

*Lead technological innovation  
and boost industrial upgrading*



## Lead technological innovation and boost industrial upgrading

China Unicom continues to tackle key core technologies, accelerates the creation of sources of origin and industry chain leadership, resolutely undertakes national scientific and technological tasks, continuously accelerates the commercialisation of scientific and technological achievements, and is committed to contributing Unicom's wisdom and strength to social progress and high-quality development.



### Measures adopted in 2025

- The Company improved its scientific and technological innovation governance system and enhanced its scientific and technological innovation strength, with R&D investment intensity exceeding 4%. We were awarded the titles of Outstanding Enterprise in Scientific and Technological Innovation of Central Enterprises and Outstanding Enterprise in "Industrial Renewal" of Central Enterprises for the year by the SASAC of the State Council.
- The Company deepened digital and intelligent operations and promoted AI and data empowerment. The total data scale of our big data platform has exceeded 700 PB. We have upgraded our digital and intelligent capability system, strengthened data governance and process intelligence, and enhanced operational efficiency and decision-making levels.
- The Company tackled key challenges in strategic emerging industries and future industries, creating a source of original technologies, continuously cultivating and leading the development of industrial chains, establishing pilot testing bases, and fostering new quality productive forces.
- The Company courageously undertook the construction of the "three chains and two places", implemented five of the "Top 100 Projects" for strategic emerging industries of central enterprises, and strived to create highlands for scientific and technological innovation and industrial innovation.



### Actions to be taken in 2026

- The Company will focus on key technologies such as next-generation Internet, big data and artificial intelligence, breaking through bottlenecks, and enhancing core technological capabilities that are independent and controllable.
- The Company will strengthen data services and data empowerment, leveraging artificial intelligence to empower the enhancement of full-process efficiency, and promoting the improvement of corporate human resource efficiency, precise allocation of resources and optimisation of business processes.
- The Company will strengthen the organisation of strategic emerging industries, promoting synergy among industry, academia, research and application, enhancing intellectual property operations and the commercialisation of achievements, and building an open and collaborative technological innovation ecosystem.
- The Company will promote the research and development deployment of future industries, accelerating the construction of national-level artificial intelligence application pilot bases, developing next-generation internet large-scale scientific facilities, and seizing the commanding heights of technology.

## Building a highland for technological innovation

China Unicom accelerates its deployment for strategic emerging industries and future industries, actively builds a high-level source of original technology, continuously improves an open and cooperative innovation ecosystem, optimises scientific and technological innovation systems and mechanisms, continuously stimulates internal vitality, and injects strong scientific and technological momentum into high-quality development.

## Establishing a Governance Structure for Technological Innovation

China Unicom establishes a technological innovation system, which is led by the Technological Innovation Leading Group, with technical oversight by the Science and Technology Committee, specific responsibility held by the Technological Innovation Department, and research and development work carried out by various technological innovation entities.

- Continuously strengthen the Science and Technology Committee to provide consultation and decision-making support for the direction of scientific and technological innovation and development and technology development strategies, to oversee scientific and technological innovation development plans, major scientific research and cooperation projects, and to evaluate the effectiveness of the commercialisation of scientific and technological innovation achievements.

- A leading group for the special task of accelerating the development of strategic emerging industries and an office for the strategic emerging industries leading group have been established, under which a resource support group and four industry promotion groups are set up, with each industry promotion group implementing a “dual-head” responsibility system.

- We are further strengthening the development of the Technological Innovation Department, focusing on enhancing the performance of functional roles such as the coordination of scientific and technological research and development, the construction of the scientific and technological cooperation ecosystem, the development of the scientific and technological talent pool, and the establishment of the scientific and technological innovation system.

- Systematically optimizes the overall deployment of technological innovation, forming an innovation capability network characterized by the division of labor and synergy among subsidiaries, professional institutions, 18 industry taskforces, 30 industrial internet companies, and joint ventures.

- To serve major national regional strategies, a series of high-level research institutes have been established in key regions such as the Beijing-Tianjin-Hebei region and the Yangtze River Delta. To cultivate strategic emerging industries, specialised companies have been established in fields such as artificial intelligence and high-end equipment.

