

2021

SUSTAINABILITY
REPORT



CHINA UNICOM (HONG KONG) LIMITED
HKEx: 0762

TAKING ON NEW MISSIONS FORMULATING NEW STRATEGY ENTERING A NEW ERA



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Note: Please refer to our 2021 Annual Report for the details of Corporate Governance Report.



MESSAGE FROM CHAIRMAN

The year of 2021 was a milestone year in the Chinese history, and has also been an important year for China Unicom to formulate its new strategy and start a new journey. In the face of the impact of the unprecedented pandemic, faster evolution of landscape in the past century, and more complex, severe and uncertain external environment, we resolutely implemented the national strategic deployments, bravely assumed economic, social, environmental as well as technological innovation responsibilities, and embarked on a new journey of high-quality development with new positioning, new strategy and new paradigm. We have demonstrated our new responsibilities in serving the implementation of major national strategies, the needs of people's high-quality life and the transformation and upgrade of thousands of industries, showing new achievements in the beginning year of the "14th Five-Year Plan".

Keeping the top priorities of China in mind, formulating strategies to break new ground. Facing the requirements of the new development stage of the country, China Unicom fully, accurately and comprehensively implemented the new development concept, actively served the construction of a new development paradigm, and shouldered the mission and responsibility of building a Technological Superpower, Cyber Superpower, Digital China and Smart Society. We closely followed the new round of technological revolution and industrial transformation trends, scientifically planned the Company's positioning and development direction, accurately grasped the "timing" and "trend". We formulated the "1 + 8 + 2" strategic planning system, put forward the new strategy of "Strengthen and Solidify, Preserve and Innovate, Integrate and Open", focused on the five main responsibilities and main businesses of "Big Connectivity, Big Computing, Big Data, Big Application, and Big Security", and strived to build "the national team in the operation and service of digital information infrastructure, the key force in the establishment of Cyber Superpower, Digital China and Smart Society, and the frontline troop in the integration and innovation of digital technologies", so as to gather the mighty force to embark on a new journey and forge ahead in the new era. New achievements were made in high-quality development, as our economic performance hit a record high and our business structure continued to be optimised, contributing China Unicom's strength to the "six stabilities" and "six guarantees" and fully demonstrated our role as a "stabiliser and ballast" of the national economy. New breakthroughs were made in digital and intelligent operation, as we built the world's largest, most advanced and ultra-large-scale centralised IT system. The "five middle platforms" of public, government and enterprise, data, network and management were initially established, and the "Intelligence Brain" was officially released, which efficiently empowered thousands of scenarios and industries. The Company vigorously promoted the digital transformation of the supply chain, with our supply chain management ranked one of the leading supply chain management systems among central state-owned enterprises and was selected as an advanced supply chain model unit by the Ministry of Commerce.

Endeavoring in digital channels and reinforcing the foundation to cultivate corporate momentum. We developed ourselves in the main course of digital economy at full strength and achieved total transformation and upgrade of development momentum, path and mode. The Company accelerated the construction of intelligent and comprehensive digital information infrastructure that is high-speed and ubiquitous, cloud-network integrated, intelligent and agile, green and low-carbon, secure and controllable. The Company provided communication support to 192 "cloud diplomacy" of government officials and 31 major events such as the China International Import Expo, empowered the smart Winter Olympics with high standards and strengthen our brand as "No. 1 provider of communication support". The Company comprehensively promoted the deployment of "dual-gigabit" network and built the fastest 5G SA network in the world. The Company's gigabit broadband network covered 110 million customers, and ranked first in the industry in Northern China in terms of broadband speed. The Company helped narrow the digital divide with 100% mobile coverage in towns and villages, creating an unobstructed information channel for economic and social development. The Company

actively implemented the “Eastern Data, Western Computing” project to create a computing power network with advanced architecture, security, reliability and excellent service. The Company built a new “5 + 4 + 31 + X” data centre system and revamped the branding of Unicom Cloud. Through coordinated data-network, data-cloud and cloud-edge development, we strengthened the computing power engine for high-quality economic and social development. Leveraging the advantages of cloud, Big Data, IoT, AI, blockchain and security integration, we unleashed the value of data, served the country’s macroeconomic monitoring and collaborative governance, and deeply supported local governments’ data governance and data security services. We supported the “Cloudification, Digital Transformation, Intelligence Enablement” of thousands of industries, deeply implemented the 5G Applications “Sailing” action plan, and won 94 awards in the “Blooming Cup” competition held by the Ministry of Industry and Information Technology. The Company implemented the overall national security concept and strengthened the defense line of network information security. The number of scam calls decreased by 49% year-on-year, and the Company’s Big Data anti-fraud capability led in the industry. We insisted on independent innovation, adhered to “four orientations” and focused on making breakthroughs in “bottleneck” core technologies, with R&D expenses increasing 61.7% year-on-year. Approved as a national engineering research centre with more than 200 self-developed application products, we have created a number of well-known star products such as government Big Data platform, industrial Internet platform, and smart city base. The Company established the Western Innovation Research Institute and the Chongqing 5G Integrated Innovation Centre to create an industry-university-research-application innovation consortium, significantly enhancing its capabilities in digital technology integration and innovation.

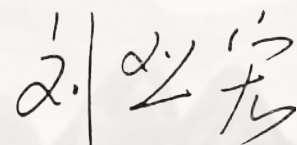
Upholding the People-oriented principle and uniting the public to do good deeds. China Unicom always insists on people-oriented development and endeavours to allow people enjoy the convenience of life brought by the development of digital technology, continuously enhancing people’s sense of gain, happiness and security. At critical moments, we led the charge and successfully completed the flood control and disaster relief missions in Henan, Shanxi and other places, turning China Unicom into a front-line troop. Our Big Data supported more than 4 billion “health code” enquiries, and efficiently supported the assessment by the State Council and relevant ministries on the pandemic prevention and control and the resumption of work and production, as we became a reliable force for the country. We consolidated and expanded the achievements in poverty alleviation, and continued to strive for comprehensive rural revitalization. China Unicom digital village platform served more than 153,000 administrative villages and provided services for 14,363,000 rural permanent residents. Through the use of digital live broadcast technology, we cultivated a number of rural e-commerce product brands with good reputation, excellent quality and distinctive features. We provided warm and intelligent services with focus on “the elderly and youth”, creating services with five dimensions: reliability, ease, security, warmth and satisfaction. We built agile and intelligent service capabilities by setting up 2,100 smart elderly service centres nationwide, comprehensively improving customer satisfaction. Adhering to the harmonious coexistence of human and nature, the Company vigorously promoted the R&D and application of the new energy-saving technologies. Through the 4G/5G co-build co-share, the Company saved more than 17.5 billion kWh of electricity per year, reduced carbon emissions by more than 6 million tons. We empowered green production and living style, helping to achieve carbon peaking and carbon neutrality goals. We accelerated the construction of a digital ecosystem of “multi-party co-build, complementary edges and mutual promotion, cross-sector integration, cooperation and co-existence”, and created a new ecosystem covering the innovation chain, supply chain and value chain, building a “joint fleet” together with our partners. The Company comprehensively deepened co-build co-share, drove the rapid development of the supply chain, and facilitated the macro economy stabilisation with the sustainable development of the industry.

Refining spirituality and enhancing reformation to become a first-class enterprise. China Unicom always focuses on improvement on internal management. We leveraged the key role of reformation in building a new development paradigm, strengthened reform and system integration, cleared the “blockages” that restricted productivity, with a view to overcoming difficulties, seizing opportunities and making new achievements through reform. The Company vigorously promoted corporate culture, and established the business management philosophy of creating value for customers. We are spontaneously customer-oriented, employee-friendly, attentive to quality service, inherently innovative and proud of endeavours, cultivating the spirit of long-term endeavours and building the spiritual support of China Unicom. In the three-year action plan for state-owned enterprise reform, the overall progress of 130 reform tasks reached 93%. We deepened the market-oriented reform of subsidiaries. 100% of our subsidiaries have established a board of directors, the majority of which are external directors. We comprehensively promoted the tenure system and contractual management of management members. The Company stimulated the vitality of the front-line responsibility units, and initially formed a customer-oriented operation system tailored for the front-line units, continuously improving our ability to get close to the front-line scenarios and serve and empower front-line staff. The Company deeply implemented talent-based corporate development, holistically cultivated, introduced and used talents. The total number of innovative talents in the special zone reached more than 9,000, and more than 40 industrial experts were introduced. Our talent structure continued to be optimised. The Company continued to enhance its competitiveness, innovation, control, influence and risk management, effectively preventing and resolving major risks. We continued to strengthen, optimise and expand state-owned capital, and took a solid step towards building a world-class enterprise with global competitiveness.

The year 2022 is the starting year for China Unicom to fully implement its new strategic plan. We will keep the “two imperatives” and “the country’s top priorities” in mind to implement the strategic plan as the main task, focus on the five main responsibilities and main businesses, adhere to the two-wheel drive of market and innovation, stabilise growth, optimise network, focus on reform, improve capabilities, strengthen collaboration, and prevent risks. We will continue to promote the spirit of endeavour, march forward in the road of new “challenges” with confidence, and greet the successful 20th National Congress with excellent results.

China Unicom (Hong Kong) Limited

Chairman and CEO



March 2022

WELCOME TO CHINA UNICOM

COMPANY PROFILE

China Unicom (Hong Kong) Limited (“China Unicom”) is a Hong Kong-listed red-chip company of China United Network Communications Group Company Limited. It was incorporated in Hong Kong in February 2000 and listed on the New York Stock Exchange* and The Stock Exchange of Hong Kong Limited on 21 and 22 June 2000 respectively. The Company has been included as a constituent stock of the Hang Seng Index since 1 June 2001. The Company merged with China Netcom Group Corporation (Hong Kong) Limited on 15 October 2008.

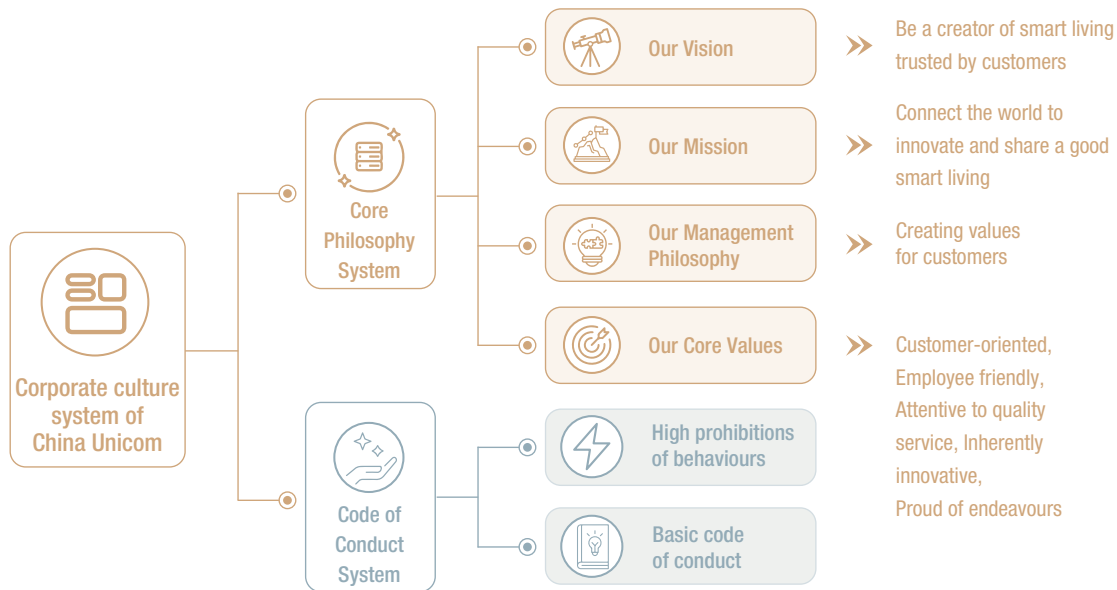
China Unicom has been selected as one of the “Fortune Global 500 Companies” for 13 consecutive years and ranked 260th in the Fortune Global 500 for the year 2021. In 2021, China Unicom was accredited with “Asia’s No. 1 Most Honored Telecom Company” by Institutional Investor for six consecutive years.

China Unicom steered on the main course of digital economy at full strength, taking “Big Connectivity, Big Computing, Big Data, Big Application and Big Security” as the main responsibilities and main businesses, opening up new development space and integrating into the new development paradigm.

* The Company’s ADSs were delisted from the New York Stock Exchange on 18 May 2021. For details, please refer to the announcement of the Company dated 23 July 2021.

CULTURAL PHILOSOPHY

China Unicom has taken the initiative to undertake the responsibility and uphold the mission to rally public support, foster new generation, develop culture and build a positive image. It adhered to the principle that culture is critical in prospering and strengthening the corporate and continuously strengthened the building of corporate culture, increased the soft power of corporate culture, and built a corporate culture system of China Unicom that consists of a core philosophy system and a code of conduct system.



Corporate culture system of China Unicom

CORPORATE GOVERNANCE

The Board of China Unicom is committed to high standards of corporate governance (including information disclosure) and recognises that good corporate governance is vital for the long-term success and sustainability of the Company’s business. As a company incorporated in Hong Kong, the Company adopts the Companies Ordinance (Chapter 622 of the Laws of Hong Kong), the Securities and Futures Ordinance of Hong Kong and other related laws and regulations as the basic guidelines for the Company’s corporate governance. As a company listed in Hong Kong, the current Articles of Association of the Company are in compliance with the Rules Governing the Listing of Securities on The Stock Exchange of Hong Kong Limited. These rules serve as guidance for the Company to improve the foundation of its corporate governance, and the Company strives to comply with the relevant requirements of international and local corporate governance best practices. There were no instances of any violation of listing-related laws and regulations by China Unicom in 2021.

Responsibilities towards the capital markets

In order to further enhance the Company's information disclosure system, and to ensure the truthfulness, accuracy, completeness and timeliness of its public disclosures (including inside information), the Company has adopted and implemented the Information Disclosure Control Policy. In an effort to standardise the principles for information disclosures, the Company established the Information Disclosure Review Committee which under the management and formulated the procedures in connection with the compilation and reporting of the Company's financial and operational statistics and other information, as well as the procedures in connection with the preparation and review of the periodic reports. Moreover, the Company established detailed implementation rules with respect to the content and requirements of financial data verification, in particular, requiring the upward undertaking by the individual responsible officers of major departments. The Company's effort in corporate governance (including information disclosure) is well recognised by the capital market, and was accredited with a number of awards.

Responsibilities towards the investors

The Company attaches importance to investor relations and maintains ongoing dialogues with the shareholders, and in particular, to communicate with shareholders through annual general meetings. Annual general meeting shall be held every year, and extraordinary general meeting may be held when the Board deems it appropriate, the Company's Directors and representatives of Board committees will attend the meetings. All matters at the Company's general meetings are resolved by poll and the relevant procedures are explained at the meeting and the Company publishes the poll results in a timely manner, thereby offering protection of the shareholders' rights and interests. The Company adopted Shareholders' Communication Policy to ensure that the shareholders are provided with readily, equal and timely access to balanced and understandable information to protect their right to know.

In addition to publishing annual reports and interim reports, the Company discloses unaudited financial information and other performance indicators on a quarterly basis and announces operational statistics on a monthly basis in order to further enhance the Company's transparency and improve investors' understanding of the business operation of the Company. Upon the announcement of interim and annual results or major transactions, the Company will generally hold analyst briefings, press conferences, and global teleconferences with investors, during which the Company's management would accurately and thoroughly respond to questions raised by stakeholders.

The Company has established the investor relations department, which is responsible for providing information and services requested by investors and maintaining timely communications with investors and fund managers. The Company also arranges from time to time roadshows and actively attends investor conferences arranged by investment banks, through which the Company's management meets and communicates with investors. The Company actively responds to investors' concerns, and transparently makes adequate disclosures on the Company's efforts to address climate-related risks on climate change issues that have been widely concerned by investors in recent years.

Latest updates on the Company's significant business developments are being provided in a timely and accurate manner through announcements, press releases and the Company's website (www.chinaunicom.com.hk), so that investors can keep abreast of the Company's latest developments. The Company was voted as "Asia's Best IR Team (Telecoms)" by Institutional Investor.

THE BOARD OF DIRECTORS AND MANAGEMENT

To serve the best interests of the Company and its shareholders, the Board of Directors of the Company is responsible for reviewing and approving major corporate matters, including, amongst others, business strategies and budgets, major investments, capital market operations, as well as mergers and acquisitions. The Board of Directors is also responsible for risk management and internal control, and reviewing and approving the regular announcements periodically published by the Company regarding its business results and operating activities. In addition, the Board of Directors has overall responsibility for environmental, social and governance strategies and reporting. The Company has established three committees under the Board of Directors, namely, Audit Committee, Remuneration Committee and Nomination Committee.



Liu Liehong

Chairman and
Chief Executive Officer



Chen Zhongyue

Executive Director and
President



Wang Junzhi

Executive Director



Mai Yanzhou

Executive Director and
Senior Vice President



Liang Baojun
Senior Vice President



He Biao
Senior Vice President



Tang Yongbo
Senior Vice President



Li Yuzhuo
Executive Director and Chief Financial Officer



Cheung Wing Lam Linus
Independent Non-executive Director



Wong Wai Ming
Independent Non-executive Director



Chung Shui Ming Timpson
Independent Non-executive Director



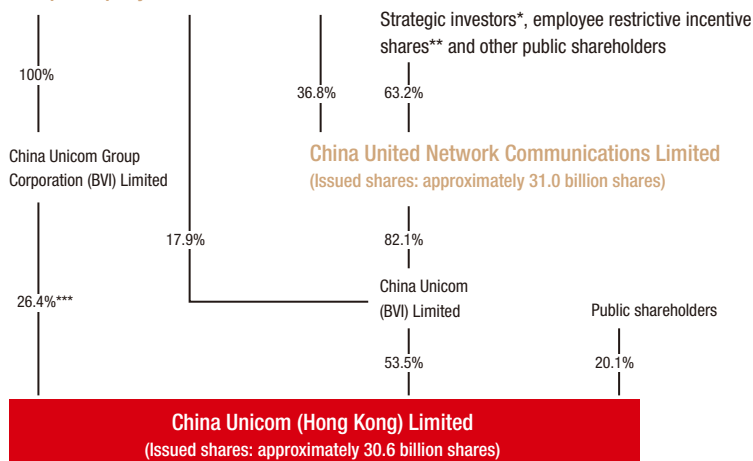
Law Fan Chiu Fun Fanny
Independent Non-executive Director

Note: Changes of the Board of Directors and management

Liu Liehong was appointed on 3 September 2021, Wang Xiaochu has resigned on 27 August 2021, Chen Zhongyue was appointed on 19 February 2021, Wang Junzhi was appointed on 3 December 2021, Li Fushen has resigned on 11 June 2021, Mai Yanzhou was appointed on 28 February 2022, Zhu Keping has resigned on 18 June 2021, Fan Yunjun has resigned on 28 April 2021, Tang Yongbo was appointed on 30 December 2021, Li Yuzhuo was appointed on 28 February 2022.

SHAREHOLDING STRUCTURE

China United Network Communications Group Company Limited



Notes:

* In 2017, approximately 10.9 billion shares of China United Network Communications Limited were acquired by the strategic investors introduced by the mixed-ownership reform through non public share issuance and transfer of existing shares. These shares were no longer restricted from sale in November 2020.

** Pursuant to the initial grant of restrictive share incentive scheme, China United Network Communications Limited granted approximately 800 million restricted shares to the core employees, of which, approximately 500 million shares were unlocked as of April 2021.

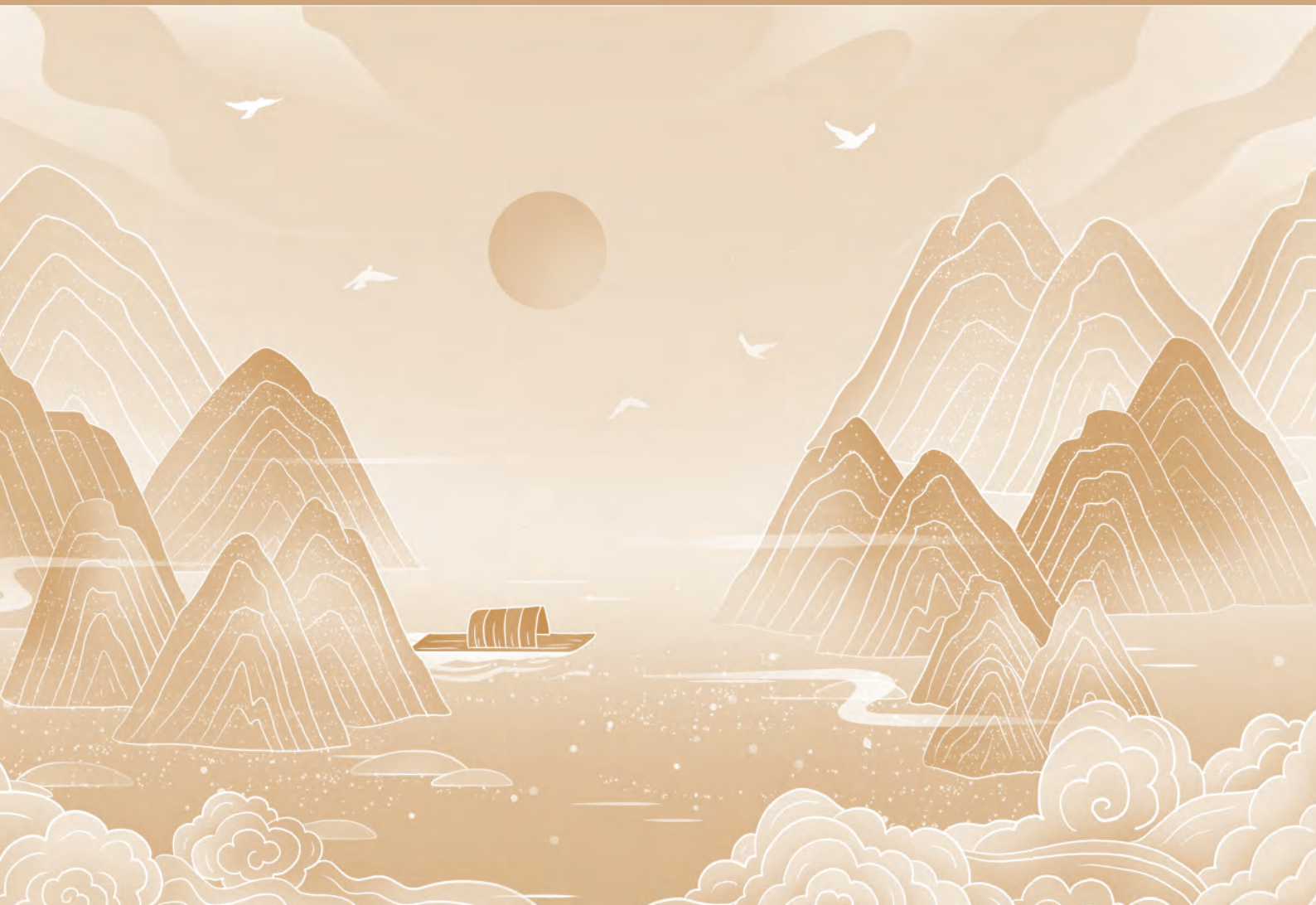
*** Excluded the interest regarding the pre-emptive right owned by China Unicom Group Corporation (BVI) Limited in 225,722,791 shares of the Company.

As at 31 December 2021

Topic 1

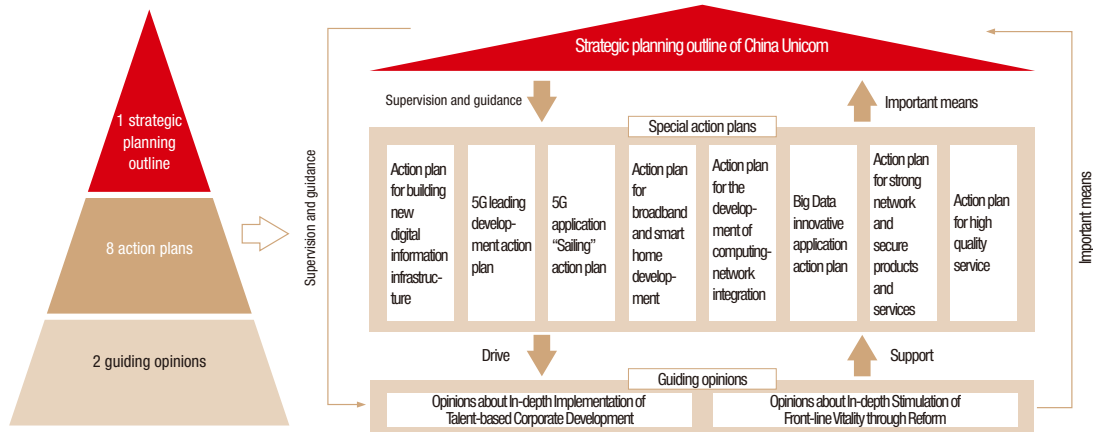
Shouldering Missions and Formulating Development Strategy

Future business is promising if the strategic judgment is accurate, the strategic planning is scientific and the strategic win is active. Keeping the “two imperatives” and “the country’s top priorities” in mind, China Unicom conscientiously implemented the national strategic deployments and fully undertook the new missions given by the new era. Leveraging its own resources and edges, it adapted to technology and market development paradigms, closely following the trend of a new round of technological revolution and industrial reform. The Company defined its new positioning, new strategy, new deployments and new missions, unswervingly strengthening, optimising and expanding state-owned capital, and becoming a world-class enterprise with global competitiveness.



Building an overall “1 + 8 + 2” strategic planning system

With a higher level of responsibility, a broader vision and a stronger mission, the Company scientifically formulated a strategic planning system consisting of “1 strategic planning outline + 8 action plans + 2 guiding opinions”, and comprehensively and systematically fulfilled its economic, social, environmental and technological innovation responsibilities with higher quality.



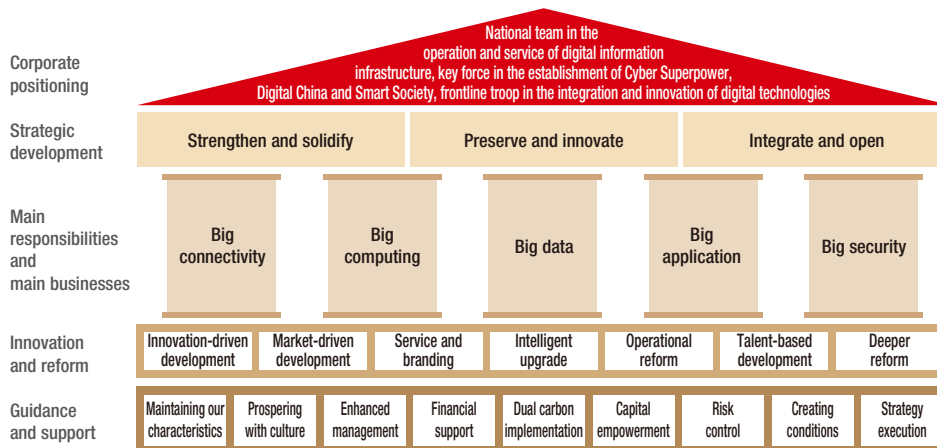
China Unicom’s “1 + 8 + 2” strategic planning system

“1 + 8 + 2” is an organic whole, which jointly guides China Unicom to endeavour in the main course of digital economy.

