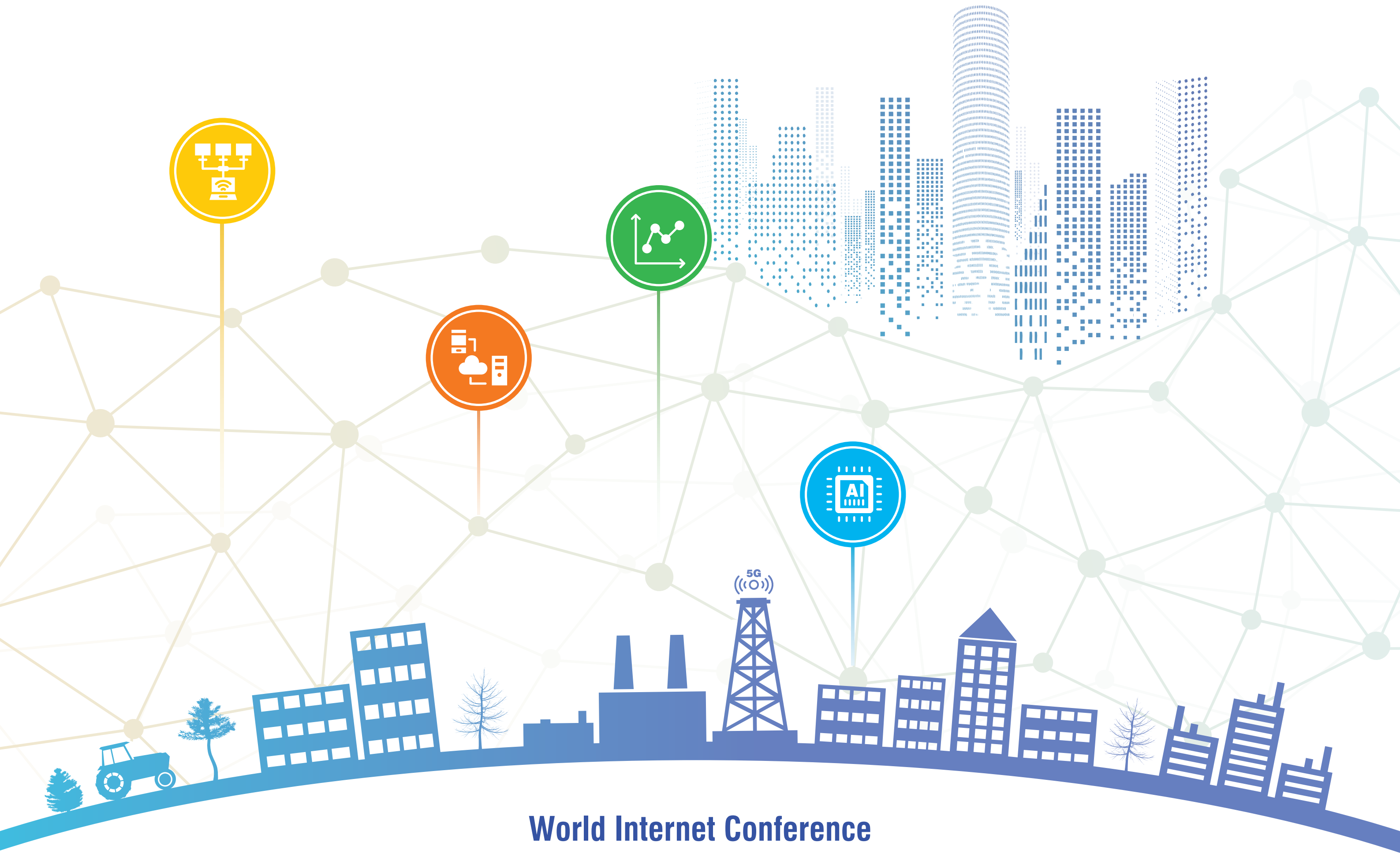
世界互联网大会
World Internet Conference

Promoting Global Digital Infrastructure Development and Bridging the Digital Divide



World Internet Conference
Think Tank Cooperation Program
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World Internet Conference Think Tank Cooperation Program

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Preface

The world is undergoing the Fourth Industrial Revolution, which is characterized by digital transformation. Digital infrastructure has become a cornerstone for global economic development and social progress.

With the rapid advancement of new-generation information technologies such as 5G, artificial intelligence (AI), the Internet of Things (IoT), and cloud computing, the global digitalization process has accelerated significantly, with the coverage and service capabilities of digital infrastructure continuously improving. However, we must be acutely aware that the issue of unbalanced and inadequate global digital development remains prominent and the digital divide persists between developed and developing countries, between urban and rural areas, and among different demographic groups. This not only constrains the sustainable development of the global digital economy, but also poses challenges to achieving the United Nations Sustainable Development Goals (SDGs). Promoting global digital infrastructure development and bridging the digital divide have become a shared consensus of the international community. In December 2015, Chinese President Xi Jinping made a five-point proposal for building a community with a shared future in cyberspace at the Second World Internet Conference, prioritizing “accelerating the building of global Internet infrastructure for greater connectivity” and emphasizing the need to break down information barriers through connectivity. The Beijing Initiative on the Belt and Road International Digital Economy Cooperation[1], released at the Third Belt and Road Forum for International Cooperation (BRF III) in 2023, called for strengthening digital capacity building, safeguarding developing countries’ rights to peacefully utilize basic Internet resources and technologies, and enhancing connectivity through high-quality digital infrastructure development and investment. In 2024, the OECD Digital Economy Outlook 2024, Volume 1: Embracing the Technology Frontier[2] highlighted that digital infrastructure of a larger scale and a broader scope is needed to narrow the information connectivity divide. The

1 https://www.yidaiyilu.gov.cn/p/0BDNJ2BM.html
2 OECD: “OECD Digital Economy Outlook 2024 (Volume 1): Embracing the Technology Frontier”, https://www.oecd.org/en/publications/oecd-digital-economy-outlook-2024-volume-1_a1689dc5-en.html

UN's Global Digital Compact[3] underscored the importance of enhancing international cooperation to achieve universal, meaningful, and affordable connectivity and bridge digital divides both between and within countries.

As an emerging international organization in the field of the Internet, World Internet Conference (WIC) officially launched its Think Tank Cooperation Program during the 2024 Wuzhen Summit. This Program aims to establish a global platform for academic exchanges and intellectual dialogues in the field of the Internet, contributing wisdom and strength to the development of the Internet industry and the bridging of the digital divide. To drive inclusive development of global digital infrastructure, the World Internet Conference (WIC) initiated a joint research project titled "*Promoting Global Digital Infrastructure Development and Bridging the Digital Divide*" in May 2025. By leveraging the expertise of the participants of its Think Tank Cooperation Program and through research, surveys, and discussions, the project produced its Research Report - *Promoting Global Digital Infrastructure Development and Bridging the Digital Divide*.

This report adopts a global perspective to systematically review the definition and composition of digital infrastructure and elucidate the role of digital infrastructure as a critical component of new infrastructure in supporting digital economic development and enabling industrial transformation and upgrading. The report provides an in-depth analysis of the current status of global digital infrastructure development, showcasing the latest progress from four dimensions: networks, computing power, data, and models. It objectively assesses the specific manifestations of the global digital divide, analyzing its multidimensional manifestations and underlying causes from three perspectives: network coverage, intelligent applications, and security. It also explores key challenges facing international cooperation in digital infrastructure development and proposes recommendations for such cooperation at the national, international organization, and industry levels.

We firmly believe that through concerted efforts by the international community, international cooperation in digital infrastructure development will reach new heights, effectively bridge the global digital divide and ensure that the benefits of digital civilization are widely accessible to people worldwide, thus laying a solid foundation for jointly building a community with a shared future in cyberspace.

3 UN: "Global Digital Compact", https://www.un.org/digital-emerging-technologies/global-digital-compact

Ⅰ. Definition and Composition of Digital Infrastructure

With the booming of next-generation information and communication technologies (ICTs), data has emerged as a vital factor of production. Digital infrastructure, serving as an essential medium for data sensing, transmission, storage, computing and application, constitutes an indispensable public service platform for economic and social development, alongside traditional infrastructure such as water, electricity, and roads.

1. Definition of Digital Infrastructure

Many authoritative international organizations have defined digital infrastructure and its related concepts.

◈ **United Nations (UN)**[1]: National information infrastructure is a system of advanced computer systems, databases and telecommunications networks that make electronic information widely available and accessible.

◈ **International Organization for Standardization (ISO)**[2]: Digital infrastructure is infrastructure driven by data and technology, based on the communication network, and centered on data computing facilities.

◈ **International Telecommunication Union (ITU)**[3]: Global information infrastructure is a collection of networks, end user equipment, information, and human resources, which can be used to access valuable information, communicate with each other, work, learn, receive entertainment from it, at any time and from any place, with affordable cost on a global scale.