## Forward-looking Assessment of Opportunities and Risks

China Unicom's Technological Innovation Opportunities, Risks and Response Measures

| Opportunity/<br>Risk Category | Sub-category                                                         | Risk/Opportunity Description                                                                                                                                                                                                                                                                                                                                     | Time<br>Horizon       | Response Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Opportunity                   | Opportunities for Technology Integration and Scenario Implementation | Technologies such as 5G-A, computing power networks and artificial intelligence have entered a critical period for large-scale commercial use, with integrated application scenarios in vertical industries constantly emerging.                                                                                                                                 | Short- to medium-term | <ol style="list-style-type: none"> <li>Optimise agile R&amp;D and delivery processes oriented towards industry customers, and launch standardised solution product packages.</li> <li>Deepen strategic cooperation with leading industry customers, and carry out joint innovation and joint market expansion.</li> </ol>                                                                                                                                                                                                                                                                                    |
|                               | Opportunities in the Strategic Deployment of Future Industries       | Frontier technologies such as 6G, space-air-ground integrated networks and quantum communication are currently in the prototype and standard formation stage, providing a historical window for the Company to seize the commanding heights of future technology, define next-generation network architecture, and reshape the industrial competitive landscape. | Long-term             | <ol style="list-style-type: none"> <li>Make early arrangements in key areas, and participate in and lead the formulation of international standards.</li> <li>Undertake major national tasks such as serving as the source of original technologies, the leader of the industrial chain and the pilot testing base, and carry out long-term research and experimental verification of frontier technologies.</li> <li>Build a future-oriented open industrial innovation ecosystem through the deep integration of industry, academia, research and application, as well as strategic investment.</li> </ol> |

| Opportunity/<br>Risk Category | Sub-category                                                  | Risk/Opportunity Description                                                                                                                                                                                                                                           | Time<br>Horizon | Response Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Risk                          | Risks of Technological Iteration and Investment Returns       | Emerging technology routes are diverse and iterate rapidly; large-scale investment in the short term may face financial and strategic risks such as errors in technology selection, unclear commercial models and excessively long investment return cycles.           | Medium-term     | <ol style="list-style-type: none"> <li>1. Establish a technology evaluation and decision-making mechanism based on scenario value, and adopt an agile investment model of “pilot-verification-promotion”.</li> <li>2. Strengthen cross-departmental collaborative planning, and set clear phased commercialisation goals and evaluation indicators.</li> </ol>                                                                                                                                             |
|                               | Risks of Disruptive Technology Impact and Strategic Passivity | Disruptive technologies may trigger profound transformations in network architecture, information security and business models. If forward-looking strategic positioning is insufficient, there will be risks of strategic passivity and loss of core competitiveness. | Long-term       | <ol style="list-style-type: none"> <li>1. Strengthen the Science and Technology Committee to systematically track and assess the strategic impact of disruptive technologies.</li> <li>2. Strengthen forward-looking technology research facing future industries such as quantum technology, embodied AI, 6G, and next-generation Internet, increase investment and deployment efforts, and create an integrated innovation and development community of production, research, and investment.</li> </ol> |

### Constructing a Full-chain Innovation Management System

China Unicom systematically promotes the optimization of the deployment of scientific research forces, the improvement of the institutional system, and the aggregation of research and development capabilities.

- Guide R&D directions through forward-looking strategic positioning, map out a “technology tree” capability atlas covering key areas, and achieve dynamic management and global visibility through digital platforms.
- Establish 27 core systems and 42 supporting policies to form a powerful support of “providing as much as possible and everything that should be provided”.
- Strengthen planning continuity and closed-loop control, formulate the 15th Five-Year technology plan on a rolling basis, and for the first time, conduct a systematic review and evaluation of on-going research projects with a value-oriented approach, establishing a rigid exit mechanism.
- Improve the project initiation mechanism oriented by demand and value, and establish a full-process digital management system.
- The “Hundred-Ten Thousand-Million” scientific and technological talent cultivation project was deeply implemented, with the total number of scientific and technological talents across the Group reaching 48,000, including two top-tier scientific and technological talents designated by the State-owned Assets Supervision and Administration Commission of the State Council (SASAC), and a “Hundred-Person Team” of 102 high-level scientific and technological talents has been established.

### Building High-level R&D Platforms and Foundational Capabilities

The number of Strategic Emerging Industries Top 100 Projects ranks among the top of central enterprises. Continuously strengthen the multi-level scientific and technological innovation platform matrix of “national level – provincial and ministerial level – major infrastructure”.

