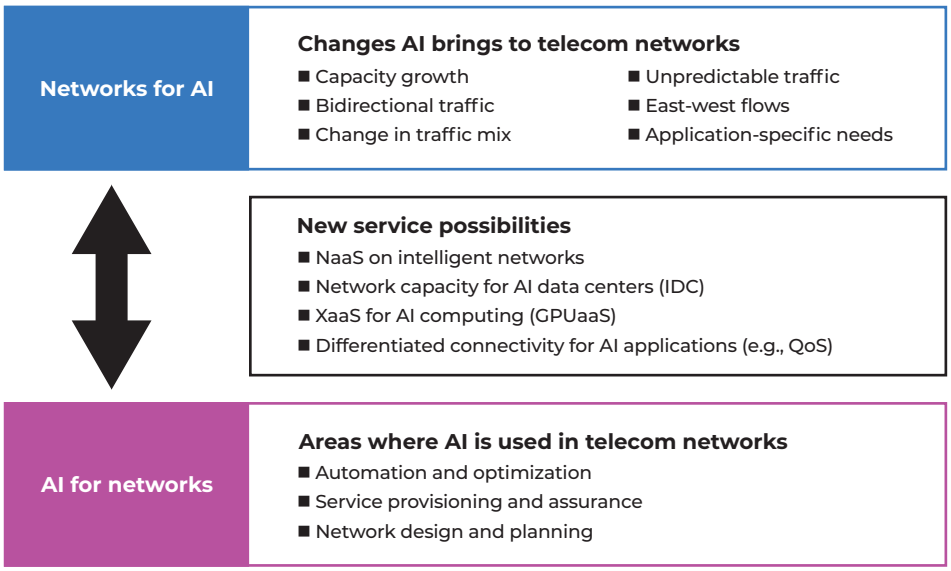
IMPACT OF AI ON TELECOMMUNICATIONS NETWORKS

NETWORKS FOR AI AND AI FOR NETWORKS

With the explosion of workloads, AI is also going to put new pressures on connectivity, and this is already forcing telecom operators to consider how they plan, design, deploy, and manage their networks.

On one hand, telecom operators recognize the need to adapt their networks and computing resources to the requirements of the inevitable growth of AI traffic and workloads in the everyday lives of consumers and operations of enterprises. On the other hand, AI is presenting brand-new opportunities to telecom operators as a strategic enabler to enhance the performance of their networks and promising unprecedented gains in efficiency and productivity by helping them optimize and automate many processes. These two impacts of AI are conceptually distinguished as operators building “networks for AI” and using “AI for networks.”

FIGURE 5: NETWORKS FOR AI AND AI FOR NETWORKS



SOURCE: OMDIA

BUILDING NETWORKS FOR AI

AI model training can be done "asynchronously" in relation to the moment of data generation,[3] but most inferencing (which is the act of "using the model") requires always-on near-real-time processing. Therefore, as the use of AI models and the amount of inferencing grows relentlessly so will the need for networks capable of carrying these new workloads and delivering them with low latency. As will be explained in this section, though AI is expected to affect the amount and type of data transferred (and therefore the capacity of networks), it also has the potential to change traditional patterns of traffic, forcing connectivity operators to think in novel ways.

GROWTH OF AI TRAFFIC (CHANGING TRAFFIC MIX)

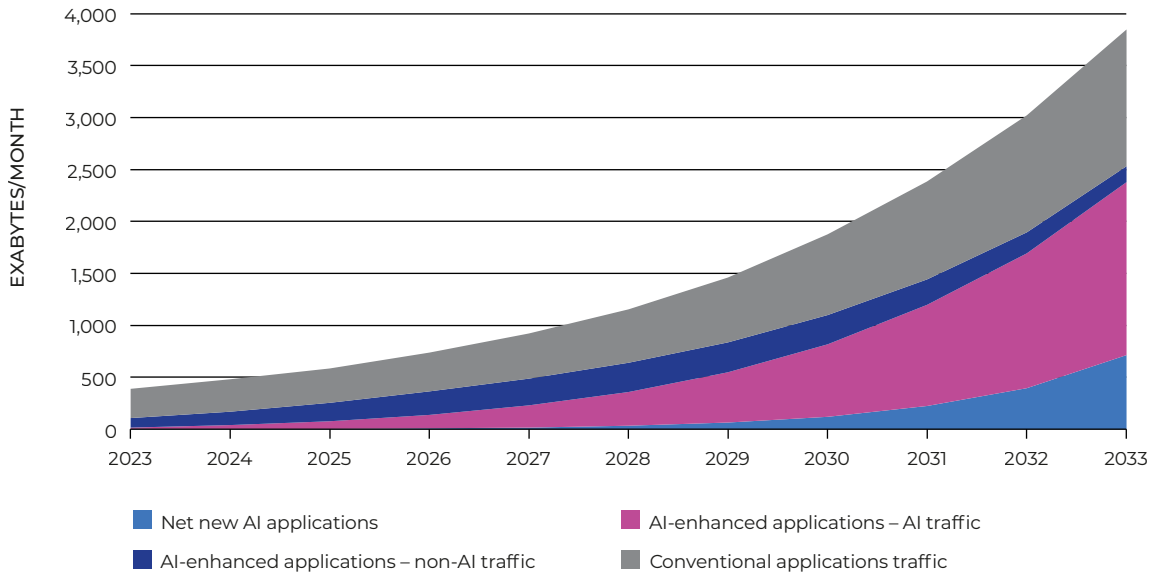
According to Omdia, AI traffic will grow with the adoption of brand-new AI applications and existing applications that are enriched by the integration of AI:

- A generative AI application that creates texts, images, or videos or an object detection model based on video flows can be considered as examples of *net new AI applications*.

- Examples of *AI-enhanced applications* can include an existing image-editing software that obtains new AI features, a social media platform that enables AI-assisted content generation, or the integration of AI algorithms to optimize the delivery or personalization of an existing digital service such as streaming or commerce.

[3]AI model training can be (and is often) done after all the data is collected, independent of when that data is collected. Inferencing, by contrast, often requires running a pretrained AI model with new input data to generate an output immediately, in near-real time (e.g., a conversation with a chatbot or real-time object recognition in a video flow).

FIGURE 6: TOTAL NETWORK TRAFFIC, AI AND NON-AI, 2023–33



SOURCE: OMDIA

According to Omdia's *AI Network Traffic Forecast: 2023–33*, these two AI-driven categories will grow from a monthly traffic of 39 exabytes (EB) per month in 2024 to 820EB in 2030. For the next few years (i.e., until 2027/28), video and image analysis and multimodal AI will be the key AI activities that generate large traffic flows. In addition, business-to-business (B2B) applications that deliver practical value will drive some AI traffic growth, because AI enrichment will replace low-value, repetitive tasks with automation. In the second phase (i.e., after 2027/28) consumer-led AI collaboration and entertainment traffic will migrate to new immersive media formats. XR / 3D / holographic and sensory outputs will also generate large volumes of B2B application traffic.

MORE EAST-TO-WEST TRAFFIC (VERSUS NORTH-TO-SOUTH)

As already hinted, AI computing is likely to expand beyond large and centralized AI factories toward edge nodes, driven by the combination of smaller and more efficient models that can run on more lightweight hardware, AI agents acting interdependently across several computing nodes, and the overall rise of everywhere, always-on inferencing that must provide quick, low-latency responses.

This is a future where the hierarchy for AI computing will be much flatter: some (probably less demanding) AI services will be delivered solely by communication across distributed edge nodes (east-to-west), rather than by transmitting data all the way up to centralized AI servers and then back down to the client (north-to-south).

Another driver of east-to-west traffic will be at the level of inter–data center (IDC) connectivity. For both training and inferencing purposes, some AI models may require computing resources (e.g., GPUs) that are in different physical locations and may have components that are hosted in different clouds.

Collectively, these shifts suggest that weaving the connectivity web for AI computing will require thinking beyond the typical "bus" or "tree" topologies toward more flexible "mesh" and "hybrid" structures.

MORE BIDIRECTIONAL TRAFFIC (VERSUS DOWNSTREAM DOMINANT)

Today, most network traffic is downstream, but AI will change this in the next few years. As explained above, the growth of video analysis will mean sending data upstream from site to edge or to cloud for AI inferencing. Growth of upstream traffic is a trend that had already been initiated with remote working and videoconferencing; AI will enhance these applications with newer media as well.

In the consumer space, changing modes of communication, the evolution of social media to AI-enriched uploads (including live broadcasts), and other applications that are not even foreseeable yet mean uplink traffic will become more important than ever and put pressure on both access and transport layers of networks.

UNPREDICTABLE TRAFFIC PATTERNS (VERSUS ESTABLISHED FLOWS)

AI applications can be quite erratic in their behavior with unpredictable spikes in inferencing and bursts of traffic. This means that network operators will have to prepare for peak capacities beyond well-known traffic patterns such as video consumption during specific times of day or massive game update downloads on specific days. Challenges caused by the unpredictability of AI traffic will be exacerbated by the distribution of computing to edge nodes, which will need significant capabilities in scaling and orchestration.

APPLICATION-SPECIFIC CONNECTIVITY

Finally, operators will need to get ready for the unique requirements of different AI application contexts. These requirements can vary according to the predictability of the timing and volume of the traffic they generate and their different latency and bandwidth needs. The ability to deliver these applications adequately (and monetize these opportunities) will require networks with built-in intelligence and a great degree of agility and scalability.

USING AI FOR NETWORKS

Operators are also benefiting from AI internally as they are building their networks to accommodate the external boom in AI traffic and workloads. The changing requirements of computing and connectivity brought about by AI will translate to a need for more scalable and agile architectures that can flexibly adapt to changing customer needs, traffic conditions, and utilization of network and computing resources. AI can greatly help with this.

There are already a vast number of application areas where telecom operators are using AI to enhance their networks' performance and to improve their network management and operations. Below is a list of the broad categories where AI is used in telecom networks:

- **Network optimization and automation:** The use of AI in the evolution to autonomous and programmable networks will bring about new efficiencies and will create new service potentials and revenue opportunities. With a mix of traditional and generative AI models, use cases such as power savings and traffic management are maturing, while spectrum management and other areas are emerging. In fixed and transport networks, intelligent routing and automation are growing areas of emphasis. All these application areas and more will soon be powered by agentic AI, which promises further efficiencies through higher degrees of network autonomy and proactivity.

- **Network management and operations (including service assurance and provisioning):** Both traditional and generative AI models are used in service assurance processes such as anomaly detection, predictive maintenance, root cause analysis, and troubleshooting. AI-led alerts are used to identify and fix problems, either automatically or with some guidance from engineers. Today, most AI solutions combine expert domain knowledge (including technical documentation) with live network data and use a generative AI interface for engineer interactions. In the future, agentic AI is likely to become more prevalent in these areas as it becomes a more common feature in OSS platforms.

- **Network design and planning:** AI is used in many aspects of network design and planning. AI models inform capacity planning and upgrade decisions (e.g., by simulations) while also helping with service provisioning and configuration. By combining geolocation, network, and actual usage data, AI models find the best locations for new sites in mobile networks and optimize where and how to deploy broadband networks.

According to Omdia's *Telecoms AI Contracts Tracker*, since 2019 telecom operators have awarded nearly 300 (publicly announced) AI-related contracts focusing on network-related use cases. Network optimization and operations/management combine as the main categories for 260. The network equipment category has the fewest entries, partly because it is currently limited in the tracker to one application, baseband radio processing. Network operations and management, the category with the most entries, has 14 use cases in the tracker. The network equipment category currently covers network radios being enhanced with AI to perform functions such as radio resource management and scheduling.

FIGURE 7: AI CONTRACTS FOR TELECOMS, NETWORK USE CASES, 2019–25

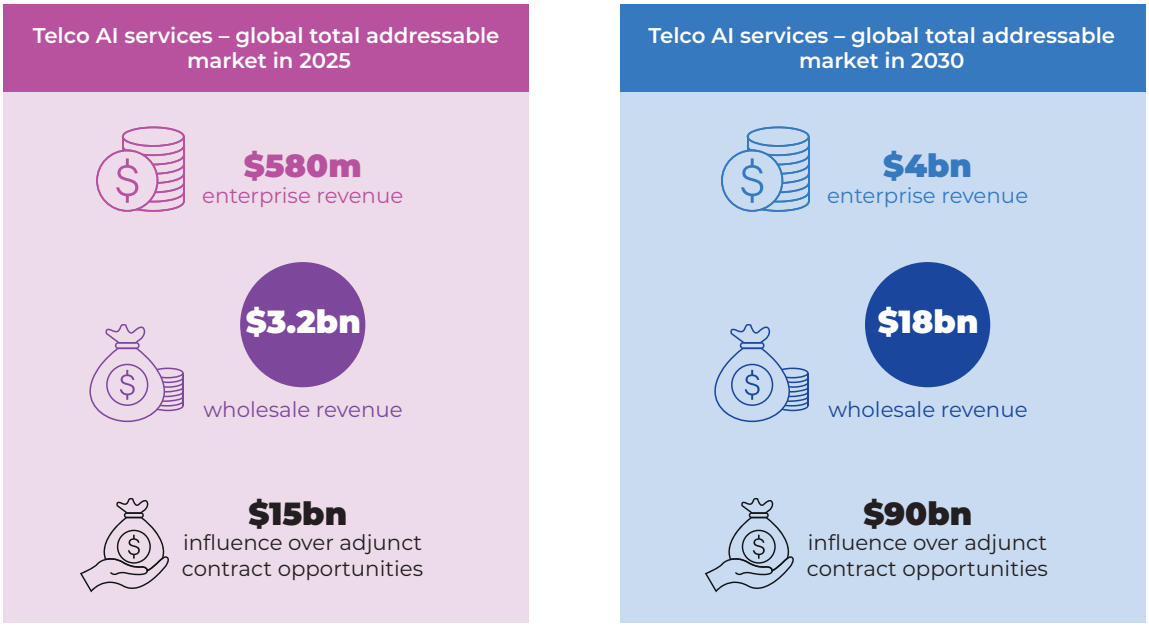
SOURCE: OMDIA

NEW SERVICE AND REVENUE OPPORTUNITIES FOR TELCOS

In between the concepts of networks for AI and AI for networks lie the synergy areas for new services and monetization potentials. For example, as operators make their networks more intelligent through AI, they will also be developing capabilities to serve their customers more effectively with new, more flexible and faster-to-market consumption models such as network as a service (NaaS). As they grow the capacity of their transport networks, they are also creating the commercial possibilities of dedicated connectivity to (and across) AI data centers. As they add new AI-capable computing resources to their networks, they are opening themselves up to external possibilities such as GPUaaS or edge inferencing for enterprise customers.

Telecom operators will be able to attract AI-related revenue, both directly from their enterprise customers and indirectly from wholesale agreements with the other ecosystem participants such as hyperscalers, application platforms, and other connectivity players. Omdia believes that the primary addressable market applicable to telcos will grow from around $4bn in 2025 to nearly $20bn in 2030. However, influence created by the ability to deliver AI services will be critical—perhaps more so than direct revenue. Winning in AI can pull through existing enterprise and wholesale business. Supporting AI services gives the telco leverage to sell other connectivity and hosting services; providers that fail to add new capabilities will lose business.

FIGURE 8: TELCO REVENUE FOR PROVIDING SERVICES FOR AI, 2025 AND 2030



SOURCE: OMDIA

BUILDING AN ECOSYSTEM AROUND AI FOR NETWORKS

The challenges posed by AI cannot be tackled by a single vendor or telecom operator alone. The problem is too big and complex, and the emerging landscape involves software and hardware stacks that are noticeably different from the legacy systems that have come to permeate current digital infrastructures. Therefore, adapting to the era of AI and using it effectively across telecom networks will require collective effort across the entire industry and a holistic approach to exploit its potential. The same goes for capturing the monetization opportunities brought about by AI.