- **1 strategic planning outline:** as the “guiding light” that leads the direction, it is the general guideline and strategy of China Unicom in the new era for corporate governance and development, playing the role of overall management and direction setting.
- **8 action plans:** as the “nautical chart” that indicates the route, they act as an important link in the strategic planning system. They constitute the supply-side structural reform of China Unicom and refine the planning outline for enforceability and actionability, leading to the optimisation of deployment structure, more efficient resource allocation and higher development quality at a deeper level.
- **2 guiding opinions:** as the “propeller” for acceleration, they are important means to promote the implementation of strategies, and manifestation of the organic combination of market-driven and innovation-driven development. They serve to solve the lack of innovative talents and lack of effective incentives in the Company, making the organisation and employees more productive, and injecting more vitality into the high-quality development of the Company.

Systematically setting out the “13579” strategic system

The outline of China Unicom’s strategic planning clearly defines “1 new strategic main line, 3 new positioning, 5 main responsibilities and main businesses, 7 innovation and reform measures, and 9 guidance and support measures”, which fully reflect the responsibilities of a great power in the nation, scientifically specifying the blueprint of its new journey, and define the ambition of high-quality development.



China Unicom “13579” strategic system

Shouldering missions and defining new positioning and new strategy

New positioning of the Company

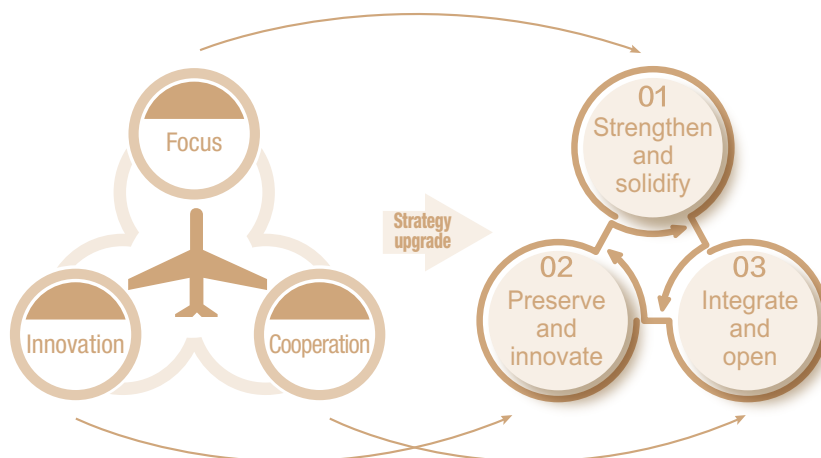
Embarking on a new journey, the Company actively served and integrated into the national strategy, resolutely shouldered the missions and responsibilities of Cyber Superpower, Digital China, Smart Society, and technological innovation, and positioned itself as “the national team in the operation and service of digital information infrastructure, the key force in the establishment of Cyber Superpower, Digital China and Smart Society, and the frontline troop in the integration and innovation of digital technologies”.

- **National team in the operation and service of digital information infrastructure:** We must resolutely implement the national mission, comprehensively build a first-class intelligent comprehensive digital information infrastructure in the industry in terms of breadth, thickness and depth, which is “high-speed and ubiquitous, spanning from sky to ground, cloud-network integrated, intelligent and agile, green and low-carbon, secure and controllable”, building an unobstructed information channel and a new digital base for economic and social development.

- **Key force in the establishment of Cyber Superpower, Digital China and Smart Society:** We must resolutely implement the Cyber Superpower strategy, serve the construction of Digital China and Smart Society, and ride on the trend digital, network-based and intelligent transformation. We leverage technologically-leading and highly integrated digital services of “full coverage, full online, full cloudification, green, and one-stop” to support the “Cloudification, Digital Transformation, Intelligence Enablement” of thousands of industries and promote the new development of digital production, digital life and digital governance.

- **Frontline troop in the integration and innovation of digital technologies:** We must resolutely implement innovation-driven development, focus on core technologies, focus on key applications, integrate and innovate, and build China Unicom into a technological innovation enterprise, so as to achieve high-level self-reliance and self-improvement of digital technology and become an important part of the national strategic technological strength.

New strategy of the Company



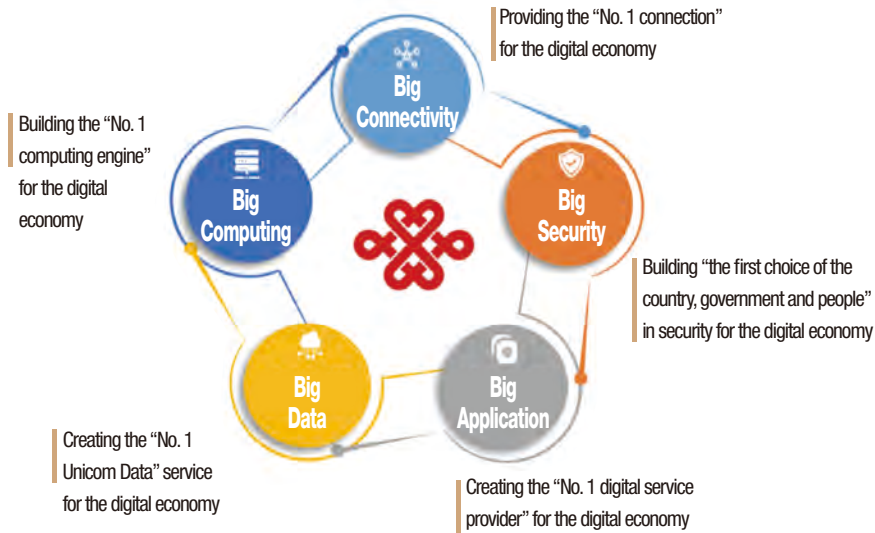
By inheriting history, making up for shortcomings and giving full play to competitive edges, the Company's strategy has been upgraded to “strengthen and solidify, preserve and innovate, integrate and open”. The new strategy is a complete system and always follows systemic concepts. It focuses on the presence as well as the long-term. It emphasises the market as well as innovation. It fortifies its bottom line and dares to try. It leverages competitive edges and embraces open cooperation. It also comprehensively and systematically responds to a series of important questions such as the foundation, drivers, means and path of China Unicom's development in the new era.

- **Strengthen and solidify:** highlight the strengthening of network and service foundation in order to consolidate the fundamentals.
- **Preserve and innovate:** highlight the integrity of network and expansion into new digital and intelligent models to make a good portfolio.
- **Integrate and open:** highlight the integration of factors and market convergence and succeed as a team with partners.

Expanding into new racecourses and laying the groundwork for five main responsibilities and businesses

Facing the new opportunities brought by the wave of digitalisation and the new demand for digital, network-based and intelligent transformation of hundreds of industries, the Company firmly grasps the modern characteristics of the information communication industry, adheres to its positioning and strengthens innovation-driven development. It shifts from traditional business competition to digital innovation development, from simple price competition to digital value creation, and from existing market competition to digital incremental market expansion. Taking

“Big Connectivity”, “Big Computing”, “Big Data”, “Big Application” and “Big Security” as the five main responsibilities and main businesses, the Company deepens digital technology to empower thousands of industries with intelligence and value, and lets people enjoy greater sense of reward, happiness and security in the course of digital, network-based and intelligent development.



Five major responsibilities and businesses of China Unicom

Leading and ensuring sustainable development with innovation and reform

- The Company gives full play to the key role of innovation and reform in building a new development paradigm, and adheres to the combination of market-driven and innovation-driven development. It sets out seven work aspects and, unleashes productivity through deep integration and efficient collaboration, clearing the “blockages” that restricts productivity, with a view to overcoming difficulties, seizing opportunities and making new achievements.

- The Company strengthens guidance and support measures. It put forward concrete support measures in nine aspects focusing on the service development strategy, the groundwork of main responsibilities and main businesses, as well as innovation and reform, in order to safeguard high-quality development.



Topic 2

Vigorously Serving the Smart Winter Olympics







The year 2021 is a decisive year for the preparation of the Winter Olympics. As the sole official telecommunication services partner of the Beijing 2022 Olympics and Paralympic Winter Games, China Unicom adhered to the ideology of “Green Olympic Games, Sharing Olympic Games, Open Olympic Games and Honest Olympic Games” and earnestly implemented the requirements of “simplicity, safety and excellence” into its Winter Olympics communication services, so as to achieve zero fault in networks support, zero complaint in event services, zero infection in personnel, and zero negative public opinion related to the Olympics, contributing China Unicom’s wisdom and strength to the high-profile Olympic Games.



Supporting the Olympic Games with smart networks and hyper speeds

China Unicom strived to build safe, reliable and future-oriented premium networks with right architecture, comprehensive functions and advanced technology, covering various scenarios such as competition venues, non-competition venues, service facilities, and traffic trunk lines. China Unicom's premium networks served as an advanced digital base for a high-tech Winter Olympics, leveraging new technologies such as 5G, "IPv6+" and WiFi 6.






- The Company successfully completed the support for a series of testing activities under the theme of "Meet in Beijing" and conducted communication system testing as extensively as possible, which was highly recognised by various organising committees.
- The Company built the world's leading intelligent comprehensive digital information infrastructure in 87 Winter Olympics venues across three regions in Beijing and Zhangjiakou, Hebei, creating a Winter Olympics "information channel".

 <p>First-time full 5G coverage at Olympics venues and built gigabit venues with "the highest speed and maximum capacity in the history of the Olympic Games".</p>	 <p>Applied for the first time "IPv6+" next-generation Internet technology and the WiFi 6 next-generation wireless access technologies at the Olympic Games.</p>	 <p>The Broadcast Contribution Network (BCN) with the highest speed, the maximum bandwidth, the longest distance and the largest scale in the history of the Olympic Games, which greatly improved the efficiency and quality of broadcasting.</p>	 <p>For the first time 5G+AI+AR technology was applied in the Olympic Games, to provide fully digital operational support that combined virtuality and reality.</p>	 <p>For the first time, an Optical Cross Connect platform (OXC) was deployed at the Olympic Games to offer 5G wireless fixed voice service, and replace integrated cabling with 5G networks, effectively implementing the concept of Green Winter Olympics.</p>	 <p>For the first time permanent timing and scoring cables were laid in the Olympic Games to avoid duplicate investment.</p>
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Serving the Olympic Games with smart applications and an extensive range of products and services

China Unicom fully leveraged new-generation communications technologies such as 5G, "IPv6+", cloud computing, Big Data and AI to perfectly integrate technology and sports, and helped the Beijing Winter Olympics to achieve a number of "global firsts" and "historical breakthroughs" in multiple fields such as "smart competition, smart spectating, and smart participation".

China Unicom 5G-Empowering Smart Winter Olympics

				
	Smart spectating	Smart competition	Smart participation	
	Bringing wonderful viewing experience to the public Providing new experiences such as high-definition live broadcast, bullet time and multi-angles live broadcast	New concept of digital intelligence and efficient coordination Built new applications such as smart command and dispatch, smart venues, Wo Zhihu and smart material management	Breaking through physical distance with innovative applications Creating new experience such as smart cloud broadcast, unmanned interview, intelligent Internet of Vehicles, remote first aid, etc.	

- On the Beijing-Zhangjiakou high-speed railway, the world's first high-speed railway with continuous 5G 200MHz bandwidth coverage, we jointly built the ultra-high-definition live broadcast studio of "5G + 4K + high-speed rail" for the first time, letting passengers enjoy the 5G + 4K Winter Olympics grand visual entertainment on high-speed trains.
- 5G cloud broadcast was used for the first time in the Olympic Games. New technologies such as "free perspective" and "bullet time" were applied to let audience freely choose the viewing perspectives and enjoy freeze-frame fantastic moments.
- Adopted 5G backhaul video broadcast signals in the Olympic Games for the first time, helping Olympic Broadcast Services (OBS) achieve the first 5G-based event broadcast in the history of the Olympic Games.
- For the first time in the history of the Olympics, the INFO-AV system realised full cloud production, editing and processing, so that registered reporters around the world could watch the live broadcast, on-demand broadcast or playback of the press conferences through the system.
- The first large-scale deployment of the digital automatic processing platform of "Big Data + AI + computing".

- Adopted the unmanned hybrid interview technology in the Olympic Games for the first time, which not only enabled real-time transmission and ensured the quality of interviews, but also met the requirements for pandemic prevention and control.
- The 5G public network intercom was used among all the Olympic stadiums in the three regions of Beijing and Zhangjiakou for the first time, improving the efficiency of event command and dispatch.
- Timely assistance was provided to skiers through 5G intelligent medical care in the Olympics for the first time, seeking to treat patients within the golden window.
- Level-4 unmanned shuttle bus, 5G unmanned torch transmission and other smart Internet of Vehicles services were provided at the Olympic Games for the first time, offering high-quality smart travel experience for the Beijing Winter Olympics.
- 5G-based smart pandemic prevention was provided for the first time at the Olympics. The Company independently developed a handheld smart pandemic prevention device called “WO Zhihu”, which improved the efficiency of event operation and management during the pandemic.



China Unicom built a 5G intelligent Internet of Vehicles system covering an area of over 1 million square meters in Shougang Park. Taking advantages of cutting-edge technologies such as 5G, MEC and BeiDou, it demonstrated intelligent operation of scenarios such as unmanned retail, driverless transport and precise delivery. The vehicles were running smoothly and could avoid obstructions in a timely manner in case of unexpected road conditions. In the Beijing Winter Olympics Village, the three core “green technologies” of “5G + perception + positioning” empowered innovative unmanned cleaning, helping to build a 5G + smart Winter Olympics Village.

Supporting the Olympic Games with smart technology and professional teams

Facing harsh natural environment such as extreme coldness, high mountain and strong wind, China Unicom insisted on network-wide coordination and overcame difficulties. Our headquarters, Beijing branch, Hebei branch, the five provinces around the Beijing Moat and the provincial branches where the international bureaus and satellite stations were located jointly contributed high-quality network service capabilities. We established a digital operation support system for the Winter Olympics network and a “1 + 5 + N” control system for the competitions, providing a full-system integrated support for the opening and closing ceremonies and various events of the Winter Olympics.

- During the Winter Olympics, a total of 257,000 personnel participated in communication support and 113,000 vehicles were dispatched across the country, successfully supporting 427 Winter Olympics events. Among which, more than 1,500 people worked in the support red line at Winter Olympics venues, more than 5,000 people directly participated in the major support initiatives of the Winter Olympics, and more than 30,000 people worked in network communication, network security, digitalisation and other support services.

- A “Digital Great Wall” for network and information security was built to provide a reliable digital protection for “Secure Winter Olympics”. Relying on cutting-edge technologies such as network security situational awareness, Big Data risk control and monitoring, artificial intelligence analysis, and automatic blocking, as well as an efficient and robust command and dispatch system, the Company ensured the secure operation of various Olympic network systems.

- According to the principle of “one venue, one policy”, 87 specialised plans were formulated, 49 large-scale drills were carried out in total, and all the Winter Olympics areas were protected by “double routing, double nodes and double power supplies”.

- We provided powerful and highly reliable network services which allowed on-site users to experience the ultimate network speed during the games, with the upload speed reaching 500Mbps, and the download speed reaching 1.5Gbps.



China Unicom Winter Olympics Telecommunication Technology Operation Command Centre (TTOC), the Intelligence Brain for Winter Olympics communication

On 4 February 2022, the Beijing 2022 Winter Olympics was grandly opened at the National Stadium. China Unicom provided 5G + 4K/8K ultra-high-definition live broadcasting to bring a wonderful opening ceremony visual experience to the public, and met the connectivity requirements of nearly 40,000 visitors and performers. In addition to the full-scenario mobile video live broadcasting, IPv6+ technology was applied to the Winter Olympics for the first time, providing a good connectivity environment with one-click activation and plug-and-play for the media. Xinhua News Agency and other media achieved real-time transmission of on-site photos and videos of the opening ceremony through 5G network slicing.



Provided reliable communication support for the opening ceremony of the Winter Olympics



The splendid moments of athletes from all over the world entering the stadium were transmitted through 5G high-definition video

With the highest standards, the strictest organization management, the most practical measures, the best services and the outstanding effects, China Unicom has been affirmed by the central leadership as for the all-out preparation and service support of the Winter Olympics. Thomas Bach, President of the International Olympic Committee, paid a visit to China Unicom's major support team and praised that "China Unicom's communication support team is a vibrant team. In addition, there were many breakthroughs in this Winter Olympics, especially the broadcasting and communication technology". Yiannis Exarchos, the Chief Executive Officer of Olympic Broadcasting Service, mentioned that "This may be the best broadcasting infrastructure that I have experienced in the history of the Winter Olympics". Athletes, reporters and staff from various countries also expressed high praise to China Unicom.

Igniting national passion for winter sports with a smart image

Adhering to the development strategy of "North Ice, South Exhibition, West Expansion and East Progress" of national winter sports, China Unicom took practical actions to help achieve the goal of "300 million people participating in winter sports". Through a series of activities such as the selection of "Winter Dream Ambassadors", the "Smart Winter Olympics China Tour", and the Winter Olympics franchise product business plan, the Company told the stories of the Winter Olympics and promoted the spirits of the Olympic Games, gathering the majestic power for the Winter Olympics. Focusing on the promotion themes of "China Unicom 5G Great Power", "China Unicom 5G Empowers Smart Winter Olympics" and "China Unicom Trusted by the Winter Olympics", the Company fully demonstrated its social responsibilities as a central state-owned enterprises and a pillar of the country, and promoted the core strength of central state-owned enterprises in technological innovation.

- During the period of the Winter Olympics, China Unicom was reported three times on News Broadcasts and 27 times on CCTV. It was also reported by several professional media, provincial and municipal local media and social media.
- The selection of China Unicom's "Winter Dream Ambassadors", which lasted for 4 years, has come to a perfect conclusion. A total of 2022 "Winter Dream Ambassadors" were recruited from more than 2,000 colleges and universities in 30 provinces across the country, and more than 2 million creative works were received, creating 17.4 billion views and nearly 300 million interactions, forming a wide social impact.
- We carried out a series of activities under the theme of "Smart Winter Olympics China Tour" to bring Olympic culture and winter sports experience to citizens in 16 cities including Beijing, Zhangjiakou, Shenyang, Taiyuan, Guangzhou and Haikou, so that the public can experience the passion and charm of winter sports.
- Taking advantages of China Unicom's nationwide online and offline channels, the Company sold franchised products for the Winter Olympics in hundreds of its business outlets in more than 300 cities in 31 provinces across the country, so that people from the Greater Khingan in Heilongjiang province, Sanya in Hainan province, Ngari in the Tibet Autonomous Region could buy the lovely "Bing Dwen Dwen" and "Shuey Rhon Rhon", letting them understand, experience and feel the Winter Olympics through China Unicom.



China Unicom "Winter Dream Ambassadors" campus activities



China Unicom "Smart Winter Olympics China Tour"

China Unicom adhered to the people-centred value base and fundamental logic, and accelerated the construction of intelligent and comprehensive digital information infrastructure that is high-speed and ubiquitous, cloud-network integration, intelligent and agile, green and low-carbon, secure and controllable, so as to promote regional coordinated development, adhere to network information security, and help build a Cyber Superpower and Digital China.



Measures adopted in 2021

- Adhering to integrity management and compliance with laws and regulations, the Company achieved remarkable results in anti-corruption.
- The cumulative scale of 5G base stations reached 690,000 and 5G population coverage rate exceeded 60%. Total broadband ports reached 239 million and IoT connections exceeding 300 million.
- The total computing power of the whole network reached 350 PFLOPS, and the high-quality computing power bearing network with low latency was comprehensively upgraded.
- We provided communication support for major national conferences and events such as the “Cloud Diplomacy” and the 2022 Beijing Winter Olympics, and contributed digital intelligence to routine pandemic prevention and control.
- We continued to build an information optical channel to serve the “Belt and Road” Initiative.



Actions to be taken in 2022

- To deepen the construction of rule of law and create a sound development ecosystem.
- To improve the breadth and depth of wireless network coverage and accelerate 10G PON deployment. To expand the pre-coverage of commercial buildings in order to provide a leading experience.
- To accelerate the construction of green, intensive, secure and reliable computing infrastructure, and promote the construction of intelligent operation support system.
- To provide high-quality communication support services, create a secure and harmonious network environment, and support scientific and technological pandemic prevention and smart pandemic prevention.
- To improve the intelligent network service capability of one network around the world and support the new development of “Cloudification, Digital and Intelligence Enablement” for thousands of industries around the world.

Building a Solid Foundation for Compliant Operation

China Unicom has always adhered to integrity in operation and compliance with laws and regulations, actively carried out law popularisation activities, popularised compliance knowledge and improved the compliance management system. China Unicom promoted the reform of the discipline inspection and supervision system, and further strengthened the supervision responsibility of the discipline inspection and supervision team by innovating the organisation mode and improving the system and mechanism. The anti-corruption work has achieved remarkable results.

Promoting integrity and honesty

We built a supervision system and unswervingly upheld the upright conduct and discipline and conducted anti-corruption with the theme of promoting high-quality development. We improved the supervision mechanism, optimised the rules and regulations, promoted and standardised the informatisation of discipline inspection and supervision, enhanced the ability of supervision and discipline execution, and created a clean and honest atmosphere.

- The Company improved the corporate supervision system, established and improved the supervision system and mechanism for key personnel, key areas and key links around “top leaders” and leadership, young cadres, grassroots governance, and “beyond eight hours of office hours” behavior, etc. The Company built a smart discipline inspection and supervision platform to strengthen the active, accurate and real-time supervision over the entire process of exercise of power.

Coverage of anti-corruption training more than

495,000
person-times

Coverage rate of anti-corruption education activities for directors and employees reached

100%

- The Company carried out in-depth anti-corruption training, conducted regular interviews with cadres and took multiple measures to carry out disciplinary education. The Company carried out case notification on “non convergence and non-stop”, “shadow companies”, “shadow shareholders” and “non-compliant action beyond eight hours of office hours”, etc. since the 18th National Congress. The Company carried out routine warning education, covering more than 495,000 person-times, and anti-corruption education activities covering 100% of directors and employees.

- In order to prevent external risks of “Hunting”, the Company revised the “China Unicom Supplier Blacklist Management Measures”, optimised the identification procedures of supplier in blacklist and carried out the fourth batch of non-compliant “supplier blacklist” identification.

- The Company organised and carried out professional line evaluation and inspection on integrity risk prevention and control. The Company promoted the implementation of prevention and control measures for 65 integrity risk points in 42 business matters in 8 key areas such as investment and construction, material procurement, marketing, and personnel selection and employment. The Company regularly carried out rectification through the case study, deeply rectified the problem of “relying on enterprises and squeezing enterprises”, and conducted special inspections on the problems of non-compliant commercial enterprises, so as to continuously improve the ability of integrity risk prevention and control.

- The Company persevered on rectifying the “four styles” problems, vigorously promoted the fine style of work, implemented the eight regulations of the central government and the spirit of the detail implementation rules. The Company regularly carried out special supervision and inspection on the “four styles” problems and included the “social circle”, “life circle” and “leisure circle” of management personnel into the scope of supervision. The Company notified typical cases at important nodes, promoted the formulation of implementation plans to reduce burden for the grassroots level, and continued to rectify the persistent problem of “mountain of paperworks and sea of meetings”. The corporate atmosphere continued to improve.

- The Company deepened inspection supervision and completed a new round of full coverage inspection. The Company carried out special inspection on personnel selection and employment, economic responsibility audit and financial compliance inspection, improved the quality and efficiency of supervision, and urged the implementation of rectification.

- The number of petition reports decreased by 11.3% year-on-year and declined for four consecutive years. The Company continuously consolidated the strategic results of anti-corruption, as a result the clean atmosphere of the Company continued to improve.

- The Company built a supervision system, promoted the reform of the discipline inspection and supervision system and formulated the “China Unicom “4+5+N” Political Supervision System Guidance Manual” and other rules and regulations. The Company improved the supervision mechanism for key personnel, key areas, and key links, promoted and standardised discipline inspection and supervision information, and supervised the ability to enforce discipline.

- For more information on the number of corruption cases and litigation outcome and so on, please go to the official website of the Central Commission for Discipline Inspection of the CPC and the National Supervisory Commission.

Improving the level of compliance operation

China Unicom continued to deepen the construction of rule-of-law with governance improvement, operation compliance, management standardisation, law-abiding and integrity. The Company strengthened risk prevention and control, and continuously consolidated the foundation for high-quality development.

Law-abiding operation

China Unicom has established a comprehensive compliance management system of “compliance in full, in all region and in all aspects”. The Company revised and issued the “China Unicom Compliance Management Measures (v2.0)”, and formulated the eighth five-year plan (2021–2025) to carry out legal publicity and education, so as to promote the construction of the rule of law.

- The Company promoted the digital management and intensive operation of law popularisation work. The Company developed the Wo Law popularisation platform and over 76,000 employees attended online learning. The Company organised various law popularisation activities, carried out special law popularisation activities such as “4.15” and “4.26”, etc. The Company actively promoted data security law and other laws and regulations, and personal information protection law, and won the Excellent Organisation Award issued by the National Law Popularisation Office.

- The Company popularised compliance knowledge and held nine sessions of “Legal Compliance Cloud Lecture”, highlighting the features of “cloud + sharing” and “teaching + forum” with more than 73,000 people learning in total. The Company operated the WeChat public account, “Grow Wo with Legal Compliance”, to enrich reading experience.

- The Company actively promoted the digital transformation of contract management to guarantee the business integrity. The legal review rate of the Company’s economic contracts was 100%.

Risk prevention and control

China Unicom adhered to the goal of “strengthening internal control, preventing risks and promoting compliance” and continued to deepen the construction of risk management and internal control management system. The Company revised and published the “Administrative Measures for the Accountability of China United Network Communications Group Company Limited for Non-compliant Operation and Investment”, and continuously improved the digital level of risk prevention and control to effectively mitigate major systematic risks.

- The Board of Directors is responsible for improving the risk management and internal control management system, consisting the internal control and risk management committee, comprehensive management department and relevant professional functional management departments.

- Based on risk assessment, the Company adopted the COSO internal control framework and established a sound internal control management system based on the basic elements of control environment, risk assessment, control activities, information communication, supervision and control.

- The Company deeply promoted the full coverage of audit and established a mechanism to transfer of problem clues and handle feedback. The Company completed special supervision such as “look back” and “I do practical things for the public” for accountability of non-compliant operation and investment, and recovered more than RMB52 million losses.

- The Company fully fulfilled its overall role of comprehensive budget management in resource allocation and established a performance-based communication system. It strengthened dynamic management and further mitigated operational risks.

- The Company improved the overseas risk prevention and control mechanism and formulated the “Level 4 Catalogue of Overseas Compliance Risks of International Companies (Trial Version)” to regularly carry out special inspections on overseas risks, and form closed-loop management. Focusing on risks in key areas such as the United States, Australia and Europe, the Company kept abreast of the latest developments and made every effort to ensure overseas compliance operations.