Based on the international consensus within the

1 UN: https://unterm.un.org/unterm2/en/view/5a179522-097d-403c-8486-c46e18c5a1d4
2 ISO: "ISO 25556:2025", https://www.iso.org/obp/ui/en/#iso:std:iso:25556:ed-1:v1:en
3 ITU: "Y.101 : Global Information Infrastructure terminology: Terms and definitions", https://www.itu.int/rec/T-REC-Y.101-200003-I/es

United Nations 2030 Agenda for Sustainable Development[4] on promoting universal digital connectivity and bridging the digital divide, and in line with the current needs of global digital development, this report posits that digital infrastructure represents a novel infrastructure system, which spans the entire lifecycle of data elements, encompassing sensing and collection, high-speed transmission, efficient storage, intelligent computing, innovative applications, and safety and security, and which is underpinned by network connectivity and computing power supply and driven by data elements and intelligent models, and aims to drive economic transformation, optimize social governance, ensure digital security, and foster technological innovations.

From the perspective of its fundamental connotations, digital infrastructure exhibits high empowering capabilities **in terms of its empowering roles**. Traditional infrastructure primarily addresses physical connectivity issues, whereas digital infrastructure not only serves as a foundational support, but also directly drives industrial transformation. **In terms of scale effects**, digital infrastructure demonstrates strong synergy. The value of digital infrastructure follows Metcalfe's Law, where its application utility increases exponentially with the growth in the "number of connected nodes", generating a "multiplier effect" across regions and industries. **In terms of development evolution**, digital infrastructure is highly dynamic and requires continuous iteration at a pace far exceeding traditional infrastructure so as to keep pace with technological innovations.

From the perspective of its value extensions, **at the economic level**, digital infrastructure functions as a growth engine for the digital economy. The International Telecommunication Union (ITU)'s report "Working Together to Connect the World by 2020"[5] indicates that a 10% increase in broadband penetration can drive the GDP growth by 0.25% to 1.38%. **At the social level**, digital infrastructure is crucial for bridging the digital divide. By deploying satellite Internet in remote areas and fiber optics in rural areas, the people in underserved regions can also access digital services such as education and healthcare. In OECD's "National Broadband Plans"[6], it is estimated that a 10% increase in broadband penetration can enhance labor productivity by 1.5%. **At the global governance level**, digital infrastructure forms the foundation for building a community with a shared future in cyberspace. The interconnected global submarine cables and cross-border data centers support cross-border e-commerce, international payments, and global scientific research collaboration, serving as the physical prerequisite for

4 UN: https://www.un.org/zh/documents/treaty/A-RES-70-1
5 ITU: "Working Together to Connect the World by 2020", https://broadband.itu.int/wp-content/uploads/2021/02/BBDavos_Discussionpaper2016.pdf
6 OECD: "National Broadband Plans", https://www.oecd.org/content/dam/oecd/en/publications/reports/2011/06/national-broadband-plans_g17a1fc5/5kg9sr5fmqwd-en.pdf

achieving “shared benefits of digital civilization”.

2. Composition and Functions of Digital Infrastructure

Digital infrastructure, through the deep integration of IT (Information Technology), CT (Communication Technology), DT (Data Technology), and OT (Operational Technology), constructs a complete closed-loop encompassing “network, computing power, data, and models” from four dimensions: “connectivity and transmission”, “computing power support”, “data value”, and “model empowerment”. This provides crucial support for digital infrastructure development. The four elements are interdependent and operate in synergy, collectively forming the organic ecosystem for digital infrastructure.

Network infrastructure delivers ubiquitous global information transmission channels, including fiber broadband networks, data communication networks, mobile communication networks, and satellite communication networks. It provides low-latency, high-reliability, and wide-coverage transmission channels for the intelligent Internet of Everything (IoE) and the efficient flow of data.

Computing power infrastructure handles the important functions of data storage and processing. It encompasses facilities such as data centers, edge computing facilities, AI data centers, and cloud service platforms, providing the computing power foundation for digital and intelligent applications in various fields.

Data infrastructure breaks down data silos, activates the value of data elements, and ensures secure and compliant data usage. It encompasses facilities related to data production, circulation, and governance, providing data support for cross-domain data flow and value discovery.

Model infrastructure offers support functions for the development, training, and inference of algorithmic models. It includes foundational large models, industry-specific models, along with their respective development, training, and inference platforms and supporting tools, offering intelligent solutions for digital transformation across industries.

Ⅱ. Current Status of Global Digital Infrastructure Development

From physical connectivity in the digital world to value creation in the intelligent era, the accelerated development of four types of key digital infrastructure - networks, computing power, data, and models, are collectively underpinning the vigorous growth of the digital economy.

1. Network Infrastructure

The coverage of global network infrastructure continues to expand, with accelerated development in four major infrastructure areas: fiber broadband networks, data communication networks, mobile communication networks, and satellite communication networks and with the boundaries of digital connectivity constantly expanding.

1.1 Fiber Broadband Networks: Enhancing Transmission Capacity

From the perspective of global submarine cable deployment, international communication submarine cables carry approximately 99% of the world's intercontinental communication and data traffic[1]. There are currently 597[2] submarine cables in operation or under construction in 2025, marking a 6.8% increase from 559[3] in 2024. In terms of fiber broadband transmission and access, the transmission capacity of global fiber-optic broadband networks continues to rise, taking broadband access into the gigabit era and accelerating the migration toward the 10-gigabit era. The United States is actively advancing the construction of high-speed backbone and access networks, expediting the transition to 400G transmission technology and 10G-PON access technology. As of the end of 2024, the fiber-to-the-home (FTTH) subscriber penetration exceeded 96% in China, with the number of 10G-PON ports reaching 28.20 mil-

1 CAICT: http://www.caict.ac.cn/kxyj/qwfb/ztbg/202307/P020230718390842938808.pdf

2 TeleGeography: "Submarine Cable Map 2025", https://submarine-cable-map-2025.telegeography.com/

3 TeleGeography: "Submarine Cable Map 2024", https://submarine-cable-map-2024.telegeography.com/

lion[4]. Looking ahead, the scale of submarine cable deployment will continue to expand, fiber-optic transmission and access technologies will undergo accelerated iteration, and the transmission capacity and coverage of fiber broadband networks will experience a substantial leap.

1.2 Data Communication Networks: Enabling the Internet of Everything (IoE)

In terms of user scale, the ITU's report "Facts and Figures 2024"[5] indicates that as of the end of 2024, there were 5.5 billion Internet users globally, accounting for 68% of the world's total population, with the year-on-year growth rate rising from 2.7% in 2023 to 3.4% in 2024. In terms of data traffic, according to the forecast in the ITU's report, global Internet traffic reached 7.3 zettabytes (ZB) in 2024, with an average monthly data usage per Internet user reaching 311 GB. In terms of technological evolution, global data communication networks will further transition from Internet Protocol Version 4 (IPv4) to Internet Protocol Version 6 (IPv6). As of August 2025, the global IPv6 Capable Rate reached 40.69%[6], with countries such as India, China[7], and France exceeding 70%. Looking ahead, the global Internet will gradually transition into an IPv6-dominant era. ICANN's Digital Inclusion Drive[8] will drive the growth of the global Internet user base by one billion.

1.3 Mobile Communication Networks: Strengthening Ubiquitous Access

From the perspective of network coverage, ITU data indicates that in 2024, the global mobile network coverage reached 98%, with 5G coverage at 51% and 4G coverage as high as 92%. However, 6% of the population could only access 2G/3G networks, while 2% of the population remained unconnected to any mobile network. In terms of core technologies, the current mobile communication network is in a phase of co-existence of different generations of technologies, with 5G leading the wave and 2G/3G/4G operating in synergy. Different generations of technologies complement each other based on scenario-specific needs, jointly ensuring the continuity and coverage of network services. Looking into the future, the innovation of 6G will accelerate, and 5G will become even more dominant. By 2030, the global mobile subscriber base is projected to reach 6.5 billion, with the percentage of 4G connections declining to 35% and that of 5G connections surging to 57%[9].