Though piecemeal implementations of AI to improve certain aspects of telecom networks are fine today, the future will belong to those that can prepare their networks broadly for the implementation of AI and rapid plug-and-play adoption of new use cases, those that can truly fuse connectivity and computing in their design and architectures to flexibly orchestrate resources and enable new services, and those that can adopt relevant working principles such as AIOps and CI/CD.

Surely, collaboration will play a massive role in enabling telecom operators to achieve their ambitions and ensure their ability to keep up with the pace of innovation in AI. To this end, there are some significant industry initiatives for AI in telecoms to this end. In the wireless space, the AI-RAN Alliance is one that focuses on the use of AI in mobile networks, especially within the radio domain. There is also some ongoing industry work on developing LLMs specifically designed for telecom operators. Most recently, WBBA has launched its AI Broadband Program, which fills a big hole in AI research in telecoms by focusing on how AI can be used in broadband networks, all the way from access to transport networks, by delivering the requirements of (inter- and within-) data center connectivity, and by identifying commercial opportunities across both consumer and enterprise domains.

CONCLUSIONS

AI has already had profound impacts on our lives and gained massive adoption in the last few years, especially driven by the arrival of LLMs and generative AI. However, we are still only scratching the surface of possibilities, and there are some big changes on the horizon.

The growing capabilities of AI will put immense pressure on our computing and connectivity infrastructures. On the computing side, current and planned investments in AI data centers are a well-established trend that will be accompanied by an expansion toward more distributed architectures, driven partly by the changing techno-economics of AI (e.g., smaller models, less demanding hardware) and partly by demand for sovereign AI. Multi- and hybrid-cloud environments will add complexities that can only be resolved by effective orchestration across workloads.

On the connectivity side, telecom operators will have to build and manage networks to satisfy the emerging requirements of AI workloads. They will have to prepare their networks with flatter topologies and with increased flexibility and scalability in mind. To build networks for AI, they will have to change their thinking:

- From prioritizing downstream capacity to recognizing the need for more uplink
- From enabling mostly north-to-south data flows to orchestrating complex east-to-west flows generated by distributed edge environments and inter–data center connectivity
- From planning capacity based on familiar traffic patterns to bracing for unpredictable traffic bursts caused by AI applications

Fortunately for telecom operators, these new challenges caused by AI workloads can be addressed with the use of AI for networks. There are a vast number of application areas of AI in telecom networks, such as for optimization and automation, for management and operations, and for design and planning. Pioneers are already benefiting from gains in efficiency, cost savings, and better customer experience. We are confident that success stories will grow in number, and outcomes will improve as operators evolve toward AI-native networks and operations.

As telecom operators build their networks for AI and power their networks with AI, they are also creating commercial possibilities such as connectivity for AI data centers and NaaS. With new AI-capable computing resources on their networks, they are generating monetization opportunities such as GPUaaS or edge inferencing for enterprise customers. By 2030, such retail and wholesale opportunities will approach $20bn and influence around $90bn worth of adjunct contracts.

In such a period of change, no single player in the telecom industry can succeed alone: challenges are too big, and opportunities are too novel. Collaboration will be key to adapting to the era of AI through the sharing of experiences and research, developing and advancing technologies powered by (and powering) AI, and going to market as partners when required. The WBBA is playing a critical role in driving such collective effort and filling a gap in the market, thanks to its focus on identifying the usage and monetization opportunities AI presents to broadband operators.

BCDI: OVERVIEW AND METHODOLOGY

OVERVIEW

The BCDI tracks and benchmarks the development of the fixed broadband and cloud computing industries by country. Research conducted by the ITU and others has shown that increasing broadband penetration and digitization drives socioeconomic benefits such as GDP and productivity growth. This explains why the BCDI aims to quantify the performance of broadband and cloud markets by country and to identify global best practices for developing these two key drivers of digital development. This, in turn, will enable broader economic and social benefits.

The BCDI measures a country's ability to narrow the digital divide and make the most of the opportunities offered by the digital economy. Its findings can help service providers plan their strategies for developing and investing in broadband and cloud networks in a country. Additionally, it identifies best practices and government policies that support the growth of these industries and the broader economy.

The BCDI is designed to identify best-in-class performance at the country level, highlight the most critical drivers for the continued development of the sector, and make clear the investment case for broadband and cloud infrastructure. The aim is to provide new insight, analysis, and examples for broadband industry stakeholders—including legislators, policymakers, investors, vendors, service providers, and enterprises—to address and drive forward the goals of democratizing broadband and cloud access to enable broader economic and social benefits.

ENHANCEMENTS TO BCDI 2025

Following the successful launch of the BCDI in 2023 and significant expansion in 2024, the WBBA has further expanded the geographical coverage of the index this year to significantly increase its scope and relevance for regulators, service providers, and suppliers worldwide. As a result, the 2025 edition of the BCDI includes 73 countries, up from 62 in 2024 and 21 in the inaugural BCDI in 2023. This means that the countries in the BCDI now account for more than 95% of global GDP, compared with nearly 75% in 2023 and 90% in 2024, and more than 80% of the world's population, up from around 75% in BCDI 2024 and 50% in BCDI 2023.

In addition, this year the WBBA has significantly increased its focus on the key region of Latin America, leading to the addition to BCDI 2025 of five countries in the region: Bolivia, Ecuador, Paraguay, Uruguay, and Venezuela. This is in addition to the six largest economies in the region, which were already covered in the BCDI, namely Argentina, Brazil, Chile, Colombia, Mexico, and Peru. This increased emphasis also led to the creation of a new dedicated chapter on Latin America in the BCDI 2025 report.

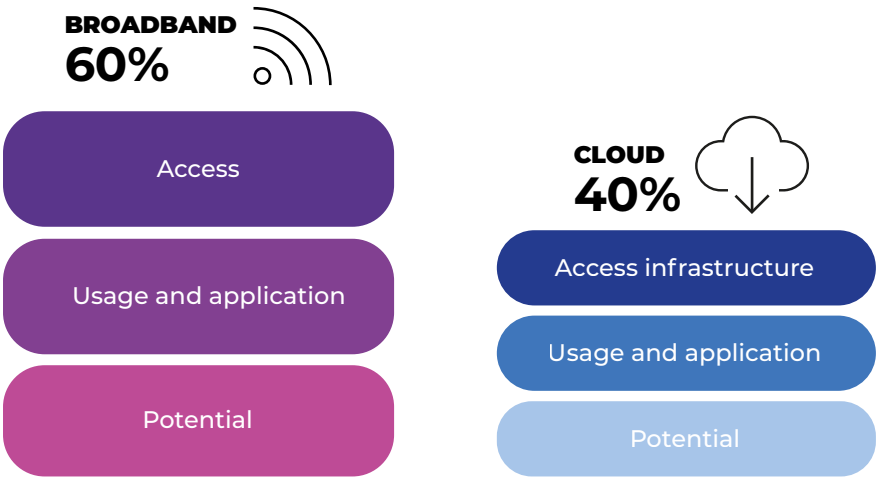
With this edition of the BCDI, the WBBA has focused on retaining the same methodology used in the 2024 edition in order to make the 2025 results as comparable as possible with those in 2024. However, BCDI 2025 and 2024 results are not comparable with those in 2023 because of the dramatic increase in coverage from 21 countries in 2023 to 62 countries in 2024 and because of methodology improvements in 2024 to make scores more comparable across countries regardless of their size and other characteristics.

METHODOLOGY

The BCDI examines the development of fixed broadband and cloud markets across 73 countries worldwide, representing more than 80% of the world's population and more than 95% of global GDP. In finalizing the expanded geographic scope of this third edition of the BCDI, the WBBA included those countries where it had access to enough high-quality data to develop a robust index quantifying the performance of the broadband and cloud markets.

The BCDI is designed to assess the overall performance and impact of the broadband and cloud markets by examining them across three key areas, which are access, usage and application, and potential.

FIGURE 9: BCDI COVERAGE AND WEIGHTING BY MARKET



SOURCE: WBBA

The relative sizes of the broadband and cloud boxes in **Figure 9** reflect the WBBA's view that broadband, as the gateway to the digital economy, is more important than the cloud. This view led the WBBA to use a methodology with index weightings of 60% for broadband and 40% for cloud.

As the segmentation in **Figure 9** shows, the BCDI takes a holistic view of broadband and cloud, starting with the initial access stage of evaluating the availability of services, then the usage and application of services, and finally, their potential going forward.

The first step in quantifying the impact of each segment in each market is the selection and validation of the most relevant high-quality input metrics available for all 73 countries in the index. Overall, the BCDI is based on 28 metrics in total with 4–5 in each segment. This adds up to 13 metrics related to the broadband market and 15 metrics on the cloud. The main source of these metrics is Omdia, a WBBA member. Ookla, another WBBA member, provided data for two of the broadband metrics. The sustainable energy metric is based on open source data from energy think tank Ember.

BROADBAND METRICS

In the fixed broadband market, the BCDI is built on 13 metrics (**Table 2**), with four to five metrics evaluating each of the three key areas, which are broadband access, usage and application, and potential. Unless stated otherwise below, the broadband metrics are based on data from the end of 2024.

TABLE 2: BCDI BROADBAND METRICS BY SEGMENT

SEGMENT	METRIC	DEFINITION
ACCESS	Residential broadband penetration	The number of residential broadband subscriptions divided by the number of households
	Total (residential and business) broadband penetration	The total number of residential and business subscriptions divided by the total number of households
	Fiber-to-the-home (FTTH) coverage	The number of residential households covered by the optical-fiber network divided by the total number of households
	FTTH penetration	The number of FTTH broadband subscriptions divided by the total number of households
USAGE AND APPLICATION	Median download speed In partnership with Ookla	Median download speed of fixed broadband services, based on Omdia's analysis of one month of aggregated Speedtest data provided by Ookla This data is not available for commercial repurposing.
	High-speed broadband penetration	The proportion of households with broadband subscription tariffs providing 500Mbps or faster download speeds
	Online video user penetration	The number of paying subscribers and free trialists across online video platforms (e.g., Netflix and Amazon Prime) divided by the population of the country
	Online video views per capita	Total transactional, ad-supported, and subscription views and transactions of content across pay-TV and online video subscription services divided by the population of the country
POTENTIAL	Market competition	One minus the Herfindal-Hirschman Index (HHI) score for the fixed broadband market The HHI measures the level of concentration within a market and, therefore, the level of competition. It considers two main factors: the number of companies and the market share of each company in that market. The index varies from 0 to 100%; the closer to 100%, the more concentrated the market. For the fixed broadband market, HHI is calculated by taking the square of the market share of fixed broadband subscriptions of each company and adding them together.
	Incumbent impact	One minus the market share of the incumbent or largest broadband service provider
	Provider penetration In partnership with Ookla	The number of active ISPs divided by the number of households The number of ISPs is based on Omdia's analysis of a month of aggregated Speedtest data provided by Ookla. This data is not available for commercial repurposing.
	Sustainable energy	Sustainable energy power capacity as a percentage of total national power capacity, based on data from independent energy think tank Ember
	Broadband affordability	Annual GDP per capita divided by annual broadband ARPU

SOURCE: OMDIA, OOKLA, AND EMBER

In the BCDI, fixed broadband services are defined as those delivered by either wired technologies (e.g., fiber or DSL) or fixed wireless technologies (e.g., 4G or 5G). Mobile broadband services delivered to a smartphone or handset via 4G, 5G, or another mobile technology are not covered in the BCDI.

CLOUD METRICS

The BCDI is based on 15 metrics evaluating the cloud market. There are five each for cloud access infrastructure, usage and application, and potential (**Table 3**). Unless noted otherwise, the metrics are based on data from 2024.

TABLE 3: BCDI CLOUD METRICS BY SEGMENT

SEGMENT	METRIC	DEFINITION
ACCESS INFRASTRUCTURE	Cloud spending	The average enterprise spending on public cloud in 2024
	Cloud spend proportion	The average enterprise cloud spending as a proportion of the average IT budget in 2024
	Storage spending	Average enterprise spending on storage in 2024; storage includes the following technologies: ■ Hard-disk drives: Standard hard drives that are used to augment or maintain storage area network (SAN) and network-attached storage (NAS) systems ■ NAS filers and arrays: A NAS file server designed and programmed for high-volume data storage, backup, and archiving ■ NAS gateways: A single gateway that consolidates and aggregates several NAS filers ■ SAN adaptors and connectors: High-speed networking hardware that is optimized for storage network traffic (e.g., fiber channel) ■ SAN disk arrays: An enterprise storage system that contains multiple disk drives; it is differentiated from a disk enclosure in that an array has cache and intelligence ■ Tape libraries: A high-capacity data storage system for storing, retrieving, reading, and writing multiple magnetic tape cartridges
	Data center investment	Investment based on the sales of rack vendors to data centers in the country divided by country GDP
	Data center load capacity	The maximum power available for IT and mechanical equipment in data centers as a proportion of the country's total power capacity
USAGE AND APPLICATION	Average PaaS spending	Average enterprise spending in 2024 on PaaS services that combine application development tools, middleware, and runtime services delivered from, or integrated with, an IaaS platform that may or may not be separately available to customers PaaS can be platform-centric (e.g., IoT or big data) or application-specific (e.g., customer engagement or business intelligence) and is typically focused on developer tools and APIs. Customers pay for usage of the services without owning the underlying software licenses, and PaaS is designed to make it easier to develop, deploy, and manage applications and cloud-based resources (external spending).
	Average SaaS spending	Average enterprise spending in 2024 on a usage-based consumption model for runtime applications delivered over the internet or accessed by private network services from multi-tenant cloud resources hosted externally either by an independent software vendor or by a managed services provider With SaaS, the service provider, not the customer, owns the software license. This includes applications, such as sales, marketing, and customer service apps; finance, ERP, and supply chain management (SCM) apps; productivity and collaboration apps; and industry-specific operations apps offered as a service (external spending).
	% of workloads in public cloud	The proportion of workloads in the public cloud in 2024 (The public cloud is defined by IaaS, PaaS, and serverless services.)
	% of workloads in SaaS	The proportion of workloads in SaaS in 2024
POTENTIAL	Cloud spending growth	The year-on-year (YoY) change in average enterprise spending on public cloud (2024 vs. 2023)
	Storage spending growth	The YoY change in average enterprise spending on storage (2024 vs. 2023)
	Growth in work-loads in public cloud	The difference in the proportion of workloads in the public cloud between 2023 and 2025 (18 months)
	Growth in SaaS workloads	The difference in the proportion of workloads for SaaS between 2023 and 2025 (18 months)
	Share of largest cloud provider	The relative market share of the incumbent (or largest) provider based on enterprises that spend more than $1m per year

SOURCE: OMDIA

NORMALIZATION

After selecting, compiling, and validating the 28 metrics for the 73 countries in the index, the next step in the methodology was to normalize all the metrics to a scale of 0–100. For metrics in percentages, such as penetrations, the first step in the normalization process is straightforward: the percentages were simply multiplied by 100.

The next step in the process was min-max normalization, which converts each metric to a scale of 0–100. In practice, this means that the lowest value in each metric converts to 0, the highest value converts to 100, and each value in between is scaled to a value between 0 and 100. The min-max normalization puts all the metrics on the same scale of 0–100 so they can be compared and aggregated into index scores.