Compliance training
8,010 times

Number of employees trained in compliance
243,000

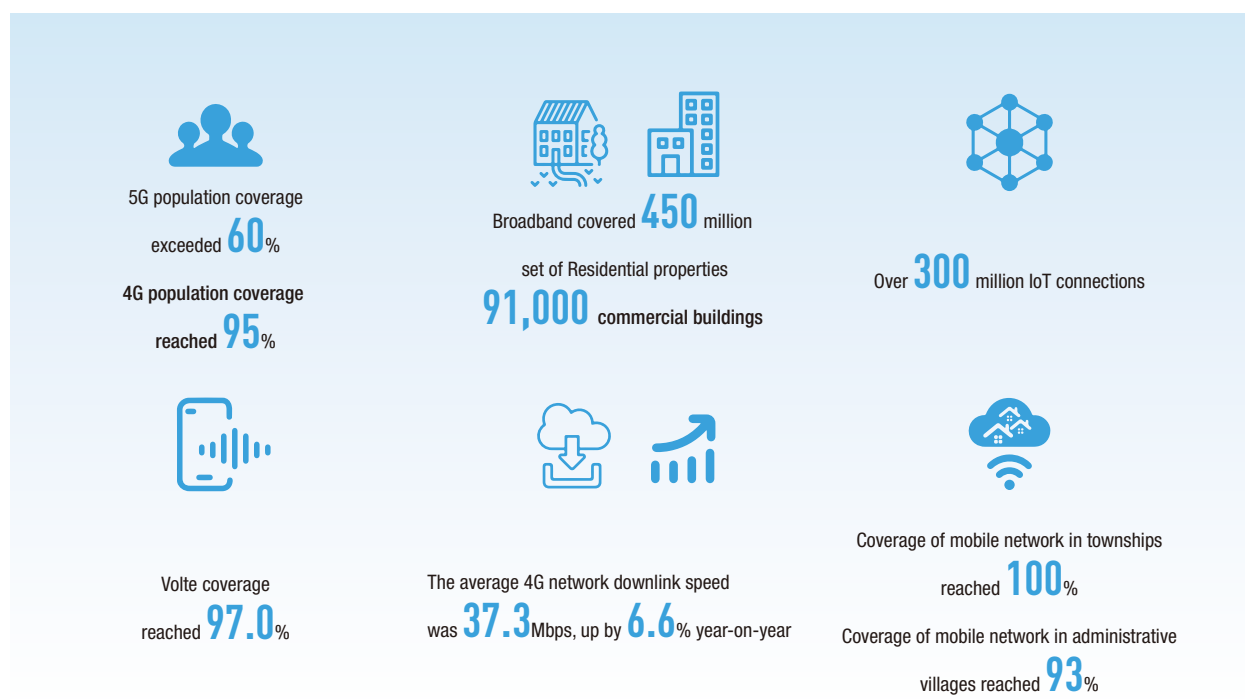
- Audit digital transformation case was selected as a typical experience of China Institute of Internal Audit
- China Unicom Digital Technology Co., Ltd. was awarded the AAA Integrity Level Certification by Beijing Security and Prevention Industry Association

Opening Up Social Information Arteries

Facing the accelerated demands of digitalization, cyberization and intelligent transformation in various industries, China Unicom has firmly grasped the symbolic characteristics in the era of the information communication industry. It has built a new digital infrastructure, adhered itself to the measures of network information security, and consolidated a solid foundation of information channels for a rapid growth in the digital economy.

Building a solid digital base

China Unicom deeply understands the strategic deployment about “accelerating the construction pace of new infrastructure such as 5G networks and data centers”. It has focused on building high-quality 5G networks, facilitated 5G IoT technologies evolution and advancement, and strengthened 5G and 4G networks synergy. The Company also deployed gigabit optical networks and improved the end-to-end connection capability of IPv6, enhancing the basic connections and connection efficiency comprehensively.



Strengthening high-speed and ubiquitous basic connections

China Unicom promotes high-quality network development and connects thousands of households, thousands of buildings, thousands of enterprises, and thousands of scenarios with high-quality networks. It creates new experiences of digital work and life for customers and builds a solid digital base for high-quality economic and social development.

- Created a 5G boutique network with effective coverage, excellent experience, first-class capabilities and outstanding efficiency. New breakthroughs have also been made in the 5G network “co-build co-share” with a total number of 690,000 5G base stations. The Company has intensified the construction of 5G DAS and has continued to improve the deep coverage of 5G network. China Unicom and China Telecom jointly won the GSMA 2021 Asian Mobile Industry Outstanding Contribution Award.
- Created a premium gigabit broadband network connecting thousands of households. The Company constructed 16.84 million broadband ports, which yielded a total number of 239 million ports with an average network access speed of 252Mbps, increasing by 40% as compared to 2020.
- Created a premium government and enterprise network with excellent quality and intelligent security. The 5G industry private network system 2.0 (5G private network PLUS) has achieved a breakthrough in three spectrums: network, industry, and service. China Unicom and Huawei have been jointly awarded the “Best Solution Award for ICT China Innovation” by the project “China Unicom All-Optical Infrastructure Network” at the ICT China High-level Forum 2021.
- Created a ubiquitous and intelligent IoT network with high/low speed synergy. The Company independently developed the Yanfei-zhilian Intelligent Connection Management Platform, and Yanfei-gewu Device Management Platform. It developed 5G + AIoT core capabilities through softwareization of network, software-hardware integration and intelligent upgrade of hardware. The Company was rated as one of the top ten chip/module enterprises in China’s 5G strength ranking in 2021 by the Communications World Omnimedia.
- Continued to push forward network advancement. The Company comprehensively promoted the construction of SDN, cloudification and virtualization of the network. Its network SDN maintained a leading position in the industry, while comprehensively deploying the next generation Internet based on IPv6. IPv6 accounted for 34.57% of mobile network data traffic. It also vigorously promoted the Beidou application. The network innovative products also exhibited excellent performances.



People experiencing the 5G network at Dalian North Railway Station

China Unicom Liaoning branch continued to improve its network coverage. In 2021, it achieved continuous coverage of 5G networks in urban areas and county-level cities. While meeting the needs of 5G hotspots in the developed towns in key cities, the Company achieved in-depth 5G indoor access at transportation hubs such as airports, subways and high-speed railway stations. It provided high-speed 5G services in key areas such as campuses, hospitals, industrial parks, government and enterprises units.

Improving intelligent and precise network experience

The Company has continued to orient itself towards users' perception. It continued to optimise the network, improve the capability of operating platforms, strengthen the construction of fulfilment system to significantly improve network quality, and maintain a leading position in the industry in terms of low latency network.

- With reliance on platform capabilities such as network AI, wireless and broadband network digital operation, etc., the Company implemented a full-scenario digital transformation of broadband network in terms of “planning, construction, maintenance, optimization and marketing” so as to accomplish automation and intelligent improvement of network operation quality. The maturity of the network AI platform has also reached an international leading level. In intelligent operation and maintenance, it achieved breakthroughs in connected network issue diagnosis and intelligent operation.

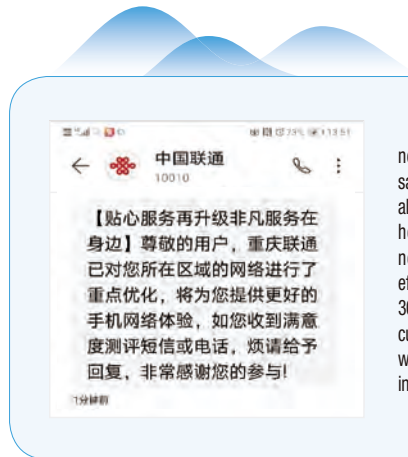
- The Company strengthened the construction of 5G fulfilment and operation system and provided end-to-end automatic activation and management capabilities for 2B network slicing products. It also promoted 100% online and centralised workflows in 5GC regions, and improved the efficiency of inter-provincial collaboration and regional operation.

- The Company also strengthened independent capacity building in the network department and implemented various network independent operation measures such as “self-operation, self-construction, self-maintenance, self-optimization and self-repair”. It improved the training system, with the certification rate of intelligent network engineers exceeding 66%, and introduced talents such as expert-level system architects.

- The Company upgraded the network quality and implemented “serving the community with practical impact” and “a hundred days of tackling” actions. It was ranked first in the industry in terms of the satisfaction level of fixed network quality by the Ministry of Industry and Information Technology. It also kept its first place in The industry for installation and maintenance services. The timely fulfillment rate of broadband installation and maintenance requests increased to 99.62%.

- The 5G users penetration rate continued to increase. In 2021, there were a total of 1,645 complaints-driven construction tasks, and 1,623 of them were completed, with a completion rate of 98.7%. The number of customer complaints from construction regions dropped by 98%.

- The Company built a low latency network, and optimised the China 169 backbone network in key directions, with the average latency of the whole network reaching below 29ms, maintaining its leading position in the industry.



China Unicom Chongqing Branch drives network value enhancement with customer satisfaction. Using on the deep neural network algorithm, the Company established a network health model to assist the identification of network problems, thereby improving the efficiency of handling network complaints by 30%. The Company also targeted high-perception customers through the model, and implemented word-of-mouth scale-up operation, which also increased customer perception by 0.19 points.

Strengthening smart computing engine

The Company implemented the national strategy of “Eastern Data and Western Computing”, built green, centralised, secure and reliable computing infrastructure. It accelerated the deployment of national hub nodes, and created a new computing power network with national integration, intelligence and agility. It developed Unicom Cloud with cloud-network integration, security, reliability, exclusive customisation, and multi-cloud collaboration, which promoted customer-oriented service model innovation, and empowered the development of digital economy.

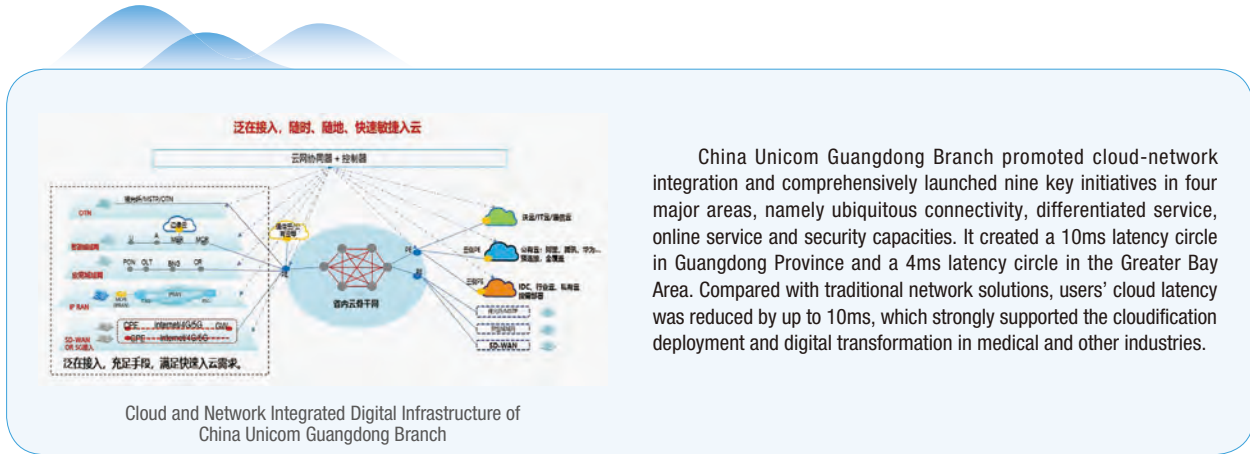
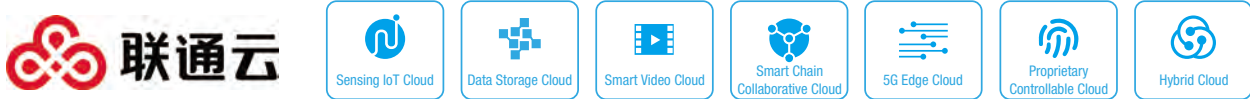
- The Company formed a cloud-network-edge integrated “5 + 4 + 31 + X” new IDC system. The total computing power of the whole network has reached 350 PFLOPS, the computing power scale reached 11.38 million vCPU cores, with a total storage capacity of 959PB. There were about 300 shared MEC nodes. It started to offer one-stop fulfilment of cloud-network resources.

- The Company comprehensively upgraded its low-latency high-quality computing power carrier network. Building on integrated computing-network architecture, it constructed service-oriented computing power networks, such as premium public Internet, multi-cloud ecological premium industrial Internet and smart metropolitan area network. It was shortlisted in the 2020 Data Intelligent Industry “Computing Power 20” by Computing Power Think Tank and was named a Cool Vendor with the best scenario implementation ability.

- The Company created Unicom Cloud with a unified technological base and PaaS platform. It also implemented the PaaS integration project to support the rapid and standardised access to multiple PaaS services such as database, security components, AI atomic capabilities, and blockchain, etc.

- The Company built a multi-cloud cooperation ecosystem with Alibaba, Huawei, H3C, VMware, Unicom Cloud, Os-easy, Tencent, etc. to enrich the number of heterogeneous cloud merchants and create “multi-cloud management + Unicom Cloud + X” hybrid multi-cloud solution.

- Based on the cloud computing dual-engine core base, the Company created integrated and digitally competitive cloud products, and upgraded the performance and diversity of generic cloud products such as computing, storage and network.
- The Company built an open and intelligent scheduling system for cloud-network-edge integration capabilities. It continued to deepen the construction of cloud computing support systems. It obtained more than 30 software copyrights and patents, and was rated as advanced level in the first batch of cloud-network integration comprehensive capability evaluations by the China Academy of Information and Communications Technology.



China Unicom Guangdong Branch promoted cloud-network integration and comprehensively launched nine key initiatives in four major areas, namely ubiquitous connectivity, differentiated service, online service and security capacities. It created a 10ms latency circle in Guangdong Province and a 4ms latency circle in the Greater Bay Area. Compared with traditional network solutions, users' cloud latency was reduced by up to 10ms, which strongly supported the cloudification deployment and digital transformation in medical and other industries.

Building Cyber Security Lines of Defense

Adhering to the overall national security concept, the Company thoroughly implemented the Cyber security Law, the Data Security Law, the Personal Information Protection Law, the Regulation on Protecting the Security of Critical Information Infrastructure, and other laws and regulations. It has built a network security and data security protection system for the digital era, and also formed the "No. 1 safety shield" as the "first choice of the country, government and people" in the digital economy.

Enhancing network security capability

China Unicom regards the maintenance of network information security as an important mission of conscientiousness and responsibility. It built a network security protection system with complete functions and leading capabilities. It also integrated security development into all areas and the processes of the Company's development, so as to strive to improve its security protection capability.

- The Company improved its capabilities in the governance of public internet network security threats. The monitoring and processing capacity of 5G SA core network increased by 9.12Tbps, and the broadband Internet monitoring and processing capacity expanded to 29.88Tbps, which effectively mitigated the attack and impact of Botnets, Trojan virus and malware.
- The Company maintained the security of Internet of Things by continuously improving the basic risk model to accurately identify suspected risk cards. As a result, there were no terrorism-related or fraud-related cases in the year.
- The Company improved active security warning capability, with the DDoS protection capability reaching over 8T. It built network security situational awareness, asset security management and other platforms to reduce hidden security threats.
- The Company successfully completed various network security support for major national events and was commended by the Ministry of Industry and Information Technology.

Combating telecom network fraud

China Unicom resolutely implemented the national requirements for combating and controlling telecom network fraud. It upheld orderly communication, protected personal data privacy, and safeguarded the legitimate rights and interests of users. There was no major information security incident in the year.

- The Company carried out in-depth management of fraudulent calls, harassing call and spam messages. It strengthened source control and implemented card-breaking operation 2.0. It carried out "cat-fighting" action and assisted the police in arresting 2,767 suspected criminals, and seizing 2,691 sets of equipment such as GoIP, which was commended by the Ministry of Industry and Information Technology.
- The Company strengthened data security control and personal information protection, carried out special rectification on APP infringement of users' rights and interests and improved data security support capabilities, with a sensitive data identification rate of 80.54%.
- The Company revised the China Unicom User Privacy Policy, the China Unicom Customer Service Agreement and other rules and regulations. It also formulated the China Unicom Children's Personal Information Protection Policy and Guardian Notices to strictly regulate user real-name registration, maintain user information security and protect children's personal information.

- The Company enhanced the public awareness of information security and promoted information security knowledge through various channels. It provided overseas incoming call alert services. Throughout the year, 565 million alert text messages and 843 million security alert group messages were sent, which were recognised by users.



Bad Information Management Platform of China Unicom Tianjin Branch

China Unicom Tianjin Branch categorised fraudulent calls, harassing calls, and spam messages into “bad information”. It built a platform for managing bad information to centralise the control of risk numbers. In 2021, it optimised and adjusted 11 high-risk areas, 51 high-risk base stations, 9 TAC codes of abnormal equipment such as GoIP. It helped the police to detect and remove three GoIP bases, arrest 8 suspected criminals, and seize 4 fraud-related equipment. It combatted bad information from the source, and the achievement received special commendation by the Ministry of Industry and Information Technology.

China Unicom Anhui Branch has established an anti-harassment/fraud Big Data system that can automatically detect and process harassing and fraudulent calls. It detects 150–200 calls a day. Combined with GoIP data, it enables joint operation with the police by providing accurate fraud clues. In 2021, the Company has helped remove 17 fraud bases, arrest 73 fraud suspects and seize more than 3,000 phone cards, which received wide recognition from the Anhui Provincial Public Security Department and Anhui Provincial Communications Administration.

Innovating on security products and services

The Company has strengthened the supply of security products and services in the aspect of network, cloud, application, data etc. It has created Unicom Cloud Shield, password, situational awareness, security island chain and other products. It also established Unicom security operation service platform, optimised the ecological deployment in network information security, and built a strong network and information security barrier for thousands of industries.

- The Company independently developed 9 password products which passed the commercial inspection. Amongst the products, 3 of them were included in the catalogue of information technology innovation. It jointly built the “State-owned CA” business brand with the Information Centre of the SASAC to achieve the implementation of benchmark cases.
- The network situational awareness product entered pre-commercial trial and was named an “Advanced Unit” by the Ministry of Public Security.
- In the “Blooming Cup” 5G Application Collection Competition held by the Ministry of Industry and Information Technology, the Company’s 5G security products and solutions won the first prize and multiple awards.
- The credit information service platform for trusted enterprises, privacy computing, data security and other products and services were awarded the “Galaxy Award” by the Committee for the Advancement of Big Data Technological standard of the CAICT.

Polishing our Brand as the First Choice of Major Communications Support

China Unicom always puts people’s live and safety in the first place. It contributed to the prevention and control of the COVID-19 pandemic with data and intellectual power. It provided communication support for major activities, devoted itself in rescue missions and disaster relief, and fulfilled its mission with actions.

Making every effort to fight the pandemic

In 2021, the pandemic situation remained severe and complex. Local confirmed cases and people with no symptoms of COVID-19 were found in many places, the lines of prevention and control were not slackened. China Unicom worked closely with the pandemic prevention and control departments at all levels, and leveraged the edges of communication enterprises to fight the “pandemic” intelligently with information empowerment and provide strong support for regular pandemic prevention and control.

Building a smart wall for pandemic prevention

China Unicom continued to and leverage its information services edges in Big Data, artificial intelligence, 5G, etc. It developed digital applications such as travel inquiry system, cloud video conference, Unicom smart community, cloud filling, etc., to fully support the precise prevention and control of the pandemic.

- Utilizing the unique edges such as multi-source, massive, open and strong integration of China Unicom’s Big Data, the Company optimised the national travel card inquiry service system structure, and supported 4.2 billion “health code” inquiries across the country, providing over 8 billion times of service cumulatively, and effectively supporting the analysis and assessment on pandemic prevention and control as well as resumption of work and production.

- The Company developed the Beijing Expressway Identification Checking System, which shortened the travelling time per vehicle from 3 minutes to 20 seconds, and completely solved the problem of queuing to enter Beijing.
- In order to solve the difficulty in holding meetings during the pandemic, the Company deeply looked into the needs of central government agencies and small and medium enterprises at all levels, and provided meeting support to them by introducing the Unicom Cloud Video system. Throughout the year, the Company supported more than 24,000 meetings and provided 38 times of major meeting support services to the central government agencies.
- The Company supported pandemic prevention and control in local communities. Catering for the visitor registration of communities, nucleic acid testing and monitoring of people flow, the Company developed products such as Unicom Smart Community and Cloud Filling, serving 59 cities in 18 provinces with 41.40 million person-times of services in total.

Ensuring smooth communication services

Facing the cases in Liaoning, Anhui, Guangdong, Guangxi, Shaanxi, Tianjin and other places, the Company made good use of its network advantages, acted in unison and actively mobilised its branches and subsidiaries to participate in the local communication service support, so as to safeguard pandemic prevention and control.



In 2021 winter, facing another wave of sudden outbreak of the pandemic in Xi'an, Shaanxi Province, China Unicom Xi'an Branch quickly responded to the challenges. The communications support team were standing by around the clock. It strengthened the business support for 901 key areas and units, such as hospitals and nucleic acid testing points. It also provided high-tech pandemic prevention products to facilitate smart prevention. More than 4 million pandemic prevention welfare messages were sent to the general public, and protection knowledge was also promoted through the production of pandemic prevention ringtone reminders, startup pop-up screen reminders, and 5G video ringtones. It deployed a large amount of pandemic prevention resources to ensure the health and safety of employees and workplaces and combat the pandemic scientifically.



China Unicom Tianjin Branch applied 5G slicing to support rapid nucleic acid testing

In January 2022, another wave of COVID-19 pandemic occurred in Tianjin. Approximately 14 million people completed nucleic acid testing within 24 hours. Citizens generally commented that the speed of testing was improving. China Unicom Tianjin Branch applied 5G slicing technology and provided QoS support for the work phones of pandemic prevention personnel with segregated wireless network resources. In the meantime, it rapidly developed a nucleic acid sampling and testing platform to ensure the stable and efficient operation of a large amount of data. The front-line workers could better experience the charm of computing-network integration. Hi-tech pandemic prevention service helped Tianjin to achieve win-win in pandemic prevention and control and the resumption of work and production.

Fulfilling Responsibilities in Providing Communications – Support for Major Events

China Unicom adheres to the concepts of “carefulness, focus, trust, excellence and intelligence” in communication support. It strives to achieve the highest standard, the strict organization, the most practical measures, the best services and the best effects. In 2021, the Company provided communication support for major national conferences and events such as the National People’s Congress and the Chinese People’s Political Consultative Conference and the “Cloud Diplomacy”. With its excellent results of “zero mistake, zero error and zero complaint”, the Company was fully affirmed by the superior units and polished its golden brand as the “chief provider of major communications support”.

“Cloud Diplomacy” communication support

With regular pandemic prevention and control, “cloud diplomacy” has become the major channel for national and institutional leaders to communicate with the world’s leaders and international organisations. In 2021, the Company successfully completed the communication support for 192 “cloud diplomacy” of central leaders and 31 major events including the China International Import Expo. It ensured network security with Unicom Cloud Shield, anti-D cleaning, domain name resolution and monitoring system, etc. The Company made outstanding contribution to “tell China’s stories and spread China’s voices” in the current complex situation, and contributed China Unicom’s power to a new chapter of Chinese diplomatic relations in the new era.



Devoting to rescue and disaster relief

With the unpredicted weather and natural disasters, China Unicom insists to make the best efforts. At every critical moment, the company strives to stay at the front line of communications support and secure its network defense line.

Establishing a sound flooding control system

In response to flooding disasters, China Unicom made early deployment and revised its emergency communication support plan. It has established a robust the cloud-network collaborative emergency responsive system, which could adapt to the regional system, platform, centralisation and cloud resources to enhance its communication support capability and emergency response efficiency. The Company carried out inspection on hidden loopholes in advance, and organised 1,372 emergency drills throughout the year so as to ensure the reliability of the operation.

- The Company carried out “Thousands of Miles Red Journey with Ingenuity Network” campaign. Communication fleets carried China Unicom’s mission of “no absence at major moments” and represented the highest level of major communication support, which lasted for 38 days spanning approximately 4,000 kilometers.

Dare to bear difficulties and challenges

We carried out flood prevention and rescue work on the front line to ensure communication by riding wind and waves. In 2021, in the face of severe floods in Shanxi, Shaanxi, Henan and Shandong, as well as earthquakes in Sichuan and Qinghai, China Unicom was not afraid of difficulties and engaged in flood prevention and disaster relief with multiple measures. During the year, it dispatched emergency communication support 695 times, disaster relief personnel 134,000 person-times, rescue vehicles 47,000 vehicle times, emergency equipment 10,000 set-times, and 370 million emergency SMS.

Rescue personnel

134,000 person-times



China Unicom Hebi Branch in Henan Province united to guard the lifeline of communication

In July 2021, in the wake of “720” heavy rainstorms in Henan, China Unicom Henan Branch gathered everyone together in such critical moment. Everyone strived to become more mature in this difficult time and moved forward in the storm. Our staff rushed out to the flood to repair the Jinghanguang optical cable. Veterans insisted to stay in the front line amidst their illness and worked hard for ten days and nights to guide the boats through the waters. In the tests and challenges posed by the floods, China Unicom united its efforts and mobilised rescue teams from 15 provinces to aid Henan and contribute to flood relief. They were warmly welcomed by the local residents. The Company received a letter of thanks from the Henan Provincial Party Committee and Henan Provincial Government, as well as more than 100 letters of gratitude and commendation from provincial units and municipal and county governments.



On 22 May 2021, a 7.4-magnitude earthquake occurred in Maduo County, Guoluo Prefecture, Qinghai Province. China Unicom Qinghai Branch assembled an emergency response team, overcame difficulties such as cold weather, hypoxia, and severe aftershocks, and headed to the disaster area. It set up a hotline for family search and reporting safety, and added 10,010 Tibetan-speaking customer service staff. During the earthquake relief period, of the Company dispatched 14 earthquake relief teams consisting of 81 people, 28 vehicles for 98 times, and more than 100,000 earthquake relief welfare messages to the users in Guoluo Prefecture.

Serving Coordinated Regional Development

The Company smoothed the domestic and international dual circulation, implemented the national strategy of coordinated regional development, accelerated the construction of a digital pilot demonstration area, promoted the coordinated development of domestic and overseas markets, responded to the Belt and Road Initiative, and fulfilled its responsibilities as a global corporate citizens.

Promoting the development of classified policies

The Company facilitated domestic circulation, implemented major national strategies and regional coordinated development strategies. It also optimised the regional resource allocation and capital deployment and actively integrated into regional coordinated development. The Company promoted the coordinated development of the Beijing-Tianjin-Hebei region and continued to promote the construction of the Beijing-Tianjin-Hebei integrated network with the sharing of resources, such as data centers. The Company promoted the development of the Yangtze River Delta integration and strengthened the collaborative innovation of industrial system. Furthermore, it facilitated the construction of the Guangdong-Hong Kong-Macao Greater Bay Area by accelerating the application innovation in smart medical care, smart transportation, smart energy and other fields to promote healthy industry development. The Company drove the high-quality development of the Yangtze River Economic Belt and the Yellow River Basin, and promoted universal social livelihood services. The Company accelerated the development of the three provinces in Northeastern China so as to foster balanced development. It also strengthened the construction of Hainan Free Trade Port and Chengdu-Chongqing region, thereby improving the efficiency of resource utilisation and contributing to the construction of beautiful China.