- We have successfully led the construction of national artificial intelligence application pilot bases for intelligent terminals and medical health.
- We are striving to strengthen the industrial leadership capabilities of the National Engineering Research Centre for Next Generation Internet Broadband Service Applications. Meanwhile, we are actively participating in the construction of national strategic platforms such as the Xiong'an Centre of the Beijing-Tianjin-Hebei National Centre of Technology Innovation.
- Led or participated in the construction of key laboratories and technology centers across multiple fields, including the “Technical Innovation Center for Tourist Behavior Supervision and Decision-making Services” of the Ministry of Culture and Tourism, the “Key Laboratory of Rural Digitalisation Technology” of the Ministry of Housing and Urban-Rural Development, the Blue Sky Laboratory of Henan Province, as well as several provincial-level key laboratories co-established in Zhejiang, Guizhou, Shandong, and other regions.
- Proactively deploy major scientific research infrastructure, and unite the forces of industry, academia, and research to jointly build a next-generation internet large-scale scientific experimental network.
- Promote the unification of technical foundations and the sharing of capabilities; build a centralised capability system by converging and integrating R&D platforms and tools, with over 38,000 reusable middle-platform capabilities.
- Build an integrated and intelligent digital innovation infrastructure, establish a technology innovation platform covering eight major functions including R&D, commercialisation, and talent, and actively introduce AI capabilities.

## Optimising the Commercialisation of Innovation Achievements

China Unicom continues to deepen the integration of technological innovation and industrial innovation, and continuously improves the mechanism for the commercialisation of achievements, achieving remarkable results in the transformation of scientific and commercialisation achievements.

- Eight of our achievements were selected for the “Recommended Catalogue of Technological Innovation Achievements of Central Enterprises (2024 Edition)” of the SASAC of the State Council, covering four fields. Among them, the fields of “Instrumentation” and “High-end Equipment” were entered for the first time, and both the number of selected achievements and the number of fields covered ranked first in the industry. One achievement was selected as one of the Top Ten Scientific and Technological Progresses in the Field of Information and Communications for the year 2024 by the China Institute of Communications. One achievement was included in “The Charm of Science and Technology”, the 2025 Publication of Selected World Leading Internet Scientific and Technological Achievements. Three achievements were awarded the First Prize of the 2025 Science and Technology Award by the China Institute of Communications.

- We formulated the “China Unicom High-Value Patent Work Guidelines (Trial)” to promote the high-quality development and industrial application of patents, with over 2,700 patent conversions and applications, and the number of invention patents applied to core businesses reaching 8,262.

| Responsibility Performance Indicators                                        | 2023  | 2024  | 2025   |
|------------------------------------------------------------------------------|-------|-------|--------|
| Number of patent applications (units)                                        | 4,398 | 2,071 | 1,617  |
| Number of granted patents (units)                                            | 2,287 | 1,436 | 860    |
| Number of valid patents (units)                                              | —     | 9,397 | 10,261 |
| Number of newly completed international standards led by the Company (units) | 26    | 40    | 53     |
| Number of newly completed industry standards led by the Company (units)      | 35    | 55    | 71     |

## Upgrading digital intelligence operation capabilities

China Unicom has strengthened the deep integration of artificial intelligence with the Company's production, operation and management, so as to consolidate its advantages in centralised operation and establish a benchmark for the digital transformation of central enterprises.

### Continuously Deepening Smart Operations

#### Deep Application of AI to Improve Quality and Efficiency

We are continuously embedding digital intelligence technologies such as artificial intelligence into key workflows of production and operations, to form a batch of lighthouse applications with high economic benefits, strong platform effects and fast value accretion.

- AI-assisted recovery of arrears exceeded RMB280 million, the intelligent clearance amount exceeded RMB34.6 billion, and the AI coverage rate for real-name registration inspection reached 94%.

- We innovatively launched office AI agents, covering a cumulative total of 280,000 employees, promoting the addition of over 15,100 new scenarios for digital employees, with the total number of scenarios exceeding 21,300, and the proportion of intelligent scenarios reaching 81.95%, significantly enhancing office efficiency.

#### Iterative Upgrading of Digital and Intelligent Capabilities

We have upgraded the digital intelligence capability architecture of “one cloud base, five central control platforms, five middle platforms, five major APPs and N scenarios” to agilely empower business development.