WEIGHTINGS

After all the metrics were normalized to a common scale, weightings were agreed to reflect the relative importance of each metric within its segment and each segment within the overall index. The most important decision was to assign the highest segment weighting of 25% to two broadband segments: broadband access and broadband usage and application. This decision was based on the fact that broadband, serving as the gateway to the internet, is fundamental to the digital economy and is therefore more important than the cloud, which relies on quality broadband connections to be effective (see **Table 4**).

TABLE 4: BCDI METRIC AND SEGMENT WEIGHTINGS

SEGMENT	SEGMENT WEIGHTING IN BCDI	METRIC	METRIC WEIGHTING IN SEGMENT
BROADBAND ACCESS	25%	Residential broadband penetration	25%
		Total (residential and business) broadband penetration	25%
		FTTH coverage	25%
		FTTH penetration	25%
BROADBAND USAGE AND APPLICATION	25%	Median download speed	25%
		High-speed broadband penetration	25%
		Online video user penetration	25%
		Online video views per capita	25%
BROADBAND POTENTIAL	10%	Market competition	30%
		Incumbent impact	10%
		Provider penetration	10%
		Sustainable energy	10%
		Broadband affordability	40%
CLOUD ACCESS INFRASTRUCTURE	10%	Average cloud spending	25%
		Cloud spending proportion	25%
		Storage spending	25%
		Data center investment	12.5%
		Data center load capacity	12.5%
CLOUD USAGE AND APPLICATION	20%	Average PaaS spending	20%
		Average SaaS spending	20%
		% of workloads in public cloud	20%
		% of workloads in SaaS	20%
		AI adoption	20%
CLOUD POTENTIAL	10%	Cloud spending growth	20%
		Storage spending growth	20%
		Growth in workloads in public cloud	20%
		Growth in SaaS workloads	20%
		Share of largest cloud provider	20%

SOURCE: WBBA

Broadband potential was judged to be less important than the other two broadband segments, because it is not focused on access and is more future oriented. This led to a weighting of 10% for this segment. This, in turn, means that all three broadband segments have a combined

weighting of 60%. Of the three cloud segments, the cloud usage and application segment was judged to be the most important, because it reflects enterprise spending on and use of cloud applications and services by country. As a result, this segment was given a weighting of 20%.

The other two cloud segments were both assigned a weighting of 10% but for different reasons. Cloud potential, as with broadband potential, was given a weighting of 10%, because it is a more future-oriented segment. Cloud access infrastructure was also weighted at 10%, because two of its metrics—data center investment and data center load capacity—are relevant not only to individual countries but also to the regional and global markets that can be served by the cloud infrastructure in those countries. Because the focus of the BCDI is to rank nations, a lower weighting of 10% was assigned to this segment because its data center metrics can be significantly influenced by the fact that data centers can serve international markets. Overall, these three cloud segments have a combined weighting of 40%.

As detailed in **Table 4**, metrics were also assigned weightings within their segment. Most metric weightings within each segment have been assigned equally, except for the broadband potential and cloud access infrastructure segments. In broadband potential, broadband affordability was seen as the most important of the five metrics affecting the potential of broadband, so it was given a weighting of 40%, followed by market competition at 30%. The other three segments were assigned weightings of 10%. However, it is important to note that the 10% weighting for the sustainable energy metric is largely because the data available for the metric is on national sustainable energy rather than on sustainable energy specifically in the broadband and cloud industries.

In the cloud access infrastructure segment, the two metrics focused on data centers were given a lower weighting of 12.5% each, because data centers in a country often serve international and national markets. The other three metrics in the segment were each assigned a weighting of 25%, because they reflect average enterprise spending by country on cloud and storage.

COUNTRY INDEX SCORES

The next step in the methodology was to calculate country index scores for each of the six segments by multiplying the score for each metric by its weighting within the segment and adding the result for all the metrics in a segment to get a total score in that segment. Each segment score was then multiplied by the weighting of that segment within the index to create a total index score for each country.

VALIDATION

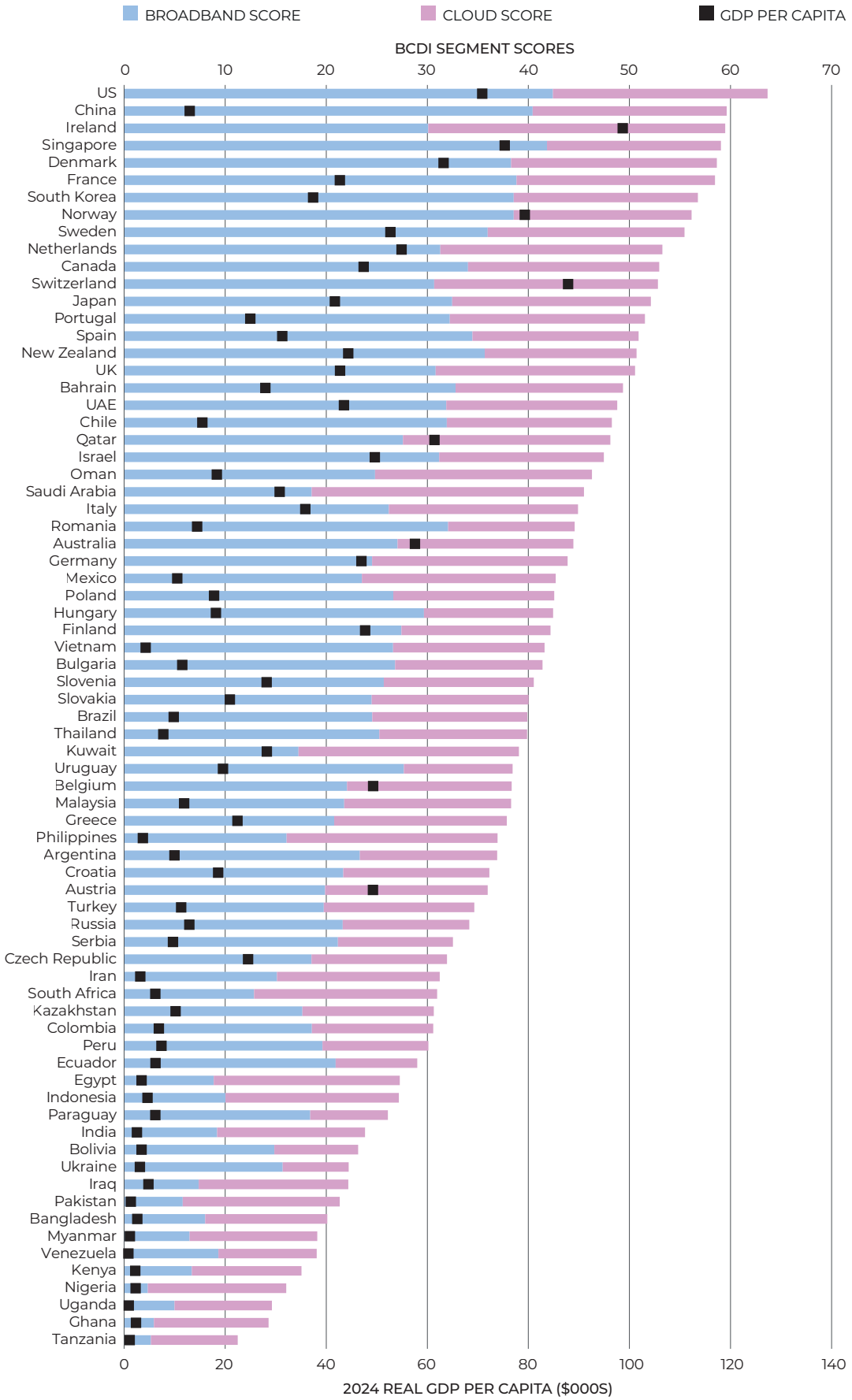
The validation of the index results was extensive and included sensitivity analysis to assess the validity of the results. This involved several approaches, such as adjusting the metrics in the index, determining the relative weightings of the metrics, refining the methodology for calculating scores, and using what-if analysis tools including scenarios and data tables to evaluate the impact of selected input changes on results. This was to gauge the sensitivity of the model to the changes and to arrive at the final methodology that produces the most robust results.

BCDI 2025: RANKING RESULTS

This chapter presents the BCDI results, including the overall score and ranking for each of the 73 countries. It is worth noting that the intent of the index is not to criticize countries based on their ranking but rather to identify best practices in countries throughout the index. This information can then be used by all stakeholders to improve the performance of the broadband and cloud markets in their countries.

The high-level results of the BCDI are provided in **Figure 10,** which indicates the overall BCDI scores by country, the separate contributions of the broadband and cloud segments, and the GDP per capita of each country.

FIGURE 10: BCDI RANKINGS, SEGMENT SCORES AND GDP PER CAPITA



SOURCE: WBBA AND S&P GLOBAL INTELLIGENCE (GDP PER CAPITA)

Figure 10 shows a clear correlation between BCDI scores and GDP per capita by country. In statistical terms, there is a 77% positive correlation between the two, indicated by a correlation coefficient of 0.77. Though this relatively strong positive correlation validates the methodology and results of the BCDI, the wide range of the relationships between BCDI scores and GDP per capita in individual countries could also uncover best practices for supporting the development of broadband and cloud at all stages of economic development.

One of the aspects that is new to the BCDI in 2025 is the ability to compare results with those of the previous year. This is possible because BCDI 2025 uses the same methodology as BCDI 2024, the only change being the addition of 11 countries in 2025. The country BCDI rankings in 2025 and 2024 are provided in **Table 5**, which includes the countries added in 2025 to show both their rankings and their impact on the rankings of other countries.

TABLE 5: BCDI COUNTRY RANKINGS IN 2025 AND 2024, AND YOY CHANGE

COUNTRY	BCDI 2025 RANK	BCDI 2024 RANK	CHANGE IN RANK, 2025 VS. 2024*
US	1	1	0
CHINA	2	2	0
IRELAND	3	3	0
SINGAPORE	4	5	-1
DENMARK	5	6	-1
FRANCE	6	7	-1
SOUTH KOREA	7	8	-1
NORWAY	8	4	4
SWEDEN	9	9	0
NETHERLANDS	10	18	-8
CANADA	11	10	1
SWITZERLAND	12	22	-10
JAPAN	13	13	0
PORTUGAL	14	16	-2
SPAIN	15	14	1
NEW ZEALAND	16	15	1
UK	17	24	-7
BAHRAIN	18	17	1
UAE	19	12	7
CHILE	20	20	0
QATAR	21	11	10
ISRAEL	22	25	-3
OMAN	23	26	-3
SAUDI ARABIA	24	19	5
ITALY	25	39	-14
ROMANIA	26	21	5
AUSTRALIA	27	27	0
GERMANY	28	29	-1
MEXICO	29	33	-4
POLAND	30	37	-7
HUNGARY	31	28	3
FINLAND	32	23	9
VIETNAM	33	36	-3

Notes: * Change expressed as 2025 rank minus 2024 rank, which means a negative number is an improvement in rankings in 2025 compared with 2024; n/a indicates the 11 countries added to the BCDI in 2025.

SOURCE: OMDIA

TABLE 5: BCDI COUNTRY RANKINGS IN 2025 AND 2024, AND YOY CHANGE

COUNTRY	BCDI 2025 RANK	BCDI 2024 RANK	CHANGE IN RANK, 2025 VS. 2024*
BULGARIA	34	34	0
SLOVENIA	35	n/a	n/a
SLOVAKIA	36	32	4
BRAZIL	37	30	7
THAILAND	38	31	7
KUWAIT	39	40	-1
URUGUAY	40	n/a	n/a
BELGIUM	41	35	6
MALAYSIA	42	44	-2
GREECE	43	42	1
PHILIPPINES	44	46	-2
ARGENTINA	45	43	2
CROATIA	46	45	1
AUSTRIA	47	41	6
TURKEY	48	49	-1
RUSSIA	49	38	11
SERBIA	50	n/a	n/a
CZECH REPUBLIC	51	52	-1
IRAN	52	n/a	n/a
SOUTH AFRICA	53	51	2
KAZAKHSTAN	54	n/a	n/a
COLOMBIA	55	48	7
PERU	56	50	6
ECUADOR	57	n/a	n/a
EGYPT	58	54	4
INDONESIA	59	53	6
PARAGUAY	60	n/a	n/a
INDIA	61	55	6
BOLIVIA	62	n/a	n/a
UKRAINE	63	47	16
IRAQ	64	n/a	n/a
PAKISTAN	65	58	7
BANGLADESH	66	n/a	n/a
MYANMAR	67	59	8
VENEZUELA	68	n/a	n/a
KENYA	69	57	12
NIGERIA	70	56	14
UGANDA	71	61	10
GHANA	72	60	12
TANZANIA	73	62	11

Notes: * Change expressed as 2025 rank minus 2024 rank, which means a negative number is an improvement in rankings in 2025 compared with 2024; n/a indicates the 11 countries added to the BCDI in 2025.

SOURCE: OMDIA

As **Table 5** details, 20 countries moved up the BCDI rankings in 2025, 34 moved down the rankings, and 8 had the same ranking in both years. Of those eight, the majority (six) were in the top 20 in both years, including the three top-ranked countries: the US, China, and Ireland. The performances of the US and China are explored in more detail in ***Country case studies and best practices***.

Of the 62 countries covered in the BCDI in both years, 44 saw their rankings change by fewer than 10 places from 2024 to 2025. Two of those countries—Spain, which slipped down one place to 15th in BCDI 2025, and Brazil, which moved down seven places to 37th in 2025—are covered in detail in the country case studies.

Another 10 countries saw their rankings change by 10 or more places in 2025 compared with 2024. Five of these countries—Kenya, Nigeria, Uganda, Ghana, and Tanzania—saw their rankings drop by double digits, largely because they ranked below the 11 new countries added to the BCDI in 2025, and another two countries (Russia and Ukraine) are at war.

Qatar dropped 10 places to 21st in BCDI 2025, largely because of a decline in its broadband access score, which was in turn driven by a decline in fixed broadband penetration. However, it should be noted in this context that Qatar has a highly advanced mobile market with mobile broadband penetration of 155% of the population in 2024 according to Omdia data. The BCDI covers fixed but not mobile broadband, because fixed broadband typically has a greater impact on economies as they develop.

SWITZERLAND AND ITALY CLIMB WITH GIGABIT STRATEGIES

Switzerland saw a major improvement in its ranking, climbing 10 places to number 12 in 2025. The country's scores improved across all broadband and cloud segments, and its broadband access score increased thanks in part to an increase in fiber broadband penetration of households to 38% at end-2024 from 33% at end-2023 following the introduction of the country's Gigabit Strategy.

Switzerland, which has relatively high residential broadband penetration of 91% but has lagged other leading European countries in fiber penetration, made a concerted effort to address this in June 2023, when the government approved its Federal Broadband Strategy, also known as the Gigabit Strategy. It aims to ensure nationwide access to high-speed internet by 2033 with a short-term goal of 1Gbps connectivity to all buildings within five years. The government will offer funding support for deployment of fiber infrastructure in areas where network expansion is considered unprofitable for private operators. To achieve this target, the government has estimated a total cost of around CHF4.0bn ($4.8bn), of which around CHF1.4bn ($1.7bn) would be provided through government subsidies.

In March 2025, the Federal Council introduced a separate CHF730m ($884m) funding program, cofinanced by the federal government and cantons, to support broadband rollout beyond urban areas. The program is supported by the proposed Federal Act on Promoting Broadband Infrastructure Expansion, also known as the Broadband Promotion Act, which will see further subsidies issued to support rollout of gigabit broadband. The consultation was open until June 23, 2025, and legislation is expected in 2026. Omdia believes that Switzerland's Gigabit Strategy indicates a proactive stance toward bridging digital divides and developing inclusive digital infrastructure to support long-term national growth.