Serving the Belt and Road Initiative

China Unicom firmly grasped the new development pattern of “building the domestic circulation as the main body and facilitating the mutual promotion of domestic and international dual circulation”. It identified new changes, new space and new opportunities accurately, and strived to promote the edges of global cloud-network integration and cloud service capabilities. It implemented the “Belt and Road” initiative, and promoted the construction of digital Silk Road through cooperative development and digital transformation innovation.

Establishing the Digital Silk Road

China Unicom deeply implemented the Belt and Road Initiative and firmly promoted the construction of the Belt and Road Digital Silk Road. It upheld innovation-driven development to provide high-quality digital information services for customers and the public along the Belt and Road. The Company insisted on cooperative development, gathered core companions along “the Belt and Road” integrated resources and fulfilled in an agile manner.

- Company continued to build an optical information channel. The Company had established 5 international network management centers overseas, and had more than 130 overseas access nodes, which covered more than 80 countries and regions. The international Internet external connection bandwidth reached 4.85T. Cumulative investment along the “Belt and Road” exceeded RMB2,800 million, and the capacity of the “Belt and Road” submarine cable increased to 26.9T and the capacity of the “Belt and Road” cross-border terrestrial cable increased to 20.1T. In 2021, three new “Belt and Road” network nodes were built.

- The company has set up 30 branches around the world, half of which are located along the Belt and Road, offering high-quality digital services for “out-going” enterprises. Targeting key industries, such as industrial manufacturing, finance, government media, transportation and logistics, energy, commercial retail and TMT, the Company created 23 “Belt and Road” international express routes and achieved global coverage of SD-WAN light-load products. Cloud interconnection service covered 40 resources pools of 10 overseas cloud providers, offering to customers scenario-based solutions.

- Provided product discounts for countries along the Belt and Road. Tariffs were reduced to low-price area in 95 counties and regions.

- Continued to strengthen the construction of “Belt and Road” companions, and actively carried out ecological cooperation such as multi-cloud platform, network and information security, supply chain, system integration and smart city, privileges. 5G NSA was activated in 21 outbound countries and 31 inbound countries. The Company has established long-term partnerships with more than 300 international carriers and has over 120 ICT global partners.

- Actively contributed to the trades between China and Africa and South African pandemic prevention and control. It served the ministerial video conference between China and Africa, increased the investment in South Africa, and participated in the pandemic prevention and control related meetings organised by the Department of Commerce of the Embassy of South Africa.



Awarded with the “Asia Regional Operator of the Year”, “Best Cloud Innovation Operator” and “Best Mobile Operator of the Year” in the 2021 Carrier Community Global Awards



Achieving seamless network connection when the China-Laos Railway passes through the tunnel

Conscientiously providing excellent cross-border services

Relying on China Unicom Global, the Company strives to become the “value creator of international digital services trusted by customers”. It has established a global customer service system, provides efficient and reliable global end-to-end integrated information services, and provides global voice message and data services.

- In order to meet the personalised demand of customers for express lines, the Company launched in total 55 express lines and achieved rapid fulfilment. In Hong Kong, targeting household demands, the Company provided multi-user data sharing plan and smart home product series. It provided one-stop communication solutions for corporates. In response to the demand for small bandwidth, it provided AS4837 IPT Hong Kong node small bandwidth products. For financial industry, it provided security products and services such as Unicom Cloud Shield.
- During the COVID-19 pandemic, to let users use data at ease during travel, the Company increased the data allowance without price increase for 126 popular outbound international roaming destinations, reduced the data tariff for 35 destinations, provided small data bundle products for 23 destinations. In 2021, the data tariff of outbound international roaming decreased by 11.26% year-on-year, and data roaming covered 249 countries and regions, including 23 countries and regions with 5G network international roaming.
- The Company served the Tokyo Olympics by helping the live broadcast of China Sports and other media platforms to ensure the high-quality coverage of the events.
- In Hong Kong, the Company officially provided 5G services. It helped prevent and control the pandemic by cooperating with the government to promote the “Leave Home Safe” APP and with Xiaomi Corporation to provide mobile devices for the elderly at low prices for the installation of “Leave Home Safe” APP. To better prepare for the quarantine-free re-opening of border between Mainland China and Hong Kong, the Company gave out “one-card with two numbers” services. It developed and promoted convenient services such as free with health code and worry-free cross-border life privileges.

Carrying out compliance and integrity management

Relying on China Unicom Global, the Company operates in compliance with laws and regulations overseas. The Company has established a sound corporate governance structure, strictly complies with domestic legal and regulatory requirements, and submits external audit reports and pay taxes in a timely manner. Its integrity management was recognised by international awards.

- The Company continued to improve its overseas compliance management system and updated the compliance manual of overseas operating companies on a rolling basis. It organised and carried out a number of risk inspections and held 13 compliance training sessions with more than 3,000 participants, enhancing employees’ awareness of risk prevention.
- In 2021, there were no incidents of dishonesty, violation of laws and regulations and disorderly competition, nor were there any incidents involving infringement of rights of indigenous people and commercial bribery.

Implementing local responsible operation

Under the principle of “one regime, one system and one group”, the Company continued to optimise its agile and smart supply chain, actively employed local employees, strictly abided by the local market order, business rules, social customs and cultural habits, and strived to build a mutually beneficial and win-win development community.

- The Company integrated its “globalised” supply chain, carried out local cooperation management in different regions and categories, strictly reviewed procurement plans, stepped up scenario-based procurement, and ensured the equipment provided by suppliers were energy-saving, environmentally friendly and safe. Local procurement rate (including Hong Kong headquarters and overseas) reached 94.59%.
- The Company continuously improved the greenness of communication network infrastructure, further promoted energy conservation and carbon reduction, prevented projects from causing negative impact on the local areas, and protected the local ecological environment. The Company won the Merit Award of the 2020 HKAEE Environmental Excellence Award in Hong Kong.
- The Company focused on the introduction of local talents, actively recruited the graduates from Hong Kong in 2021, and launched an internship program with the Henry Business School of the University of Reading in the United Kingdom, which received positive feedback from both the teachers and students locally. As of the end of 2021, China Unicom Global had a total of 896 employees, including 761 overseas employees and 289 overseas female employees. Currently, there are no local employees among the senior management.
- In strict accordance with the legal requirements in the employment location, the Company safeguards the legitimate rights and interests of local employees. It has formulated a remuneration and welfare system respecting local customs. It formulated differentiated monetary subsidies and actively organised recreational activities and welfare publicity, etc., fulfilling its social responsibility of caring local employees with practical actions. It was awarded “Green Office Award Scheme” and “Healthy Workplace” certifications by World Green Organisation, and recognised as a “Good MPF Employer” by the Mandatory Provident Fund Schemes Authority of Hong Kong.
- The Company cares for female employees and fully supports “Breastfeeding Friendly Workplace”, and obtained “Breastfeeding Friendly Workplace” certification from UNICEF HK.



Merit Award of the 2020 HKAEE Environmental Excellence Award in Hong Kong

- The Company actively participated in various activities organised by local associations, improved its overseas news and public opinion monitoring system, and maintained constructive communication with local communities and Chinese enterprises. As the leader unit of the Digital Economy Working Group (Chinese) of the BRICS Business Council, China Unicom deepened the research and exchange cooperation in the digital economy, in order to promote practical cooperation among the working group members.

Fulfilling overseas social responsibility

China Unicom actively participated in overseas charity activities, and promoted the spirit of love, mutual assistance and care for the community. It also carried out activities such as food saving, environmental protection and care for vulnerable groups in order to contribute to the society and fulfill its overseas social responsibilities.



In 2021 Dragon Boat Festival, China Unicom Global Limited ("CUG") participated in the caring visits to the elderly living alone organised by the Hong Kong Chinese Enterprises Association, bringing lucky bags and blessings to the elderly living alone in Shatin, New Territories.



CUG participated in the "Food Angel Day" activity organised by Food Angel to sort and process surplus food ingredients. 30 boxes of food ingredients with a total weight of 490kg were recycled to prepare for hot meals and food packs, offering warmth and care to people who are in need in the society.

Over the years, CUG has participated in the Hong Kong charity bazaar named "Handicapped Youth Cookies Gift for Love" organised by the Hong Kong Federation of Handicapped Youth to help the Hong Kong Federation of Handicapped Youth, Pei Ho Counterparts, the Parent's Association of Pre-school Handicapped Children and other organizations for the underprivileged.



Devoted to
Shouldering

“Corporate Responsibilities”

and Firmly Fulfilling Obligations in
Economic Development



The development of digital information infrastructure and the iterative innovation of digital technology let people enjoy greater sense of reward, happiness and security. China Unicom supports the development of digital economy, and empowers thousands of industries with digital intelligence. It continuously enriched the substance of communication products and services, and vigorously improved network quality and customer experience, in order to provide customers with satisfying high-quality communication services, and contribute to the development of digital economy. As a “pioneer” in the mixed-ownership reform of central state-owned enterprises, guided by the market-oriented allocation of production factors, the Company focused on the deep reconstruction of systems and mechanisms, accelerated the establishment of improved mechanisms to stimulate the vitality of micro entities, so that production relations can be better adapted to the development of productivity. The operating efficiency of the Company has been significantly improved. China Unicom regards its employees as its most valuable assets, attaches great importance to them and helps them achieve success. It provided its employees with a broad development platform and promoted holistic human capital development, forming a good atmosphere for the harmonious development of employees and the Company.



Measures adopted in 2021

- Built core capabilities of cloud computing, Big Data, Internet of things, AI, blockchain and security, and created industrial internet application products in some key industries.
- Launched special services to improve customer perception.
- Deepened the three-year action plan of state-owned enterprise reform and created a process-oriented organisation.
- Built a warm and harmonious labour relationship by effectively protecting employees’ legal rights, caring for employees’ physical and mental health, and improving employees’ sense of reward.



Actions to be taken in 2022

- Comprehensively promoting the “Sailing” action plan for 5G applications, commercialisation of security products, focusing on key regions and industries, and creating “No. 1 supplier of digital services” of digital economy.
- Setting the overall goal of “1 + N + 1” service system to create high quality service.
- Forming a long-term reform mechanism to promote transformation into a digital, intelligent, ecological and platform-based enterprise.
- Deepening the reform of talent development system and mechanism, so that employees could share the achievements of reform and development and grow together with the enterprise.

SDG 9 Boosting the Development of Digital Economy

As an integrator of information and communication technologies and services, China Unicom gave full play to the magnification, superposition and multiplication of digital technologies in economic development. For supply chain, vertical industries, government affairs, people’s livelihood and other fields, it cultivated and developed digital application services with certain scale and created application products in the field of industrial integration, sailing in the main channel of digital economy at full strength. It empowered the transformation and upgrade of various industries, and built the “No. 1 supplier of digital services” for the digital economy.

9.1 Accelerating Industry Integration

China Unicom is committed to accelerating industry integration. It expanded the innovative applications of industrial Internet and 5G + industrial Internet integration and deepened the innovative application of key vertical industries such as “smart transportation”, achieving the replication and scale expansion of standardised industry products.

Industrial Internet

China Unicom’s industrial Internet has formed eight industry solutions, including “5G + smart mine solutions”, “5G + smart steel solutions”, “5G + smart home appliance solutions”, “5G + smart power solutions” and “5G + smart car solutions”, covering more than 10 industrial categories and more than 2,000 benchmark projects, forming a large-scale development model of leading enterprises plus industry clusters.

- For key industries, industrial clusters and enterprises in the region, we built a Yundi industrial Internet platform to enable the visualised, predictable and intelligent management of industrial economy by local governments through the platform, providing support for government decisions.
- By providing a large amount of industrial Internet application resources to local enterprises, we promoted “cloudification and platform-based upgrade” among enterprises and comprehensively improved the level of digitalisation; “Lianqing 5G Fully Connected Factory” realised the comprehensive interconnection of all production factors of manufacturing enterprises, improving the production management. It established a production data middle platform to process and standardise the management of data generated in the production process, realising unified standards of enterprise data interfaces and formats, providing efficient data services for factories, and unleashing the value of data.

China Unicom Jiangxi Branch took smart manufacturing of industrial internet as its key mission. Taking into account the leading textile and garment industry in Qingshan Lake District, Nanchang City, it innovatively created the 5G + smart factory benchmark project of Huaxing Knitting. It empowered the textile and garment industry with 5G + industrial internet, reduced the labour intensity of workers to embody humanistic care, improved the production efficiency and market competitiveness of enterprises, and promoted the development of the local modern textile industry cluster.

Relying on China Unicom Shanxi Branch, China Unicom Industrial Internet Company and other units, China Unicom completed the construction and empowerment application of a total of 170 5G networks in Datang Tashan and Majialiang, and established several joint laboratories with coal groups and universities to develop 5G intelligent applications in coal mines. In 2021, the Company constructed the Tashan Intelligent Dispatch Command Centre and completed the research and application of 5G technology in mines, smart video recognition platforms, wireless sensors and other tests. It realised the full coverage of 5G signals on the ground and underground, building a new mode of intelligent mining.

China Unicom Jilin Branch cooperated with Changchun FAW Group to build a 5G smart automobile factory pilot, providing 5G private network construction technology, equipment, services and other support for Fanrong factory of FAW Hongqi. It worked with partners to jointly verify 5G applications such as high-speed mobile monitoring of overhead cranes, C2C control and computer vision AI quality control, so as to provide support for the digital, intelligent and flexible manufacturing of the factory.

Intelligent transportation

China Unicom focused on information infrastructure construction, industry operation supervision and public travel services, etc. and created 22 industry solutions such as intelligent expressways, intelligent ports, intelligent logistics and intelligent airports. It also executed 2 industry benchmark projects such as Sanya Yazhouwan Intelligent Transportation EPC Project. It served 80+ transportation and logistics customers across the country, continuously empowering the digital transformation of the transportation and logistics industry.

China Unicom (Tianjin) Industrial Internet Research Institute focused on vehicle and road collaborative technology and vigorously promoted the implementation of smart transportation application scenarios. So far, it has successfully developed an application scenario for autonomous buses in Haihe Education Park, Tianjin. At the same time, it has established a “5G + Internet of Vehicles” application demonstration base, setting up a cooperation benchmark for “government, industry, education, research and application”, and driving the rapid development of the intelligent and connected vehicle industry.

Digital village

China Unicom continued to empower rural infrastructure construction, rural governance model innovation, production mode upgrade, and lifestyle improvement by focusing on digital village and leveraging the advantages of digital technology. It built a “model digital village” according to local conditions. The digital applications deployed in rural areas have become a “new agricultural tool” to help rural revitalisation and a “good helping hand” to improve the quality of life of villagers.

Number of administrative villages served by China Unicom Digital Village Platform exceeded

153,000

In June 2021, China Unicom held a digital village promotion conference, officially launched the Digital Village Cloud Platform and its Digital Village brand, and released the China Unicom Digital Village White Paper and a Digital Village product manual to comprehensively serve the economic and social development of rural areas.

For rural governance, industrial upgrade and people's livelihood improvement, China Unicom focused on the implementation of the "Four New Projects" and provided new digital application services with "cloud-network-edge-terminal-business integration". It established a new informatisation paradigm that supported modern agriculture and the integrated development of urban and rural areas, contributing digital power and connected intelligence to rural revitalisation and letting the rural population enjoy digital benefits.

- **Constructing new infrastructure for gigabit connection.** Focusing on building the "One Cloud", "Gigabit Network" and "Universal IoT", we upgraded the "Gigabit Network", promoted the "Smart Large Screen" and built the "Unmanned Farm", promoting the construction of a new generation of information infrastructure in rural areas, and eliminating the digital divide between urban and rural areas. As of the end of December 2021, China Unicom Digital Village covered 153,000 administrative villages, serving 14,363,000 rural permanent residents.

- **Implementing a new platform for rural governance.** Focusing on the last mile of informatisation in rural areas, relying on the Digital Village Cloud Platform, the Company developed a large number of successful applications in rural organisations, online government affairs, village safety, village management and other solutions and services. It injected "smart genes" into basic governance and services to make rural governance more intelligent, granular and professional. By the end of December 2021, it has served over 153,000 administrative villages.

- **Implementing new digital application services.** The Company provided solutions for digital governance services, industrial services, livelihood services and local services, and acted as a digital technology service expert for farmers by implementing digital rural liaison stations and counselors.

- **Implementing the new ecological project of "agriculture, rural areas and farmers" cooperation.** The Company cooperated with various excellent partners to provide smart terminals, smart TVs to rural areas, financial subsidies, trade-in, direct supply and procurement of featured agricultural products, and special training for new farmers to accelerate the digital and intelligent transformation of agriculture, rural areas and farmers.

China Unicom vigorously carried out the construction of model digital villages in targeted villages, and actively developed a number of successful, influential and replicable demonstration projects which could be further promoted to other villages. Currently, 388 projects have been built.

Baer Lake Town is a demonstration town for rural revitalisation in the Sichuan province. China Unicom Sichuan Branch conducted two-way mapping, dynamic interaction and real-time connection for the 20 km² and 8 administrative villages in Baer Lake with due regard to its water characteristics. It applied digital twin technology to rural revitalisation, serving more than 20,000 villagers and approximately 7,000 tourists every day, creating a digital village model with the characteristics of Baer Lake.



New look of Baer Lake Town

China Unicom Guizhou Branch has achieved practical results in serving rural revitalisation. It sorted out more than 17,000 administrative villages in the province and selected 1,757 as the first batch of service areas to be promoted. It built four national demonstration digital villages, namely Guiyang Xifeng, Zunyi Yuqing, Bijie Qianxi and Bijie Jinsha, and three provincial demonstration digital villages, namely Zunyi Huamao, Anshun Shimen and Liupanshui Caoyuan. Focusing on key towns and key scenarios, the Company carried out four major revitalisation actions, namely "Digital Towns", "Hundred Towns and Thousand Villages", "Joint Construction" and "Supporting Spring Cultivation", to drive marketing activities in villages and upgrade rural development models in innovative ways.



Chairman Liu Liehong visiting the Digital Village Platform in Liuchang Township, Qingzhen City



Contract signing of Digital Rural Workstation



Xifeng County Shida Town Qianfeng Village Project



China Unicom Gansu Qingyang Branch cooperated with Zhajiahe Township to build the first digital township platform in the city, so that the public can inquire policy information and handle various businesses online without leaving home.

Deepening livelihood applications

China Unicom is committed to deepening livelihood applications and innovating on high-quality daily life services. It enriched innovative applications such as “smart culture and tourism, smart education, and smart medical care”, promoted inclusive services for people’s livelihood, and developed products such as 5G Messages, promoting the upgrade of new information consumption.

Smart culture and tourism

Leveraging its Big Data, blockchain and AI technology capabilities and focusing on key areas such as industry supervision, scenic spot services and smart culture and museums, China Unicom created 11 solutions such as all-for-one tourism, smart scenic spot and smart culture and museums, serving more than 170 cultural and tourism management institutions at all levels, more than 200 scenic spots and more than 50 cultural and museums venues across the country, facilitating the digital transformation and upgrade of cultural tourism management, cultural tourism services and cultural tourism marketing.



General overview

Based on the local circumstances, China Unicom Hunan Branch innovatively built the command centre platform of the Hunan Provincial Department of Culture and Tourism, which helped the digital upgrade of cultural tourism in the province, and further demonstrated the cultural and tourism industry environment with Hunan characteristics and its innovative development model. It strengthened the industry regulatory means, and provided smart empowerment for the recovery of the cultural tourism market after the pandemic.

Smart education

Focusing on key areas such as general education, high-vocational education and regional education management, China Unicom has built 22 industry solutions such as China Unicom’s 5G future campus and China Unicom’s primary and secondary schools smart campus, and implemented 3 benchmark project cases such as the “Informatisation Project of the School of Experimental Sciences of The Open University of China”, serving 150+ education industry customers nationwide.

China Unicom iCloud Wisdom Technology Co., Ltd. has developed a virtual experimental teaching service system that integrates cutting-edge technologies such as AI, 3D and VR, and integrates modern information technology into the teaching and learning of theoretical knowledge of physics, chemistry, biology and science, as well as experimental operation and examination.

Smart medical care

China Unicom focused on key areas such as smart hospitals, smart health care and smart medical insurance, and developed six medical industry solutions, including China Unicom Smart Hospital, China Unicom 5G Smart Ward and China Unicom 5G Smart First Aid. The Company implemented benchmark projects such as 5G primary smart medical care in Hainan and 5G smart first aid in Ruijin Hospital, serving 100+ medical industry customers across the country. It continuously empowered the medical system reform and promoted the construction of a healthy China.

China Unicom Hainan Branch promoted the construction of a 5G + AI primary medical information platform covering all over 3,000 primary medical and health institutions in the province, innovatively creating a new model of 5G primary medical care in Hainan, comprehensively improving the diagnosis and treatment capabilities of primary medical and health institutions in the province. In 2021, 5G primary medical care services were provided to more than 250,000 people.

5G messaging

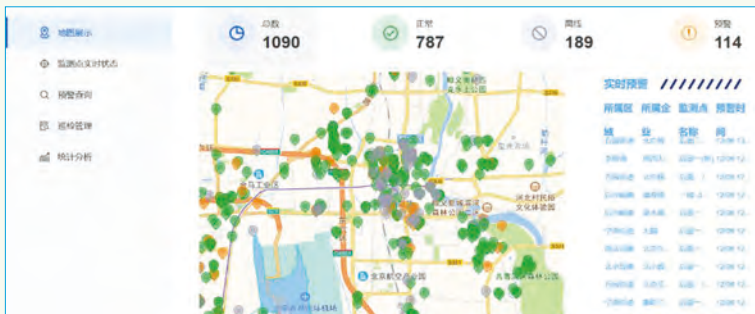
China Unicom completed the pre-commercial trial of 5G messaging and developed China Unicom Winter Olympics 5G messaging application. Currently, the number of 5G messaging users has exceeded 100,000. 5G messaging was put into pre-commercial trial across the country, with a total of 53 customers and 109 CSPs. The Company successfully held the “the Future of Smart Messaging” 5G messaging forum and established the 5G messaging ecosystem alliance.

Strengthening applications in government affairs

China Unicom is committed to strengthening applications in government affairs and deepening high-efficiency governance services. It deeply participated in the development of digital government, smart city, smart ecology, etc., and built innovative application products such as “one-network-office, one-network-management” to help the modernisation of national governance capabilities and governance systems.

Digital government

China Unicom focused on key businesses such as emergency response, public security, Internet + government services, and developed six industry solutions including emergency management, safe production, smart fire protection, city security, smart public security and one-network-office, serving more than 200 government customers such as the Ministry of Emergency Management and the Ministry of Public Security.



China Unicom Beijing Branch Smart Pollutant Monitoring Cloud Platform

Based on the digital needs of local regulatory authorities, China Unicom Beijing Branch created a “Four-Transformation” smart pollutant monitoring platform in Shunyi, Beijing as an example, and a number of smart ecological environment monitoring benchmark projects across the country, which were highly recognised by local government authorities.

Smart city

China Unicom built a new smart city capability system called “City Smart Brain CityNEXT”, launched 10 solutions including China Unicom’s new smart city comprehensive solutions, smart park solutions and city brain solutions, and implemented more than 660 smart city projects in 31 provinces across the country.

By integrating technologies and resources, China Unicom Shenzhen Branch launched online intelligent response to simple and common enquiries to improve the service capability of customer hotline. Through Big Data, it accurately analysed government information and public opinion to improve the timeliness and effectiveness of the government in handling emergencies and comprehensively enhance the service capability of the Shenzhen government service hotline platform, contributing to the development of Shenzhen into a smart city.

Smart ecosystem

China Unicom focused on areas such as comprehensive supervision of ecological environment and Big Data of ecological environment and developed solutions such as “China Unicom Ecological Environment Big Data Platform” and “Classification of Domestic Waste of Urban Residents”. It also implemented comprehensive management systems for ecological environment monitoring and “one-network-management” projects for ecological environment in Xiong’an, Shandong, Zhejiang, Shanghai and other provinces and cities to achieve cross-departmental, cross-level and cross-regional ecological environment data sharing within the provinces and facilitate digital, convenient and accurate management.

Providing Warm and Intelligent Services

“Customer trust” is the foundation for the survival and development of an enterprise. China Unicom is committed to continuously improving the quality of products and services to meet customer needs, creating a high-value smart brand, caring for special groups, and obtaining high trust from customers.

Creating excellent customer service

China Unicom always adheres to the business philosophy of “creating value for customers”, promotes high-quality service projects, promotes the closed-loop mechanism for problem solving, continuously enriches the service brand connotation, deepens customer service, improves service quality, and creates a better, more efficient and more convenient service experience for customers with diversified services.



Improving customer experience and perception

Guided by customer perception, China Unicom launched special service enhancement projects to actively solve customer complaints.

- The Company comprehensively sorted out customer complaint data from four major channels and established a full-scale problem solving system based on “two networks and two businesses”. It strengthened the pre-authorisation and closed-loop operation of all problems, smoothed complaint channels, increased service authorisation and remediation scenarios, and launched customer satisfaction re-visits to continuously improve customer perception.
- The Company innovatively built the China Unicom Complaint Platform, and launched an Internet complaint platform website, WeChat mini program and a complaint portal at the China Unicom APP in 31 provinces across the country to create an excellent customer experience with extensive touch points, transparent process, convenience and efficiency, improving customer service perception.
- The Company carried out the “Special Action for Improving Customer Satisfaction”. Focusing on 23 issues affecting customer experience in ten categories, it continued to implement the service action, and effectively solved the “pain point” problems of the public.
- The Company strengthened the service KPIs and carried out three-dimensional matrix management on the subjects of complaints penetrating “vertically to provincial branches, horizontally to professional departments, and specially to subsidiaries”. It promoted problem solving through monthly analysis and notification, customer re-visits and supervision, so as to achieve the goal of “solving one type of problem by handling one complaint”.
- The Company ensured the stable operation of mobile number portability service. Relying on the advantages of its nationally centralised system, the Company focused on launching services such as “online and cross-region port-in services” and “cross-region refund of tariff balance for port-out users”. It firmly adhered to the red line and bottom line of the policy of mobile number portability, and carried out special rectification on service issues such as “obstructing mobile number portability and restricting mobile number portability with unknowing unbundling” to create a warm and caring service experience.



Innovating on digital life experience

China Unicom provides users with a more intelligent living experience through product innovation. In 2021, the total number of mobile subscribers reached 317 million, the number of 5G subscribers reached 155 million, and the number of fixed-line broadband subscribers reached 95,046,000.

- The Company built an open and shared China Unicom smart home ecosystem. It independently developed culink, a standardised ecological connectivity protocol, and created six integrated systems including gigabit, secondary card, fixed voice, application, video and finance through the digital operation platform to provide users with a smarter, more intelligent and happier new family life experience.
- The Company built a platform-based innovative product system. To create an ultimate experience for 5G users and meet the needs of users for digital and intelligent life, the Company created innovative products such as video ringtones, Unicom assistant and China Unicom cloud disk to release product innovation energy. The number of registered users of video ringtones reached 200 million, and the number of registered users of Unicom assistant reached 181 million.