1.4 Satellite Communication Networks: Enabling Full-Domain Connectivity

In terms of network scale, a total of 2,695 sat-

4 https://tjca.miit.gov.cn/xwdt/xydt/art/2025/art_9e47ba7732b04892a2ffc88e11b8504b.html
5 ITU: "Facts and Figures 2024", https://www.itu.int/itu-d/reports/statistics/facts-figures-2024/index/
6 APNNIC: https://stats.labs.apnic.net/ipv6/?s=IPv6+Capable&d=31%2F08%2F2025&w=31&t=Auto
7 China National IPv6 Development Monitoring Platform: https://www.china-ipv6.cn/#/activeconnect/simpleInfo
8 ICANN: https://www.icann.org/zh/blogs/details/global-digital-compact-endorsement-icanns-position-19-12-2024-zh
9 GSMA: "The Mobile Economy 2025", https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-economy/wp-content/uploads/2025/04/030325-The-Mobile-Economy-2025.pdf

ellites were launched globally in 2024, 81% of which were used for commercial communications[10]. In terms of operators, data from the GSMA[11] reveals that 99 operators worldwide now provide satellite services, with the Asia-Pacific region leading the world with 39 operators. In application domains, satellite communication networks are delivering ubiquitous connectivity to information blackspots such as polar regions, oceans, and deserts, while providing stable communication support for high-dynamic, wide-area coverage scenarios, including aviation, maritime operations, and emergency rescue. Moving forward, the penetration of satellite communications in areas such as mobile phones, automotive, and aviation is expected to rise significantly, providing users with seamless and ubiquitous communication services with global coverage.

2. Computing Power Infrastructure

Global computing power infrastructure development is scaling up, with data centers, edge computing facilities, AI computing centers, and cloud platforms mutually supporting and dynamically interacting with each other. This ecosystem is transitioning from scale expansion to energy efficiency and sustainability.

2.1 Data Centers: Supporting Massive Data Storage and General-Purpose Computing

In terms of deployment scale, the installed capacity of global data centers reached 122.2 gigawatts[12] in 2024, with the level of industrial concentration increasing. In the first quarter of 2025, there were 1,189 large-scale data centers operated[13] by hyperscale companies, which accountd for 44% of the global total data center capacity . From an energy efficiency perspective, data centers consume over 80% of the electricity of the entire ICT industry[14]. In 2024, the global average Power Usage Effectiveness (PUE) of data centers reached 1.56, a 37.6% reduction from 2007[15]. In the future, the data center industry will focus on improving energy efficiency, with PUE expected to enter the 1.0x range by 2030.

2.2 Edge Computing Facilities: Supplementing Low-Latency Computing at the Edge

In terms of market size, the IDC data[16] indicates that global edge computing market revenue is projected to reach $261.0 billion in 2025. In terms of deployment scale, the growth in the number of terminal devices has generated massive data volumes, leading to a significant in-

10 SIA: “State of the Satellite Industry Report”, https://sia.org/news-resources/state-of-the-satellite-industry-report/
11 GSMA: “Satellite and NTN tracker”, https://www.gsmaintelligence.com/research/satellite-and-ntn-tracker-q1-2025-to-charge-or-not-to-charge
12 VisualCapitalist: https://www.visualcapitalist.com/data-center-capacity-around-the-world/
13 Synergy Research Group: https://www.srgresearch.com/articles/the-worlds-total-data-center-capacity-is-shifting-rapidly-to-hyperscale-operators
14 Huawei: https://www-file.huawei.com/admin/asset/v1/pro/view/2e6e8ebcf2c643668384be3c1422955d.pdf
15 Statista: https://www.statista.com/statistics/1229367/data-center-average-annual-pue-worldwide/
16 IDC: https://my.idc.com/getdoc.jsp?containerId=prUS53261225

crease in demand for edge computing. In 2024, over 60% of enterprises had integrated edge technologies[17] to enable real-time data processing and reduce network latency. Looking ahead, the number of connected IoT devices is projected to reach 40.6 billion by 2034, more than tripling from the 2022 figure[18]. This growth will drive the sustained rapid expansion of the edge computing market. The edge computing market is expected to grow to $380.0 billion by 2028, with a compound annual growth rate (CAGR) of 13.8%.

2.3 AI Data Centers: Scaling AI Computing Power Supply

In terms of computing power scale, the global AI computing power reached 875 EFLOPS in 2023, representing a 13% increase from 2022[19]. From a core hardware perspective, the exponential growth in data volume and model parameters has led to explosive growth in hardware demand for AI computing power. According to the data from Statista[20], the AI chip market reached $71.25 billion in 2024 and is projected to reach &91.96 billion in 2025. Looking into the future, as model sizes grow rapidly, the computing power scale of AI data centers will advance from 10,000 to 100,000 GPUs.

2.4 Cloud Service Platforms: Elastic Allocation and Remote Delivery of Computing Power

In terms of deployment scale, approximately 74% of enterprises around the world currently use data warehouse services from public cloud service providers, while 50% utilize their Generative AI (GenAI) services[21]. From a market size perspective, the cloud services market continues to expand, with global end-user spending on public cloud services reaching $595.7 billion in 2024 and projected to rise to $723.4 billion in 2025[22]. Moving forward, hybrid cloud architectures on cloud service platforms will become mainstream, with 90% of enterprises expected to adopt hybrid cloud architectures by 2027 to balance the needs for data security and elastic computing power.

3. Data Infrastructure

Data infrastructure is a new type of infrastructure that, from the perspective of unlocking the value of data elements, provides integrated services for data production, storage, processing, and management to society with the support of network, computing power, and other infrastructure. As a key production factor in the digital economy era, data has become a strategic resource impacting future economic development and is a crucial component of data infrastruc-

17 https://www.globalgrowthinsights.com
18 Statista: https://www.statista.com/statistics/1194682/iot-connected-devices-vertically/
19 https://www.caict.ac.cn/kxyj/qwfb/bps/202501/P020250117503621662777.pdf
20 Statista: https://www.statista.com/statistics/1283358/artificial-intelligence-chip-market-size/
21 Flexera: https://info.flexera.com/CM-REPORT-State-of-the-Cloud?lead_source=Organic%20Search#CM-REPORT-State-of-the-Cloud-2025
22 Gartner: https://www.gartner.com/en/newsroom/press-releases/2024-11-19-gartner-forecasts-worldwide-public-cloud-end-user-spending-to-total-723-billion-dollars-in-2025

ture.

3.1 Data Production: Explosive Growth in Data Scale

In terms of data scale, a report[23] released by IDC in 2024 predicts that the global data volume will grow to 393.8 zettabytes (ZB) by 2028, a 9.8-fold increase from 39.9 ZB in 2018, representing a CAGR of 24.4%. In terms of data production efficiency, the world generated 4.2 petabytes (PB) of data per second in 2023 and it is projected to climb to 12.5 PB by 2028. In the future, the exponential growth in data volume will place higher requirements on the receiving and processing capabilities of data infrastructure.

3.2 Data Storage: Migration to Cloud Emerges as the Mainstream

From a storage approach perspective, IDC predicts that by 2028, 37% of data will be generated directly in the cloud, with over 60% of data ultimately stored on the cloud. From a storage architecture perspective, data infrastructure is accelerating its transition to “cloud-native”, with the collaborative integration of public and private clouds becoming a key focus to meet large-scale data storage demands.

3.3 Data Processing: Surge in Real-Time Processing Demand

From a processing demand perspective, the ultra-real-time data (latency <40ms) accounted for 5.2% and real-time data (latency between 40 and 200ms) accounted for 16.7% of the global data generated in 2023. As GenAI and high-frequency trading scenarios become more prevalent, data infrastructure needs to further promote the adoption of real-time data warehouses, Lakehouse architectures, and data integration tools. Technical optimizations will be required to reduce processing latency and ensure efficient data flow. From a content perspective, the rapid development of GenAI is driving data infrastructure toward multimodal content processing. Currently, over 35% of the data generated by GenAI is text-based. However, as technology evolves, over 75% of the generated data will be distributed across texts, images, and videos by 2028, while nearly 18% will be software code. The diversity of hybrid content places new demands on the multimodal processing capabilities of data infrastructure, requiring support for unified storage, encoding/decoding, and retrieval of different data types.

3.4 Data Management: Holistic Coordination of Data Assets

The growth in data volume and the increasing complexity place higher demands on the data infrastructure’s ability to coordinate data assets. From a management approach perspective, data infrastructure achieves unified management of heterogeneous data through technologies such as metadata and knowledge graphs,

23 IDC: “Revelations in the Global DataSphere, 2024”, https://my.idc.com/getdoc.jsp?containerId=prCHC52667624

to reduce resource consumption by redundant storage and improve the utilization efficiency of data elements. From a value attribute perspective, data infrastructure clarifies data ownership and usage rights through mechanisms such as rights confirmation and responsibility assignment, enabling a value leap from "data resources" to "data assets".

4. Model Infrastructure

As a groundbreaking technological innovation in the field of AI, large models are driving the intelligent transformation of industries. With exponential growth in parameter scale, large models have demonstrated strong comprehension and complex data processing capabilities, making model infrastructure an essential component of digital infrastructure.

4.1 Model Development: Industry Becomes the Main Driver

In this wave of AI, the industry has replaced academia as the primary driver of research and development (R&D), with emerging industry institutions such as OpenAI and Anthropic becoming the backbones of model development. According to the Artificial Intelligence Index Report 2025[24] from Stanford University, the industry released 55 top AI models in 2024, accounting for 90.16% of the total of that year. 5 models were developed through industry-academia collaboration, significantly smaller than the number of models developed by the industry.