The country with the biggest improvement in rankings in BCDI 2025 was Italy, which moved up 14 places to 25th in 2025. Italy's scores improved across all cloud and broadband segments, including broadband access: an increase in fiber penetration of households from 18% in 2023 to 23% in 2024 led to a significant increase in its score in the segment. The increase in fiber penetration can be explained in large part by the commitment of the Italian government to a strategy to achieve nationwide gigabit broadband availability.

As part of the Italian Strategy for Ultra Broadband Toward the Gigabit Society, the country aims to achieve gigabit connectivity for all citizens by 2026, four years ahead of the goal set by the EU's Digital Decade program. According to the European Commission's Broadband Coverage in Europe report, 70.7% of Italian households had access to networks offering 1Gbps speeds by mid-2024, surpassing the EU average (69.2% in 2024) for the first time. Without cable networks, Italy's high-speed connectivity depends primarily on fiber-to-the-premises (FTTP) and 5G fixed wireless access (FWA) services.

To support the gigabit coverage goals, the Italian government has launched several initiatives, such as vouchers for underserved consumers and small and medium-sized enterprises (SMEs) and a connected schools program. It has also earmarked €3.7bn for the Italia a 1Giga project, which aims to bring 1Gbps speeds to 8.5 million households in poorly served areas by the end of 2026. Contracts for fiber deployment have been awarded to Open Fiber and to FiberCop, which plans to decommission 6,700 of its 10,500 legacy copper exchanges by 2028.

BCDI RANKINGS BY CLUSTER

Although analysis of selected countries will be provided in a later chapter, it is difficult to directly compare the results of one country with those of another, given the wide variety of countries in the index, their different stages of development, and the many unique characteristics of their broadband and cloud markets.

Therefore, to compare results at a higher level, the following sections organize BCDI countries into three different clusters (**Figure 11**).

FIGURE 11: BCDI COUNTRY CLUSTERS

CLUSTER 1	■ Cluster 1 includes countries where both the broadband and cloud markets have above-average scores in the BCDI. ■ Cluster 1 has 27 countries with an average GDP per capita of $46,266, ranging from the US and China to Mexico and Poland.
CLUSTER 2	■ Cluster 2 includes countries where either the broadband or cloud market has an above-average score in the BCDI, but the other market does not. ■ Cluster 2 has 23 countries with an average GDP per capita of $19,560, ranging from New Zealand and Saudi Arabia to Egypt and Indonesia.
CLUSTER 3	■ Cluster 3 includes countries where both the broadband and cloud markets have scores that are average or below average in the BCDI. ■ Cluster 3 has 23 countries with an average GDP per capita of $6,204, ranging from Croatia and Turkey to Ghana and Tanzania.

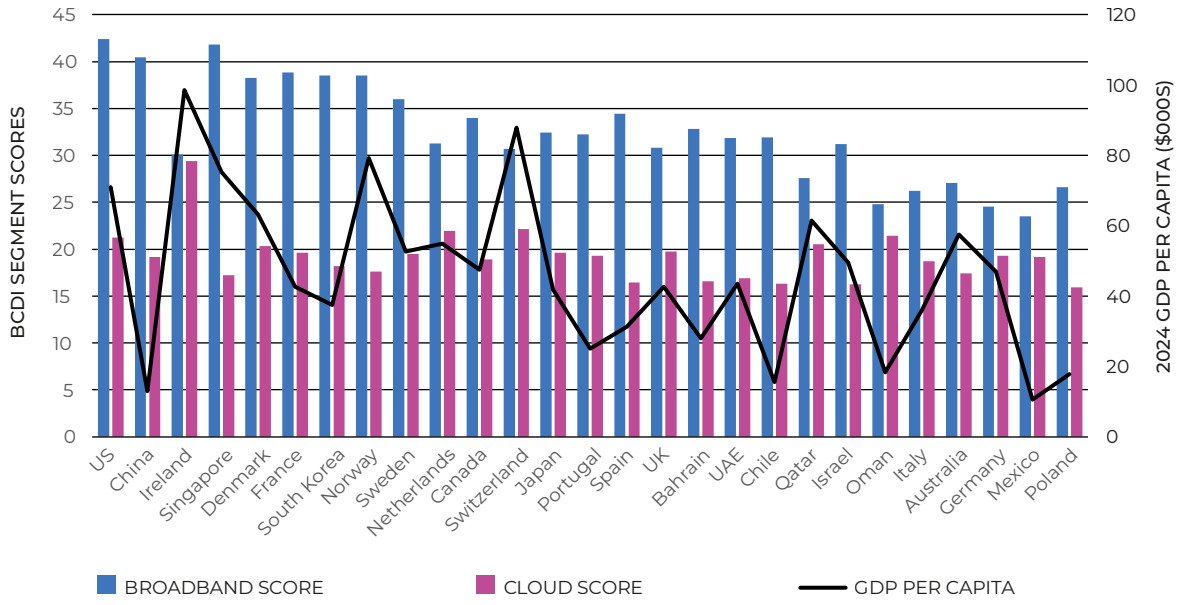
SOURCE: WBBA

It should also be noted that the larger number of countries in the BCDI in 2025 means there is a relatively wide range of scores across the countries in each cluster. For example, in Cluster 1, which is the largest cluster, broadband scores range from a high of 42.4 to a low of 23.5, and cloud scores range from 22.1 to 15.9. That shows that the clusters are broad groupings with similarities across countries but also significant differences, all of which can be useful for analysis.

CLUSTER 1

The 21 countries in Cluster 1 have economies that tend to be highly developed, large, or both (**Figure 12**).

FIGURE 12: BCDI CLUSTER 1 COUNTRIES, SEGMENT SCORES AND GDP PER CAPITA



SOURCE: WBBA AND S&P GLOBAL INTELLIGENCE (GDP PER CAPITA)

The US and China lead the cluster and overall BCDI rankings. These countries will be covered in the country case studies in a later chapter. Ireland holds third place in the cluster and in the overall BCDI rankings thanks to its top score in the cloud segment, which is in turn driven by leading scores in cloud usage and application and cloud access. Although Ireland's high score in cloud access is likely driven in part by its role as a key data center location serving Europe and the world, its strong performance in cloud usage and application is driven by relatively high average spending by Irish enterprises on PaaS and SaaS. Ireland also benefits from having the highest real GDP per capita ($98,673) of all the countries in the BCDI.

In Cluster 1 countries, there is more variation in broadband scores than in cloud scores. This suggests that even for most countries with the highest BCDI scores, investing in high-quality broadband access is the best way to increase their score. Therefore, investing in broadband should arguably be their top priority, followed by cloud investments.

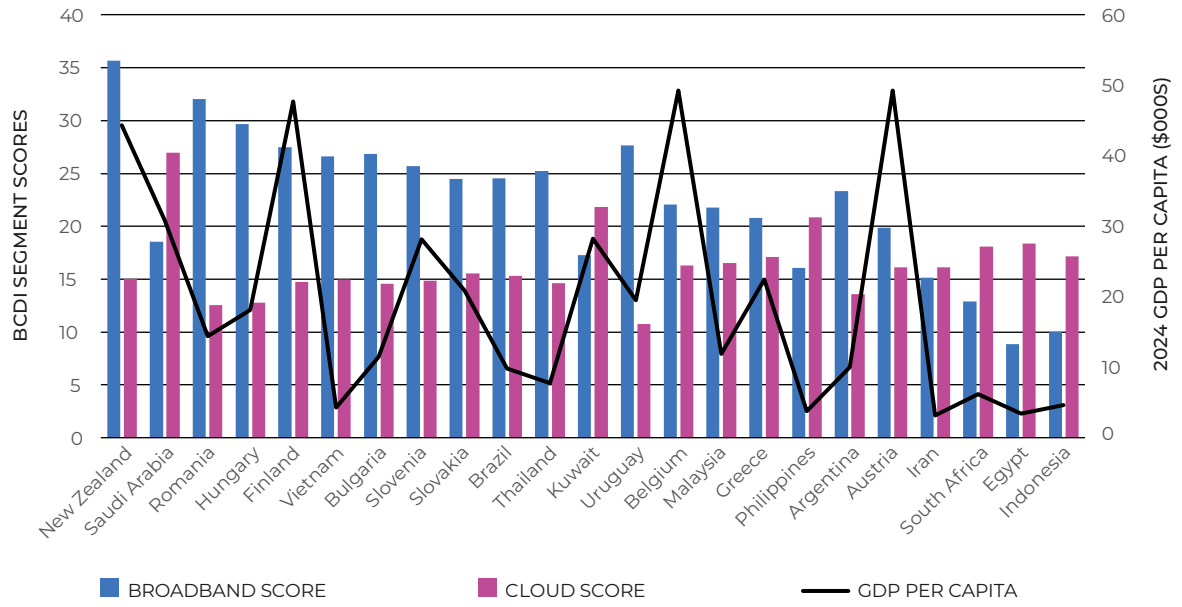
In addition to China, several other countries in Cluster 1, namely Chile, Oman, Mexico, and Poland, have relatively low GDP per capita. Despite their many differences, one commonality they share is relatively high fiber broadband coverage and adoption compared with other countries in the BCDI. For example, Brazil may have the lowest GDP per capita of Cluster 1 countries at $10,511, but 77% of households in the country have access to fiber broadband services, and 42% have adopted the services. The other Cluster 1 countries with relatively low GDP per capita are similar in that fiber broadband services are available to most of their households: 85% of households in Chile have access to fiber services, 87% in Oman, and 79% in Poland. This suggests that government and industry support for investment in fiber broadband is one of the best ways for a country to develop both its broadband and cloud markets, irrespective of the country's level of economic development.

The countries in Cluster 1 are prime candidates to integrate their cloud and broadband networks, a process sometimes referred to as cloud-network convergence. This is because they already have advanced broadband and cloud networks and leading technical capabilities, which are essential for cloud-network convergence.

CLUSTER 2

Cluster 2 includes 23 countries with one market segment scoring above average and the other scoring average or below average (**Figure 13**).

FIGURE 13: BCDI CLUSTER 2 COUNTRIES, SEGMENT SCORES AND GDP PER CAPITA



SOURCE: WBBA AND S&P GLOBAL INTELLIGENCE (GDP PER CAPITA)

Figure 13 shows that most of the first 13 countries in the cluster, from New Zealand to Uruguay, have above-average broadband scores and below-average cloud scores, with the exception of Saudi Arabia and Kuwait, which have below-average broadband scores, partly because of their relatively low penetration of fiber broadband. By contrast, most of the remaining 10 countries from Belgium to Indonesia, with the exception of Argentina, have above-average cloud scores and below-average broadband scores.

The first 11 countries in the cluster, from New Zealand to Thailand, all have fiber broadband services with extensive coverage, as does Uruguay. Saudi Arabia, which has a robust mobile broadband market, has the lowest fiber coverage (67%) and household penetration (18%) in the group.

The other 10 countries at the top of Cluster 2 all have relatively high fiber penetration rates, ranging from 33% of households in Hungary to 70% in Romania. For these countries, continuing their focus on fiber broadband while unlocking the potential of the cloud market are logical priorities for development. Potential approaches include government and regulatory support, industry and service development, and technology innovation. Because these countries have large-scale fiber broadband markets, advanced technical capabilities, and relatively high GDP per capita, they are also leading candidates for cloud-network convergence, because that could leverage the strength of their broadband networks and services to accelerate the development and growth of cloud services.

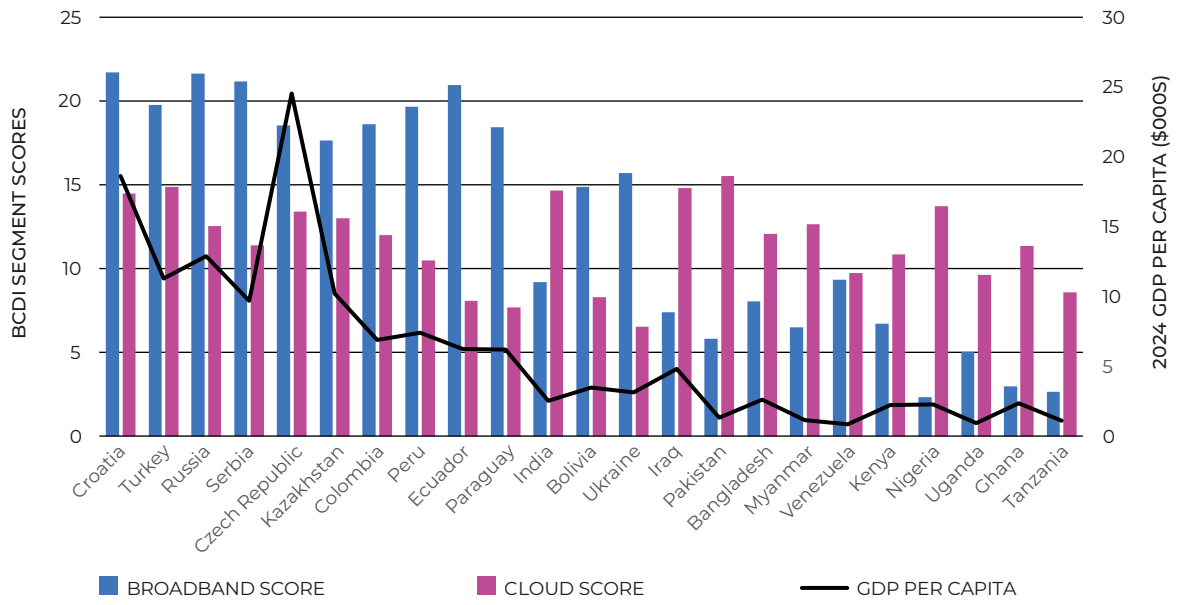
It is also interesting that several countries with relatively low GDP per capita, including Vietnam, Brazil, and Thailand, are in Cluster 2 thanks to the strength of their broadband markets. Like the countries in Cluster 1 with relatively low GDP per capita, this group of Cluster 2 countries is united by having fiber broadband services available to most households. Vietnam is a particularly striking example: it combines one of the lowest GDP per capita figures ($4,266) in the BCDI with one of the highest levels of FTTH coverage at 96% and robust household fiber adoption of 68%.

The nine countries in the cluster from Belgium to Indonesia but excluding Argentina have varying GDP per capita, but most have relatively low penetration of fiber broadband services. The exception is Malaysia, where 43% of households subscribe to fiber broadband services and 88% of households have access to fiber services, suggesting that the country has a strong opportunity to move into Cluster 1 in future given the potential for fiber adoption to accelerate and drive up the country's broadband score in the BCDI. After Malaysia, the countries with the highest fiber penetration in this group are Argentina at 28%, the Philippines at 24%, and Indonesia at 15%. In this group of countries, the focus should be on developing policies, regulations, investments, and innovation to support the deployment and adoption of advanced fiber broadband services.

CLUSTER 3

The 23 countries in Cluster 3 have below-average scores in both the broadband and cloud segments (**Figure 14**).

FIGURE 14: BCDI CLUSTER 3 COUNTRIES, SEGMENT SCORES AND GDP PER CAPITA



SOURCE: WBBA AND S&P GLOBAL INTELLIGENCE (GDP PER CAPITA)

This is understandable, because the countries in the cluster have an average GDP per capita of $6,204, 75% below the average GDP per capita of $25,229 for all 73 countries in the BCDI. However, it is useful to understand more about the countries in the cluster to gauge priorities for development.