Building agile service operation



China Unicom leveraged its advantages in smart operation, strengthened centralised empowerment, continued to improve its service operation capabilities, and achieved online and offline integration and service marketing integration.

- Deepening seamless online and offline services to solve customer problems in one stop. For seamless services, the Company strengthened omni-channel service coordination by linking up hotline and offline service points, effectively improving customer perception. For seamless marketing, through insights into customer demands and the strategy of precise service matching, the Company realised all-round and seamless intelligent services.
- Leveraging the advantages of smart operation, the Company improved the ability of one-stop solution to customer problems. The problem solving rate increased by 1.9PP to 88.9%, and the proportion of smart services increased by 56.8PP to 84.03%.

Smoothing customer service channels



The Company expanded service channels such as the 10010 hotline and China Unicom APP, extended service coverage and improved service quality and efficiency.

- The 10010 hotline service channel adopted centralised operation to achieve centralised cross-region dispatch and re-use of idle capacity, and the success rate of connecting to human customer service within 15 seconds increased to 92.5%. The Company built an agile and intelligent call centre. Customers can dial directly throughout the country, and they will be matched precisely with suitable services according to their needs. The hotline can make intelligent prediction and offer intelligent response. It knows customers’ deeds, understands customers’ needs and can solve customers’ issues. In 2021, the customer service hotline service volume reached 1,380 million times, and the satisfaction rate of 10010 increased by 2.3PP to 97.5%.
- China Unicom’s APP takes leading experience as its goal and has become a preferred one-stop service channel for users with accurate lookup, quick delivery, smooth operation and full service. As of 2021, China Unicom APP served 62.98 million users, representing an increase of over 80%. Self-service accounted for 80.5%. Service satisfaction rate was 9.1 points, improving by over 25%.



In April 2021, China Unicom’s Mobile Business Outlet APP was officially renamed as “China Unicom APP”, which was fully upgraded in terms of service, life, entertainment and wealth. It is committed to providing customers with a warmer and smart experience and creating a more convenient and personalised good life.

“WO Online” customer portal adopts lightweight H5 design. Users do not need to download any App. A video connection request can be initiated by scanning a code or clicking a link. In the process of service sign-up, the customer service representative will push the fill-free form with key content highlighted to the user’s mobile phone for confirmation, fully protecting the user’s right to know, eliminating induced consumption and billing disputes, and letting users easily and knowingly sign up services.



Establishing experience monitoring system

Adhering to the “people-oriented” principle, the Company established an end-to-end customer experience monitoring system covering all customers, businesses and life cycles.

- We built an end-to-end perception monitoring system to collect and analyse data in real time, and promote the solution of perception depression. Focusing on four major professional aspects and 301 key scenarios, the Company built a full-scenario map of customers, and promoted the fundamental solution of problems through “advance insight and prevention, in-process operation monitoring, and post-event evaluation management”.
- Based on the concept of full network service, the Company reconstructed its service standard system, which covered four major professional aspects and aligned with customer-side experience evaluation for integrated operation. It employed digital means to conduct real-time monitoring for early warning and swiftly resolve problems, leading to all-round customer experience improvement in network, business and services.



Shaping internal culture and external reputation

China Unicom is committed to building the influence of high-quality services. Externally, based on the service perspective and focusing on hot topics, pain points and business priorities, it strengthened knowledge dissemination, conveyed its differentiated service advantages, and infused service reputation into people’s minds. Internally, we drove the development and integration of service culture, promoted the profound reform of ideological awareness, code of conduct and process system, and instilled the service culture into our staff.

- The Company carried out a service culture season campaign titled “I do practical things for the public – ‘all endeavors for three purposes’ action again” to forge a new service culture.
- The Company launched a customer word-of-mouth campaign titled “Further upgrade of service experience” to integrate its internal and external publicity resources to build official publicity for China Unicom’s promoting high-quality services.
- The Company launched six topics such as cross-region sharing and China Unicom APP service upgrade and “I do practical things for the public” during the year, with over 3.01 billion times of publicity exposure in total. Service reputation and awareness rate reached 50.14%. China Unicom’s customer service accounts in Douyin and Bilibili ranked first among central state-owned enterprises in terms of scale and its Kuaishou account ranked first in the industry. The Company created a communication knowledge expert series named “instantly understanding China Unicom”, publishing 560 knowledge videos and 168 live broadcasts with a total of 210 million views, thereby educating the public on communication knowledge and tips on usage in a clear and easy-to-understand manner and establishing good customer communication and interaction.



China Unicom Customer Service Operation Account Award

In 2021, the overall satisfaction rating of the Company by the Ministry of Industry and Information Technology showed an improvement trend throughout the year

MIIT Satisfaction rating

81.68 points

Among which, network satisfaction increased year-on-year

0.94 points

Year-on-year improvement in service quality

2.58 points

Continuous improvement of NPS

Annual self-improvement and enhancement of mobile network

16.8 points

Broadband upgrade

9.9 points

5G-specific satisfaction remained

Industry-leading

Building a first-class brand image

Under the macro landscape of digital economy, China Unicom has renewed and upgraded its brand strategy, optimised its brand positioning, built a brand strategy model and improved its brand management system. Under the guidance of the new strategy, it built a high-value smart brand and achieved brand leadership in the digital economy era.

Continuing to enhance brand reputation

Leveraging on the opportunities of 5G and the Winter Olympics, the Company fully coordinated with the internal media matrix to create a “warm” differentiated smart brand image with both internal and external refinement to enhance the overall brand value.

- The Company undertook the “5 + N” brand revamp and internalisation project. Through brand alliance platform, brand education and training, brand image engineering, brand ambassador selection and publicity activities, it continued to deepen its brand substance, enhanced employees’ awareness and sense of identity of the brand, and stimulated the initiative to fulfill the brand commitment.

- Taking advantage of current hot topics, the Company created a brand smart experience in multiple dimensions. Through Hearing King Card, smart cultural tourism, respecting and helping the elderly, industry exhibitions and partner conferences, we conveyed China Unicom’s clear attitude of creating value for customers, the society and the industry, and demonstrated China Unicom’s social responsibility of participating in the digital economy and promoting high-quality development.

- Seizing current hot topics such as the Tokyo Olympics, the Company co-organised online and offline interactive experience activities such as “Going to N Cities”, lighting up the “City Olympic Landmark”, “Life Like This”, “Family Network Testing for People Service” and “Fancy Sports Game Show” with leading media such as Douyin, Bilibili and Sina. Through scenario-based presentation, the Company highlighted product features.

- The Company, together with Beijing Satellite TV, Youth League Central Committee, Xinhuanet, Beijing Satellite TV and other senior units, central media and industry vertical media, jointly produced contents such as “Meeting Winter Dreams” and “Hardcore Young Ice and Snow Season”. It cooperated with benchmark enterprises and experts in the form of “small incidents, big stories” to highlight the advantages of China Unicom’s products and services through differentiation, strengthen the capabilities of China Unicom’s industry solutions, and enhance the brand favourability.



China Unicom and Xinhuanet jointly launched the “5G Pilot, Sailing for the Future” series of programs, which showed the real application experience of China Unicom’s 5G by users and the public and demonstrated the technical strength of China Unicom’s 5G technology. It explained key projects in detail through case studies to shape the smart image of China Unicom’s brand.



Taking advantage of the 517 World Telecommunications Day and the 520 Global Accessibility Day, the Company created a warm short film adapted from three real stories from a special perspective to tell the changes brought by China Unicom’s technologies and wisdom to the lives of special people. It embodied China Unicom’s sense of social responsibility, a technological sense full of profound humanitarian spirit, and the brand’s warmth with human touch.

The video creativity won four awards at the 2021 China International Advertising Festival, including the Gold Award for short video creative advertising in the category of audio-visual game media of the Interactive Creativity Award, the Gold Award for humanitarian care artistic advertising in the category of public welfare advertising, the Bronze Award for brand image public welfare advertising and the Bronze Award for artistic innovation marketing, and won the Nomination Award of the 14th Golden Investment Award for Commercial Creativity.



Standardising brand management

In line with the Company’s brand development strategy, the Company revised and improved the “China Unicom Brand and Advertising Management Measures” to make brand management scientific, standardised, efficient and transparent, enhance the brand concept of all employees of the Company and improve the brand management system.

SASAC brand building capability

Seventh among central state-owned enterprises, first in the industry

第七名中央国有企业，行业第一

Brand first-mention rate

No. 2 in the industry

行业第二名

Brand reputation

No. 2 in the industry

行业第二名

Strengthening Reform to Enhance Motivation

China Unicom has been consistently promoting reform and innovation, strengthening system integration, and effectively driving the integration and iterative deepening of various special reforms with the Company's strategy, so as to form a long-term reform mechanism and lead the Company's high-quality development.

Promoting three-year action of state-owned enterprise (SOE) reform

China Unicom thoroughly implemented the three-year action plan for SOE reform and organically combined the three-year action plan for SOE reform with comprehensive digital transformation and world-class management improvement actions. It identified 130 reform tasks in 10 aspects, and coordinated the whole Company to systematically implement them. As of the end of 2021, it completed 93% of the reform tasks.

Continuously improving modern corporate system

Boards of directors were established at 100% applicable subsidiaries, and 100% of them had a majority made up of external directors.

Deepening the market-oriented operation mechanism

China Unicom fully adopted tenure-based and contract-based appointment of middle management, and iteratively promoted the reform to stimulate the vitality of front-line responsibility units. Smart Home engineers were 100% included in sub-divided unit management to strengthen grid-based digital empowerment.

Promoting system optimisation and structural adjustment

Based on the reform of professional operating systems, the Company carried out in-depth reform and review of operating systems such as big marketing, network and technological innovation, and continued to optimise the reform plans. The Company successfully completed the clean-up of non-core businesses and inefficient assets and reduction of legal persons.

Deepening the market-oriented reform of subsidiaries

In 2021, China Unicom promoted the restructuring and integration of key businesses in the value chain, and established China Unicom Digital Technology Co., Ltd., which is a major strategic move to actively adapt to the changes in the new productivity of the "cross-domain integration" of the digital economy and reconstruct the new production relationship of "integrated innovation". At the same time, China Unicom Asset Operation Company was established to strengthen the unified planning and operation of real estate and land resources.

On 7 February 2021, the establishment ceremony of China Unicom Digital Technology Co., Ltd. was held in Beijing. At the commencement of "14th Five-Year Plan", the Company vigorously integrated the capabilities of "cloud computing, Big Data, IoT, AI, blockchain and security" and established China Unicom Digital Technology Company. This is not only a move to actively adapt to the changes in the new productivity of the "cross-domain integration" of the digital economy and reconstruct the new production relationship of "integrated innovation", but also a supply-side structural reform driven by the new changes in the demand side of the digital economy. It is a major strategic move of China Unicom to create unique innovative competitive advantages and achieve differentiated breakthrough in innovative racetracks.

With the management model of "integration of transformation and reform", i.e. creating unique digital productivity through comprehensive digital transformation, and building a unique new production relationship through pilot mixed ownership reform of central SOEs, China Unicom was successfully selected as one of the ten benchmark management models of SASAC, serving as a role model of SOE management, empowering the core competitiveness of enterprises, and creating a new model for the transformation and upgrade of SOEs in the new era.

Deepening three-systems reform

Deepening the reform of labour, personnel and distribution system is a key element to enhance the vitality and efficiency of an enterprise. China Unicom continued to deepen the reform of the three systems and fully activated the core elements of human resources. With more flexible promotion and demotion of management personnel, employment and dismissal of employees, and adjustment of income, the vitality and competitiveness of the Company was enhanced.

- The Company focused on comprehensive guidance and formulated the Guiding Opinions of China Unicom on Deepening the Three Systems Reform to clarify the reform tasks and the reform requirements.
- The Company focused on structural optimization. The network department continued to strengthen the construction of the intelligent network engineering team that supports independent operation and fulfilment. The consumer market department promoted the migration of personnel to key positions such as online operation team and middle office production and operation. The government and enterprise department promoted key customer marketing, product management, solutions, and technology R&D team development.
- The Company focused on evaluation and feedback, and established three-systems reform evaluation system. It focused on reform performance indicators, placing emphasis on systemic indicators in regard to the three aspects of "promotion and demotion, employment and dismissal, and increase and reduction". It evaluated the reform results in a closed-loop manner, and strengthened the application of evaluation results.

Strengthening internal process governance

Focusing on value creation, adhering to the principles of “customer first”, “business first” and “front-line first”, the Company transformed the low-efficiency and high-cost traditional processes centred on management and control into a customer-centric digital process with high efficiency and low cost. It built a process-oriented organisation to promote the transformation to a digital, intelligent and ecological platform-based enterprise.

- Focusing on the process framework, the Company established a process management system and a process construction and operation system. Based on the process management platform, the full process view could be visualised, managed and controlled.
- The system operation steps were simplified. Taking as an example the scenario of switching from 4G integration to 5G integration, the number of system clicks were reduced from 88 steps to 68 steps, and the processing time was shortened from 15 minutes to within 10 minutes, creating a streamlined and efficient process.
- The Company compressed process workflows. It reduced the number of steps in the project initiation of government and enterprise dual-line business. The fulfilment time (with resources) was shortened from as long as 15 days to 3/5/7 days, and the average time of fulfilment was reduced by 50%, improving the efficiency of service fulfilment.
- The Company established centralised operation services and promoted the provincial-level centralisation of accounting and invoicing for government and enterprise business, reducing the number of supporting staff by 10%, the time lapse of revenue booking by 20% and invoice printing cycle by 50%. The average efficiency improved by over 30% and labour costs were reduced by 45%.

Exploring operation in the mode of mixed-ownership reform

Deepening the reform of Yunnan branch. In order to ensure the sustainable and healthy development of China Unicom Yunnan Branch, China Unicom studied and issued the Notice on Further Deepening the Comprehensive Reform of “Double-hundred Action” of China Unicom Yunnan Branch. China Unicom increased its shareholding from 5% to 40% to become the single largest shareholder, ensuring the control of state-owned capital in the reform. It completed the integration of two entities to achieve unified operation.

Promoting the reform of Guangxi branch. China Unicom Guangxi Branch implemented social capital cooperation and operational reform in 7 cities and entered the first cooperation period in 2021. The 7 local operating companies have established a market-oriented operation system and a financial control system with profit and cash flow as the focus. The companies in the autonomous region implement integrated operation and management for reform and non-reform areas.

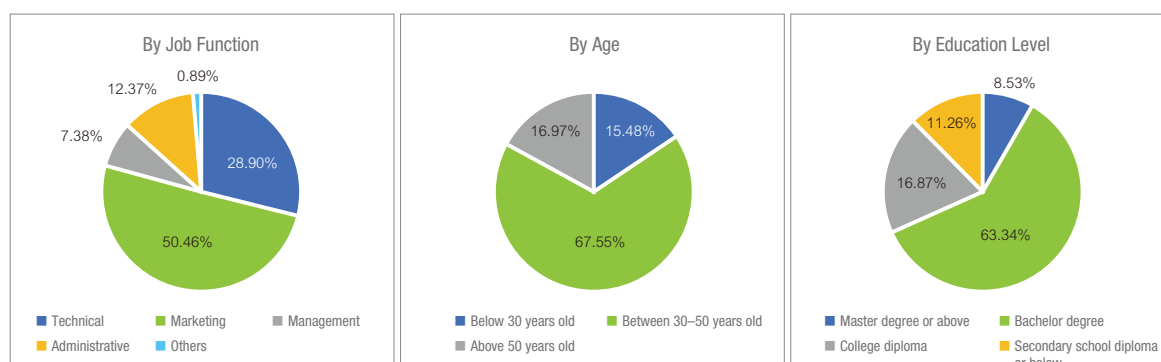
Smart Connection Technology actively preparing for IPO. Smart Connection Technology Company improved its corporate governance system, completed the reform of its joint-stock system, completed the market-oriented selection and appointment of the management team, and formed a new management team comprising the general manager, deputy general manager and CFO. Since the reform, the valuation of the Company increased from RMB100 million at the time of establishment to RMB1,039 million before investment and RMB1,500 million after investment, effectively realising the preservation and appreciation of state-owned assets. Through the organic integration with automobile manufacturers and other strategic investors in the industry ecology, it achieved rapid improvement in value creation capabilities, maintained a market share of over 70% in the factory-installed market, and consolidated its leading market position.

Creating a Pool of Innovative Talents

China Unicom adhered to the strategy of talent-led development, deepened the reform of the talent development system and mechanism, deeply implemented talent-oriented corporate development and created the comparative advantages and competitive advantages of talents. It comprehensively cultivated, introduced and used talents to promote the fundamental change of talent structure. At the same time, the Company effectively safeguarded the legitimate rights and interests of its employees, gave full play to their enthusiasm and creativity, and let them share the achievements of reform and development and grow together with the Company.

Optimising talent structure

China Unicom adhered to strengthening the enterprise with talents, improved the talent management system and mechanism, and optimised and adjusted the talent structure in response to strategic requirements. The Company focused on identifying outstanding young management talents at the front-line acting in major events, and continuously improved the whole chain mechanism of education, selection, management and use of talents. The age structure of the middle management team continued to improve. The Company has built a four-level professional talent pool of 19,000, including 950 leading and expert talents, 6,100 backbone talents and 12,200 new talents. The “Digital Elite” program was implemented to achieve full coverage of digital training certification for four-level professional talents.



Total number of employees		Employees in Mainland China	Employees in Hong Kong, Macau and Taiwan	Employees overseas
243,381		242,497	598	286
New recruits	Gender proportion (Male/Female)	Proportion of ethnic minority employees (%)	Number of resigned employees	Temporary labour hired on market-oriented basis in Mainland China
13,038	1.62:1	6.8	4,009	12,606

Four-level talent pool

19,000

Turnover rate of four-level talents

12.8%

Number of industry experts in the field of technological innovation introduced

more than **40**

Protecting employees' rights

China Unicom insisted on regarding employees as its foundation. It promoted the spirit of endeavours and innovation and respected labour, knowledge, talents and creativity. It safeguarded the legitimate rights and interests of employees and served its staff with full efforts. It promoted the “win-win” situation where employees and the Company grew together through the market-oriented reform of human resources, and continuously improved the sense of happiness and achievement of employees.

Adhering to fair employment

- Strictly abiding by the Labour Law, the Labour Contract Law and other relevant laws and regulations, the Company signed labour contracts with 100% of employees, and implemented dismissal policies in accordance with relevant national requirements.
- The Group has formulated the “Human Resources Risk Prevention and Control Manual”, adopted strict inspection and control procedures in recruitment and promotion and strictly prohibited any discrimination against employees in terms of age and gender. It complied with the “Provisions on the Prohibition of Using Child Labour”, strictly prohibited the use of child labour, and provided training to main contractors providing manpower or services. In 2021, there were no incidents of discrimination, child labour and employee abuse.
- The Company implemented the national policy of “stabilising employment and expanding employment” and expanded the scope of recruitment to graduates in the past two years who were unemployed. It actively promoted employment assistance, provided 396 targeted recruitment positions in Xinjiang, Tibet and Qinghai, and recruited a total of 39 Tibetan graduates.

Protecting democratic rights

- The Company implemented the national regulations on working hours management, strictly implemented the special working hours declaration system, and protected the rights of employees to rest and leave. There was no forced labour.
- The Company implemented paid leave system and retained 100% of job opportunities after maternity leave. It actively supported and implemented childcare leave and single child care leave. It implemented the paid companion leave system for employees whose children were enrolled in the high school and college examination, and provided guidance services for 3,700 employees' children to fill in their choices for colleges.
- Workforce development was reported to the employee representative congress and the formulation and implementation of human resources policies was disclosed, providing smooth information communication channels.



China Unicom AI Special Training Course



China Unicom “Digital Elite” four-level professional talent training

Innovating on talent incentives

- The Company optimised the total salary management measures and continuously released the bonus of mixed-ownership reform. The Company improved the labour cost allocation rules of provincial branches and subsidiaries, optimised the incremental income sharing mechanism, and realised the coordinated growth of labour cost and benefit. Labour cost increased by 7.6% year-on-year. The average adjustment ratio of labour cost of each unit reached 10% in order to break the rigidity of the existing system.
- The Company improved the framework of long-term incentive system and optimised the flexible welfare system to meet the diversified needs of employees.
- The Company regularly carried out employee rank and salary promotion, with a rank promotion rate of 14.3% and a salary promotion rate of 38.4% in 2021.

Helping employees grow

China Unicom adhered to the people-oriented principle, cherished the value of each employee and attached great importance to the capacity building and career development of employees. It continuously promoted the construction of education and training system with emphasis on improving the digital capabilities of all employees, so as to facilitate the career development of each employee and promote the communication with and growth of employees.

Reconstructing training system

The Company continued to improve the training management system and mechanism and deepen the reconstruction of the education and training system. It increased the training organisation support and training resource allocation, and promoted the implementation of the education and training system in all units.

- We established training programs for key groups and set up a professional competence standard system. Focusing on the training objectives, development paths and capability requirements of different groups, we built digital capability standards and curriculum systems to enable digital empowerment.
- We promoted the construction of certification systems for various professional departments and promoted capacity transformation through position certification. We completed the update and iteration of capacity standards for 63 professional aspects, and professional talents passed the certification 93,056 person-times.
- Focusing on digital empowerment, network intelligent operation, network information security, intelligent network independent fulfilment, technological innovation and other aspects, the Company carried out the development of technical professional courses, and developed a total of 223 courses and 360 teaching hours during the year.
- Making full use of the resources of various online education platforms, the Company held a series of training sessions such as “China Unicom Lecture Hall”, “Smart Talks” and “WO Sharing”, with a total of 1,260,000 person-times of participation. It held 33 live broadcast training sessions with 53,000 viewers. It set up a special zone for online college, with over 9,970,000 people studying online.
- We carried out IT/DT technology capacity training for all employees, with 19,000 people trained online. The Company implemented the digital piloting and digital elite projects to achieve full coverage of second-level managers, third-level managers and fourth-level professionals. We carried out the “apprenticeship” for four-level talents to enhance the digital capabilities of other professionals.

Training participants	Training Content
Company-wide managers and employees	The Company carried out 11,402 sessions of learning and education on Thought on Socialism with Chinese Characteristics in the new era, with more than 897,000 participants.
Management	The Company continued to carry out professional ability improvement training. 340 people participated in the rotation training class for headquarters personnel, and 47 general managers of local branches participated in the transformation training demonstration class. 26 management personnel were selected to participate in the training of the Organisation Department of the Central Committee of the CPC.
Outstanding young cadres	The Company held the “Young and Middle-aged Cadre Training Class” and “Young Management Talent Demonstration Class”, and 122 outstanding young management talents participated in theoretical learning and ability training.
Professional talents	Focusing on key tasks, the Company carried out regular and multi-level transformation and empowerment training for four-level talents and professional staff, organised demonstration classes at the headquarters to empower all professional teams persistently. The Company carried out more than 84,000 professional skill training sessions for employees of various professional ranks, with a total of more than 5,160,000 participants.
Front-line employees	For front-line sales, call centres and installation and maintenance employees, we built digital capability standards and curriculum systems, and conducted more than 58,000 training and certification sessions throughout the year, with over 2,290,000 participants.

RMB **340.99** million
was invested in employee training

5,390,000

people-times participated in the training

Average training time

94 hours



At the opening ceremony of the training class for young and middle-aged cadres and the demonstration class for young management talents, Liu Liehong, chairman of the Company, attended and personally presented flags for the two classes.

Training rate of senior management

100%

Average training time

203 hours

Training rate of middle management

100%

Average training time

104 hours

Training rate of general employees

99%

Average training time

94 hours

Training rate of male employees

98.87%

Training rate of female employees

98.87%

Average training time of male employees

94.31 hours

Average training time of female employees

94.31 hours

Building a training platform

China Unicom is committed to building a team of talents for digital transformation. It actively carried out various skill competitions such as 5G innovative applications, Big Data innovation, solutions, and smart Winter Olympics. It drew cases from real production scenarios, real customers, and real cases to substitute training, spur learning and achieve empowerment through competitions, and continuously improved the technical capabilities of employees.

- The Company carried out 502 labour and skills competitions in 2021, covering subdivided marketing, customer operation, financial rights, network AI, network support for the Winter Olympics, network security. We selected 233 “China Unicom Technical Experts” and the number of competitions, number of participants and participation rate reached record high.

- The Company jointly held a competition on the practical digital operation skills for government and enterprises with the China National Defense Posts and Telecommunications Union and co-organised a network co-build co-share labour competition with China Telecom.

16

first- and second-class labour and skill competitions at the Group level were held in 2021

30

third-class skill competitions at the Group level were held



China Unicom Innovative Product Labour Competition



China Unicom New Operation Project Innovative Skills Competition

Improving democratic management

China Unicom has established a robust democratic management system based on the labour union, coordinated and promoted the three-in-one democratic corporate management comprising “labour union, open corporate affairs, and employees’ advice and suggestions”. It guaranteed the right to know, participate, express, and supervise of employees at all levels, and encouraged employees to contribute their wisdom to the development of the Company.

- Throughout the year, the Company held about 500 labour union meetings at all levels. Over 1,700 items of various matters were discussed at the provincial company level, over 10,000 items were discussed at subsidiaries and municipal companies, and there were over 3,000 items of various proposals.

- The Company set up channels for collecting opinions such as “all endeavors for three purposes” “discussion, the whole committee online, employee satisfaction survey and front-line survey, etc. It held special employee participation activities such as process governance, authorisation and delegation, China Unicom APP user experience, and work style improvement. In 2021, the Company received a total of 13,400 employee requests, with a resolution rate of 97.61%.

- The Company carried out the service culture season activity of “I do practical things for the public” to collect experience and feelings of touchpoint service, product business, network experience and other aspects. A total of 26,668 questions and suggestions were collected.

- The Company kept smooth channels for reasonable suggestions, and ensured that all employees’ demands and feedback were responded to through various reasonable suggestions activities such as “General Manager Online”. Throughout the year, the Company carried out more than 150 “General Manager Online” meetings, conducted two rounds of selection of outstanding proposals by employee representatives, and collected 85 proposals.



Listening to the voice of our employees and collecting feedback from the front-line. China Unicom organised “General Manager Online” events for employees at all levels to actively contribute to the development of the Company.

Caring for employees' life

Adhering to the concept of serving employees, China Unicom fully understood the thoughts of employees at the front-line, continuously innovated on various measures to serve employees, helped employees balance work and life, created an efficient, relaxed and caring working atmosphere for employees, and enhanced employees' sense of belonging, security and mission to the Company.

Strengthening pandemic prevention and control

As the pandemic prevention and control has become a new normal, the labour unions at all levels continued to carry out pandemic prevention and control, and continuously optimised and implemented employee care measures on the premise of implementing pandemic prevention and control measures, so as to better serve enterprises and employees in special periods.

- The Company established a pandemic prevention mechanism, required the labour unions at all levels to strengthen their awareness of pandemic prevention, organised pandemic prevention activities according to local conditions, reasonably reserved pandemic prevention materials, formulated emergency response measures, and coordinated the promotion of pandemic prevention and control and the Company's business development.