- The five major APPs have become the primary channels for customers and the front line to handle business efficiently. The monthly active users of the Unicom APP exceeded 110 million, with full compatibility with HarmonyOS.

- The five major operating platforms and middle-platform capabilities collaborated efficiently, ensuring that 41 sets of core systems achieved nationwide version releases with “zero downtime”, and the new paperless architecture has been fully switched over across 31 provincial branches.

- We have accelerated the comprehensive migration of internal applications to the cloud, with the system cloudification rate reaching 100%, the proportion of independent research and development in core systems increasing to 50%, and the system availability rate remaining above 99.9%.

- The total data scale of the big data platform has exceeded 700 PB, and the intelligent middle-platform has completed its upgrade, strengthening AI-native application development and data intelligent labelling capabilities.

- We completed multiple digital intelligence pilot projects of the SASAC of the State Council with high quality, actively participated in research on key topics, achieved significant results in fields such as intelligent supervision models which have been promoted.



Awarded the TM Forum Excellence Award

## 🔍 Deepening Data Governance and Process Governance

China Unicom continues to deepen digital governance, enhance governance levels, and create a benchmark for digital governance in the information and communications industry.

### Manifesting the Value of Data Elements

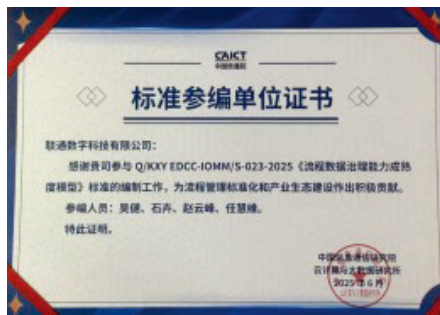
We are striving to strengthen the data foundation, with average monthly shared data reaching 388 trillion items and accumulated high-quality datasets exceeding 50 TB, and was selected for the “First Batch of High-quality Dataset Cases in the Artificial Intelligence Industry for Central Enterprises” by the State-owned Assets Supervision and Administration Commission of the State Council. Build trusted data spaces, carry out cross-provincial anti-fraud and carrier settlement pilots, and undertake the “National Data Infrastructure Construction Pilot Task” of the National Data Bureau. Deepen data-empowered governance, streamlining 1,098 grassroots reports throughout the year.

### Intelligent Process Governance

We constructed three major intelligent agents to empower national integrated process operations, improving approval process efficiency by over 20% and reducing the duration of on-site installation for consumer business by 14.3%. The digital and intelligent process governance practice was awarded the second prize for management innovation in the telecommunications industry, and industry standards were jointly released, providing customers with more efficient services through intelligent operations.



Jointly released the process data governance research report “Path and Practise of Data-driven Enterprise Process Digital Intelligence” with the China Academy of Information and Communications Technology (CAICT)



Participated in the compilation of the CAICT industry standard “Process Data Governance Capability Maturity Model”

## Tackling strategic emerging and future industries

### Implementation of the “Top 100 Projects” for Strategic Emerging Industries

Five key projects were successfully selected for the State-owned Assets Supervision and Administration Commission of the State Council’s “Top 100 Projects”, with the number of selections ranking tied for first place among central enterprises. Meanwhile, the Company has adopted a forward-looking deployment by adding five new internal key projects in reserve across critical fields such as new industrialisation, cloud services, and large models, forming a “5+5” tiered strategic deployment.

### Accelerating the Development of the Source of Original Technologies

We strengthen basic innovation and application innovation in network technology, data technology, and intelligent technology, break through the bottlenecks in the supply of original technologies, and accelerate the aggregation and optimized allocation of innovation elements across the entire industry.

#### Case Study

The source of original technologies for the next-generation Internet has spearheaded multiple industry “firsts”. The first “Internet 2030 White Paper” was released in China, the world’s first wide-area lossless transmission over 3,000 kilometres was completed, the world’s first online inference AI-native router was developed, and the industry’s first demonstration of intra-domain source address validation technology based on an operator’s existing network was achieved. The development of “Key Technology Research and Innovative Practise of Wide-area Intelligent Computing Network” was awarded as one of the Top Ten Scientific and Technological Progresses in the Information and Communications Field by the China Institute of Communications.