Two European countries in the cluster, Croatia and the Czech Republic, have by far the highest GDP per capita in the group at $18,619 and $24,538 respectively. Although most households in each country subscribe to broadband services, they are based mainly on legacy broadband technologies, and fiber broadband penetration was at 16% of households in both countries at the end of 2024. This limits the end-user experience, which in turn hinders the adoption of advanced broadband and cloud services.

Four countries in Latin America—Colombia, Peru, Ecuador, and Paraguay—have a similar performance in the cluster with relatively high broadband scores driven by adoption of advanced fiber services, offset somewhat by a lower score in the cloud segment. Bolivia, another Latin American country, follows a similar pattern.

The group of 10 countries from Iraq to Tanzania share common challenges of having relatively low GDP per capita and less developed broadband networks. However, all these countries

show higher scores in the cloud segment. This suggests that despite the limited number of consumers and enterprises with fixed broadband, there is a growing adoption of cloud services. As a result, accelerating the deployment and adoption of advanced fiber broadband services should be a priority in these countries.

There is also a case to be made for the idea that these countries would benefit from skipping the classic path of developing separate advanced broadband and cloud networks and then integrating them, instead moving directly to developing cloud-converged networks. Although the technical feasibility of this approach would need to be proven, the concept of emerging markets skipping traditional systems is well established.

LATIN AMERICA ACCELERATES BROADBAND AS AI DRIVES CLOUD

BCDI NEARLY DOUBLES COUNTRY COVERAGE IN THE REGION

Latin America comprises developing economies and is home to more than 665 million people. The region has one of the highest shares of urban population globally at 82%, second only to North America. It also includes 3 of the world's 15 largest countries by land area: Brazil, Argentina, and Mexico.

The broadband and cloud markets in Latin America will be affected by the overall outlook for the region's economy, which is expected to experience moderate growth in the coming years. GDP growth is projected to slow to 2.0% in 2025, down from 2.4% in 2024, lower than the global average (+2.3%) but better than in advanced economies (+1.4%).

Fixed broadband is undoubtedly the main growth engine for the telecoms market in the region, particularly fiber broadband. In the cloud market, the region is benefiting from the AI-driven boom in data center investment, but that has yet to drive major increases in enterprise spending on cloud. The challenge for service providers across Latin America is to reduce costs, increase efficiency through AI, and accelerate the development of solutions mainly for the enterprise market.

In order to better track developments in this key region, the WBBA significantly increased coverage of Latin America in BCDI 2025 to 11 countries, up from 6 in BCDI 2024. The 11 Latin American countries in BCDI 2025 represent 85% of the region's population and more than 75% of its real GDP, making them a sizable sample of the region.

TABLE 6: BCDI 2025 LATIN AMERICAN COUNTRIES BY GDP AND POPULATION

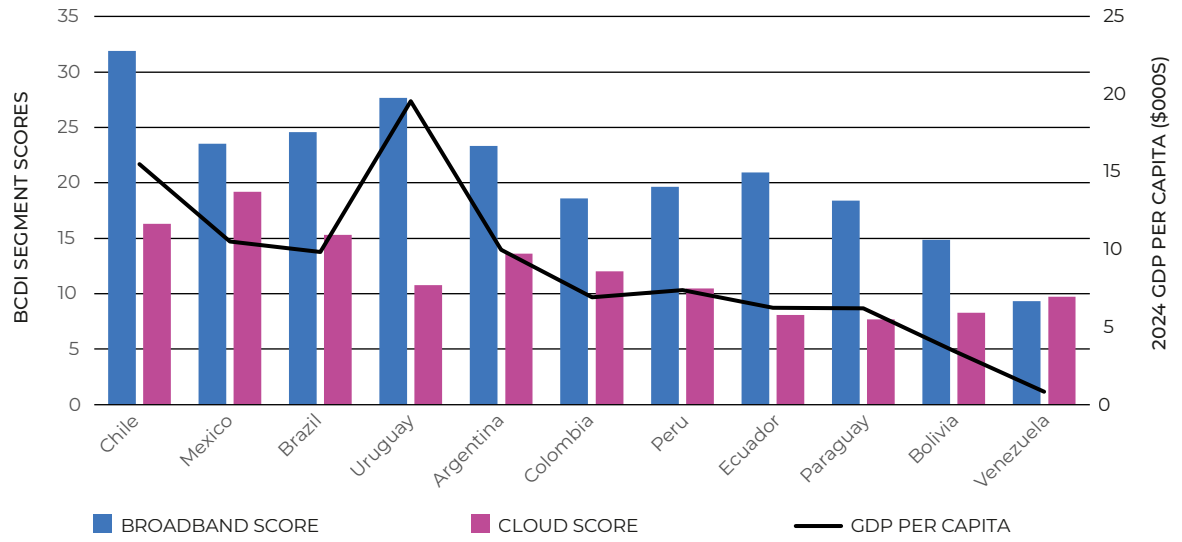
COUNTRY	REAL GDP, 2024 ($BN)	POPULATION, 2024 (MILLIONS)
BRAZIL	2,081	212
MEXICO	1,375	131
ARGENTINA	453	46
COLOMBIA	365	53
CHILE	306	20
PERU	249	34
ECUADOR	113	18
URUGUAY	66	3
BOLIVIA	43	12
PARAGUAY	43	7
VENEZUELA	24	28
TOTAL	5,118	565

SOURCE: OMDIA, S&P GLOBAL

The performance of the countries in the BCDI varies considerably, which is understandable given the huge diversity of countries in the region and their very different level of economic development as evidenced by a GDP per capita ranging from $19,557 in Chile to $838 in Venezuela.

The ranking of the Latin American countries in the BCDI is provided below. Chile is ranked first in the region and is followed by Mexico, Brazil, Uruguay, and Argentina. Those countries also have the highest GDP per capita of the 11 countries in the region included in the BCDI.

FIGURE 15: BCDI 2025 LATIN AMERICA COUNTRIES BY BCDI SEGMENT SCORES AND GDP PER CAPITA



SOURCE: WBBA AND S&P GLOBAL INTELLIGENCE (GDP PER CAPITA)

As indicated in the chart, there is a strong positive correlation of 83% between the BCDI scores and GDP per capita of the countries in the region, which confirms the strong relationship between their broadband and cloud markets and economic development.

The Latin American countries in the BCDI are spread widely across the overall BCDI rankings, from Chile at 20 to Venezuela at 68. This is also reflected in the clusters the countries fall into, with Chile and Mexico in Cluster 1; Brazil, Uruguay, and Argentina in Cluster 2; and all the other Latin American countries in Cluster 3. As detailed in the previous chapter, the BCDI's Cluster 1 includes countries with both broadband and cloud scores that are above the average segment score in the BCDI; Cluster 2 includes countries that have an above-average score in one segment but not the other; and Cluster 3 includes countries with average or below-average scores in both segments.

TABLE 7: LATIN AMERICA COUNTRIES BY BCDI RANK AND CLUSTER

COUNTRY	BCDI LATIN AMERICA RANK	BCDI GLOBAL RANK	BCDI CLUSTER
CHILE	1	20	1
MEXICO	2	29	1
BRAZIL	3	37	2
URUGUAY	4	40	2
ARGENTINA	5	45	2
COLOMBIA	6	55	3
PERU	7	56	3
ECUADOR	8	57	3
PARAGUAY	9	60	3
BOLIVIA	10	62	3
VENEZUELA	11	68	3

SOURCE: OMDIA

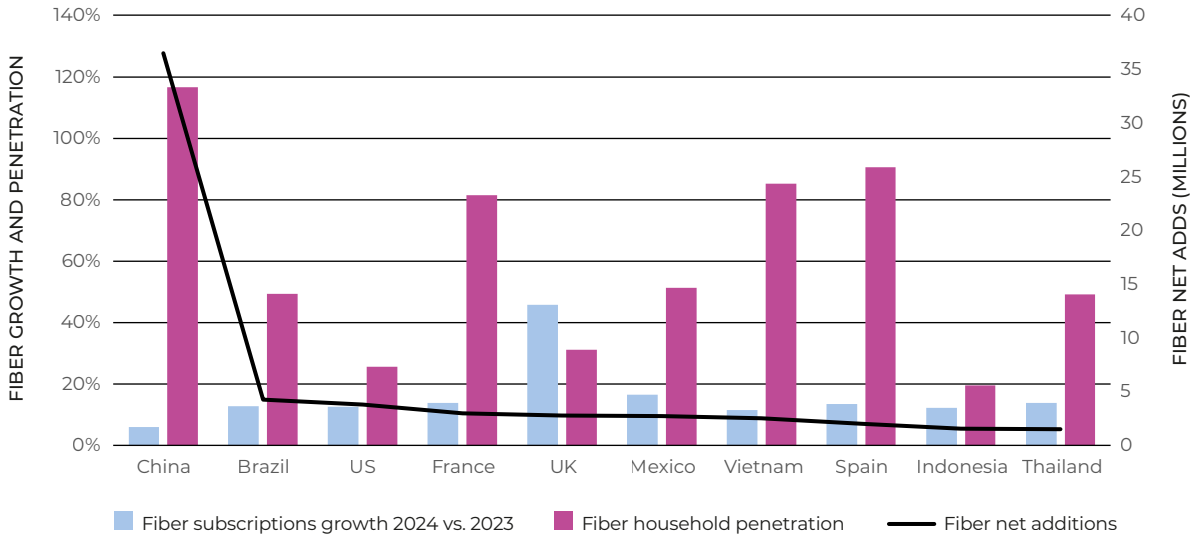
The rankings of the countries can be better understood in the context of the overall development of the broadband and cloud segments across the region.

BROADBAND IN LATIN AMERICA

With an estimated 230 million households and 133 million fixed broadband connections, Latin America achieves a 58% fixed broadband penetration rate, placing it ahead of Africa, the Middle East, and Central & Southern Asia.

Demand for fixed broadband in Latin America has been strong for the past few years, to the point that it has driven profound changes in the market's structure. FTTH has been the workhorse for the market, being adopted by both new and established players. Telcos are phasing out copper in favor of fiber, cable companies have chosen to expand to new areas exclusively through fiber, and some have even decided to replace their cable infrastructure for FTTH. The technology has also allowed ISPs to carve out an opportunity in the market. In Brazil, for instance, thousands of ISPs have been deploying fiber networks across the country. They have been particularly strong outside the main cities, in areas where the communications service providers (CSPs) have not invested. By 2025, these ISPs had grabbed 54% of the Brazilian fixed broadband market (see the Brazil case study later in this report). In addition, new fiber wholesale companies have been created, especially since 2021, when most of these players were formed from fiber infrastructure spin-offs from the main CSPs. Typically, the CSP retained a share (50% or less) and sold the remainder to a financial investor. CSPs saw this as a way to monetize investment in the network, accelerate fiber expansion, and share the burden of investment with a financial partner. In Brazil alone, three new fiber wholesalers—FiBrasil, V.tal, and I-Systems—were created in 2021. FiBrasil was created from the Vivo network outside São Paulo State, V.tal originated from Oi's network and now has the largest fiber network in the country, and I-Systems was created from TIM Brazil's last-mile network, which has a relatively smaller footprint, concentrated in the São Paulo and Rio de Janeiro metro areas. Other countries, such as Chile, Colombia, and Peru, have also seen the emergence of fiber wholesale players. In several cases, the model involved merging two or more networks into one single wholesaler to optimize costs and improve economic viability. Operators continue to compete at the service layer while sharing infrastructure expenses.

FIGURE 16: TOP 10 COUNTRIES IN FIBER NET ADDITIONS, GROWTH, AND PENETRATION, 2024



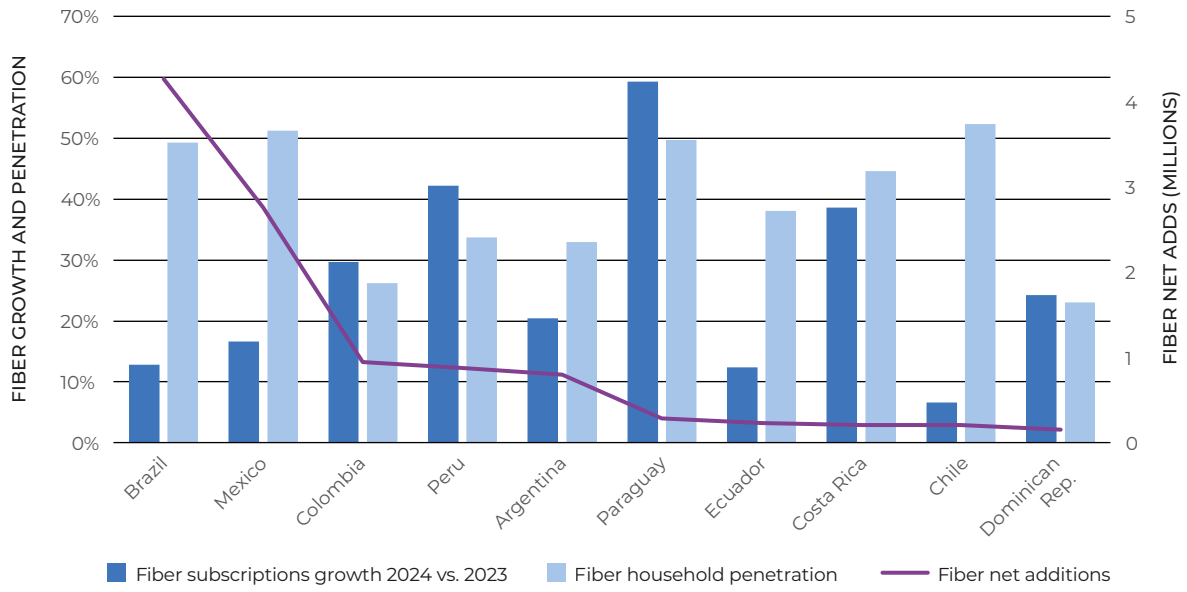
SOURCE: OMDIA

The effect of this new market dynamic has been an acceleration of fiber broadband adoption in the region. FTTH/B was responsible for 22% of all fixed broadband in Latin America in 2019, and this grew to 65% in 1Q25. Brazil was the highlight: from 1Q19 to 1Q25, its FTTH/B subscription base grew by 4.9×. As a consequence of all this activity around FTTH, Latin America has two countries (Brazil and Mexico) in the top five worldwide with the most FTTH net additions. Furthermore,

these two countries are still growing at more than 10% YoY with more potential to keep growing. In each market, FTTH has reached approximately 50% household penetration.

Nonetheless, these countries, along with Chile, have been sustaining strong FTTH growth for several years and lead the region in FTTH adoption at close to 50% of households. However, growth is beginning to slow: each market grew by less than 15% in 2024. On the other hand, other markets are accelerating. **Figure 2** shows which countries have FTTH growth rates above 20%; these include Colombia, Argentina, Peru, Costa Rica, Dominican Republic, and Paraguay. Moreover, all these countries have FTTH penetration rates below 50%, indicating that they still have potential to keep up the momentum. FTTH deployments across the region also benefit from the ease of access to the network of posts managed by energy companies, even considering that conflicts over price and access to the posts may arise. In addition, most countries still lack regulation over the issue, and telecom operators, including ISPs, are building their business over aerial fiber networks (which is significantly less expensive than digging underground networks) to avoid the costs seen in other regions. CSPs have an incentive to invest in FTTH, not only to be better placed to compete with challengers that are 100% fiber network but also to fight copper theft. The relatively high price of the metal attracts criminals, and copper theft causes frequent service disruptions. It is difficult to estimate the size of the problem, but the latest information available from the CSP association of Brazil, Conexis, estimates that 5,500km of copper cables were stolen in Brazil in 2023.