- During the COVID-19 pandemic, the Company arranged employees to stay put during the Spring Festival and visited the families of overseas employees. The Company provided various forms of care for employees who stayed put during the Spring Festival, and relieved the worries of employees who were unable to return home during the severe pandemic overseas. The labour union organised care visits for overseas employees and their families, and distributed care gifts and money to the families of overseas employees.

Ensuring production safety

The Company strictly abides by the Production Safety Law of the People's Republic of China and other relevant laws and regulations. It further implemented production safety responsibilities, improved basic systems such as the Measures for the Supervision and Administration of Production Safety and the Fire Safety Management Regulations, improved the safety supervision mechanism, strengthened personnel protection, and fully implemented production safety.

- The Company improved the production safety quality of all employees, organised theme activities such as Production Safety Month, Fire Safety Day and Production Safety Law Publicity Week, carried out fire practice and theoretical training, and organised fire and emergency evacuation drills and accident handling drills.

- In 2021, there were no general or above production safety accidents in the whole system. The Company achieved zero fire in the whole system and zero fatality rate per thousand people. There were no lost days due to work-related injuries, and the safety sense of employees has been significantly improved.

- We promoted the construction of employee health management system, and provided employees with health examination, health lectures, critical illness insurance and other services.

- We protected the mental health of employees, extensively carried out a series of activities such as "mental health of employees" and "public sports for front-line", innovatively promoted the construction of "psychological station" on a pilot basis, and actively provided psychological care during special periods such as the pandemic in Hebei and overseas as well as the flood in Henan. In 2021, the Company was awarded the honor of "Healthy Enterprise" by People's Health Network.

119

training sessions held on
production safety

100%

coverage on production
safety training



In order to conscientiously implement the Three-year Action Plan for Special Rectification of Production Safety of China Unicom, popularise fire safety knowledge of the headquarters personnel, improve fire safety awareness, and enhance safety knowledge and necessary skills, the administrative service centre of the headquarters invited Tian Siyu Police Officer of the Fire Rescue Branch of Financial Street, Xicheng District to conduct fire safety knowledge training in the office.

Caring for female employees

By signing a special collective contract for female employees, improving the construction of "breastfeeding room" and holding a series of special activities on "March 8 Festival", we protected the rights and interests of female employees and provided targeted and considerate services to them. In 2021, China Unicom selected 120 "Heroines' Civilised Positions" and 125 "Heroines' Meritorious Models" to stimulate the entrepreneurial vitality of female employees.

Enriching cultural and sports activities

China Unicom earnestly implemented the national strategy of "Healthy China" and "National Fitness", organised various cultural and sports activities, participated in various competitions organised by the National Defense Posts and Telecommunications System, Communications Sports Association of China, etc.. In 2021, trade unions at all levels organised nearly 6,000 cultural and sports activities with 600,000 participants. China Unicom Shandong Branch was honored as an advanced unit of national mass sports by the State General Administration of Sports. Hu Mingrui of China Unicom Guangdong Branch and Qu Fengxia of China Unicom Hebei Branch were honored as advanced individuals of national mass sports.



Flowers and handcraft themed activities for female employees on International Women's Day



China Unicom carried out a series of sports activities such as badminton competition and balloon volleyball competition for employees under the theme of “Celebrating the Winter Olympics and Writing a New Chapter”. Chairman Liu Liehong came to watch the competition and encouraged employees to actively participate in various cultural and sports activities of the Company.



2021 China Unicom Employee Table Tennis Competition

Deepening assistance and care

We are dedicated to solving difficulties for employees, and have established an assistance mechanism, including files of employees in difficulties, insurance cover for major diseases, and mutual assistance funds for employees. We have built a “Trinity” assistance system of critical illness insurance, mutual assistance fund and supplementary medical care. In 2021, more than RMB70 million assistance funds were distributed to employees in difficulties, 2,273 claims were made for critical illness insurance, and mutual aid funds were provided 3,700 times. After the severe flood disaster in Henan, the labour union of the headquarters immediately went to the site to visit the front-line rescue personnel and raised RMB 1,000,000 to support the post-disaster reconstruction.

We set up special funds for “five small” construction, raised RMB6,685,000 in 2021, improved the working and living environment for 100 front-line units in red old areas, supported the post-disaster reconstruction of front-line units in Henan, Shanxi and Sichuan, and improved the working and living environment for cadres and employees working in remote areas due to poverty alleviation and stability maintenance work.

Hohhot Branch in Inner Mongolia organically combined home-building work with the construction of employee teams and employee culture. When the office building was relocated, it fully considered the needs of employees, built a “reading corner” full of books and energetic “fitness corner” for employees, and improved employees’ sense of happiness and gain through the construction of “employee home”, and enhanced employees’ sense of identity and belonging to the Company.



We carried out the activity of “I do practical things for the public”. For heroic models, families of a martyred soldiers, national model workers and other groups, we carried out the “sending a piece of care” activity. A total of 2,306 people were visited and RMB2,570,000 were provided as care money by labour unions at all levels.

RMB **70.22** million spent on aiding employees in need

RMB **42.10** million spent as care money

Caring for employees’ children

In order to overcome the difficulties caused by the pandemic, the Company continued to carry out the “Employees’ Children Custody during Leave” and provide custody services for employees’ children in innovative form. Among them, the employees’ children custody class of China Unicom Fujian branch was rated as “National Custody Class with Love” by the All-China Federation of Trade Unions.



Firmly Committed to
Carrying the
Responsibility of the
People's Livelihood With the
“People's Needs”
in Mind



The country is the people and the people are the country. China Unicom has always adhered to the people-oriented development philosophy, taking improving the well-being of the people and promoting the all-round development of people as the starting point and goal of digital development. It consolidated and expanded the achievements of poverty alleviation and effectively connected it with rural revitalisation, actively conveyed the warmth of charity, promoted the common prosperity of the society, and continuously enhanced the sense of gain, happiness and security of the people. At the same time, we actively implemented the national “dual carbon” requirements to help build a beautiful China. We consolidated the advantages of all parties to engage in “team competition” and form an integrated and open cooperation ecosystem, promoting the common development of the industry chain.



Measures adopted in 2021

- Consolidated and expanded the achievements of poverty alleviation, continued to contribute to the comprehensive rural revitalisation with broadband network covering 327,000 administrative villages.
- Strengthened green management, green production and operation, green industry empowerment. A special fund of RMB130 million was allocated for energy-saving upgrades.
- Integrated advantages of various parties such as industry peers, equipment and terminal suppliers, channel partners, and strategic investors to engage in “team competition”.
- Carried out charity donations, deepened universal services, and actively took part in charity and volunteer service to give back to society.



Actions to be taken in 2022

- To vigorously promote the construction of rural revitalisation network and drive rural revitalization with industrial revitalisation.
- To deeply implement carbon peak and carbon neutrality, and drive research, testing and application of new technologies, new equipment and new solutions in energy conservation.
- To deepen cooperation with strategic investors and industry leaders, and achieve win-win cooperation in terms of business, products and capital.
- To systematise the organisation and management of charity volunteer services, standardise team building and normalise activities.

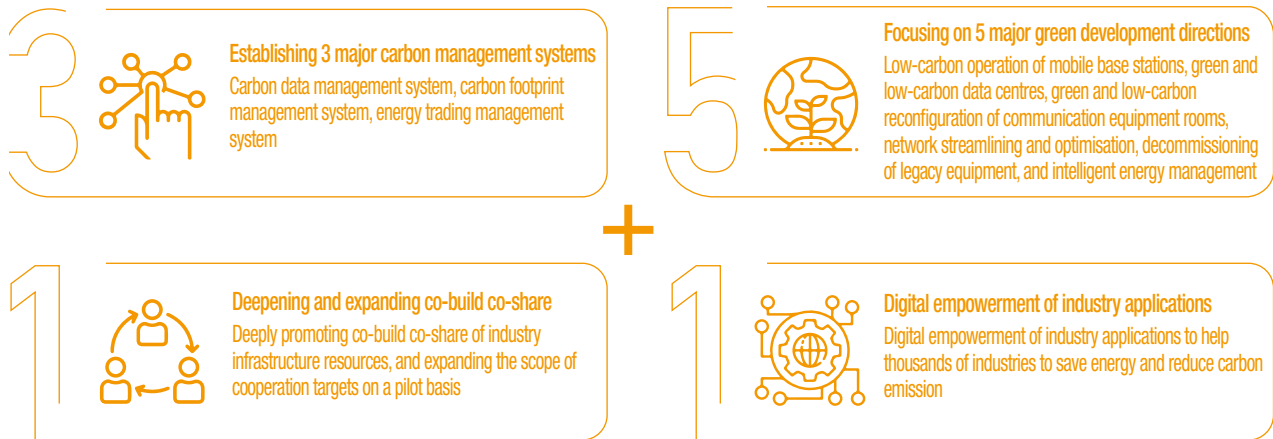
Facilitating the Construction of a Beautiful China

People live up to lucid waters and lush mountains. China Unicom adheres to the concept of green development. It coordinated and promoted green management, network construction, operation and other work, strictly controlled energy consumption intensity and reasonably controlled the total energy consumption. It deeply promoted the green empowerment of industries to facilitate green and low-carbon production, living and governance, thereby contributing to carbon peak and carbon neutrality, and bringing ecological benefits to the people.

Improving the green management system

In compliance with the Environmental Protection Law of the People’s Republic of China, the Energy Conservation Law of the People’s Republic of China and other laws and regulations related to environmental protection, China Unicom actively responded to the adjustment brought by national climate change. It established the “Carbon Peak, Carbon Neutrality” Management Committee, to guide the establishment and improvement of the Company’s “Carbon Peak, Carbon Neutrality” management system, and decide on relevant major work matters. The Management Committee has set up a “Carbon Peak, Carbon Neutrality” management office, which is responsible for research on relevant policies, establishing and improving relevant systems, organising the research and development, testing and promotion of energy-saving and carbon reduction technologies, and organising relevant training, publicity and exchanges, striving to reduce carbon footprint.

The Company formulated and released the “Carbon Peak, Carbon Neutrality” 14th Five-Year Action Plan, and launched the “3 + 5 + 1 + 1” action plan. With the goal of green and low-carbon circular development, the Company comprehensively, systematically and deeply promoted energy conservation and carbon reduction, continuously improved the greenness of communication network infrastructure, and helped bring the green and low-carbon development of the industry to a new level. It made a positive contribution to the country’s 2030 targets to increase the proportion of non-fossil energy consumption to about 25%, and to reduce the carbon dioxide emissions per unit of GDP by more than 65% as compared with 2005.



Details of the “3 + 5 + 1 + 1” action plan for carbon peak and carbon neutrality

Enhancing green production and operation

Promoting green and low-carbon production

China Unicom actively promoted the intelligent transformation, energy-saving innovation and green upgrade of communication infrastructure to improve comprehensive energy utilisation efficiency. The Company enforced strict control from the source of equipment procurement, implemented energy-saving responsibilities, put forward energy-saving KPI requirements, and allocated RMB130 million of special fund for energy-saving transformation.

- **Promoting 5G energy-saving technology.** The Company conducted in-depth research on key technologies for 5G energy conservation, installed small air-conditioning and energy-saving equipment such as fresh air, and made full use of clean energy, appropriate hibernation, time-specific shutdown and other measures to reduce the high energy consumption of 5G. Based on the concept of green environmental protection, the Company built the “4G/5G collaborative intelligent energy-saving management platform” to achieve intelligent coordination of multi-mode network and differentiated energy-saving management with “one policy for one station”, so as to promote the sustainable development of communication networks in a green, efficient and intelligent manner.

- **Building green data centres.** The newly-built communication equipment room (including data centres) strictly followed the requirements of the national and local industry authorities on environmental impact assessment and environmental protection acceptance. The Company introduced high-voltage direct current and municipal direct power supply technology, simplified the power supply system, optimised the air flow organisation of equipment rooms, and made full use of natural cold sources, air conditioning atomisation, closed cold and heating channels and other means to reduce power supply loss and improve cooling efficiency.

- **Promoting the optimisation and upgrading of production capacity.** 114 sets of MGW equipment for core network were decommissioned. 40 sets of PSTN equipment and 27 sets of NGN equipment for integrated access network were decommissioned. Approximately 45,000 ports of outdated MSTP/SDH equipment and approximately 897 ports of outdated WDM equipment were retired from the transmission network, with a completion rate of 187%. 62 sets of DCN backbone equipment for data network were decommissioned. The Company continued to retire aging equipment for ancillary infrastructure, saving electricity costs of approximately RMB23.95 million for the year.

- **Strengthening the management of electromagnetic radiation.** In the construction of mobile communication base stations, the Company strengthened the management of electromagnetic radiation of base stations to ensure that the electromagnetic radiation of base stations met the requirements of national standards. After the completion of base station construction, base stations were tested for electromagnetic radiation, and the test data were disclosed to the public on the web for public supervision.

Energy-saving technology coverage rate of base stations

75%

Energy-saving technology coverage rate of core equipment rooms (including IDC)

85%

China Unicom Guangdong Branch conducted its work with a view to achieving dual carbon goals. During the year, by simplifying the network, eliminating legacy capacity, carrying out technical energy conservation and power tariff reduction, and reconfiguring its green and low-carbon equipment rooms, China Unicom Guangdong Branch reduced energy consumption costs by RMB41.44 million, saving 5,100 tons of standard coal.



Carrying out green and low-carbon equipment room reconfiguration

In May 2021, the “4G/5G Collaborative Intelligent Energy Saving Management” of China Unicom Research Institute project won the WSIS ICT Electronic Environment Group Champion Award.



“4G/5G Collaborative Intelligent Energy Saving Management” Project Award Certificate

China Unicom Digital Technology Co., Ltd. focused on the construction of a low-carbon data centres. By using energy-saving technologies and operating measures such as natural cold source, equipment dynamic frequency adjustment control, UPS operation mode, etc., we achieved power saving of approximately 9,974,000 kWh and reduced 9,943.7 tons of carbon dioxide emissions. In the feasibility study for data centre construction projects, energy saving solutions were prepared. We actively introduced renewable energy on a pilot basis to meet ancillary office energy consumption and increased the usage mix of green electricity through market-based transactions. Langfang and Hohhot data centres were rated for 5 consecutive years as the “Advanced Unit of Energy Conservation and Emission Reduction” Guian and Hohhot data centres were included in the National Green Data Centres List.



Guian Data Centre was included in the National Green Data Centres List

Promoting green and low-carbon operation

China Unicom actively carried out green office, green product design and business services, built a green supply chain system, and deepened resource recycling.

- **Practicing green office.** The Company unswervingly implemented the concept of “green office”, adopted high-efficiency energy-saving and environmental-friendly products and built resource-saving and environment-friendly office buildings around office air conditioners, building elevators, office lighting, employee canteens and other office and living scenarios. We have formulated special measures for vehicle fuel saving and consumption reduction, and timely scrapped vehicles that had reached the end of life, failed to meet environmental standards, and had high consumption of fuel and material maintenance. The Company continued to promote the digital operation of business outlets, actively guided users to sign up services online, and realised digital operation and paperless signups.
- **Reasonable use of water resources.** Strictly complying with the relevant requirements of the “Water Law of the People’s Republic of China” and the “Water Pollution Prevention and Control Law of the People’s Republic of China”, we strengthened daily water conservation management, and improved the reuse of water resources from trivial issues, such as using surplus water for cleaning, dust removal or watering, collecting rainwater for outdoor green space irrigation. We strengthened equipment maintenance and inspection to avoid leakage. The Company’s daily office and production and operation water is mainly sourced from municipal unified water supply, and there is no risk of water pollution.
- **Building a green supply chain.** The Company issued the Notice on China Unicom Strengthening the Independent and Controllable Supply Chain and Encouraging the Development of Green and Low-Carbon Procurement, and separately set out green and low-carbon requirements in the centralised procurement of 5G and other network equipment to increase the weight of energy-saving KPIs. We required suppliers to provide products that meet the requirements of green packaging, not to use toxic and hazardous substances as packaging materials, and to use recyclable, degradable or harmless packaging materials to avoid excessive packaging.
- **Strengthening recycling.** The Company established an internal revitalisation mechanism for idle materials based on fair market value, and the accumulative revitalisation and allocation of materials amounted to RMB78 million. Public auctions for disposed assets were held through online auction platforms. The transaction value amounted to RMB456 million, of which retired batteries accounted for RMB122 million and other scrapped materials accounted for RMB334 million.
- **Carrying out green publicity.** By fully leveraging activities such as the National Energy Conservation Publicity Week and the National Low-carbon Day, the Company organised energy conservation publicity activities both online and offline, and educated and guided employees to practice green consumption and low-carbon lifestyle, so as to improve the awareness of energy conservation, emission reduction and environmental protection of all employees, and create a new fashion of green and low-carbon life.

China Unicom innovated the “volunteer revitalisation” working model and launched volunteer revitalisation team to reallocate idle information terminals in good operating condition to improve the office terminal configuration of front-line personnel in economically backward areas and disaster-hit areas. In 2021, the total scale of information terminal revitalisation reached RMB20.11 million, including 905 computers, as well as certain printers, scanners, servers, switch and other terminal equipment, for a total of 1,202 terminals.

China Unicom Beijing Branch has formulated energy-saving plans, energy-saving initiatives and implementation plans for water, heating and electricity. It refined energy consumption ledger of water, heating and electricity, implemented green network operations and promoted energy conservation and consumption reduction in office premises. In accordance with the Green Logistics Action Plan of China Unicom Beijing Branch, it actively promoted group logistics express open market application and assisted related units to put more than 300 idle assets and materials such as tables and chairs on the shelves of second-hand shops.

Strengthening green empowerment of industries

China Unicom gave full play to its technological advantages in 5G, cloud computing, Big Data, Internet of Things and AI, focused on key scenarios such as carbon emission reduction, smart water conservancy and environmental monitoring, developed green and intelligent application products, and launched informatised green solutions to empower the green transformation and upgrade of thousands of industries.

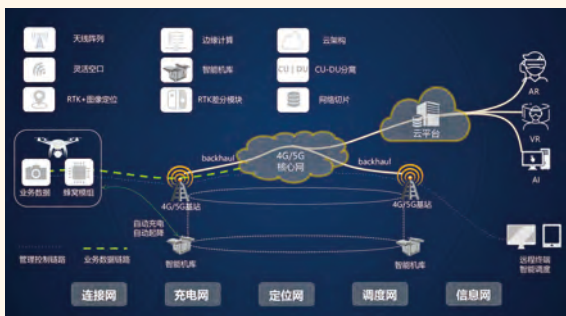
Building “Dual Carbon Cloud” intelligent products. We built a “dual-carbon” Big Data platform to form a general capability foundation. We strengthened the development of carbon emission management software to realise the functions of carbon emission quantification, analysis, management and reporting. The Company built an application centre to support the access of various double-carbon applications, and closely integrated with the power, industry, construction, steel, transportation and other industries to improve low-carbon management. We built a unified dual-carbon data resource system, innovated the dual-carbon management decision-making service model, and improved the dual-carbon indicator system and evaluation system.



“Zero Carbon” Asian Games Energy Internet Model

China Unicom Zhejiang Branch built a 5G power virtual private network for State Grid Hangzhou Power Supply Company, empowering the creation of a “zero-carbon” Asian Games energy Internet model. The investment in communication and optical cables decreased by RMB60 million, and the average annual power outage time decreased by 42%, and it was expected to reduce carbon dioxide emissions by 550,000 tons in the year.

Innovating smart water conservancy solutions. Focusing on key areas such as water resource development and utilisation, flood and drought prevention, rural water conservancy, water ecology, and water environment, we promoted the modernisation of water governance system and water governance capabilities, created smart water conservancy with thorough perception, comprehensive interconnection, in-depth exploration, intelligent application, and ubiquitous service, and realised the whole-process intelligent management and control of water-related events perception, supervision and decision-making.



5G + UAV river patrol technology architecture

China Unicom Fujian Branch earnestly implemented the new positioning of the Ministry of Water Resources on the national water conservancy work deployment, innovatively created a river and lake chief system and smart water conservancy demonstration benchmark, assisted in the digital transformation of water conservancy, realised resource integration, improved work efficiency, and reduced social management costs, which were highly praised by all sectors of society. The platform has served more than 20,000 river chiefs, river chief officers, special management officers and the general public, supporting more than 2.4 million river patrol services every year and handling more than 200,000 river and lake incidents.

Launching the environmental monitoring program of “one network with unified management”. Focusing on the comprehensive supervision of ecological environment, ecological environment Big Data and other fields, the Company created solutions such as “China Unicom Ecological Environment Big Data Platform” and “Classification of Domestic Waste of Urban Residents”, and implemented the comprehensive management system of ecological environment inspection and the “one network with unified management” project of ecological environment in Xiong’an, Shandong, Zhejiang, Shanghai and other provinces and cities to achieve cross-departmental, cross-level and cross-regional ecological environment data sharing, and realise digital, convenient and accurate management.



Demonstration of Ecological Environment Smart Monitoring System in Xiong'an New Area

Relying on its technological capabilities with independent innovation, China Unicom integrated 5G applications, remote sensing, ecological data standardisation, data governance, environmental monitoring IoT, edge cloud and other capabilities, to independently develop a smart ecological environment platform, achieving 5G full-scenario coverage of smart monitoring of ecological environment in Xiong'an New Area. It built an integrated ecological environment smart monitoring system of "Tiandidian" and improved the alert and early warning, informatisation and protection of ecological environment monitoring.

Promoting Comprehensive Rural Revitalisation

2021 is a year when China achieved a comprehensive victory in poverty alleviation and successfully started to implement the strategy of rural revitalisation. The rural revitalisation strategy is a comprehensive and historic task related to the construction of a modern socialist country in an all-round way, and is the general focus of "Agriculture, Rural Areas and Farmers" work in the new era. Rural revitalisation must be pursued before national rejuvenation. China Unicom resolutely implemented the requirements of "four things not to reduce", effectively enhanced the sense of mission and responsibility of helping rural revitalisation, ensured that work was not reduced, capital investment was not reduced, policy support was not reduced, and the strength of assistance was not reduced. It took multiple measures and made continuous efforts to comprehensively promote rural revitalisation and consolidate and expand the achievements of poverty alleviation.

Improving our position and coordinating rural revitalisation

China Unicom further optimised and sorted out the three major systems formed by the Group in poverty alleviation, namely the Work System for Big Poverty Alleviation, the Responsibility Division System for Targeted Poverty Alleviation and the Work System for Promoting Poverty Alleviation with Industrial Development as the Core, which continued to serve as the basic system and work requirements for supporting rural revitalisation.

Completed the rotation of temporary cadres, the first secretary of the village and the members of the working team in the village of

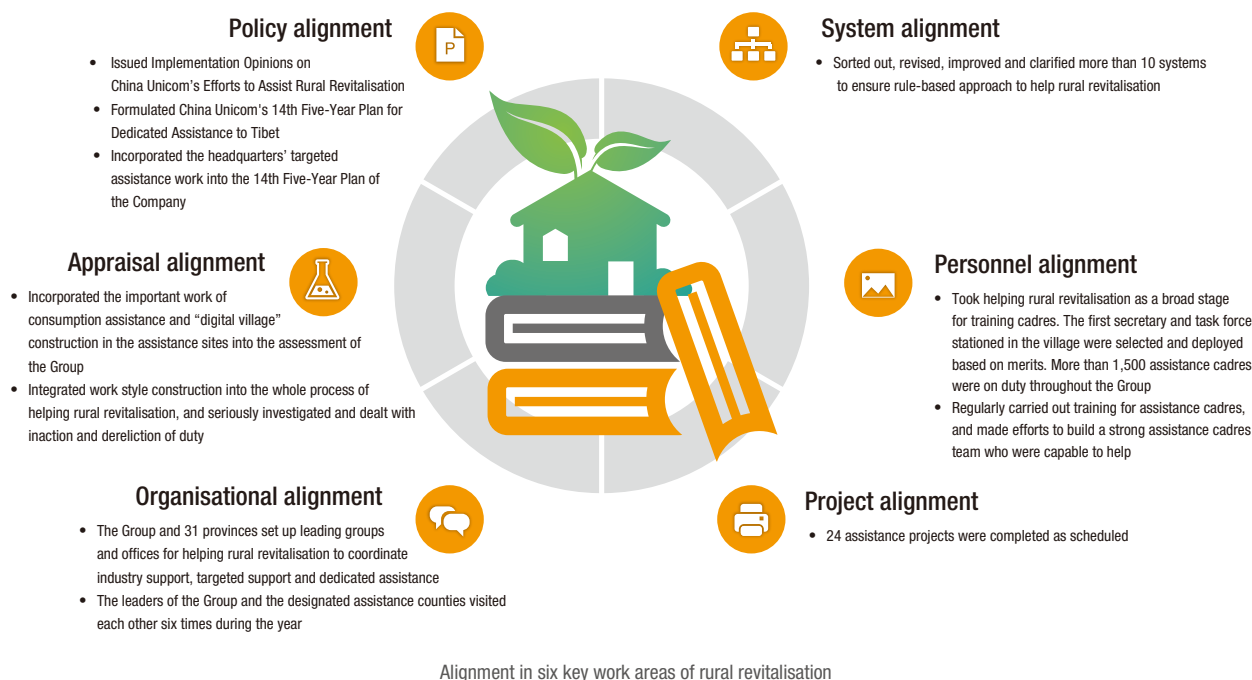
1,493 people

On 25 February 2021, the National Poverty Alleviation Summary and Commendation Conference was held at the Great Hall of the People. China Unicom Poverty Alleviation and Dedicated Tibet Aid Leadership Group was awarded "National Advanced Group for Poverty Alleviation".



Targeted poverty alleviation work won the title of "National Advanced Group for Poverty Alleviation"

Through the coordination of six tasks, including policies, systems, personnel, projects, organisations and appraisal, the Company provided all-round support for the in-depth, practical and successful rural revitalisation. We strengthened typical guidance, built a "publicity team" for rural revitalisation, created a good atmosphere, and guided more cadres and employees to pay attention to rural revitalisation, participate in rural revitalisation, and help rural revitalisation.



We carried out two on-site training courses on "Digital Village" for assistance cadres and relevant personnel of the rural revitalisation offices nationwide, and uploaded the training courses to China Unicom Online College. A total of more than 5,000 assistance cadres were trained online and offline.

Universal service for building information highway in rural areas

Everything we do is for the needs of the public. China Unicom overcame difficulties such as tough construction environment, difficult construction and long distance, and built an information highway for villages and remote areas to bring information benefits to people.

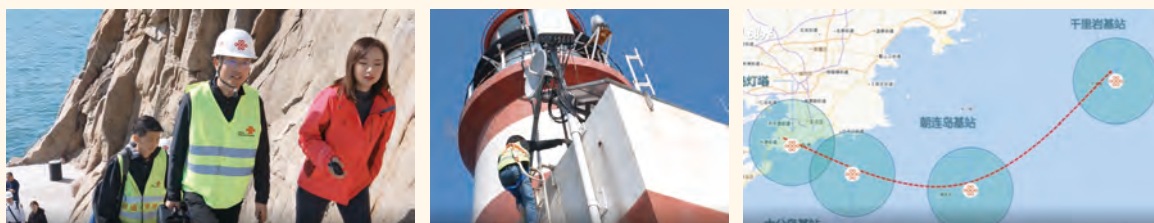
- The Company vigorously promoted the construction of rural revitalisation network, orderly promoted the seventh and eighth batches of pilot projects for rural universal services and the construction of China Unicom's special poverty alleviation network. Broadband covered 327,000 administrative villages, including 244,000 administrative villages in 10 northern provinces, with a coverage rate of 98%.
- We strengthened the construction of network channels in remote poverty-stricken areas to make our services closer to rural life. The number of channels in rural areas and remote poverty-stricken areas reached nearly 230,000.