4.2 Model Scale: Boost Demand for Advanced Computing Power

Large models are undergoing a transition from a-hundred-billion-parameter to a-trillion-parameter scale, driving the upgrade in computing power demand. GPT-4 has 1.8 trillion parameters and is trained on approximately 13 trillion tokens, corresponding to a staggering training computing power of up to 2.15×10^{25} floating-point operations per second (FLOPS) [25]. Model training has become the most computing power-intensive scenario. To meet the surging demand for computing power, the industry has formed two major strategies: on one hand, rapid improvements in chip computing power, with the B200 chip released by NVIDIA in 2024, capable of delivering 15X real-time large model inference performance of its H100 chip released in 2022[26]; on the other hand, the industry is reducing costs and ensuring computing power supply through the joint construction of large-scale data centers.

4.3 Technological Innovation: Multimodal Capabilities Emerge as the New Trend in Large Models

After ChatGPT ignited the large language model (LLM) wave in November 2022, the multimodal

24 Stanford University: "Artificial Intelligence Index Report 2025", https://hai.stanford.edu/assets/files/hai_ai_index_report_2025.pdf
25 https://www.caict.ac.cn/kxyj/qwfb/bps/202501/P020250116675154243240.pdf
26 https://resources.nvidia.com/en-us-dgx-systems/dgx-b200-datasheet

capabilities of large models were significantly enhanced in the second half of 2023, with models such as GPT-4 and Gemini gradually supporting image and audio inputs for text generation. In 2024, technological breakthroughs further accelerated, with OpenAI releasing the GPT-4o multimodal large model, capable of processing and generating texts, images, and audio within one unified model. In January 2025, DeepSeek released the Janus-Pro multimodal large model, integrating excellent text-to-image generation and visual understanding capabilities.

As an important component of digital infrastructure, model infrastructure is characterized by concentrated global R&D resources, collaborative upgrades in computing power and ecosystems, breakthroughs in multimodal technologies, and cross-industry scenario empowerment. It is driving the intelligent transformation and high-quality development across sectors. The deep integration of technological iteration and industrial implementation not only reshapes the innovation landscape of AI, but also continues to inject new momentum into the global digitalization process.

Today, digital infrastructure is no longer a mere technological stacking in a single domain but a new type of infrastructure system that combines the hard support of networks and computing power with the soft driving forces of data and models. It has become the cornerstone for achieving intelligent upgrade and inclusive development in the global digitalization process, constantly injecting new impetus into global industrial transformation and high-quality economic development.

III. Current Status of Global Digital Divide

According to the UN's definition, the digital divide is the gap between those who have access to and use ICTs including Internet connectivity, Internet-enabled devices and digital literacy skills and those who do not[1]. The digital divide is an evolving concept. As ICTs advance, the scope of divide has gradually expanded from network connectivity to encompass broader aspects such as intelligence and security capabilities.

1. Network Divide

Despite decades of efforts, the network divide remains an urgent issue for the international community to address. About 32% of the global population, or 2.6 billion people, remain offline, 3.3 billion do not have access to digital ID and over 4 billion lack access to high-speed, reliable Internet services[2]. The global network divide primarily manifests in three dimensions: network coverage, network quality, and network affordability.

First, there is a gap in network coverage. ITU data shows that in high-income countries, 93% of the population used the Internet in 2024, approaching universal coverage. In contrast, 27% of the population in low-income countries was estimated to be online, while is was only 16% in rural areas - just one-third of urban residents. 84% of the population in high-income countries were covered by 5G; while the 5G coverage in low-income countries was less than 5%. 31% of rural populations still relied on 2G networks or remained unconnected to any mobile network.

Second, there is a gap in network quality. Regarding fixed networks, the Speedtest Global Index[3] shows that as of July 2025, Singapore

1 UN-HABITAT: https://unhabitat.org/addressing-the-digital-divide
2 ITU: "Facts and Figures 2024", https://www.itu.int/itu-d/reports/statistics/facts-figures-2024/index/
3 Ookla: "Speedtest Global Index", https://www.speedtest.net/global-index

led the world with a fixed broadband download speed of 393.15 Mbps, followed by Hong Kong, China at 323.87 Mbps and France at 319.43 Mbps. In contrast, low-income countries like Syria, Cuba, Afghanistan, Libya, and Cameroon ranked at the bottom with speeds of 3.19 Mbps, 3.33 Mbps, 4.43 Mbps, 10.79 Mbps, and 10.87 Mbps respectively.

Third, there is a gap in network affordability. According to the ITU data[4], In 2024, the proportion of mobile broadband costs to the income of users in lower-middle-income countries was six times that of users in high-income countries, while for users in low-income countries, this proportion was 19 times that of users in high-income countries. The cost of 5GB of data for users in low-income countries was the equivalent of 29.3% of gross national income (GNI) per capita, far exceeding the 1% level in high-income countries.

2. Intelligence Divide

Amid the rapid development of AI, the intelligence divide is emerging as a new component of the global digital divide. As AI technologies and industries accelerate their evolution, countries face the risk of widening gap in computing power resources, innovation capabilities, and talent reserves.

First, there is a gap in computing power resources. Data released at China Computational Power Conference[5] indicates that as of the end of 2023, over 70% of global computing power was concentrated in six countries: the United States, China, Japan, Germany, the United Kingdom, and Canada. Only 17% of countries worldwide possessed data centers capable of supporting AI inference. In Africa and South America, only South Africa and Brazil had AI computing capacity, while most developing nations countries in the world had none[6].

Second, there is a gap in innovation capabilities. In 2024, the United States accounted for 64.5% of the world's 62 renowned AI models. In 2023, over 85% of authorized AI patents globally belonged to the three major economies: China, the United States, and Europe[7].

Third, there is a gap in talent acquisition. A trend of concentration of top digital talents was observed. According to the data released by Boston Consulting Group in 2024[8], 2.2% of AI experts moved across borders over the past 12 months, with 54% choosing developed nations like the United States, the United Kingdom, Canada, and Germany. Most developing coun-

4 ITU: "Facts and Figures 2024", https://www.itu.int/itu-d/reports/statistics/facts-figures-2024/index/
5 https://www.sdbdra.cn/newsinfo/7842811.html
6 Oxford: "AI Compute Sovereignty: Infrastructure Control Across Territories, Cloud Providers, and Accelerators", https://mybroadband.co.za/news/wp-content/uploads/2025/06/Oxford-AI-Data-Centres.pdf
7 Stanford University: "Artificial Intelligence Index Report 2025", https://hai.stanford.edu/assets/files/hai_ai_index_report_2025.pdf
8 Boston Consulting Group: https://web-assets.bcg.com/a7/58/7af3ad10461b91e7ba7135e94cf3/top-talent-tracker-stem-ai-nov-2024.pdf

tries experienced minimal AI talent inflow, with outflow exceeding inflow.

3. Security Divide

Security serves as the foundational safeguard for digital economic development. The security divide is increasingly becoming a critical factor affecting global digital progress, as the gap in safety and security technologies, governance systems, and security education frameworks among countries will impact the global digitalization process.

First, there is a gap in security capabilities. The ITU's Global Cybersecurity Index[9] 2024 (GCI 2024) reveals that only 139 countries established national Computer Incident Response Teams (CIRTs). Globally, 89% of high-income countries had a national CIRT, 70% of upper-middle had one, and 46% of lower-income countries had one as of 2024.

Second, there is a gap in cybersecurity governance systems. The above-mentioned ITU report also evaluates cybersecurity regulatory frameworks across regions, revealing Europe's overall strong performance, with most countries scoring near 100. The Americas also scored highly, while significant variations were observed in Asia-Pacific and Africa, with some countries scoring low.

Third, there is a gap in security education systems. According to ITU's statistics, 91% of European countries offered cybersecurity education in higher education institutions, compared to only 61% of African countries. Similarly, 63% of European countries provided cybersecurity education at the secondary level, while only 16% of African countries do so.

4. Bridging the Digital Divide Requires Global Cooperation

The Matthew effect is evident in the development of ICTs, with technology, capital, and talent concentrating in leading countries and enterprises. Although digital development levels vary across countries and regions, all countries deserve equal access to development opportunities brought by digital technologies. Therefore, bridging the digital divide requires concerted global efforts to narrow disparities in digital infrastructure, technological application, and human resource reserves and foster inclusive global development.

9 ITU: "Global Cybersecurity Index 2024", https://www.itu.int/epublications/publication/global-cybersecurity-index-2024

IV. Key Challenges in International Cooperation in Digital Infrastructure Development

International cooperation among countries in building infrastructure such as networks, computing power, data, and models is essential for bridging the global digital divide and enhancing global digital development capabilities. However, compared to traditional infrastructure, international cooperation in digital infrastructure development places higher demands on the alignment of governance mechanisms, the matching of talent capabilities, and the balance between market supply and demand. It thus requires the international community to continuously address challenges in these areas.