FIGURE 17: TOP 10 LATIN AMERICA & THE CARIBBEAN COUNTRIES IN FIBER NET ADDITIONS, GROWTH, AND PENETRATION, 2024



SOURCE: OMDIA

In Brazil, 5G spectrum auction winners were required to extend fiber infrastructure into the Amazon region. Chile adopted a reverse auction model to fund transport networks in remote areas. In Peru, the government financed the expansion of a fiber backbone to areas outside the main cities of Lima and Callao and handed network management to a private company. However, with no control over pricing and tariffs considered too high by local operators, the company eventually returned the asset to the government because of insufficient demand.

CLOUD COMPUTING IN LATIN AMERICA

The cloud infrastructure market in Latin America, which had already been growing in importance, gained a further boost from the demand for AI services. Many countries in the region have big potential for renewable energy, which is one of the most important requirements for data centers. Brazil, Mexico, and Chile are the main data center markets. Governments are designing new plans to attract data centers. The most recent examples include REDATA, the Brazilian plan for data centers, which is expected to be approved in 2025,

and Argentina is also preparing incentives to attract investment and boost its data center infrastructure. The country is well placed given its low energy costs, skilled workforce, and the fact that it has been home to some of the largest Latin American internet companies.

On the other hand, some regions are grappling with their own unique challenges in developing a stronger cloud services market. The Caribbean, for instance, must contend with a fragmented geography of thousands of islands, limited connectivity between them, seasonal hurricanes, and high energy costs despite strong potential for solar and wind power generation. As a result, the data center market here remains limited with few local players and most workloads still processed in the US.

The strong momentum behind the cloud market in Latin America can be highlighted by investment from hyperscalers. Since 2024, the largest cloud providers operating in Latin America have opened up new cloud regions in the area.

Hyperscalers have stepped up investments in the region; for example, AWS announced a $4bn investment plan for Chile over 15 years. The new cloud region is expected to start operations in 2026. AWS is also planning to spend $5bn in Mexico in the next 15 years and $1.85bn in Brazil until 2034, reaching close to $11bn of planned investment in cloud and AI infrastructure in Latin America. These investments will support construction, connection, operation, and maintenance of data centers in addition to training of professionals in AI and cloud.

Oracle Cloud Infrastructure (OCI) has also been investing in the region. Part of its strategy is to partner with regional telecom groups, especially América Móvil, with which it has had dealings in three countries: Mexico, Colombia, and Brazil. OCI opened new regions in these areas using América Móvil data centers, and América Móvil added OCI cloud services to its multicloud portfolio. In Mexico, OCI opened a second region and will use Triara, an América Móvil data center company. In Brazil, Claro announced a $177m investment plan in the expansion of its cloud offering. The company offers services from AWS, Oracle, and Huawei, using OCI infrastructure in its data center. Finally, OCI launched a new cloud region in Colombia—the first deployment by a major hyperscaler in the country—and Claro became its first local partner.

Huawei has also been building a fast-growing cloud business in the region. Huawei Cloud's main cloud regions in Latin America are located in Brazil, Mexico, and Chile. The company has some of the largest telecom groups in the region as cloud partners, leveraging its strong position in the telecom equipment market. Nonetheless, it has built a partner program that goes beyond telcos, with more than 1,400 partners across Latin America & the Caribbean. Furthermore, Huawei Cloud has been expanding its infrastructure across Latin America. Between Brazil, Chile, Mexico, Argentina, and Peru, it currently operates 12 availability zones and plans to launch a fourth zone in Brazil in the near future.

The company is also expanding collaboration in areas such as AI. A notable example is its agreement with Dataprev, the Brazilian institution responsible for data processing across various government sectors, including social security. Under a nonexclusive arrangement, Dataprev will host Huawei Cloud services, including AI services, in its data centers to support the digital transformation of public services.

In 2024, Microsoft Azure announced a three-year plan to invest $2.7bn in cloud and AI infrastructure in Brazil. The plan includes the training of 5 million Brazilians in AI until 2027. In 2025, Microsoft launched its first cloud region in Chile, which includes three independent data center zones offering Azure, Dynamics 365, Microsoft 365, and Power Platform services. In early 2024, Microsoft also launched its first cloud data center region in Mexico, and in September the same year, it announced a $1.3bn investment plan for the next three years.

In December 2024, Google Cloud announced it had opened its third cloud region in Latin America, located in Mexico, which will join Santiago de Chile and São Paulo in Brazil, and it is investing $850m in building a data center in Uruguay. Google is one of the sponsors of two submarine cables landing in Uruguay, Firmina and Tannat, providing the high-capacity connectivity required by its cloud business.

Overall, Latin America is well placed to accelerate cloud infrastructure investment, but there are issues that need to be addressed. Even though many countries in the region have great potential for renewable energy, investment is needed to convert this potential into a market-ready infrastructure. In addition, some countries still charge high import taxes on electronic equipment (Brazil, for instance, charges 52.7%), which constitutes a major roadblock to the development of the data center market. Political stability is also a critical element for decision makers given the long investment cycle that characterizes the data center market. Finally, the shortage of skilled workforce can be a deterrent to cloud business in the region.

COUNTRY CASE STUDIES AND BEST PRACTICES

This section provides a more detailed analysis of several countries in the BCDI to uncover best practices and other learnings that could benefit broadband and cloud stakeholders worldwide. The case studies cover the US, China, and Spain from Cluster 1; Brazil from Cluster 2; and Kenya from Cluster 3.

The following case studies include an analysis of how country BCDI rankings have changed over the last year and the drivers of that change in the broadband and cloud markets. The case studies also examine the roles that selected government policies and investments have played in the BCDI scores and rankings, emphasizing the need for governments, policymakers, and regulators to support major industries such as broadband and cloud. This support is crucial because it encourages investment, adoption, and usage, which drive economic and social benefits.

US

The US ranks first in the BCDI, thanks to its leading performance in broadband and strong showing in cloud. The US may still have low fiber penetration, but it is the global leader in broadband usage and application, powered by its top scores in online video users and views. And the US government continues to make significant investments in the segment, which will have a positive impact on availability. There are some concerns with affordability because of some recent government changes.
The US ranks in the top five for the second consecutive year for GDP per capita, and absolute GDP per capital grew compared with last year. The economic situation has become tenuous in the US, and going forward there may be increased strain on both consumers and business. However, enterprise spending on public cloud grew from 2023 to 2024, and investment continues.

TABLE 8: US, SELECTED STATISTICS

STATISTICS	2024	2023
Population (millions)	342	335
GDP per capita	$70,886	$68,781
GDP per capita rank in BCDI	5	5
Fixed broadband household penetration	94%	93%
FTTH household penetration	23%	21%
Enterprise average spending on public cloud (000s)	$1,276	$1,098

SOURCE: S&P GLOBAL MARKET INTELLIGENCE AND OMDIA

RANKINGS BY SEGMENT

Broadband penetration ticked up one percentage point this year to reach 94%. But although fixed broadband penetration is high, FTTH penetration is still relatively low at just 23% of households in 2024, though this is an increase from 21% in 2023. Therefore, it is crucial to increase investment in fiber rollouts to drive the next phase of broadband-enabled economic growth in the US.

TABLE 9: US BCDI RANKINGS BY SEGMENT

SEGMENT	2025 RANK	2024 RANK
BROADBAND	1	1
Broadband access	27	28
Broadband usage and application	1	1
Broadband potential	18	10
CLOUD	7	6
Cloud access infrastructure	4	3
Cloud usage and application	10	15
Cloud potential	19	33
BCDI OVERALL RANK	1	1

SOURCE: WBBA

The US maintained its number 1 rank in broadband this year, while its cloud ranking faltered slightly, though it is still near the top at seventh. The US's rank in broadband potential slid from 10th last year to 18th this year, largely because of broadband affordability. The abrupt closure of the Affordable Connectivity Program (ACP) and the social security program cuts in the One Big Beautiful Bill (OBBB), which will make it harder for lower-income Americans to afford broadband, are key factors in the slide in broadband potential.

While broadband potential slipped back, cloud potential jumped from a rank of 33rd in 2024 to 19th in 2025. Growth in public cloud workloads and growth in storage spend contributed to this rank change. With leading hyperscalers investing in AI, the US market has the potential to be among the leaders in the AI boom. In addition to this, the government is supporting AI through various investments.

BROADBAND EQUITY, ACCESS, AND DEPLOYMENT PROGRAM FUNDAMENTALLY CHANGED BY SCRAPPING OF FIBER PREFERENCE

In the US, there is significant investment in broadband through various government programs and policies aimed at closing the digital divide and ensuring all Americans have access to affordable, high-speed internet. The Broadband Equity, Access, and Deployment (BEAD) Program remains the largest one introduced in recent years.

BEAD is a $42.45bn grant program funded by the Infrastructure Investment and Jobs Act (IIJA) with the aim of connecting every American to high-speed internet. The IIJA was signed into law in November 2021 by President Biden, but as of August 2025 no shovels have broken ground. It is a complex program, and because of this and the slow progress, the US Department of Commerce, under the new Trump administration, released a Policy Notice in June 2025 that updated key parts of the program.

The updates in the Policy Notice reduce regulatory burdens, which can help to speed up program implementation. The Notice also removes the fiber technology preference and instead prioritizes the lowest cost. This will undoubtedly change the technology mix from BEAD deployments.

All broadband technologies that meet performance requirements of 100/20Mbps speeds and latency less than or equal to 100 milliseconds are given equal preference. Notably, satellite is no longer considered a last resort, and the program now allows unlicensed FWA providers, which will affect which areas are BEAD eligible, because those with unlicensed FWA now count as served areas.

The program changes will have a lasting mark on the US broadband landscape. What was originally expected to expand fiber across the US is now more likely to favor other technologies, such as satellite and FWA, that can be deployed quickly and cheaply. The loss is the speed and reliability that fiber would provide and the future-proofed nature of the technology.

THE END OF THE ACP AFFECTS LOWER-INCOME AMERICANS

The ACP was a federal program funded through the IIJA with a $14.2 million allocation. The program provided $30/month ($75/month for those on tribal lands) to subsidize internet services. It was considered highly successful at connecting lower-income Americans, but as the fund diminished, Congress did not act to replenish it. As a result, the ACP ended abruptly in June 2024 when funding ran out. The 23 million people that depended on it lost the benefit. Although some could pivot and find a low-cost option, an estimated 5 million households lost broadband connectivity altogether. This shows how vital it is for broadband providers to offer low-cost options in order for the government to achieve its broadband connectivity goals.

OBBB EXPECTED TO INCREASE BROADBAND DEPLOYMENTS BUT MAY MAKE IT HARDER FOR LOW-INCOME AMERICANS TO ACCESS SERVICES

The IIJA-funded BEAD and ACP programs were from the Biden era. A new administration under Donald Trump is influencing broadband in the US with its own set of policies and programs.

In July 2025, President Trump's key legislation, the OBBB, was signed into law. The OBBB includes provisions that are expected to have a positive impact on the US broadband landscape. For example, the tax policies in the OBBB are seen as pro investment and are expected to accelerate broadband deployments and investments.

The bill permanently reinstates the 100% bonus depreciation for select equipment purchases, which in its original form was on a phase-out schedule that was at 40% in 2025, falling to 20% in 2026 and 0% in 2027.

With the passing of the OBBB, AT&T said it plans to invest more quickly in next-generation networks and increase its investment by an additional 1 million fiber locations annually starting in 2026.

The OBBB may incentivize ISPs to increase deployments, but it may also make it harder for low-income households to qualify for affordable broadband. The OBBB also includes cuts to social security programs that will affect access to government-subsidized internet and phone services. The bill makes cuts to both Medicaid and the Supplemental Nutrition Assistance Program (SNAP). These are two of the main programs that qualify individuals for the Lifeline program, which supplies government-subsidized internet (or phone) service. The changes to SNAP could result in an estimated 22.3 million households losing access, and the cuts to Medicaid could result in an estimated 10 million people losing access.

Finally, some of the other government programs that have been supporting the development of broadband in the US in recent years include the Connect America Fund, the Rural Digital Opportunity Fund, the Tribal Broadband Connectivity Program, the American Rescue Plan Act (ARPA), and the Rural eConnectivity (ReConnect) Program. There were also a variety of other programs formed in the IIJA, such as the Enabling Middle Mile Broadband Infrastructure Program and the State Digital Equity Act.

AI DRIVES CLOUD INVESTMENT BOOM

A significant part of the development of the cloud market in the US relates to AI this year, because there has been exponential growth in this area in addition to government policies and programs to support its development.

First, US cloud companies have started investing large amounts of capital to expand cloud infrastructure in the face of the growth of AI. Investment also includes enhancing computing power and integrating AI more deeply into their business.

Together, the four hyperscalers Amazon, Microsoft, Google, and Meta are expected to spend more than $300bn in capex in 2025. Amazon plans to spend $100bn, compared with $83bn last year. AWS has been investing in things such as "AI innovation campuses" and building out data center capacity. Investments have recently been announced in Pennsylvania and North Carolina. Microsoft is planning $80bn in capex, driven by its interest in leading in AI cloud workloads. Google's capex is expected to be similar to Microsoft's at $75bn and focused on compute capacity. Finally, Meta's capex is expected to be in the range of $60–56bn as it incorporates AI deeper into its products, seeing this as a way to stay competitive.

These investments are aligned with the Trump administration's goals in AI leadership.

THE OBBB INCLUDES VARIOUS PROVISIONS FOR AI

The OBBB included a focus on AI. It includes $26bn in funding for AI-related initiatives across various sectors, aimed at fostering innovation, enhancing competitiveness, addressing national security concerns, and more. The key funding allocations include the following:

- $10bn for AI R&D
- $2bn for workforce training
- $5bn for defense AI
- $3bn for AI in healthcare
- $4bn for AI infrastructure
- $1bn for ethical AI development
- $1bn for AI in education

WINNING THE RACE: AMERICA'S AI ACTION PLAN

Shortly after the OBBB was introduced, also in July 2025, the Trump administration released its Winning the Race: America's AI Action Plan with the aim of achieving global AI dominance. The plan includes almost 100 policy recommendations across three pillars: accelerating AI innovation, building American AI infrastructure, and leading in international AI diplomacy and security.

The first pillar is focused on fostering US leadership in AI and limiting regulatory burdens that slow AI innovation. The second pillar is focused on facilitating infrastructure builds for data centers and other infrastructure by streamlining permitting and providing environmental exemptions for builds on federal land. The final pillar is aimed at extending leadership globally, protecting critical AI technologies, and countering foreign adversarial influence.

Along with this plan, President Trump issued three executive orders for executing the policy recommendations: "Preventing Woke AI in the Federal Government," "Accelerating Federal Permitting of Data Center Infrastructure," and "Promoting the Export of the American AI Technology Stack."

THE STARGATE JOINT VENTURE DOVETAILS WITH THE GOVERNMENT'S AIMS FOR AI

Though it is not itself a government initiative, Stargate was revealed in January 2025 at the White House by President Trump with the CEOs of Stargate's key principals in attendance. Stargate is a joint venture between OpenAI, Softbank, and Oracle. Microsoft, NVIDIA, and Arm are also technology contributors to the project, and there is funding from private equity investors.

Stargate's aim is to ensure the US is a global leader in AI and to drive AI innovation. To do this, Stargate's plan is to expand AI infrastructure for OpenAI to train and run the AI models it is developing. This involves plans to build out large-scale data centers.

The joint venture plans to build up to 20 large AI data centers in the US with an initial investment of $100bn and up to $500bn by 2029. The initial plan was to build two AI data centers in Texas in 2025, but as of July 2025 this has been scaled back to one data center this year.