#### Case Study

A number of achievements from the source of original big data technology are leading both domestically and internationally. Our data trusted circulation technology has reached an internationally leading level. We led the formulation of China’s first international standard for big data architecture, and won the Second Prize of the National Technological Invention Award. The “Integrated Digital-Intelligence Security Management and Control Platform” was awarded the Gold Award for Excellent Cases of Digital China, and two major data sets were selected as the first batch of high-quality data set excellent achievements by the SASAC of the State Council.

### Forward-looking Deployment for Future Industries

We are proactively preparing for future industries such as computing power networks, quantum technology and space-air-ground integrated networks, consolidating the digital foundation through independent innovation, and empowering the intelligent transformation of various industries.

- **Next-generation Internet:** We completed the world’s longest-distance 1,500 km hybrid training trial on heterogeneous chips for large models, with equivalent computing power reaching over 95% of a single-chip single-cluster, providing an important practical foundation for the development of intelligent computing networks.

- **Next-generation optical networks:** We completed the construction of the first air-fibre integrated high-precision time synchronisation experimental network, and promoted the research, development and application of quantum technology, launching quantum-resistant secure mobile phones and the “Quantum+” secure encryption product series.

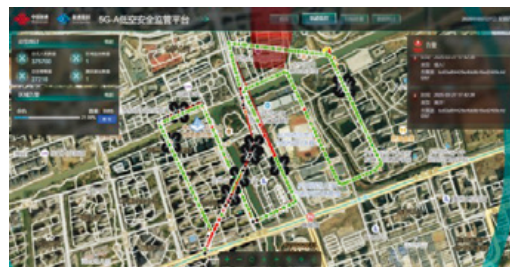
- **6G:** We successfully developed millimetre-wave indoor micro base stations with a high localisation rate, achieving autonomy in key chips and protocol stacks, and facilitating independent breakthroughs in millimetre-wave technology.

- **Satellite Internet:** We were approved for the Beijing 6G Space-Air-Ground Integrated Laboratory, obtained satellite communication operation permits, and collaborated on the launch of multiple low-earth orbit (LEO) satellites, one of which is the first LEO satellite in China with narrowband Internet of Things (IoT) communication capabilities.

- **Quantum Information:** We developed the industry’s first “integrated communication and encryption” quantum private line convergence equipment and quantum-resistant secure mobile phones, and constructed infrastructure such as the Beijing-Xiongan quantum channel and quantum key service platform.

## Case Study

Zhejiang Hangzhou Unicom has developed 12 types of low-altitude applications by constructing a “five-network-in-one” multi-dimensional network architecture and promoting technological innovations such as 5G + Integrated Sensing and Communication (ISAC) and high-precision navigation, providing end-to-end support for Hangzhou and its surrounding areas.



China Unicom Low-altitude Security Supervision and Management Platform

## Leading the development of the cybersecurity industry

As the leader of the modern industrial chain for network security, China Unicom unwaveringly implements the holistic approach to national security and strives to serve as the “supporter, leader and organiser” of industrial development.

### Core Technologies Achieved Multiple Major Breakthroughs

Taking independent innovation as the core support, we are strengthening key technological breakthroughs and product innovation in reliability and security, and establishing an all-scenario network security product system covering cloud-network-terminal-data integration, including security operation platforms and quantum-resistant terminals.

- The self-developed Unicom Cloud localised container engine CSK Turbo and the UniAI network security large model were successfully selected for the “Beijing First Unit (Set) of Major Technical Equipment Catalogue”.

- The number of ITU international cybersecurity standards we have led is industry-leading.

- We collaborated with partners such as the University of Electronic Science and Technology of China to develop UniYAK, a fully domestically produced programming language, to resolve the “bottleneck” issues of basic programming languages. The achievements were awarded the First Prize of the Science and Technology Award of the China Institute of Communications.



Awarded the First Prize of the Science and Technology Award of the China Institute of Communications

### Industrial Synergy Creating a New Landscape

We fully leverage the leading role of integration and mobilisation, and innovatively create a new work paradigm of “five-chain integration” comprising the “technology innovation chain, security capability chain, value creation chain, industry-investment synergy chain and ecosystem aggregation chain”.

- We convened the 2025 annual council meeting of the China Cybersecurity Industry Innovation and Development Alliance, recruiting more than 60 vice-chairman and council member units.

- The approval of the first batch of national-level industrial intellectual property operation centres, being the first and only national-level intellectual property operation centre in the field of cyber security.

- We have deeply participated in important activities such as Cybersecurity Week and the World Internet Conference.