1. Differences in Digital Governance Approaches

Countries have different mechanisms and approaches to digital governance, which may lead to difficulties in coordinating standards, interoperability, and compliance requirements for digital infrastructure development, posing challenges to international cooperation in this field.

The lack of coordination of national legal frameworks governing data flows creates cost and compliance challenges for global data sharing. The European Union's General Data Protection Regulation[1] (GDPR) strictly restricts data flow to countries with inadequate protection levels through its “adequacy decision” approach. The United States asserts extraterritorial data jurisdiction through the Clarifying Lawful Overseas Use of Data Act[2] (CLOUD Act). China has issued the Provisions on Promoting and Regulating Cross-Border Data Flows[3], refining its data classification and grading system as well as its cross-border data security assessment mechanism. Indonesia’s Personal Data Protection

1 EU: “General Data Protection Regulation”

2 US Department of Justice: “Clarifying Lawful Overseas Use of Data (CLOUD) Act”, https://www.justice.gov/criminal/media/999391/dl?inline

3 Cyberspace Administration of China (CAC): https://www.cac.gov.cn/2024-03/22/c_1712776611775634.htm

Law[4] (PDP Law) mandates strict data localization in critical sectors such as finance.

The lack of coordination in cybersecurity standards and systems across countries poses compliance risks for international cooperation in digital infrastructure development. The EU released the Common Criteria-based Cybersecurity Certification Scheme[5] (EUCC) in 2024 to ensure the trustworthiness of ICT products throughout their lifecycle. The United States employs market regulatory mechanisms such as the "Cyber Trust Mark"[6] to help consumers identify products that meet government cybersecurity standards. In China, the Cybersecurity Law of the People's Republic of China[7] and the AI Safety Governance Framework 2.0[8] establishes a tiered protection system, specifies security risks, and proposes technical countermeasures and governance recommendations to safeguard network, data, and application security.

2. Imbalance in Digital Development Capabilities

The gap in digital development capabilities among different groups and regions pose potential challenges to the advancement of international cooperation in digital infrastructure. These capabilities encompass three aspects: educational resources, industrial ecosystem, and technological application. Such imbalance will affect the sustainable utilization of digital infrastructure.

Uneven distribution of educational resources leads to a shortage of digital talent in underdeveloped regions, hindering the full potentials of digital infrastructure. The global digital talent cultivation systems are highly concentrated in certain countries. According to the QS World University Rankings by Subject 2025: Computer Science and Information Systems[9], Europe accounted for 37.8% with 321 institutions, Asia accounted for 34.9% with 297 institutions, and North America accounted for 16.9% with 144 institutions, while Latin America (40 institutions) and Africa (16 institutions) accounted for only 4.7% and 1.9%, respectively.

The imbalance in the development of the digital industry has limited the access to advanced digital products and services by underdeveloped countries and regions. Among the ICT-related companies in the Fortune Global 500 2025[10], 22 are from the United States, 15 from China, 7 from Japan, and usually 1-3 from an EU country, while there is only 1 from Latin America and

4 Indonesia: "Personal Data Protection"

5 EU: https://certification.enisa.europa.eu/certification-library/eucc-certification-scheme_en

6 US: https://bidenwhitehouse.archives.gov/briefing-room/statements-releases/2025/01/07/white-house-launches-u-s-cyber-trust-mark-providing-american-consumers-an-easy-label-to-see-if-connected-devices-are-cybersecure/

7 Cyberspace Administration of China (CAC): https://www.cac.gov.cn/2016-11/07/c_1119867116.htm

8 Cyberspace Administration of China (CAC): https://www.cac.gov.cn/2025-09/15/c_1759653448369123.htm

9 https://www.topuniversities.com/university-subject-rankings/computer-science-information-systems

10 https://fortune.com/ranking/global500/

none from Africa.

The imbalance in digital technology application capabilities weakens the public's awareness and adoption of digital and intelligent products and services in underdeveloped regions. Data released by KPMG[11] shows that at the technology usage level, 88% of the population in high-income countries has integrated into AI application scenarios, compared to 66% in middle-income countries and only 47% in low-income countries. At the technology learning level, 70% of the population in high-income countries has participated in AI-related knowledge learning, while the participation rate drops sharply to 38% in middle-income countries and only 18% of the population in low-income countries possesses a basic knowledge foundation in AI.

3. Imbalance in Digital Infrastructure Investment

There is a pronounced centralization of global investment in digital infrastructure development, with notably insufficient capital flowing to underdeveloped countries and regions. This will create a cumulative comparative disadvantage for these regions, further disincentivizing the investment in digital infrastructure development in these regions.

There is a substantial investment gap in global digital infrastructure. According to a report released by the UN[12], greenfield investment in ICT infrastructure in 2024 amounted to only $15.0 billion, far below the annual demand of $62.0 billion. Regions such as Sub-Saharan Africa and Least Developed Countries (LDCs) became investment lowlands due to insufficient coverage.

The regional concentration of digital infrastructure investment has further intensified. The investment is highly concentrated in a few countries, with ten Asian countries absorbing nearly 80% of the investment directed towards developing countries in 2024. Middle-income countries accounted for 80% of global data center investment directed towards developing countries, while LDCs only accounted for 3%.

The UN Global Digital Compact[13] points out that we can only achieve SDGs through strengthened international cooperation that closes all digital divides between and within countries. China's Positions on Global Digital Governance[14] proposes four basic principles for global digital governance: first, uphold unity and cooperation; second, focus on development; third, promote fairness and justice; and fourth, facilitate effective governance. Global cooperation in

11 KPMG: "Trust, attitudes and use of artificial intelligence: A global study 2025", https://assets.kpmg.com/content/dam/kpmgsites/xx/pdf/2025/05/trust-attitudes-and-use-of-ai-global-report.pdf

12 UN: https://unctad.org/system/files/official-document/wir2025_overview_en.pdf

13 UN: "Global Digital Compact", https://www.un.org/digital-emerging-technologies/global-digital-compact

14 Ministry of Foreign Affairs of China: https://www.mfa.gov.cn/web/wjb_673085/zzjg_673183/jks_674633/zclc_674645/qt_674659/202305/t20230525_11083602.shtml

digital infrastructure development requires the joint efforts of countries, international organizations, industry, and academia. While respecting diverse national governance approaches, it is essential to promote a balance between data flow and data security, establish rules for the coordinated development of the four types of key infrastructure: networks, computing power, data, and models, and avoid the creation of new digital divides.

V. Recommendations for International Co-operation in Global Digital Infrastructure Development

To address the global divides in connectivity, intelligence, and security, and in light of the challenges in international cooperation in digital infrastructure, countries, international organizations, and industry players should leverage their respective roles to create synergies in building four key types of digital infrastructure: networks, computing power, data, and models and to precisely respond to the diverse needs of global digital development.

1. At the National Level: Promote Infrastructure Connectivity and Mutual Recognition of Rules

Network Infrastructure: Cross-border network connectivity could be prioritized in infrastructure development. Efforts should be made to control the costs of network access and improve the accessibility of basic network services in underserved regions, with a combination of policy and market approaches.

Computing Power Infrastructure: International cooperation on computing power application development through joint R&D initiatives should be improved. In light of local industrial characteristics, countries should develop computing power application solutions tailored to local needs and promote deep integration between computing power and industrial scenarios.

Data Infrastructure: Countries should promote the mutual recognition of cross-border data rules, establish a categorized and tiered management framework, and assist developing countries in building data security systems.

Model Infrastructure: Countries should encourage the open-sourcing of foundational AI models and patent sharing, waive or reduce patent fees for low-income countries, support joint R&D of specialized models tailored to local needs, and solidify the foundation for digital co-operation.

2. At the International Organization Level: Enhance the Role of Multilateral Mechanisms

Network Infrastructure: Efforts should be made to develop international standards for network connectivity, enhance technical support for developing countries in network construction, operation and maintenance, promote global ubiquitous coverage of network services, and bridge the network divide in underdeveloped regions.

Computing Power Infrastructure: Efforts should be made to build a global collaborative network for computing power to enable low-income countries to access computing power resources at affordable costs; establish unified standards for efficient matching and transparent trading of computing power resources; and promote the development of digital skills training systems to cultivate digital professionals in developing countries.

Data Infrastructure: Efforts should be made to coordinate rules for cross-border data flows and provide governance capacity support to developing countries.

Model Infrastructure: Efforts should be made to develop ethical and security assessment standards, complemented by technical training, to help countries enhance their model application capabilities.

3. At the Industry Level: Promote Technological Inclusion and Ecosystem Co-construction

Network Infrastructure: Efforts should be made to encourage investment in network construction targeted at developing countries and engage in collaboration with local enterprises through joint R&D, network operations, and other forms.