CHINA

China ranks second overall in the BCDI thanks to its strong performance in broadband and cloud, despite having a relatively low GDP per capita. China has a huge population of more than 1.4 billion, which makes it relatively difficult to lift GDP per capita in comparison with other countries. That said, China managed to increase its GDP per capita to $13,005 in 2024 from $12,030 in 2023, and its GDP per capita has ranked at number 39 in the BCDI for two years in a row.

China's GDP has been mainly driven by industrial and manufacturing output and by strong exports, while China's high-tech sectors have also seen significant investment, signaling the country's effort on innovation. Other countries can learn from the successful government initiatives that have made China a leading broadband and cloud market.

TABLE 10: CHINA, SELECTED STATISTICS

STATISTIC	2024	2023
Population (millions)	1,419	1,426
GDP per capita	$13,005	$12,030
GDP per capita rank in BCDI	39	39
Fixed broadband household penetration	99%	99%
FTTH household penetration	95%	99%
Enterprise average spending on public cloud (000s)	$1,694	$1,488

SOURCE: S&P GLOBAL MARKET INTELLIGENCE AND OMDIA

China has an advanced broadband market with fixed broadband household penetration reaching 99% of households (**Table 10**), among the highest in the index. In addition, China's FTTH household penetration was 95% in 2024, also one of the highest in the BCDI. This means that by the end of 2024, nearly 500 million households across China's vast territory had access to fiber broadband services with the high speeds and low latencies needed to support advanced applications and services.

RANKINGS BY SEGMENT

China maintains its third-place ranking in broadband in the BCDI (**Table 11**), and its strong performance in broadband access contributed to this rank. In 2025, China's ranking in broadband access jumped to first from second in 2024, mainly because of its high overall broadband household penetration rates and FTTH household penetration. China's high level of FTTH coverage and penetration makes it stand out in the BCDI among other developing countries. However, China's rank in broadband potential slid from 49th last year to 57th this year, partially because of a below-average score in broadband market competition.

China ranks 17th in cloud, down from its fourth-place ranking last year. Specifically, China's rank in cloud usage and application slid from third last year to eighth this year. Its cloud potential rank was also down from 45th in 2024 to 59th in 2025. China's cloud market competition is high, and the economic environment makes enterprises more cautious about growing their cloud spending significantly, which has an impact on China's cloud ranking in the BCDI.

TABLE 11: CHINA BCDI RANKINGS BY SEGMENT

SEGMENT	2025 RANK	2024 RANK
BROADBAND	3	3
Broadband access	1	2
Broadband usage and application	6	5
Broadband potential	57	49
CLOUD	17	4
Cloud access infrastructure	6	5
Cloud usage and application	8	3
Cloud potential	59	45
BCDI OVERALL RANK	2	2

SOURCE: WBBA

CHINA MOVES TO DUAL 10-GIGABIT BROADBAND

The Chinese government continues to promote the rapid development of the network connectivity to empower high-quality economic and social development. China's ambitious targets and the Chinese operators' investments in broadband development have been the key drivers of the country's high ranking in the broadband segment in the BCDI.

In 2021, China set out its 2025 broadband network targets in its 14th Five Year Plan. The Ministry of Industry and Information Technology (MIIT) aims to cover more than 80% of administrative villages with 5G network and have 60 million gigabit fiber broadband users by 2025. So far, China has already achieved the 5G and gigabit fiber network deployment goals outlined in the 14th Five Year Plan ahead of schedule. Gigabit connectivity has been achieved in every county, every township, and more than 90% of administrative villages. As of the end of June 2025, the total number of 5G base stations in China had reached 4.55 million, the number of ports with gigabit network service capability had reached 30.22 million, and the number of gigabit broadband users had reached 226 million.

So far, 5G has been integrated into 86 of 97 major categories of China's national economy. In November 2024, to promote 5G development, the MIIT and 12 other departments released the "Set Sail" Action Upgrade Plan for 5G Scale Applications. The upgrade plan highlights China's aim to accelerate 5G developments and sets out several targets for 2027, including 5G individual user (non-IoT) penetration rates to exceed 85%, the proportion of cellular data traffic on the 5G network to exceed 75%, the penetration rate of 5G applications in large- and medium-sized industrial enterprises to exceed 45%, and the number of 5G virtual private networks to exceed 70,000.

Furthermore, China is moving to dual 10-gigabit broadband. Dual 10-gigabit broadband refers to 5G-Advanced (5G-A) and 10-gigabit optical networks, which can provide users with a peak downlink speed of up to 10Gbps.

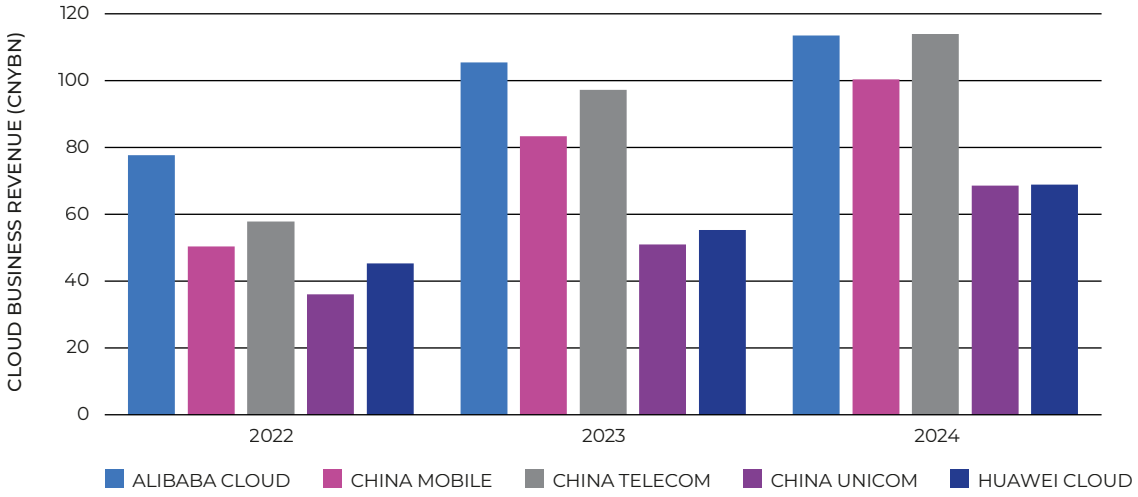
China commercialized 5G-A in 2024 and is targeting a larger scale of 5G-A commercialization in 2025. China Mobile has already deployed 5G-A in more than 330 cities and claims to have the largest 5G-A network in the world. As of the first half of 2025, China Telecom had deployed 100,000 5G-A carrier aggregation base stations and 600,000 Redcap base stations in more than 300 cities. By the end of 2025, China Mobile aims to achieve 50 million 5G-A subscriptions, and China Unicom also plans to fully launch 5G-A services in the main urban areas of 39 key cities and in key scenarios in more than 300 cities across China.

In January 2025, MIIT issued "Notice on Launching the Pilot Work of 10-gigabit Optical Network." By the end of 2025, in cities and regions with conditions and foundations, China will focus on key scenarios such as residential areas, factories, and industrial parks and will carry out pilot projects for 10G optical networks.

CHINESE OPERATORS DEVELOP CLOUD WITH AI

The China telecoms market has established a unique example for global telcos, because cloud services have become a major growth driver for the Chinese telecom operators. Notably, both China Telecom and China Mobile have exceeded CNY100bn ($14.0bn) in annual cloud service revenue. In 2024, China Telecom's cloud service revenue was recorded at CNY113.9 bn, while China Mobile's cloud service revenue reached CNY100.4 bn. This is the first time that China Telecom's cloud business revenue has exceeded Alibaba Cloud's revenue, demonstrating telcos' capabilities in China's cloud market.

FIGURE 18: CLOUD BUSINESS REVENUE BY CHINESE COMPANY, 2022–24



Notes: Alibaba Cloud data is based on its fiscal year from April 1 to March 31; FY2024 ended March 31, 2024. Data for the other companies is based on their fiscal years, which are calendar years.
Alibaba Cloud notes in its 2024 annual report that in its FY2024 it reclassified revenue from its DingTalk business from its Cloud business to its "All others" segment.
Huawei Cloud revenue in 2024 of CNY68.8bn includes revenue from other Huawei segments.
SOURCE: OMDIA

The three Chinese telco operators' cloud services have all demonstrated continuous growth during recent years, but YoY growth rates are slowing down because of the increasing scales of their cloud service revenue (China Mobile, 20.4% in 2024 vs. 65.6% in 2023; China Telecom, 17.1% in 2024 vs. 67.9% in 2023; China Unicom, 17.1% in 2024 vs. 41.6% in 2023), so all three are now proactively exploring new growth momentum for their cloud services. The development of AI has brought about the development of intelligent cloud. Therefore, the telcos in China deem intelligent computing service to be a new growth engine and expect AI to provide strong impetus for future growth in cloud services.

Faced with the intelligent cloud trend, the Chinese telcos have already laid out their strategy. For example, China Telecom has built an intelligent cloud system with "Xirang" as the core platform, based on cloud-network convergence. China Telecom says it provides full-stack capabilities spanning computing power, platform capabilities, data resources, model frameworks, and application services. Xirang provides heterogeneous computing services with a capacity of 77EFLOPS and delivers standardized AI products, industry-specific LLMs, and intelligent agent solutions to consumers, government, and enterprises. The operator says it has used AI integration to deploy more than 160 AI applications across 21 key sectors, supported by a unique process toolchain platform that creates a model-as-a-service system to develop customized AI solutions to support different requirements.

Regarding AI as a driving force for cloud development, the Chinese telecom operators are also proactively partnering with leading AI players to enhance their cloud services. In February 2025, China Mobile, China Telecom, and China Unicom all integrated the AI large models of DeepSeek into their cloud services. By doing this, the Chinese telecom operators have commercially provided their cloud services to several vertical customers, including customers in energy and finance.

Looking ahead, the China government is urging the deployment of intelligent computing infrastructure. In August 2025, MIIT announced it would continue optimizing the national computing power layout and guide intelligent computing infrastructure to be moderately advanced and dynamically balanced. As of June 2025, the scale of China's intelligent computing power had reached 788EFLOPS.

SPAIN

Spain ranks 15th in the overall BCDI, up one place from its 2024 ranking, mostly because of its strong performance in high-speed connectivity and nationwide FTTH deployment. Spain also moved from Cluster 2 in 2024 to Cluster 1 in 2025 as a significant increase in fiber penetration boosted both its broadband access and cloud scores, because companies with improved broadband access increased adoption of cloud services.

Spain's overall BCDI ranking is higher than its GDP per capita ranking, reflecting significant connectivity infrastructure investment backed by the EU's funding and favorable regulatory environment. However, Spain's cloud performance is still trailing behind, preventing it from reaching an even higher position in the overall index, although it moved to 32nd place in the cloud ranking, up 13 points, reflecting a boost from EU government and Spanish government initiatives aimed at cloud adoption.

TABLE 12: SPAIN, SELECTED STATISTICS

STATISTIC	2024	2023
Population (millions)	48	47
GDP per capita	$31,299	$30,068
GDP per capita rank in BCDI	24	25
Fixed broadband household penetration	79%	71%
FTTH broadband household penetration	69%	61%
Enterprise average spending on public cloud (000s)	$598	$550

SOURCE: OMDIA AND S&P GLOBAL MARKET INTELLIGENCE (GDP PER CAPITA)

RANKINGS BY SEGMENT

In the broadband segment of the BDCI, Spain ranks 10th with relatively high positions in broadband access (11th) and in broadband usage and application (13th). It ranks 25th in the broadband potential segment. Over the last decade, operators have heavily invested in advancing fiber network infrastructure, providing households and businesses with high-speed connectivity and near-universal broadband coverage. A favorable regulatory framework, combined with the EU's financial and strategic backing, has played a key role in supporting Spain's widespread fiber access, usage, and application.

Spain ranks 32nd in the overall cloud ranking, and its performance in cloud access usage and application is more modest than its broadband performance. Though large enterprises consistently show higher rates of cloud adoption and spending, many Spanish SMEs have been slower in cloud adoption because of costs, security aspects, financial strains, and a lack of skilled workforce. The country ranks lower than many other advanced markets, but the EU and the Spanish government have recently boosted funding for Spain's cloud initiatives (e.g., Quantum Spain, UNICO R&D Cloud initiative), which is reflected in an overall improvement in cloud index score with a significant boost in cloud access and cloud potential segments.

TABLE 13: SPAIN BCDI RANKINGS BY SEGMENT

SEGMENT	BCDI RANK 2025	BCDI RANK 2024
BROADBAND	10	11
Broadband access	11	14
Broadband usage and application	13	14
Broadband potential	25	8
CLOUD	32	45
Cloud access	33	45
Cloud usage and application	33	35
Cloud potential	36	54
BCDI OVERALL RANK	15	14

SOURCE: WBBA

EFFECTIVE GOVERNMENT POLICIES POSITION SPAIN AT THE FOREFRONT OF FIBER DEVELOPMENT IN EUROPE

Spain now leads Europe in fiber rollout: fiber accounts for 90% of the total technology mix, thanks in part to the effective regulatory framework. For example, Telefónica, Spain's incumbent operator, initially received regulatory holidays that incentivized fiber investment without immediate open-access requirements. Spain was also among the first European countries to develop a strategy for phasing out legacy copper networks, and earlier in 2025, Telefónica shut down its copper network. Moreover, Spanish regulator CNMC has adopted a regulatory framework that both encourages infrastructure investment and maintains competition.

Spain's Digital Agenda, Digital Spain 2026, initiated in 2020 and updated in 2022, establishes strategic priorities for national digital transformation, aligning with EU Gigabit Society and Digital Decade goals. The program guarantees at least 100Mbps coverage for the entire population by end-2025 and 100% FTTP / Very High-Speed Capacity Network (VHCN) coverage by 2030. The initiative prioritizes extending coverage to rural regions and also aims to deliver 1Gbps connectivity to data-intensive industrial and research zones. In terms of infrastructure and access, Spain is on track to meet its 2025/30 connectivity targets. According to data from the European Commission, Spain had 95.68% 100Mbps (or higher) coverage and 25.4% 1Gbps coverage in 2024.

Funding for Spain's Digital Agenda comes from public resources across different EU programs and financial instruments as part of the Next Generation EU Recovery Plan. Within the EU's Recovery and Resilience Plan (RRP) framework, €250m was allocated through the 2021 call of the UNICO-Banda Ancha program, a Spanish initiative aimed at expanding ultrafast broadband access. The 2021 call aimed to bring high-speed broadband connection to one million homes and businesses across 4,500 municipalities. In the framework of the 2024 call of the UNICO-Banda Ancha program, Spain allocated another €18.5m in grants to facilitate the development of FTTP/VHCN networks at speeds of at least 300Mbps to 60,000 businesses and homes.

In 2023, Spain established a Ministry for Digital Transformation and Civil Service that is responsible for the implementation of Spain's digital policies including oversight of digital infrastructure programs including "Digital Spain 2026." This ministry facilitates centralized planning, funding, and regulation to achieve FTTP/VHCN targets particularly in underserved areas.

GOVERNMENT POLICIES AND EU-FUNDED PROGRAMS SUPPORT CLOUD SERVICES AND DEVELOPMENT OF QUANTUM TECHNOLOGIES IN SPAIN

The Spanish government has a series of initiatives, such as Digital Spain 2026 Agenda and the Digital Transformation Plan for Public Administrations, that support cloud adoption across both public and private sectors. In 2022, the Ministry of Economy and Digital Transformation (merged

into the Ministry for Digital Transformation and Civil Service in 2023) launched the National Cloud Services Strategy for public administrations. This strategy prioritizes cloud-based service delivery across public administrations, primarily leveraging the adoption of a hybrid-cloud infrastructure that includes each administration's own cloud resources supplemented by those of other public administrations and external providers.