Base station construction in Wulong poor remote mountainous area

In order to solve the perennial problem of no network signal coverage in the poor and remote mountainous areas of Wulong District, China Unicom Chongqing Branch actively carried out universal telecommunication services and devoted itself to the construction of base stations in mountainous areas. "If there are no lanes, we will carry them by hand; if the mountain is high and steep, we will team up and march together; if the road is slippery, we will stay in the station to seize the construction period." It fully completed and opened 27 base stations to achieve full coverage of 4G network, and paved a smooth information road for the local people with the original mission of post and telecommunications people.

Qianliyan Island is the farthest island of the Yellow Sea waters of Shandong Province from the mainland. The natural environment is harsh with no mobile network signal, and the daily necessities are extremely scarce. The Qianliyan lighthouse on the island has been in operation for 77 years, and the only way of entertainment for lighthouse workers was to watch satellite television. In order to solve the “last kilometer” problem in the communications of Qianliyan Island, 12 construction personnel of China Unicom Qingdao Branch embraced difficulties and stayed on the island for 18 days to carry out construction, covering the surrounding 30 kilometers of sea area with 4G network and voice calls. China Unicom staff realised the dream of “making the century-old navigation channel lighthouse and modern communication technology come together”, so that the island is no longer isolated and family bonds are no longer cut off.



Base Station Construction at Qianliyan Lighthouse

Enriching people by industry and broadening the channels for farmers to increase income

The key to agricultural and rural work is to increase farmers’ income in essence. Industrial revitalisation is the material foundation for rural revitalization. Industrial poverty alleviation is the way out, and finding the right path is essential for further promoting rural revitalisation.

Creating advantages in featured agricultural products

China Unicom continued to carry out targeted assistance, actively penetrated into the front line, and cultivated new industries and new business models based on the local actual circumstances, so as to help farmers further expand income channels.



Ceheng County Glutinous Rice Banana Plantations

China Unicom Guizhou Branch continued to carry out rural revitalisation, assisted 1 county (Ceheng) and 20 villages in a targeted manner, dispatched 23 cadres for rural revitalisation. It prepared the “14th Five Year” Ceheng industrial assistance plan to provide financial support for further consolidating and expanding poverty alleviation results. In November 2021, the National Rural Revitalisation Bureau published the “China Unicom’s Support for Ceheng County to Build a Whole Industry Chain Development Landscape of Glutinous Rice Banana”, which focused on reporting excellent experience and practices and was promoted to the central designated assistance units and local authorities.



Technician guiding villagers in Dongjiu Village, Xiangxi Prefecture to pick up tea leaves

In order to help the villagers in Dongjiu Village, Xiangxi Prefecture, Hunan Province to lead a good life, China Unicom Hunan Branch, taking into account the characteristics of local soil and suitable crop types, invested RMB2.48 million to build a gold tea industrial park with nearly 800 mu. After the tea trees become mature, more than 50 kilograms of fresh tea leaves can be harvested every mu.



Helping farmers grow crops

Zhang Zehui, the in-village “First Secretary” of China Unicom Hegang Branch in Heilongjiang, led villagers to carry out online sales and picking activities of agricultural products. Through online ordering, direct sourcing from the place of origin, and delivery to home, farmers increased their income by RMB10,000 each year. He coordinated with the County Disabled Persons’ Federation for many times, invested RMB60,000 in the village, built six smart greenhouses, and mobilised the disabled poor households to develop the lepista sordida planting industry. With his help and coordination, the village developed a number of poverty alleviation industries. Villagers were able to earn more income, lead a better life and be happier.

Innovating on agricultural products promotion methods

China Unicom vigorously carried out activities such as smart rural red research, promotion of beautiful rural culture and tourism, and live broadcast of agricultural product traceability. In combination with digital rural construction and digital live broadcast technology, China Unicom created a channel for agricultural products to “connect to the Internet” and “upgrade”, and accelerated the cultivation of a batch of well-known, high-quality and niche rural e-commerce product brands.



China Unicom Tianjin Branch Agricultural Products Live Streaming

China Unicom Tianjin Branch carried out live broadcast to help rural revitalisation, innovatively created a brand for “live broadcast competition of Tianjin Rural Harvest Festival” and supported the digital transformation of agriculture. The “Unicom KOL” live broadcast studio enriched the sales channels of agricultural products, cultivated the KOL team for live broadcast in rural areas, “enhanced” agricultural brands and reputation, refined the quality of life of people, and won wide recognition from all walks of life.

Building an Integrated and Open Ecosystem

Open cooperation is a historical trend, and mutual benefit and win-win are the expectations of the people. China Unicom has always adhered to the cooperation concept of “mutual consultation, co-build, co-share, co-creation, integration and win-win” and insisted on wider, broader and deeper open cooperation. It created a new ecological system covering the innovation chain, industry chain and value chain, and built a “joint fleet” with partners to achieve complementary advantages and mutual empowerment of all parties, in order to accelerate the integration of factors and resources, and jointly meet the people’s ever-growing wonderful digital life.

Launching a new ecological cooperation initiative

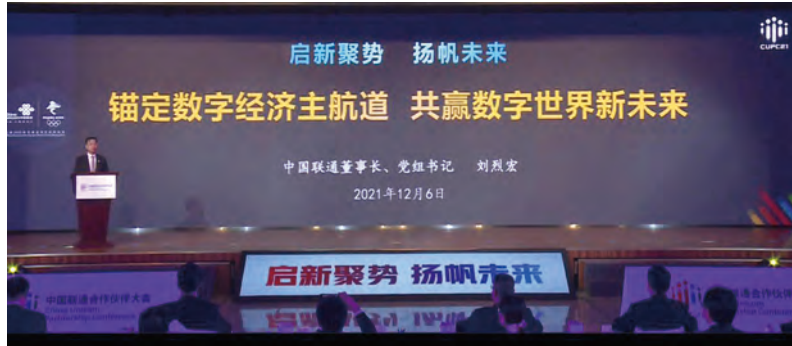
The 2021 China Unicom Partners Conference was held on 6 December 2021. The theme of the conference was “Embarking on New Journey and Gathering Momentum for a Better Future”. The conference aimed to fully demonstrate the digital technology achievements of China Unicom and its global partners, and jointly draw a blueprint for the development of digital economy. Liu Liehong, chairman of the Company, delivered a keynote speech titled “Anchoring the Main Channel of Digital Economy, Win New Future of Digital World” and released China Unicom’s new strategy.

In order to accelerate the construction of a digital ecosystem featuring “diversified co-build, complementary and mutual promotion, cross-domain integration, and cooperation”, China Unicom joined hands with friends from all walks of life to create a new model of industrial cooperation and jointly write a new chapter of digital economy with sincerity, open-mindedness and practical actions. We issued three new initiatives:

- Deepening cooperation in the innovation chain and strengthening the national strategic technological power. Adhering to the principle of “open door for innovation, co-creation for win-win”, we worked with all parties to carry out more in-depth collaborative innovation and released the “Technological Innovation Cooperation Plan”.

- Deepening industry chain cooperation and expanding new space for digital development. We worked together with all parties in the industry for win-win and sharing, fully opened up our capabilities, comprehensively met demands, and efficiently cooperated in planning formulation, business alignment, procurement settlement, model innovation, etc.

- Deepening cooperation in the value chain and better integrating into the new development paradigm. We further strengthened collaboration with industry partners and investors, enhanced factor allocation and support capabilities, and promoted the improvement of the value chain.



Cooperating with fellow operators for new win-win development

China Unicom conscientiously implemented the deployment of new infrastructure, deepened network co-build co-share, realised the integration of digital information infrastructure resources, protected industry value, promoted sustainable development of the industry, and built a solid digital base for the construction of Cyber Superpower, Digital China and Smart Society.

Promoting co-build co-share in all aspects

The Company continued to promote the co-build co-share of 5G, 4G and basic network resources with China Telecom, and continued to expand the breadth, depth and thickness of the network.

- The scale and coverage of 5G network was comparable to the industry. The two parties jointly built 690,000 5G base stations, covering all urban areas of cities and counties as well as developed towns and above in China.
- The Company actively carried out 4G network co-build co-share and added 1.4 million new 4G shared districts, with the total reaching more than 2 million.
- The Company expanded the scope of cooperation in infrastructure co-build, co-share and co-maintain. It co-built and co-shared more than 400,000 kilometers of trunk lines, optical cables, pole lines and pipelines, saving more than RMB4,000 million investment and RMB200 million maintenance costs per year. The Company further promoted the cooperation in cloud-network integration, communication equipment room, international submarine cable, emergency support and other aspects to realise the synergy potential.
- The Company eliminated the monopoly of broadband in residential and commercial buildings to ensure the simultaneous exercise and fair access of telecommunications infrastructure construction.

Cumulative investment saved through co-build co-share for the country

RMB 210 billion

The operating cost saved exceeded

RMB 20 billion/year

Emissions reduced exceeded

6 million tons



5G construction joint operation system of Heilongjiang branches of China Unicom and China Telecom

China Unicom Heilongjiang Branch and China Telecom Heilongjiang Branch jointly developed a 5G construction operation system. Relying on ultra-high-precision map simulation and Big Data platform resources, the system realised automatic planning, value-accretive network construction, efficient operation and maintenance, and intelligent optimisation for the whole process, driving a new 5G development paradigm with faster construction, higher resource efficiency, better service quality, and more rational competition order.

Under the premise of co-build and co-share with China Telecom, the Company actively carried out strategic cooperation in the industry and reached a consensus with State Grid Electric Power, City Investment and Communications Group in sharing resources of pole towers, optical fibre cables and local offices.



5G base station maintenance

China Unicom Henan Branch promoted co-build and co-share of 5G network with China Telecom across the province, and had put into service more than 42,500 5G base stations in total, covering all cities, counties and towns. It actively cooperated with partners to build a series of 5G typical applications, such as the first commercial application of autonomous driving bus line in China, the first 5G + MEC intelligent application in ultra-high voltage power substation in China, and the first 5G pan-low air testing centre in China, providing new momentum for the high-quality development of Henan's economy and society.

Firmly safeguarding the sustainable development of the industry

The Company unwaveringly implemented the requirements of the central government for inspection and rectification, resolutely rectified the vicious competition at the expense of customers' interests and industry value, drove the entire industry to form a benign situation of cooperation, continuously unleashed development dividends, and helped the healthy and sustainable development of the industry. It fully played its role as a "stabiliser and ballast" of national economy, and vigorously promoted the construction of Cyber Superpower, Digital China and Smart Society.

Promoting in-depth cooperation in the industry chain

China Unicom actively worked with all parties to build a safe, innovative, smooth and efficient industrial chain and supply chain, creating value for customers with digital technology, and driving the integration, innovation and coordinated development of the industrial chain.

Deepening cooperation with equipment suppliers

The Company strengthened the standardised management of material procurement, built a digital supply chain platform, and drove equipment suppliers to actively fulfill their social responsibilities.

- **Strengthening standardised management.** All projects subject to tender in accordance with the law conducted public tenders in strict accordance with the requirements of national laws and regulations. For projects not subject to mandatory tender, in accordance with the open procurement principle of the SASAC, the Company innovated on transaction tools such as open selection and open direct purchase, and selected qualified suppliers through the supply chain platform. The entry barrier for suppliers was lowered and the product technology qualification system was widely adopted, so that small suppliers could participate in procurement activities fairly. China Unicom conducted credibility reviews for enterprises in tendering and procurement activities, and prohibited rule-violating enterprises from participating in tenders. The amount of centralised procurement stood at approximately RMB 128,380 million.

- **Building a digital supply chain.** The Company improved the electronic bidding platform and promoted the "online remote bid evaluation" model during the pandemic to achieve centralised and transparent procurement. The risk rules and data models were embedded into the system to enable automatic risk identification, early warning and control throughout the entire supply chain processes. The Company enhanced the capability of e-commerce platform and provided diversified and convenient procurement support services for the basic networks. We established a unified supplier information database and built a "supplier portrait" to provide support for procurement review and supplier evaluation.

Total number of e-commerce platform vendors

71,000

14,000

new vendors in the year

Indicators	2019	2020	2021
Centralised procurement ratio (%)	90.6	91.4	96.7
Proportion of local suppliers (%)	>99	>99	>99
Proportion of electronic procurement (%)	68	88	96

Strengthening cooperation with terminal suppliers

The Company vigorously built a new pan-terminals ecosystem with the characteristics of China Unicom, strengthened the empowerment and guidance to terminal suppliers, expanded the operational boundaries, enriched product categories, and strengthened integrated operations to achieve common development.

- **Empowering partners with intelligence.** Relying on the service portal of terminal partners, the Company provided partners with one-stop services such as technical specifications, access guidelines, performance testing and product display. In 2021, it added more than 100 terminal suppliers and 15 service providers, privilege providers and financial service providers, with a total of over 300 partner brands. It sold a total of 25.95 million pan-intelligent terminals.

- **Guiding terminal suppliers to fulfill their responsibilities.** The Company strengthened the management of mobile malware. Terminal suppliers promised not to install malware in terminal products. It timely and dynamically communicated and understood the preventive measures adopted by terminal suppliers in terminal software. It required partners to conscientiously implement the national 3C (China Compulsory Certification) and SRRC (National Radio Management Committee) certifications for terminal products. The Company actively communicated with terminal suppliers with negative news, set up a special team to quickly implement customer complaints, information verification, customer comfort and other work, so as to reduce the negative impact on the society and maintain the corporate image and reputation.



At the 2021 China Unicom Partners Conference Channel and Terminal Ecosystem Cooperation Forum themed “Gathering Momentum with One Heart to Achieve Ecological Win-win”, the deputy general manager He Biao proposed to integrate and cooperate with all parties in the industry chain in the future to jointly build a new ecosystem of channel cooperation, a new ecosystem of terminal synergy, and a new ecosystem of pan-terminal technology sharing, and jointly expand new potential for digital development.

Jointly building a new ecosystem of digital channel cooperation of “Three Connections”: To give full play to the advantages of flat and agile operation, marketing service capacity and Internet big connection, and strive to jointly build a new ecosystem of digital channels of “integrated products, interoperable data and smooth marketing” with the industrial chain.

Jointly building a new smart terminal operation model of “Three Integrations”: To give full play to the advantages of the precise handset replacement insights of millions of existing users and the precise terminal network-business alignment of 5G and broadband, and cooperate with partners to expand the development scale of “5G terminal integration, smart home pan-terminal integration, and industrial application intelligent terminal integration”.

Jointly creating a new future of flourishing development of three-gigabit smart terminals: To give full play to the advantages of cloud-network integration, computing-network integration and Intelligence Brain, carry out in-depth cooperation with partners, jointly set standards for terminals and pan-terminals, break the shortcomings of terminal chips, and jointly build a modern digital supply chain.



Launched the Joint Laboratory of Pan-terminal Technology and Ecological Innovation

China Unicom established the Joint Laboratory of Pan-terminal Technology and Ecological Innovation. 21 enterprises including Huawei, Shanghai Quectel and Unisoc signed up to be the first batch of partners in the laboratory. The laboratory will focus on four major segments, namely technology and standards, testing methods and capabilities, business and application, and core technology research, so as to promote a new pan-terminals ecosystem with technologies.

Vigorously expanding channel cooperation

Adhering to the concept of coordinated development, open cooperation and win-win cooperation, the Company promoted the digital transformation of channel partners through online and offline joint innovation and mutual empowerment to enhance value, creating a win-win-win situation among operators, channel partners and users.

- **Strengthening the complementary advantages of channels.** Seizing the window of 5G handset upgrade, the Company seamlessly integrated its products and services into manufacturers’ channels to promote the scale development of 5G. The Company made comprehensive use of financial installment, electronic coupons, supply chain finance and other capabilities to help the transformation of channel partners. The Company continuously improved the digital capabilities of its IT systems and promoted the use of ZhangWoTong APP in all channels, so as to quickly introduce new partners, sign up services and share revenue, and improve the efficiency and return of partners.

- **Promoting channel partners to fulfill their responsibilities.** The Company strictly implemented real-name registration business requirements, controlled risks at the source of account opening, eliminated potential risks, and fortified the “first line of defense” for security protection of SIM cards. The Company improved the prevention and control capabilities of the marketing and sales tools of ZhangWoTong and comprehensively applied the human image comparison technology and ID card verification equipment, etc.. While enhancing the convenience of customer service, it further strengthened the risk management process and helped channel partners carry out business activities in compliance with laws and regulations.

China Unicom jointly launched the “Channel Ecological Cooperation Alliance” with Xiaomi, D.Phone, Davao, JD.com and other partners. Through the integration of channel partners’ strengths and wisdom, the Company continuously upgraded its channel ecosystem model to promote the sustainable development of channels.



Officially launched the Channel Ecological Cooperation Alliance

Approximate number of channel partners at the end of 2021

200,000

Flourishing digital cooperation new ecosystem

Facing the vast blue ocean of digital economic development, China Unicom continued to deepen cooperation with strategic investors and leading enterprises in industry verticals to jointly build a Big Application ecosystem with integrated, open and win-win cooperation, and serve the digital transformation, intelligent upgrading and integrated innovation in various fields of the economy and society.

Expanding new information consumption cooperation

The Company gave full play to the advantages of strategic partners in smart terminals, AI, Big Data, content and other fields to jointly provide customers with high-quality products and services.

- The Company cooperated with Baidu to sell 867,000 Xiaodu speakers and 190,000 WiFi6 routers. The smart customer service voice AI portal was launched in 31 provinces, with a smart service ratio of 80.2% and a national end-to-end recognition rate of 94%.
- The Company cooperated with Tencent to launch the Jiasubao product to reduce lag, latency and packet loss in games and improve user experience.
- The Company cooperated with Alibaba in the development of financial installment products, built China Unicom Digital Assistant through Alibaba Cloud, and upgraded product functions.

At the same time, the Company actively strengthened cooperation with ecological partners to jointly create strategic and innovative basic innovative products.

- The Company cooperated with partners such as Xinhuanet and the National Warning and Release Centre to promote the pre-commercial trial of 5G messages.
- The Company cooperated with iQIYI, Bilibili, Mango TV, ByteDance and other partners to carry out video targeted traffic value management.
- The Company cooperated with CCTV Cloud, Himalaya, Mango Active, China Literature Limited, iFLYTEK and other partners to launch online audio and digital reading products.
- SIM-CTID, a SIM digital identity authentication product, was jointly launched with Anicert and other partners.

Deepening cooperation in industrial transformation and upgrade

The Company gave full play to the magnification, superposition and multiplication effect of digital technology on economic development, joined hands with all parties in the industry to achieve win-win and sharing, fully opened up its capabilities, comprehensively met demand, and jointly served the demand for “cloudification, digital empowerment and intelligence” transformation and upgrade of hundreds of industries.

- The Company accelerated the promotion of 5G applications from “show flats” to “commodity flats”. Relying on the 5G application innovation alliance, we built an open 5G ecological platform, and worked with partners to engage in “team competition”.
- The Company planned and built an open China Unicom 5G Laboratory with Huawei and Unisoc, and developed a standardised 5G terminal R&D, testing and application process.
- The Company worked with partners to enrich the supply of security products and security operation services, and promoted the complementary advantages and coordinated development of the network and information security industry.
- The Company realised the large-scale promotion of key projects such as cooperative public cloud and joint venture cloud.

Building a capital cooperation ecosystem

The Company actively expanded and optimised its capital deployment. Focusing on serving national strategies and the Company's strategic businesses, it built a bridge for the ecological cooperation between industry and capital, and jointly built a capital ecosystem with strategic investors and industry leaders to strengthen synergy, increase innovation, and improve value. By strengthening industry chain through investment, the Company empowered and promoted the coordinated development of the industry.

- The product and service capabilities of the seven joint ventures, namely Yunlizhihui, Yunjingwenlv, Yundun, Yundee, Yunqi, Cloud Broadcasting and Smart Steps, continued to improve.
- The Company continued to deepen cooperation with investors, leveraged their respective advantages, deepened capacity enhancement and product promotion in cloud computing, Big Data, AI, Internet touchpoints and other fields, and expanded strategic synergy.
- The Company further strengthened capital operation, focused on five main responsibilities and main businesses, and comprehensively used diversified methods such as investment, mergers and acquisitions, equity participation and funds to promote rapid breakthroughs in key areas such as Beijing-Tianjin-Hebei, Yangtze River Delta, Guangdong-Hong Kong-Macao Greater Bay Area, Sichuan-Shaanxi-Chongqing, as well as key business areas such as industrial Internet, Internet of Vehicles, smart city, smart medical care, smart education, smart home, integrated communication, edge computing and information security, so as to amplify the functions of state-owned capital.
- The Company set up a 5G parent fund on a scale of over RMB10 billion focusing on 5G industrial ecology and related application fields. It leveraged the resource advantages of basic telecom operators, took advantage of government policies and resource advantages, and mobilised social industry capital to accelerate the development of 5G innovative business.
- The Company promoted the market-oriented reform of professional subsidiaries in the fields of Internet of Vehicles and industrial Internet. It promoted the introduction of strategic investors, mixed-ownership reform and listing of professional companies with high degree of marketisation, strong business independence, good development prospects and high valuation premium, and built a group of “specialised, niche, special and novel” enterprises with innovation capabilities and competitiveness.

Engaging in Public Charity to Benefit Society

China Unicom insisted on cultivating and practicing the core values of socialism and meeting the growing demand for social service of people. It actively took actions in providing aid to Tibet and Xinjiang, culture and sports, education, medical and health care, environmental protection, public welfare and other aspects, and continuously conveyed care and warmth to the society to serve the improvement of people's livelihood.

Actively carrying out charitable donations

China Unicom has always adhered to the principles of voluntariness, acting within capacity, clear rights and responsibilities, and honesty and trustworthiness, continuously improved the management system of charitable donations, actively assumed social responsibilities, strived to repay the society, and promoted the sustainable development of charitable undertakings.

Donation Projects	Amount donated RMB'000
Invested in assistance funds	109.5
Aid to border areas (aid to Tibet and Xinjiang)	357.8
Other donations (culture and sports, education, medical and health care, charity, environmental protection, etc.)	1,615.2
Total	2,082.5

RMB **2,082,500**
external donations in 2021

China Unicom further made great efforts to assist Tibet in the new era, and completed the "14th Five Year" Plan of China Unicom for Supporting Tibet. It increased its assistance in promoting industrial development, improving infrastructure construction, improving medical care and education capabilities, and strengthening interactions and exchanges among ethnic groups. During the year, it arranged 8 projects for Tibet assistance. The Company continued to carry out targeted assistance to Xinjiang. Through sending cadres to Xinjiang and carrying out smart assistance to Xinjiang, the Company took root in Xinjiang and made contributions to Xinjiang, thus creating a new path for central state-owned enterprises to help Xinjiang.



Improving infrastructure construction



Company visits by cadres assisting Xinjiang



China Unicom Jiangsu Branch launched smart assistance to Xinjiang



Campus recruitment in the University of Tibet

China Unicom (Sichuan) Industrial Internet Co., Ltd. has built a medical information system for Garze Tibetan Hospital, involving hospital outpatient management, inpatient management, comprehensive management, integrated platform, medical technology system, and TCM evidence-based system, while supporting the switch and display of Chinese and Tibetan, so that the ethnic minorities in Tibetan areas can feel the life convenience brought by medical informatisation.

Deepening inclusive communications services

Helping the elderly and the disabled are people's livelihood projects that the state attaches great importance to. China Unicom continued to promote the implementation of various preferential policies and service measures for helping the elderly and the disabled, and strived to create a good information environment for the life and work of the underprivileged by doing practical things for them.

Smart elderly assistance

The Company focused on building services and capabilities in areas such as "heart-warming" services for the elderly, "filial piety" products for the elderly, and "reassuring" terminals for the elderly, adhered to the original intention of doing practical things for the public, and continued to carry out publicity and optimisation work.

- The Company created "heart-warming" elderly services. It provided elderly care channels in the business outlets, launched a "care version" of China Unicom APP, and enabled direct access to manual services in 10010 customer hotline. At present, 2,100 smart elderly assistance service centres have been set up in business outlets throughout the country. The 10010 hotline has provided services to the elderly for over 14 million times, and 42,000 offline elderly assistance activities have been held with 380,000 participants, helping the elderly to overcome the digital divide.

- The Company created the "filial piety" communication products for the elderly, and launched the silver age card, the filial piety card, the "WO Family Security Eye" and other products according to the actual needs of the elderly. In 2021, over 2.02 million users were benefited, and the accumulative communication tariff discounts exceeded RMB35.72 million.

- The Company built a variety of "reassuring" terminals for the elderly, meticulously self-developed and innovatively created intelligent communication terminal products for the elderly that were more user-friendly and useful, such as the "Little Assistant for the Elderly", for which it has applied for national network access certification.

China Unicom Hainan Branch joined hands with the Library of Hainan Province to carry out the "E-era of Silver Age" smartphone charity classroom for the elderly. The elderly were guided on how to prevent fraudulent calls, and were helped to use WeChat, health code, payment and other common APP, so that the elderly were able, dare and willing to use smart products.



"E-era of Silver Age" Smartphone Charity Classroom for the Elderly

According to the reading habits of the elderly, China Unicom Hubei Branch has compiled the Manual of Assistance for the Elderly of China Unicom Hubei Branch with large fonts and pictures to help the elderly to easily master 10 uses of WeChat such as adding WeChat friends, video chat, and moments, etc. By means of information services to communities, nursing homes and other offline activities, the manual was distributed to the elderly and was widely praised.



Manual of Assistance for the Elderly

Helping the disabled with warm heart

China Unicom cares for the communication service needs of people with disabilities and focuses on solving their service pain points.

- The Company innovated on tech products and created the first barrier-free communication product for hearing-impaired people, namely the “Unicom Hearing King Card”, to realise real-time conversion of text and voice, and help hearing-impaired people realise barrier-free communication. China Unicom APP has a designated area for Hearing King Card. Special care personnel on the online customer service platform served users of the Hearing King Card for a total of 22,000 times with a 100% satisfaction rate.

- In cooperation with the National Disabled Persons’ Federation, National Association of the Deaf and China Association of the Blind, the Company launched the nation-wide unified “Hearing King Card” and “Viewing King Card”. For all disabled users, the Group launched the nation-wide unified preferential packages for them. In 2021, more than 80 exclusive packages for the disabled were launched nationwide, benefiting approximately 553,800 disabled users, and the accumulative communication tariff discounts exceeded RMB 170 million.

- On 17 May, China Unicom cooperated with the National Association of the Deaf and successfully launched the first operator sign language live broadcast, covering a total of 15 internal and external platforms with 8.76 million viewers. At present, the Company has conducted a total of 7 heart-warming sign language live broadcasts and simultaneously created 35 communication knowledge videos for the disabled to help solve the communication service problems of the hearing impaired.