Computing Power Infrastructure: Efforts should be made to support joint technological breakthroughs among enterprises from different countries; promote cooperation in the construction of transnational data centers; and establish mechanisms for technology open-sourcing and sharing to lower the barriers to accessing core technologies.

Data Infrastructure: Enterprises should actively participate in the development of international norms and platforms for the circulation of data elements, and foster an ecosystem that enables efficient data flow and value realization.

Model Infrastructure: Leading enterprises are encouraged to promote international technology sharing through technology openness and model open-sourcing to help low-income countries foster AI application ecosystems.

Looking ahead, international cooperation in global digital infrastructure development will contribute to the establishment of an inclusive global digital ecosystem. It will ensure that all countries can equitably access digital resources, equally participate in rule-making, and collaboratively prevent and control security risks. This will enable the benefits of digital technology to reach people across all nations. Bridging the digital divide and overcoming development challenges require a global commitment to collaboration, with the goal of building an open and inclusive digital ecosystem. Through coordinated governance, capacity building, and resource sharing, differences can be transformed into complementary strengths. Only by pooling global efforts can we promote the inclusive development of digital infrastructure and lay a solid foundation for shared prosperity in the digital age.

Appendix: Cases of International Cooperation in Global Digital Infrastructure Development

To provide valuable insights for international cooperation in global digital infrastructure development, the WIC has selected 28 cooperation cases across five key areas: optical fiber communication network, mobile communication network, computing power infrastructure, co-construction of digital ecosystem, and coordinated regional development. These cases were chosen through the collection of submissions from member partners of the Think Tank Cooperation Program and the compilation of publicly available information, aiming to share best practices and provide cooperation models.

1. Cooperation in Optical Fiber Communication Network: Network Deployment and Emergency Response

The cases in this section cover cross-border submarine cable construction, regional network coverage, and communication emergency response. The core experience lies in promoting infrastructure connectivity through multi-country joint planning, cost-sharing, and benefit-sharing models, while adapting technologies locally to meet diverse regional needs.

The undersea survey for the Trans-Caspian Fiber-Optic Cable Project, with the joint participation by Azerbaijan and Kazakhstan, was officially launched in August 2025[1]. This cable line is a crucial component of the Digital Silk Road. The two countries plan to construct a 380-kilometer submarine fiber-optic cable line connecting the cities of Sumgait in Azerbaijan and Aktau in Kazakhstan across the Caspian Sea. With a designed transmission capacity of up to 400 Tbps, it will enable high-speed transmission of large-capacity data, create a digital communication corridor covering Azerbaijan, Kazakhstan, Georgia, Türkiye, and Turkmeni-

1 https://az.mofcom.gov.cn/jmxw/art/2025/art_c867ee6c69b54fb19a145b49f3c7614d.html

stan, and establish a high-capacity, low-latency digital infrastructure. The project is scheduled for completion by the end of 2026, with AzerTelecom serving as the executing agency for Azerbaijan and Kazakhtelecom for Kazakhstan. Technical supervision and consulting services are provided by Pioneer Consulting from the United States.

The Singapore segment of the PEACE Cable System, constructed by HMN Tech and invested in and operated by Peace Cable International Network Co., Ltd., has been completed and delivered[2]. This milestone marks the full commercial operation of the entire route from Singapore to France for this Maritime Information Silk Road, spanning over 22,000 kilometers and connecting Asia, Africa, and Europe. This cable provides a high-capacity, high-quality communication network with latency as low as 136 milliseconds between Singapore and France, injecting new vitality into connecting the China-Indian Ocean-Africa-Mediterranean Sea blue economic passage and building high-level international connectivity. Previously, in December 2022, the French, Egyptian, Kenyan, and Pakistani segments of this cable entered commercial operation, continuously providing high-speed, reliable bandwidth to countries along its route. The 6,400-kilometer Singapore segment completed high-standard offshore construction and acceptance testing in August 2024. Upon full commercial deployment, it will further meet the rapidly growing data communication demands of countries along the route.

The MAREA transatlantic subsea cable system was jointly designed by Meta and Microsoft, with Telxius leading its operation and management[3]. Spanning 6,644 kilometers, this cable connects Virginia Beach, USA, to Bilbao, Spain, becoming the first transatlantic cable to provide a direct link between the two locations. In 2021, AWS acquired the right to use one fiber pair, further enriching the project's international participants and strengthening the system's service coverage. The MAREA cable efficiently connects core network nodes in Europe and the United States, providing high-capacity, low-latency, and high-resilience transmission guarantee for cloud service interactions for cross-border enterprise, transmission of high-definition streaming media, and real-time synchronization of financial data. It serves as a model for international companies working together to build transoceanic digital infrastructure.

The NOKIA Lightspan MF-2, an optical line terminal (OLT) device, has been deployed globally. From 2015 to 2023, the Philippine GLOBE Telecom deployed 530 sets of MF-2 devices to provide the Fiber-to-the-Home (FTTH) services, which promoted local digital economic development. In Europe and North

2 https://www.hmntech.com/cnPressReleases/38091.jhtml
3 https://www.submarinenetworks.com/en/systems/trans-atlantic/marea

America, multiple municipal operators have also widely adopted this device, effectively narrowing the digital divide between rural and urban areas. The MF-2 enables network slicing and multi-service coexistence, providing high-quality network experiences for users of different types. Its compact and modular design enhances the flexibility and cost-effectiveness of network architecture, and further promotes fiber network expansion, thus providing more equitable and reliable network access globally, and contributing to the prosperity of digital economy.

China Telecom supported the construction of the communication system for the Jakarta-Bandung High-Speed Railway (HSR) in Indonesia. The Jakarta-Bandung HSR in Indonesia is the first overseas HSR project utilizing Chinese technologies and standards and it officially commenced operations in October 2023. As the technical service provider for the communication system, China Telecom dispatched multiple communication experts from China to Indonesia. In light of the railway's communication requirements, joint research was conducted to provide seamless coverage through interleaved networking technology, with the network reliability reaching 99.99%, providing secure and stable support for real-time railway communication, control, and dispatch operations.

China Telecom's Digital Mali Project is a key component of the Belt and Road Initiative (BRI) and the Digital Silk Road (DSR), serving as a flagship project for the Smart Africa initiative. China Telecom entered the African market in 2008 and established China Telecom (Africa and Middle East) Co., Ltd. in 2015 to accelerate regional business expansion. The company has provided network infrastructure services to countries including South Africa, Egypt, and Kenya. This project established comprehensive digital infrastructure for Mali, encompassing the national optical fiber backbone network, access networks, the Safe City system, and the electronic ID system. The optical fiber network enhanced basic communications, the Safe City system strengthened monitoring capabilities of public security, and the electronic ID system improved government efficiency. The digital infrastructure comprehensively elevated Mali's digital capabilities, driving local digital transformation and socioeconomic development, and setting a benchmark for China-Africa digital cooperation.

China Telecom efficiently completed the repair of Tonga's submarine cable, demonstrating its international communication emergency response capabilities. A violent volcanic eruption severely damaged Tonga's only external submarine cable and interrupted the country's external communication. As Tonga's international communication service provider, China Telecom promptly dispatched a professional repair vessel from Papua New Guinea to the fault location. The repair operation promptly restored Tonga's external communication, demonstrating the professionalism and responsibility of Chinese enterprises in the field of international emergency communication.

China Mobile, together with eight international operators, jointly initiated the 2Africa Submarine Cable Project[4]. The cable encircles the entire African continent and connects data traffic hubs in the Middle East, Asia, and Europe. Spanning approximately 45,000 kilometers, the system boasts a design capacity of up to 180 Tbps, making it the largest transoceanic submarine cable globally to date. It truly lives up to its name as a “super highway”. The launch of 2Africa will provide more efficient and convenient international connectivity to 33 countries along the route, significantly improve the accessibility of connectivity, and offer higher-quality, low-latency, and high-resilience data transmission solutions for education, healthcare, manufacturing, agriculture, commerce, finance and other fields, benefiting approximately 3 billion people along the route. Additionally, the 2Africa project and the construction of landing stations and extension segments along the route provided employment for a large number of local African workers, created thousands of new jobs and trained a significant number of technical professionals in the ICT field for Africa.

These practices have effectively enhanced international network access capabilities, especially in remote areas, strengthened global communication resilience, and provided reference for bridging the digital divide and building a reliable global communication network system.

2. Cooperation in Mobile Communication Network: New Technologies and Multi-Scenario Implementation

The cases in this section focus on international cooperation in mobile communication technologies and their applications. The core experience lies in providing differentiated solutions tailored to the development levels of different regions and promoting the deep integration of new technologies with local application scenarios.