Spain is also actively investing in cloud infrastructure using EU recovery funds: a significant proportion of the €40.4bn RRP is dedicated to development of cloud programs. For example, in 2022 Spain launched the UNICO R&D Cloud initiative, called UNICO I+D Cloud, with a €43m budget, which provides grants to support innovative cloud computing projects in public research centers and foundations and in public universities.

In the context of the Important Project of Common European Interest on Next Generation Cloud Infrastructure and Services (IPCEI-CIS), launched by the EU in 2023, Spain aims to promote cloud technology adoption among businesses while investing in innovative green-cloud infrastructure. For example, this includes developing sustainable operating models that achieve full decarbonization using natural refrigerants in data centers.

Another forward-looking initiative launched in 2021, supported by RRP, is the Quantum Spain program. This initiative has an initial investment of €22m with total investment expected to reach €60m. The project aims to establish a national quantum ecosystem, featuring a superconducting qubit-based quantum computer with cloud access, quantum algorithm development capabilities, and emulators, across Galicia, Castilla y León, and Barcelona. In the framework of the Quantum Spain program, Spain deployed its first quantum computer in February 2025, and in April 2025 access to this quantum infrastructure was opened to researchers and businesses, offering quantum network as a public service. Also in April 2025, Spain launched its Quantum Technology Strategy with €800m in public funding supported by RRP and the European Regional Development Fund (ERDF).

BRAZIL

Brazil ranks 37th in the BCDI, occupying an intermediary position in line with what can be expected from a developing economy that needs to overcome significant challenges to connect its population of 212 million in a large country and with a GDP per capita of $9,815 in 2024. Nonetheless, it is significant that, though Brazil has only the 48th-highest GDP per capita of the countries featured in this report, its performance in the BCDI is actually better than its GDP per capita would suggest.

Nonetheless, the country dropped seven positions in the ranking from 2024, largely because of issues with cloud potential and cloud usage and application. Overall, Brazilian enterprises are still in the initial stages of cloud services adoption; despite investments from important sectors including financial services, oil and gas, and telecommunications, there are still several sectors and many small and midsized businesses that have yet to accelerate cloud services adoption.

TABLE 14: BRAZIL, SELECTED STATISTICS

STATISTIC	2024	2023
Population (millions)	212	218
GDP per capita	$9,815	$9,309
GDP per capita rank in BCDI	48	45
Fixed broadband household penetration	54%	53%
FTTH broadband household penetration	38%	38%
Enterprise average spending on public cloud (000s)	$527	$493

SOURCE: S&P GLOBAL MARKET INTELLIGENCE AND OMDIA

Among the factors behind Brazil's performance, it is possible to mention the success of investment in fiber infrastructure. The country developed a competitive landscape, with national and regional broadband providers that have been investing in fiber networks, while a light-touch approach from the regulator has been supporting the development of the market. As a

consequence, fiber broadband is the leading technology in the country, and Brazil has one of the highest levels of fiber connections in the world in absolute terms.

RANKINGS BY SEGMENT

Brazil ranks number 35th in broadband and 41st in cloud, leading to its overall number 37 ranking in the BCDI (**Table 15**). This result is mainly driven by the country's performance in broadband. Even though Brazil's ranking in broadband access dropped to 44 in 2025, that was largely due to a statistical factor: results from the new Brazilian Census were published by the end of 2024 and identified a higher number of households in the country than previously estimated by the Brazilian Statistics Bureau, which led to a lower broadband penetration rate than previously estimated but a more accurate view of the state of adoption of broadband in the country. Nonetheless, the highly competitive market and relatively affordable broadband service prices compensate for the drop in broadband access score, keeping BCDI broadband index stable at 35th place.

The biggest impact on Brazil's BCDI ranking drop was its performance in the cloud metrics. Brazil was surpassed by countries including Italy, Mexico, Poland, Vietnam, Bulgaria, and Slovakia. Though it was close to most of them in terms of broadband metrics, these countries outperformed Brazil in cloud metrics, which led to the overall ranking drop for the country.

TABLE 15: BRAZIL BCDI RANKINGS BY SEGMENT

SEGMENT	RANK 2025	RANK 2024
BROADBAND	35	35
Broadband access	44	36
Broadband usage and application	27	28
Broadband potential	16	37
CLOUD	41	21
Cloud access	37	35
Cloud usage and application	37	17
Cloud potential	42	21
BCDI OVERALL RANK	37	30

SOURCE: WBBA

BRAZIL IS ONE OF THE MOST DYNAMIC FTTH MARKETS WORLDWIDE

Brazil is the largest Latin American market, and scale, competition, and regulation are the key elements to understanding the country's performance in the BCDI. The country's geography and sociodemographic characteristics help in understanding how the connectivity market evolved over time. Brazil has a population of 212 million and 93 million households and is the fifth most populous country in the world.

The combination of investment from CSPs and ISPs has made Brazil one of the most dynamic FTTH markets globally. In 2024 alone, the country had 51.9 million fixed broadband subscriptions, of which 38.4 million were FTTH. As a consequence, Brazil reached 55.5% of households with fixed broadband, and 41% of households are connected via FTTH.

Also, Brazil has a relatively lower share of its population living in large urban areas than its neighbors. This has created demand for fixed broadband in the interior of Brazil that was only partially served by the main CSPs. This led to the emergence of thousands of ISPs that deployed fiber networks across the country, to the point that by 1Q25 these ISPs were responsible for 54% of all fixed broadband connections in the country.

The government has been fostering the market through several initiatives. First, Brazilian regulator Anatel designed a straightforward licensing process to make it easy for ISPs to offer services. Additionally, Anatel included the requirement to build transport networks in areas such as the Amazon region among the obligations attached to spectrum auctions. Furthermore,

Brazil's Universal Telecommunications Fund (FUST) has been used to fund fiber infrastructure projects. Funded by a 1% levy on telecom service provider revenue, the resources are managed by the Brazilian Development Bank (BNDES) in coordination with the Communications Ministry (MCOM), which approves eligible initiatives. One such initiative is the Network Expansion project, which plans to build networks across 552 cities, reaching 776,000 households. With a budget of BRL1.4bn allocated for 2023–25, the plan covers three key areas: city-level fiber expansion, access networks, and 4G/5G coverage.

Nonetheless, with a fixed broadband penetration rate of 55.5%, Brazil is still only halfway along its journey to connect its population. The size of the country remains a challenge for the government and for service providers aiming to reach all areas. There are 41.4 million households that have yet to be connected by fixed networks, and according to Anatel, 22% of municipalities are not reached by a fiber transport network.

LEADING LATIN AMERICA IN DATA CENTER INVESTMENT

Brazil leads the Latin American region in terms of data center infrastructure investment. The country is seeing increasing activity from hyperscalers and investors, and the government is preparing a special regime that will give tax breaks and funding for data center expansion and construction projects.

Furthermore, companies such as Odata, Equinix, and Scala have announced important investments in key cities including São Paulo, Fortaleza, and Rio de Janeiro. New initiatives such as Rio AI City and Patria Investments' reentry into the data center market through the launch of Omnia reinforce Brazil's role as a regional hub. Omnia also plans to expand its footprint with data center developments in Chile and Mexico.

Odata is among the most active players in Brazil's data center market and is currently developing its sixth facility in the country. Fortaleza has been attracting key investments thanks to its position as a major submarine cable hub. Scala, for instance, is planning a 21 megawatt (MW) data center in the city, while Tecto is constructing its third site in the region. Meanwhile, Brazilian company Casa dos Ventos is seeking regulatory approval to build two data centers in the Pecém Industrial Hub in Ceará, with an estimated investment of $9bn. Despite this, São Paulo continues to lead as Brazil's primary data center hub.

Demand for AI has been driving data center investment in Brazil. One of the most ambitious plans currently in discussion is the building of Rio AI City, a campus with a capacity of up to 3.2 gigawatts (GW), by 2032. Elea Data Centers already has a data center on the campus and plans to build another two. It estimates that Rio AI Hub could reach 1.5GW by 2027, powered by renewable energy. The city government of Rio de Janeiro is promoting the project to attract the necessary investment.

Elea is also leading another important project in the State of Rio Grande do Sul. It received approval to build a 5GW AI data center, which is one of the largest approved by the Energy and Mining Ministry (MME).

The Brazilian federal government has been working on two complementary plans: the National Plan for AI (PNIA) and the National Plan for Data Centers (REDATA). PNIA is focused on AI development nationwide with an estimated BRL23bn in investment between 2025 and 2028. Key areas include application development, data center infrastructure, chip production, and the creation of a national supercomputer linked to the National Laboratory for Scientific Computing. Meanwhile, REDATA plans to facilitate data center investment by offering tax incentives for equipment imports. Its goal is to safeguard national sovereignty over sensitive data, increasing the economy's productivity, fostering AI innovation, and strengthening national companies.

The telecommunications universal fund is also contributing to the development of cloud infrastructure, providing BRL600m to projects building or expanding data centers.

Despite these initiatives, Brazil still faces considerable challenges in accelerating cloud investment. The country's complex tax system increases both operational and capital expenses. Another hurdle is the shortage of skilled professionals, a problem already affecting the entire IT sector and expected to get worse as new data centers become operational. Additionally, even though Brazil has strong potential for renewable energy, the infrastructure for generating and distributing solar and wind power is still under development.

KENYA

Kenya has experienced a notable decline in its BCDI positioning, descending to 69th globally, a 12position decline from its 2024 ranking. The decline can be primarily attributed to the significant decline in enterprise-level spending on public cloud infrastructure and services. In addition, the introduction of 11 more technologically advanced markets into the 2025 BCDI evaluation may have caused Kenya's drop down the rankings.

Nevertheless, Kenya's macroeconomic indicators remained robust. GDP per capita expanded 4.5% YoY in 2025, which was attributed to the sustained growth across key economic sectors including agriculture, tourism and hospitality, telecommunications, and manufacturing.

TABLE 16: KENYA, SELECTED STATISTICS

STATISTIC	2024	2023
Population (millions)	56	56
GDP per capita	$2,216	$2,163
GDP per capita rank in BCDI	68	58
Fixed broadband household penetration	9%	8%
FTTH broadband household penetration	6%	5%
Enterprise average spending on public cloud (000s)	$353	$370

SOURCE: S&P GLOBAL MARKET INTELLIGENCE AND OMDIA

RANKINGS BY SEGMENT

Kenya ranks 67th in broadband adoption and 64th in broadband and cloud adoption, giving it an overall 69th ranking in the BCDI **(Table 17)**. The country's broadband development is supported by key strategic factors including accelerated infrastructure expansion initiatives, enhanced affordability for connectivity services and end-user devices, and a progressive regulatory framework. Kenya has accelerated deployment of fiber-optic infrastructure to meet the surge in demand for high-capacity and low-latency connectivity services.

Notwithstanding the relative decline in the rankings, Kenya remains a vibrant and evolving digital marketplace, characterized by high service adoption trends across both the consumer and enterprise segments.

TABLE 17: KENYA BCDI RANKINGS BY SEGMENT

SEGMENT	RANK 2025	RANK 2024
BROADBAND	67	56
Broadband access	68	56
Broadband usage and application	73	62
Broadband potential	27	18
CLOUD	64	57
Cloud access	65	58
Cloud usage and application	63	47
Cloud potential	63	48
BCDI OVERALL RANK	69	57

SOURCE: WBBA

KENYA LEVERAGES BROADBAND DEVELOPMENT TO DRIVE ECONOMIC GROWTH

The Kenyan government acknowledges broadband as a fundamental catalyst for economic growth, social inclusion, and national development. Through the National Broadband Strategy (NBS) 2018–2023, Kenya established a framework to transform into a globally competitive knowledge-based economy utilizing affordable, secure, and high-speed broadband. This strategy outlined ambitious targets including 95% national broadband coverage by 2020, connection speeds of 2Mbps in communities and 10Mbps in high-impact areas by 2023, and the achievement of 100% broadband penetration across rural areas by 2023.

Over the last two decades, Kenya has invested in the National Optical Fiber Backbone Infrastructure, creating an extensive connectivity network spanning 9,000km of terrestrial fiber-optic infrastructure with 40Gbps design capacity. This ambitious project connects key government institutions across all 47 administrative counties nationwide. The implementation was done in three phases and included the deployment of IP equipment and building of metropolitan area networks across all the county headquarters.

The government enhanced its broadband development efforts by introducing the Universal Service Fund (USF) Strategy 2023–2027 in May 2025. This ambitious KES40bn ($307m) blueprint aims to bridge the digital divide while promoting inclusive ICT service access. Central to this strategy is the Digital Superhighway initiative, which envisions deployment of 100,000km of fiber-optic cable, creation of 25,000 public Wi-Fi hotspots, and the establishment of 1,450 ICT hubs nationwide.

Since its operationalization in 2014, the USF has successfully connected more than 800,000 residents in rural and underserved regions, provided broadband to 886 learning institutions, and transformed 56 public libraries into digital resource centers. The government seeks to accelerate progress through partnerships with service providers and utility companies, focused on last-mile connectivity expansion with the aim of deploying 2,500km of fiber across 19 underserved regions while establishing 1,450 ICT hubs throughout the country. This initiative will drive digitization across key sectors of the economy including agriculture, education, health, and justice, ensuring digital service accessibility throughout Kenya.

Though it has not fully achieved all targets, Kenya has made considerable progress in broadband development, resulting in expanded coverage, increased subscriptions, and improved digital transformation. It is noteworthy that mobile connectivity dominates the broadband landscape. Fixed broadband household penetration was at only 12% in 2024 compared with 70% for mobile services.

Kenya considers data centers and cloud services to be essential infrastructure components for e-government service delivery. The government established a Tier 2 Government Data Center in 2008 to secure and host critical government data and applications. Building on this foundation, Kenya has developed the National Data Center at Konza Technopolis, featuring a cloud-based Tier 3 data center connected to all major fiber-optic infrastructure throughout the country.

ACCELERATING DIGITAL TRANSFORMATION BY PROMOTING ADOPTION

Despite significant progress in infrastructure development, Kenya faces several critical challenges in its digitization journey, including the high cost of devices, a widespread lack of digital skills, and connectivity gaps, particularly in marginalized regions across the country.

In response to these challenges, the government launched the Kenya Digital Economy Acceleration Project in 2023, a $390m initiative supported by the World Bank to advance the digital economy. This project will be implemented across three phases between 2023 and 2028 and will focus on three key components: digital infrastructure and services, digital government and services, and digital skills and markets.

To address the device accessibility and affordability challenge, the government partnered with mobile operators to establish East Africa Device Assembly Kenya Limited (EADAK) in October 2023. This facility represents Kenya's first smartphone assembly plant, capable of

manufacturing up to 3 million devices annually. Although the government initially targeted sub-$35 smartphones, locally produced devices currently retail from $50. Service providers have introduced device-financing programs to enhance affordability and encourage adoption.

The Kenya Digital Master Plan 2022–32, launched in 2022, emphasizes digital skills development to enhance ICT capacity and accelerate digital service adoption in the country. Recognizing the increasing sophistication of ICT, the government acknowledges the need for advanced skill sets to foster a vibrant digital economy and support innovation. The Digital Literacy Programme (DLP) was established to incorporate digital skills into the basic education curriculum, distributing more than 1.1 million learning devices and benefiting more than 3 million students. Additionally, the Ajira Digital initiative provides training and digital employment opportunities to more than 1.2 million young Kenyans.

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