Ericsson provided low-cost communication solutions for underdeveloped regions in Africa. In many economically underdeveloped areas in Africa, Ericsson utilized microwave technology to provide low-cost transmission solutions for local wireless networks. In Tanzania, Ericsson supplied a large number of microwave devices to operator Tigo, covering 13 million people in rural areas. Microwave technology, due to its low cost and short construction period (compared to fiber optics), is particularly suitable for rural areas with low ARPU and reduces operator investment to a reasonable level. In Kenya, Ericsson provided

4 https://www.2africacable.net/

microwave, WiFi, and IP network products to operator Safaricom to meet network upgrade needs in densely populated areas and address increasing bandwidth demands. In Madagascar, Ericsson supplied network equipment for over 2,000 wireless sites to operator Telma, achieving nationwide network coverage and assisting Africa in narrowing the digital divide.

Ericsson and China Mobile collaborated to build energy-efficient 5G smart base stations[5]. In 2022, Ericsson and China Mobile Jiangsu jointly launched a 700 MHz band 5G smart base station capable of zero-carbon operation. The team configured solar panels through simulation based on local sunlight conditions and station power consumption. After trial operation, the solar system could meet the station's power demands and achieve green operation. Meanwhile, Ericsson has partnered with China Mobile Guangdong to launch 5G smart base stations operating at the 2.6 GHz frequency band. These stations utilize Ericsson's energy system, which employs hybrid energy management to optimize the use of solar power, grid power, and batteries, thereby enhancing the energy efficiency of base stations.

Huawei and Zain KSA jointly launched the "5.5G City" joint innovation project[6]. In March 2023, during MWC23 Barcelona, Huawei and Zain KSA, a leading telecommunications operator in Saudi Arabia, signed a memorandum of understanding on strategic cooperation to jointly launch the project. The two parties will continuously enhance network performance, develop end-to-end autonomous network operation and optimization capabilities, and comprehensively promote the implementation of 5.5G technology. Additionally, they are committed to driving 5.5G technology innovation, expanding innovative services to full scenarios, including consumers, households, and enterprises. At the same time, they are also committed to strengthening digital infrastructure development, building a global benchmark network for 5.5G evolution, and supporting Saudi Arabia's national digitalization goals outlined in its Vision 2030.

Orange, a French telecommunications company, built the Orange 5G Network in Botswana [7]. In November 2022, the 5G network deployed by Orange was officially launched in Gaborone and Francistown, covering 30% of the local population. Leveraging this 5G infrastructure, Orange has partnered with local healthcare providers on the "Connected Ambulance" initiative, enabling doctors to guide paramedics in performing life-saving procedures en route to hospitals. This 5G network deployment will drive technological innovation and digital inclusion in Botswana, positioning the nation at the forefront

5 https://www.ericsson.com/zh-cn/press-releases/2/2022/12/ericsson-joins-hands-with-china-mobile-5g-smart-stations
6 https://www.huawei.com/cn/news/2023/3/mwc2023-zain-5-point-5g-mou
7 https://newsroom.orange.com/orange-launches-its-commercial-5g-network-in-botswana-the-first-orange-country-in-africa-to-launch-5g-technology/

of 5G adoption in Africa.

China Unicom collaborated with Thailand's AIS Telecom, Huawei, and Midea Group to jointly build the Midea Thailand air conditioning 5G smart factory. As the first fully 5G-connected smart manufacturing benchmark project in Southeast Asia, it is based on a 5G private network platform, aiming to break through the bottlenecks of traditional industrial network and comprehensively promote the digital transformation of factories. The project successfully achieved the first commercial deployment of a 5G Ultra-Reliable Low-Latency Communications (URLLC) industrial control scenario in Southeast Asia, verifying the high reliability of the millimeter-wave band in industrial environments. By introducing an innovative business model featuring "network capability exposure platform + scenario subscription service", the project significantly shortened the cycle of return on investment for customers while effectively enhancing the value across the industrial chain.

These practices have lowered the threshold of mobile communication in low-income areas, accelerated the promotion and application of new technologies, alleviated imbalance in digital capability, and provided reference for achieving inclusive mobile communication and promoting the integration of intelligent technologies with industrial scenarios.

3. Cooperation in Computing Power Infrastructure: Data Center Layout, Supercomputing Support, and Cross-Regional Computing Power Collaboration

The cases in this section focus on the regional layout, capability output, and collaborative scheduling of computing power resources. Building localized data centers in underdeveloped regions ensures that developing countries have access to computing power resources. Exporting computing capabilities to underdeveloped regions can fill the regional gap in high-end computing power for these regions. Promoting cross-regional computing power collaboration can optimize computing power scheduling efficiency.

Alibaba Cloud advanced the construction of regional data centers in Southeast Asia[8]. Alibaba Cloud officially launched its data center in Malaysia on July 1, 2025, while simultaneously announcing plans to open a data center in the Philippines in October 2025. This marks Alibaba Cloud's commitment to deepen its cloud computing and AI infrastructure footprint in Southeast Asia to meet the growing demand for secure, resilient, and scalable cloud services in local and surrounding markets. Upon com-

8 https://tech.cnr.cn/techgd/20250702/t20250702_527239551.shtml

pletion of these projects, its cloud computing service network across Southeast Asia will be further enhanced and its service capabilities for local enterprises and users will be strengthened.

Amazon Web Services (AWS) collaborated with South Africa to build a local data center[9]. In 2020, this data center was officially launched in Cape Town, South Africa, to provide low-latency and high-reliability cloud services for South African enterprises. AWS deployed three availability zones in Cape Town. Each one consists of one or more data centers located in different geographical areas, significantly reducing the risk of single incident affecting business continuity. From 2018 to 2022, AWS's investment in South Africa contributed ZAR 12 billion to the country's GDP and provided an average of 5,700 full-time jobs annually.

Global Resources Management Sdn Bhd (GRM), a well-known B2B cloud product and solution provider in Malaysia, officially launched its data center Alto Cloud, relying on Tencent's Cloud Dedicated Zone (CDZ) solution[10]. CDZ, being homologous and homogenous with the public cloud, enables the "on-demand construction" of the public cloud in local Telehouse or Internet Data Centers (IDCs) and allows Alto Cloud to achieve product capabilities locally consistent with the public cloud. The data center integrates various mature public cloud products from Tencent Cloud, including servers, storage, lightweight application servers, and databases. While ensuring data security, it assists GRM in completing its transition from IDC to cloud computing, which can provide over 400 cloud products and solutions for local enterprises in Malaysia.

Phase II of the Zimbabwe Centre for High Performance Computing (ZCHPC) project, with computing power platforms provided by Huawei, was successfully delivered[11]. On August 15, 2025, Phase II of the China-assisted ZCHPC was delivered to the Zimbabwean side at the University of Zimbabwe. The launch of this project positions Zimbabwe as one of the African nations equipped with advanced HPC capabilities. Equipped with computing platforms provided by Huawei, ZCHPC will further support scientific research at Zimbabwean universities, research institutions, government agencies, and private enterprises, inject new momentum into the nation's digital transformation, and propel local development in areas such as scientific innovation and industrial upgrading.

Microsoft collaborated deeply with G42, an AI enterprise in the United Arab Emirates, to jointly promote the construction of comput-

9 https://www.amazonaws.cn/en/blog-selection/aws-investment-south-africa-results-economic-ripple-effect/?nc1=h_ls
10 https://caijing.chinadaily.com.cn/a/202408/20/WS66c4626aa310b35299d37a38.html
11 https://xhpfmapi.xinhuaxmt.com/vh512/share/12695864

ing power infrastructure and technological ecosystem in Kenya[12]. The green data center jointly built by the two parties will provide high-end computing power support for Microsoft Azure cloud services, meet the demand for low-latency and high-reliability cloud services from enterprises and public sectors in the region and fill the gap in high-end computing power infrastructure in East Africa. The two parties will collaborate deeply with the Kenyan government to establish a cloud service system in compliance with regional data security standards. Additionally, they are also committed to developing local language AI models, build an East African innovation lab, and conduct extensive AI digital skills training for the local people.

China Telecom Global Limited (CTG) constructed a data center in Tseung Kwan O, Hong Kong to serve the Asia-Pacific region[13]. Located in the Tseung Kwan O Industrial Estate, Hong Kong, the data center covers an area of over 71,000 square meters with a total power capacity of 100 MVA, and capable of accommodating approximately 10,000 cabinets. It is one of the largest Internet data centers in the Asia-Pacific region. This data center will provide higher-quality and more reliable cloud computing and data service support for global customers, enhance data storage and processing capabilities in the Asia-Pacific region.

These practices have effectively alleviated the challenge of centralized computing power resources, improved regional computing power scheduling efficiency, lowered the threshold for accessing computing power and provided reference for achieving inclusive computing power.

4. Co-construction of Digital Ecosystem: AI Empowerment, Mechanism Collaboration, and Integration of Multi-Scenario Ecosystem

The cases in this section focus on the collaborative construction of digital ecosystems. The core experience lies in enhancing regional digital capabilities through AI technology openness and talent cultivation, developing cross-border data flow mechanisms by adapting to different legal frameworks, and promoting the integration of intelligent technologies with industrial scenarios.

The Alibaba Cloud announced the establishment of the AI Global Competence Center (AIGCC) at its Global Summit in Singapore[14]. The center will serve as a regional AI innovation hub, providing technical support to over 5,000 enterprises and 100,000 developers. By integrating advanced AI models with cloud computing resources and establishing partnerships with 120 global universities, including the National

12 https://news.microsoft.com/source/2024/05/22/microsoft-and-g42-announce-1-billion-comprehensive-digital-ecosystem-initiative-for-kenya/
13 http://www.chinatelecom.com.cn/news/06/ZQFU/ZQDT/202210/t20221025_72112.html
14 https://www.msn.cn/zh-cn/news/other/%E9%98%BF%E9%87%8C%E4%BA%91%E6%88%90%E7%AB%8B%E9%A6%96%E4%B8%AA-ai%E5%85%A8%E7%90%83%E8%83%BD%E5%8A%9B%E4%B8%AD%E5%BF%83/ar-AA1HOI1H

University of Singapore, it aims to cultivate 100,000 AI professionals annually. This initiative will accelerate AI technological innovation and talent development across Southeast Asia and globally.

The Macao Digitalization Development Association (MDDA) collaborated with the International Data Spaces Association (IDSA) of the European Union to establish the "Macao China, China-EU Data Cross-border Flow Channel"[15]. Leveraging the institutional advantages of "One Country, Two Systems" in Macao, China, and its legal affinity with the European Union, the MDDA has partnered with the EU-based IDSA. Operating within the existing legal frameworks of Macao's Personal Data Protection Act (PDPA) and the EU's General Data Protection Regulation (GDPR), they pioneered the establishment of a three-pronged framework for cross-border data flow in the scientific research sector, integrating legal regulations, management mechanisms, and technical safeguards. This comprehensive system covers the entire lifecycle -before, during, and after data transfer - ensuring both security and the promotion of data sharing. This channel has established secure cross-border research data management practices between the International Institute of Next Generation Internet of Macao University of Science and Technology and the Fraunhofer Institute for Software and Systems Engineering, which can provide a viable model for cross-border data flow.

The German Research Center for Artificial Intelligence (DFKI) closely collaborated with global academic institutions, industry partners, and government departments to translate AI research achievements into practical applications and promote sustainable social and economic development. DFKI develops and optimizes technologies for disease diagnosis and treatment to alleviate the burden on medical staff. It studies robots capable of autonomous operation in harsh environments such as disaster areas or deep seas. It is committed to developing solutions that enhance efficiency and sustainability in agriculture, production, or energy industries. DFKI not only focuses on intelligent system research, but also emphasizes the impact of ethics, safety, social responsibility, and natural conservation on technology.

iFlytek unveiled the Spark ASEAN Multilingual Large Model Foundation specifically designed for ASEAN nations at the 22nd China-ASEAN Expo. Based on the linguistic features of the ASEAN region, this model, based on the Spark Multilingual Large Model, enhances its general performance across ten ASEAN languages through specialized training. It covers Malay, Indonesian, Thai, Vietnamese, Filipino, Burmese, Khmer, Lao, Tamil, and Ja-

15 https://world.gmw.cn/2022-11/08/content_36146771.htm

vanese. It possesses capabilities in language comprehension, machine translation, knowledge Q&A, text generation, mathematical analysis, and common-sense reasoning. Leveraging a comprehensive toolchain, the Spark ASEAN Multilingual Large Model Foundation delivers full-stack industry solutions, enabling efficient and secure deployment of industry applications across ASEAN nations.

China Unicom Europe (CUE) collaborated with COSCO Shipping to develop the AI Analytics Platform for the Piraeus Container Terminal in Greece. This initiative actively supports COSCO Shipping's strategic goal of building digital ports. China Unicom Europe, in collaboration with Huawei and local partner Nuts, comprehensively upgraded the existing surveillance system by introducing an AI analytics platform to establish a fully integrated intelligent security video monitoring system. This system will deliver multiple functionalities including terminal operations monitoring, compliance monitoring, smoke and fire detection, security surveillance, vehicle recognition, and personnel monitoring to comprehensively enhance the terminal's intelligent management capabilities. The project had positioned the AI Analytics Platform for the Piraeus Container Terminal as a benchmark for digital ports in the Mediterranean region.

These practices have narrowed regional gap in digital capabilities, promoted cross-regional data flow, accelerated the application of intelligent technologies, and provided reference for building an open and inclusive global digital ecosystem.

5. Coordinated Regional Development: Cross-Border Facility Linkage, Data Element Circulation, and Multilateral Capacity Building

The cases in this section focus on the collaborative construction of digital infrastructure and multilateral cooperation at the regional level, and aim to address issues of imbalance in regional development and resource matching. In response to the challenge of digital coverage in remote areas, satellite Internet services are provided for the benefit of the public. Cooperation among regional data exchanges is encouraged to facilitate the regional flow of data elements. Cooperation in digital economy is carried out through multilateral organizations, while joint digital talent cultivation is conducted to strengthen capacity building.

The Ministry of Transport and Communications (MTC) of Peru, in collaboration with the National Telecommunications Program (Pronatel), launched the "Conecta Selva" Satellite Internet project[16]. The project was implemented by Italy's Telespazio following a

16 https://www.gob.pe/institucion/pronatel/noticias/498079-mtc-lanzo-conecta-selva-para-beneficiar-con-internet-satelital-a-200-mil-peruanos-en-zonas-aisladas-de-la-amazonia

competitive bidding process. As a core component of Peru's “Todos Conectados” Program, this project focused on addressing digital coverage challenges in the Amazon rainforest region. With a total budget of PEN 90,888,750, it aimed to serve 1,034 remote areas across the regions of Loreto, Amazonas, Ucayali, and Madre de Dios. Specific construction included deploying satellite Internet equipment to 1,316 public institutions (1,212 educational institutions and 104 health centers). Additionally, free WiFi access points had been set up at these sites. This project ultimately benefited approximately 200,000 Peruvian citizens.

Kazakhstan's Astana Data Exchange and the Shanghai Data Exchange signed a strategic cooperation agreement in May 2025, aiming to integrate their advantageous resources in the field of data element circulation and jointly explore innovative models for cross-border data circulation and collaboration[17]. Based on this cooperation, the two sides are committed to jointly building an open, collaborative, and secure data circulation ecosystem and helping enterprises seize opportunities in the global digital economy. Through in-depth collaboration in areas such as construction of cross-border data sharing platform, cross-border circulation standards, technical communication, compliance governance, and equity cooperation, the two sides will promote the establishment of an efficient, secure, and mutually trustworthy data trading mechanism and enhance the role of China-Kazakhstan cooperation in digital economy in supporting the high-quality development of the “Belt and Road Initiative”.

The BRICS countries jointly released the BRICS Economic Partnership Strategy 2025, designating the digital economy as a priority cooperation area[18]. In practice, the BRICS Digital Industry Ecosystem Cooperation Network now includes over 30 members, covering BRICS nations and partner countries such as China, Brazil, Russia, South Africa, Ethiopia, Indonesia, and Nigeria. The mBridge Project, a multi-central bank digital currency (CBDC) initiative involving China, the UAE, Thailand, and Saudi Arabia, has reached the minimum viable product (MVP) stage, offering new solutions for cross-border settlements among BRICS members. China-BRICS AI Development and Cooperation Center, initiated by China, aims to strengthen industry and project collaboration among BRICS nations. E-commerce enterprises in Brazil, South Africa, and other countries have achieved rapid growth in recent years by leveraging the experience and resources of Chinese companies. These collaborations have not only effectively elevated the digital economy levels of some BRICS member states, but also enhanced their voice in the global digital econo-

17 https://www.chinadep.com/bulletin/news/CTC_20250519151955815392
18 https://www.yidaiyilu.gov.cn/p/0N44NJP2.html

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China and the member states of the Shanghai Cooperation Organization (SCO) jointly established the China-SCO Big Data Cooperation Center to actively promote digital talent training and capacity building[19]. In May 2023, the center officially commenced operations, positioning itself as an international exchange platform for China and SCO member states to collaborate on digital infrastructure development and skills training. As of August 2025, the center had trained over 830 digital technology professionals from SCO member states, with its three-year target of 1,000 trainees expected to be achieved ahead of schedule. This talent development initiative represents a crucial step in building an open, inclusive, and shared global digital industry ecosystem, and establishes a cooperative bridge for SCO countries to advance their digital transformation.

These practices have effectively alleviated regional imbalance in digital development, improved the capabilities to collaborate on multilateral digital governance, and provided reference for promoting regional connectivity and bridging the digital divide.

19 https://www.gov.cn/lianbo/bumen/202508/content_7038205.htm

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