China Unicom Beijing Branch actively organised and conducted research on barrier-free navigation projects to develop Beijing’s barrier-free environment, improving the quality of life services for the disabled. The barrier-free navigation on-site experience trial was highly appraised by more than 20 leaders and experts from China Disabled Persons’ Federation and Beijing Disabled Persons’ Federation.



Barrier-free navigation on-site experience trial

The Company actively cooperated with Beijing Disabled Persons’ Federation and Beijing Deaf Association to hold the activity of “I do practical things for the public – barrier-free listening, helping the disabled with love”, donated communication products for disabled users on site worth RMB6 million and established a WeChat circle of friends for the hearing impaired. We set up a “designated area for Hearing King Card” in our own business outlets to allow hearing-impaired friends to enjoy heart-warming services.



“Barrier-free Listening, Helping the Disabled with Love” activity

On 3 December 2021, the 30th International Day for the Disabled, China Unicom Ganzhou Branch held a charitable activity with the theme of “Everyone Caring for the Disabled, Let Love Speak”. At the event, China Unicom Ganzhou Branch sent daily necessities to the hearing impaired. Our staff explained and demonstrated the features of the Hearing King Card at the event. Nearly 50 hearing impaired people participated in the event.



China Unicom Ganzhou Branch Assisting the Disabled

Actively participating in volunteering services

China Unicom combined the volunteer spirit of “dedication, friendship, mutual assistance and progress” with the goal of building a team of cadres and employees. Based on the work ideas of expanding the team, stimulating vitality, improving quality and advocating civilisation, it systemised the organisation and management system of volunteering services, standardised the construction of volunteering service teams and normalised volunteering service activities. It fulfilled social responsibilities, established a good corporate image, assisted the transformation and development of the Company and the construction of corporate culture, and promoted the high-quality development of the Company.

57,550

registered volunteers

68,735

participation in volunteering service activities

Caring for Every Little Thing and Building a WO Future Together – China Unicom created a points-based charity brand to support education

The program, based loyalty points, connected with 350 million customers of China Unicom to build a new model of diversified charity participation, and drive social forces to support targeted poverty alleviation. It was an active attempt for China Unicom to fulfill its social responsibilities and demonstrate its brand influence. In 2021, we provided nearly 40 services in total, with more than 500,000 participating volunteers. We donated “Love Libraries” to 132 Primary Schools in Southern Xinjiang, provided scholarships for 8,000 poor children, and sent 3,015 sets of warm winter supplies to Tibet children.



Donation ceremony of “Love Libraries” of China Unicom Bazhou Branch, Xinjiang



China Unicom Tacheng Branch in Xinjiang launched the “Winter Olympics in the Love Libraries” and other primary and secondary school writing and painting competitions

On top of the traditional points-based donation, the Company further expanded into various charity activities such as “WO’s Reading”, “China Unicom Online Call Charge Thumbs-up” and “Tencent 99 Charity Day Double”.



The Network Department and the Winter Olympics Office of the Group jointly launched a series of volunteering services titled “Love Ignites Hope, Building Dream with China Unicom Together”

China Unicom Xiaoyan, Service to Home – China Unicom Jiangsu Branch Xiaoyan Volunteer Service Brand

“Touching a city and warming a province. Standing with integrity and dedication, helping the elderly and caring for disabled, China Unicom Xiaoyan started from the needs of users, and made innovation and wisdom with a foot on the hot soil of Jiangsu.” In May 2021, China Unicom Jiangsu Branch Xiaoyan won the Service Innovation Award of “Touching China, Jiangsu Role Model of the Year”.

- China Unicom Xiaoyan penetrated the community. During the COVID-19 pandemic, China Unicom provided users with handset-to-home service, SIM card-to-home service, broadband-to-home service and network-to-home service without fear of risks. The average user rating was 9.64 out of 10.

- China Unicom Xiaoyan went to the frontline of the fight against the pandemic. In the face of the pandemic in Nanjing and Yangzhou, the volunteers from Xiaoyan rushed to support the front line and penetrated testing sites. They urgently purchased drinking water and snacks to help residents alleviate hunger; they helped the residents waiting for testing to scan codes, register, fill in data, and generate inspection information, fully supporting the efficient implementation of nucleic acid testing.

- Volunteers from China Unicom Xiaoyan also visited welfare homes, sanitation venues, and college entrance exams to carry out charity activities such as “Bringing Coolness by Xiaoyan” and “Caring for the Elderly, Moving Nanjing” to show care to users and the public with warm smiles and attentive service.



China Unicom Jiangsu Branch Xiaoyan Service in Community



China Unicom Jiangsu Branch Xiaoyan rushed to support the front line of the fight against the pandemic



China Information Technology Designing & Consulting Institute Company Limited and China Unicom Online Information Technology Company Limited jointly carried out a charity activity titled “Connecting You and Me with Heart-warming Education Support”



The Youth League Branch of Asset Operation Company held a warm winter clothing donation activity titled “Warm Clothes for the Winter”



Deeply Practiced the
Responsibility of Scientific and
Technological Innovation
with the Insight of
“Trend”

Technology is the foundation of the country's prosperity, and innovation is the soul of the nation's development. China Unicom is committed to become the national team for the development in operations and services of digital information infrastructures, and target to be the key force in establishment of Cyber Superpower, Digital China and Smart Society, and the frontline troop in the integration and innovation of digital technologies. Focusing on serving national strategies, supporting and leading high-quality enhancement as its key development, the Company has upheld a strong coordination with its overall development and security, focused on improving the traction of original technology demand, source supply, resource allocation, transformation, and application capabilities. It has also accelerated the construction of a world-class enterprise, and strive to play a better role as a central enterprise in achieving self-reliance in the development of science, technology, and also building a modern industrial system.



Measures adopted in 2021

- The Company optimised the scientific and technological innovation system, increased R&D investment, strengthened incentives for scientific and technological innovation, and released the "Torch Plan" of China Unicom ecological cooperation.
- The Company accelerated the creation of the original technology sources and promoted major technical breakthroughs.
- The Company upgraded the smart middle platform, integrated, and shared the core businesses, core capabilities, core data and core processes across the country, and built the smart middle platform into a key engine for comprehensive digital transformation.
- With the continuous improvement of industrial innovation layout, the national engineering laboratory for the next-generation Internet broadband business application was included in the national engineering research centre for new sequence management, so as to create an innovative consortium of industry-university-research-application.



Actions to be taken in 2022

- The Company will actively carry out the construction of technological innovation ecosystem, continue to improve the technological innovation mechanism, and stimulate the potential of technological innovation.
- The Company will focus on the five main responsibilities and main businesses, i.e. Big Connectivity, Big Computing, Big Data, Big Application and Big Security, so as to promote the significant technology researches and achieve notable technological breakthroughs.
- The Company will continue to iterate and improve the five middle platforms, four major APPs, the intelligent customer services, and strengthen its operational security, while improving the user perceptions as well.
- With reliance on the National Engineering Research Centre, the Company will actively participate and support key national strategic tasks and key projects.

Deepening the Innovation of Scientific and Technological Innovation Mechanism

In order to promote independent innovation, it is undoubtedly crucial to overcome institutional barriers, and maximise the potential of technology as the primary productivity. China Unicom further deepened and improved the reform of the scientific and technological system, improved the scientific and technological innovation system and enhanced its organisational structure, and built an efficient scientific research system, in order to, improved its efficiency of the innovation system, and strived to stimulate innovation vitality.

Improving the scientific and technological innovation system

China Unicom constantly improves its technological innovation system and optimizes its technological innovation organisation. In 2021, it established a leading group of scientific and technological innovation to coordinate the planning of technological innovation, to strengthen the basic management of technological innovation and increase the investment in research and development.

- China Unicom thoroughly implemented the requirements of the SASAC on promoting central enterprises to increase its capital injection in scientific and technological innovation, and improved the intensity of R&D investment. By the end of 2021, R&D investment has reached RMB4.792 billion, representing a year-on-year increase of 61.7%.
 - Explored and implemented the mechanism of "leadership revelation" and "horse racing", and carried out 44 group-level technology research projects.
 - In terms of system and regulation, the Company managed to have a standardization of newly developed management activities, released the management measurements for R&D projects, the positive and negative list of R&D activities, and established the framework for the technological innovation process system.
 - Built a comprehensive management plan for achieving the whole processes of scientific and technological development. It has also improved the management rules for the registration and identification of its development, and established a scientific and technological achievements specialized mechanism covering all branches and subsidiaries.
 - Strengthened the construction of scientific and technological innovation talents, established the Group's standard certification system for scientific and technological innovation capabilities, and introduced overseas high-level scientists.

Increasing incentives for scientific and technological innovation

China Unicom has further improved its incentive system for scientific and technological innovation through extensive research and consultation. In 2021, the Group has issued RMB71,944,000 of awards for scientific and technological innovation development, which was doubled up as compared to 2020. It has continued to maintain a rapid growth momentum and greatly stimulated the vitality of scientific researchers.

- The Company increased the support of strategic incentive resources, including the development of the industrial chain length and technology resources. It has also enhanced the introduction of leading talents and innovation teams, the transformation of scientific and technological achievements, and the development of scientific and technological innovation activities.
- The Company has made good use of the medium and long-term incentive policy, and vigorously carried out equity dividend incentives for technology-based enterprises. It has also actively carried out medium and long-term incentives for the transformation of scientific, technological achievements and share returns, furthermore, it also explored and implemented incentive methods in line with its own characteristics.
- The Company strengthened the incentive orientation of scientific and technological innovation, implemented differentiated incentive resource allocation, and increased the allocation of remuneration to the key scientific research personnel which is responsible for scientific research projects.

Strengthening the ecological cooperation in scientific and technological innovation

China Unicom has adhered to open cooperation and strengthened the joint innovation of industry, university, research, and application. It has released the “Torch Plan” for China Unicom’s ecological cooperation, and put forward the “1 + 3 + 5 + N” scientific and technological innovation cooperation system. While focusing on the single blueprint of scientific and technological cooperation planning, it has established three cooperation models, which are, joint research and development, strategic investment and platform cooperation. It has also provided five major empowerments, through application demonstration, scale promotion, cooperation operation, research and procurement collaboration, investment and industry collaboration. Furthermore, it has also accelerated the implementation and operation in N forms, such as forming industrial alliances, joint laboratories, developing industrial demonstration bases and getting capital support. The Company has established 7 joint laboratories with industry-leading scientific research units and universities such as Pengcheng Laboratory, Beijing Academy of Blockchain and Edge Computing, Beijing University of Posts and Telecommunications, Wuhan University and China Eastern Airlines. It has also signed 7 strategic agreements to carry out the construction of technological innovation ecosystem actively and effectively.



Announcing the China Unicom’s Scientific and Technological Innovation Cooperation Torch Plan

In December 2021, China Unicom officially released the “Scientific and Technological Innovation Cooperation Torch Plan” at the 2021 Partnership Conference to empower the five key responsibilities and businesses. It also consolidate the foundation for cooperative development. At the same time, it has also promoted and announced the development of the Reconfigurable Intelligent Surface (RIS) Technology Alliance Initiative and the Intelligent Super Perception Industry Joint Initiative.

Strengthening Core Technology Research

In order to firmly grasp the initiative of innovation and development, it is crucial to accelerate the technology growth of “bottleneck” in important fields, and break through the industrial bottleneck effectively. China Unicom has given a full play as the main role of central enterprises in the scientific and technological innovation, and bravely served as the “source” of original technology, tapped into the “no man land” of science and technology, accelerated the breakthrough of “bottleneck” technology in important fields, explored the potential of digital technology, and promoted the safety, stability, independency and controllability of the industrial chain and supply chain.

Undertaking major national scientific research projects

China Unicom has adhered to the country’s major national needs and actively undertook major national scientific research projects.

Undertaking national projects

In 2021, China Unicom undertook 7 national key R&D projects and have passed all the inspections.

- In the demonstration of “multi-mode network and communication”, the Company took the lead in showing the procedures of research and application of the industrial passive optical network architecture and system may smoothly conduct with ultra-low latency, ultra-large connection, safety, reliability, and also two other skills such as multi-scale network slicing and intelligent adaptation.
- The Company has undergone joint partnerships to take part in 8 special projects for the industrial basic reconstruction and high-quality development of manufacturing industry.
- The Company led the major national science and technology project, “Research and Development and Test of 5G Business for Industrial Manufacturing” in order to achieve great research results. It has also won the second prize of Scientific Progression Award by the Chinese Institute of Electronics.

Leading national key projects

- The key project under the 2018 National Key Research and Development Programme “High-Tech Winter Olympics – Constructing Reliable 5G Communication and Advanced Network Demonstration in Complex and Extreme Conditions” has achieved continuous 5G coverage over 87 Winter Olympics venues as well as the Beijing-Zhangjiakou High-speed Railway, Beijing-Chongli Expressway, Zhangjiakou-Chengde Expressway (Chongli Section) and other important transportation links in the three designated areas in Beijing and Zhangjiakou. The project has sufficiently met the needs of communication during the period of Winter Olympics.

- The key project under the 2019 National Key Research and Development Program “High-Tech Winter Olympics – Research and Demonstration of Efficient and Intelligent Vehicle Network Technology for Winter Olympics” has developed the master system of 5G intelligent vehicle network business platform, which supports the collaboration among human-vehicle-road-cloud, “5G + Beidou” high-precision positioning, and autonomous vehicle dispatch. It has demonstrated ten major scenarios of business operation, such as autonomous vehicle connection, mobile sales, unmanned distribution and drive assistance in the district of Shougangyuan during the Beijing Winter Olympics. It is expected that the project outcomes will be formally applied in the events of the Beijing Winter Olympics.

Carrying out key and core technology research over the challenges

China Unicom has organised and implemented critical technology research in order to accelerate the forging of the long-term plates in the fields of new generation network, 5G enhancement, Big Data, and Vehicle Internet.

New generation of network core technology

China Unicom’s next-generation of network innovation system (CubeNet3.0), has been confirmed by a panel of experts led by Academician Wu Hequan and Academician Liu Yunjie. The experts believe that the results are technologically advanced, innovative and forward-looking. The outcomes are conducive to creating a new generation of digital infrastructure that can be widely applied, flexible, customizable, synergetic, intelligent, and secure.

Tracking the trend of forward-looking technology evolution

China Unicom has conducted foresight research on 6G scenarios and has moderately surpassed several forward-looking technologies, such as quantum information.

- The Company has conducted the three 6G standard closing projects and two initiation projects. The research outcomes of our Unicom’s 6G viewpoints have been continuously shared with and channeled to ITU/IMT-2030/3GPP/CCSA and other organisations.

- The Company has promoted joint R&D of the prototype system of intelligent ultra-surface technology, conducted end-to-end test system demonstration in the peripheral region of Huairou, and promoted the establishment of the industry alliance of intelligent ultra-surface technology.

- The Company has promoted the research on the integration of low-cost, miniaturization, chip-based quantum communication equipment, and traditional communication networks. Based on the research on the security improvement plan of the quantum communication system blockchain technology, the Company has also completed the development of the prototype of the quantum encryption cloud platform.

Overcoming the “bottleneck”

China Unicom has carried out risk analysis on the “bottleneck” of the current supply chain in the fields of IT and CT, which sorted out and identified 22 major risk points of the IT line and 18 points of the CT line. Risk response plans for each risk point have been proposed, laying out the strategic idea of “reducing risk to breakthrough” to organise core technology research that provides suggestions to reduce risks. In 2021, to tackle the “bottleneck” risks, the Company has focusedly examined the controllable and independent problems, and has invested nearly RMB1 billion in research and development to launch 15 core technology breakthrough projects in the field of domestic substitution. Risk reduction plans are proposed in combination with the core technology breakthrough tasks undertaken by the SASAC to overcome the “bottleneck” issue.

- We have promoted intelligent network transformation, developed network AI test bed and MR intelligent maintenance auxiliary system, etc., as well as defined a measurable grading method to evaluate automatic driving networks.

- We have constructed a prototype of the digital twin model of broadband access network to establish an integrated and internet-oriented operating model to access network planning, construction, maintenance, and operation.

- We have independently designed and developed an IP network simulation system, the prototype of the digital twin system network architecture and built the digital twin system for the National New District (Xiong’an).

- We have held the 2020 AIA Cup AI 5G Network Application Competition and ITU AI/ML in 5G Challenge, Network AI Forum.

- We have supplied AI capabilities and applications, opened up smart networks, perception analysis, AI algorithm models, application services and other capabilities. We have also reshaped the smart city operation model and created applications, such as new effective urban governance, new convenient public services, new industry upgrade, and new livable and green ecology, in order to reconstruct a new form of citizen experience.

The core technology for Internet of Vehicles

The core technology of “Internet of Vehicles” focuses on six key issues, including 5G private network capabilities, edge collaborative computing, safe and reliable terminals, common ability aggregation, capability open service, and pan-scene operation. It induces a top-level architecture design “Intelligent Vehicle-Road Collaborative System”, and creates critical products and solutions, namely “1 intelligent integrated network, 1 common service platform, 2 vehicle-road intelligent terminals, and N-type collaborative service scenarios”. The results have been released at the 2021 China Unicom Partners Conference: Technology Innovation Summit Forum.

- By the results of the project, China Unicom joined the “Central Automobile Enterprise Digital Transformation Collaborative Innovation Platform” and was selected as one of the council members.

- Relying on the base of the core mission application demonstration – Tianjin Haijiao Park Demonstration Base, China Unicom led and submitted the project “5 GV2X Vehicle-Road Collaborative Pilot Application Based on Industry Specific Network”, which won the first prize in “Industry Virtual Private Network” and the second prize in the national finals of the “4th Blooming Cup” 5G Application Competition in 2021 hosted by the Ministry of Industry and Information Technology.

- We have cooperated with the National Intelligent Commercial Vehicle Quality Inspection and Testing Centre to build the largest and most complete 5G/MEC vehicleroad collaborative test bed in China; in addition, we have established the “5G vehicle-road collaborative joint test research centre”.

Intensifying research in the area of basic hardware and software

China Unicom has accelerated the improvement of its shortcomings in the area of independent and controllable basic software and hardware. It has improved the core technological capabilities in the terminal field, and solved the problems such as core deficiency, core technology and core components. In 2021, the Company carried out differentiated competitiveness innovation mainly in the fields of CT and IT independence and controllability, and also, the development in 5G, optical network, cloud-network integration, digital innovation, Internet-oriented transformation and security has as well as been highly focused.

- The Company has obtained a number of research results, such as the first domestic millimeter wave micro-station that has used localized core components in China, the first light-weight Internet of Things TLS transmission protocol based on the new state-level public key authentication technology in China, the self-developed controllable white box router based on self-developed operating system, the technology system and related standards of independent controllable communication cloud, and the first molding card integrated cellular network module without pre-built number in the industry.

Promoting research on fundamental common technology

China Unicom has adhered to innovation-driven development, increased investment intensity, promoted breakthroughs in basic common technologies and consolidated the basic capability platform of Yunda Wuzhi Chain and Security. It has also strengthened the development of cloud computing, Big Data, Internet of things, AI, blockchain and security, increased the supply of self-developed products in the fields of digital government, smart city, industrial internet, public security and emergency management, created a professional level of comprehensive digital services, and achieved an independent development of its core technologies.

- In the field of cloud computing, it has supported the commercialisation of virtualization and cloud-native dual engine computing power base, and achieved a capacity of 100,000-level for its container scheduling technique.



Newly released the brand "Unicom Cloud"

At the 2021 China Unicom Partnerships Conference, Mr Liang Baojun, deputy general manager of China Unicom, officially announced that Unicom Cloud has been upgraded comprehensively, and the brand of cloud computing business has also been fully renewed. The upgraded Unicom Cloud can provide more than 280 IaaS and PaaS products to meet customers' cloud adoption needs in general scenarios. Based on the core infrastructure capability of Unicom Cloud 3.0 operating system, China Unicom has built seven scenario-based clouds, namely IoT sensing cloud, digital storage cloud, smart video cloud, smart chain collaborative cloud, 5G edge cloud, autonomous and controllable cloud and hybrid cloud. All these has helped to provide reliable support for the cloudification, Big Data analytics and intelligent transformation for thousands of industries.

- In the field of Big Data, we carried out multi-source heterogeneous data collection, exchange technology and ultra-large-scale task that has distributed scheduling technological innovation, in order to achieve the support for PB-level data volume.

- In the field of Internet of Things, we have self-developed the Internet of Things (IoT) connection management platform – Yanfeizhilian, which could have allowed a volume of 160 million connections, surpassing Jasper to become the main connection platform.

- In the field of blockchain, China Unicom Chain BaaS platform has enhanced cross-cloud and cross-chain service capabilities, and supported the integrated services with multiple cloud computing platforms such as Unicom WO Cloud, Alibaba Cloud and Tencent Cloud, as well as, with the blockchain framework such as XuperChain, FISCO BCOS.

- In the field of security, the Company strengthened the security innovation of the Internet of Things, and achieved the high-efficiency detection technology of large-scale network encryption that could detect data, and as a results, the average detection rate of https protocol metadata and mirror data was > 85%.

In 2021, China Unicom signed a proposal with 27 units that has included State Grid Corporation of China, China Construction Bank, Beijing Academy of Blockchain and Edge Computing, and initiated the establishment of the "Changan Chain Ecological Alliance". At the same time, China Unicom joined the "China Science and Technology Association Engineer Consortium" as a council member, and joined the "Quantum Information Network Industry Alliance" as vice chairman.

Participating in the formulation of international and industry standards

China Unicom actively participates in international and domestic organizations to help determine standards and measures for the industry, which cover 5G, cloud computing, Big Data, Internet of Things, artificial intelligence, edge computing, blockchain, information security, and other strategic development areas. Such endeavour has effectively fostered the standardisation of the Company's cutting-edge research and development, improved our influence over the industry as well as our discourse power in the international network space.

- The Company has given much emphasis on intellectual property protection. We have laid out the "Outline for the Construction of a Intellectual Property Power (2021-2035)" and the "14th Five Year National Intellectual Property Protection and Application Plan", revised the measures for patent management, and strengthened our protection measures over the source of intellectual property as well as high-quality creation.

- In 2021, the Company has led the establishment of 33 new international standard measures and the publication of 25 international standard measures.

- The Company recommended experts to run a campaign for the management positions in 3GPP and ITU-T and has successfully gained 3 new positions. It has more than 100 active positions in several important international standard organisations such as ITU-T, 3GPP, GSMA, Linux Foundation, OpenInfra and open sources communities, including more than 20 key management positions.

- The Company launched the "China Unicom Standardisation" WeChat official account to build an academic exchange platform and has popularized the latest development of domestic and foreign standard research and open source communities.

- The Company has led the project initiation and project results in 3GPP, ITU-T, GSMA, ETSI, BBF, O-RAN, TIP and other important international standard organisations.

- The Company leading project "China Unicom Smart City Network Technology Research and Development" has won the first prize of the China Institute of Communications.

Responsibility performance indicators	2021
Number of leading international standards (article)	25
Number of leading industry standards (article)	38
Number of patents applied (item)	2,224
Number of patents granted (item)	1,128

Empowering Digital Transformation

China Unicom further promoted digital transformation, and built the smart middle platform as the core engine of comprehensive digital transformation, which stimulated data vitality, empowered digital transformation and upgrading, and created a new benchmark for digital transformation of central enterprises.

Consolidating digital capabilities

In 2021, China Unicom has adhered to intensive and independent research and development, upgraded the smart middle platform, upgraded and shared the core businesses, core capabilities, core data and core processes across the country, and built the smart middle platform into a core engine for comprehensive digital transformation. It promoted the digitisation of business operations, intelligent network operations, digital operation and management, and scenario-based data empowerment, and strengthened the connection of the Unicom Intelligence Brain.

Creating a unified digital base

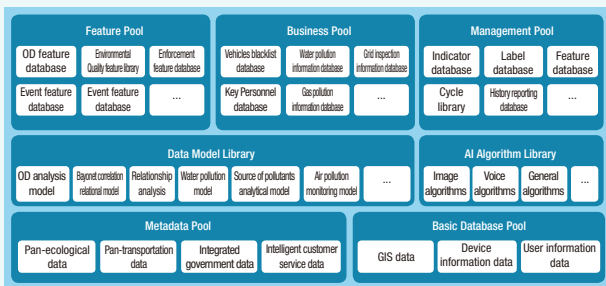
China Unicom's unified digital base was further consolidated to effectively support the Group's R&D, operation and maintenance and capacity sharing.

- It covers 6 Big Data centres, 36,000 + nodes, three major structures (X86/ARM/OpenPower), dual-engine container (Messos/K8s), and virtual and bare dual-machine, achieving full BMDOE connection, supporting 1,043 cloud applications, 10,000 cloud-based R&D and 250 million cloud codes, 1,500 + open capabilities and 1,100 million daily capacity adjustments.

Construction of five middle platforms

China Unicom completed the construction of 48 centres, 6 platforms and 9 skill buildings, achieving real-time order scheduling, one-point product release, network resource visibility, and full cloud data access.

- The Company focused on 16 core business scenarios in 8 categories, and completed the testing of business integration in all 31 provinces, ensuring the end-to-end availability of business services. The Company piloted intensive operation in 15 provinces to achieve the coordination of R&D, production and operation.



China Unicom ecological environment data middle platform chart

Based on the data middle platform and the business middle platform, China Unicom Shandong Branch focused on improving the quality of the ecological environment, scientifically applied cloud computing, Big Data, Internet of Things, mobile Internet and other technical means to improve the environmental management level of water, solid waste, comprehensive environmental law enforcement, environmental monitoring and other businesses. It further enhanced the ability of comprehensive environmental supervision, improved the level of information disclosure and government services, and achieved scientific comprehensive decision-making, precise environmental supervision, convenient public services, and business management informatisation. It has also initially achieved the effectiveness of Big Data construction of ecological environment in Shandong Province.

Building a smart Intelligence Brain

China Unicom built the Unicom Intelligence Brain and released it through the Partner conference, laying a solid foundation for smart operation.

- Achieved 100% of intensive core business system.
- Achieved 100% of centralised 10010 hotline.
- Achieved 100% of completed smart middle platform.



China Unicom Intelligence Brain release

At the 2021 China Unicom Partners Conference, Mr. He Biao, deputy general manager of China Unicom, officially released the Unicom Intelligence Brain Product. "China Unicom Intelligence Brain" is committed to build an iconic and leading brain-type intelligent middle platform and an ultra-computerised cloud-network engine, and build a scenario-based and intelligent central nervous system featuring high-speed ubiquitous, cloud-network integration, computing networks integration, security and reliability, and intelligence and agility. China Unicom's Intelligence Brain is connected with thousands of smart operation scenarios internally, and agilely achieved the empowerment and integration of thousands of industries externally.



Smart Operation System Chart

China Unicom Shanghai Branch has built a smart network operation brain, which has subverted the traditional working model and significantly improved production efficiency. Taking resources and data as the foundation of digital twins, the Company built the decision-making capability of "Network Brain" through the digital intelligence rules. At present, it has covered 1,397 scenarios and more than 30,000 rules. At the same time, it focuses on key businesses and key processes, and enhanced the transformation of operation model which the automation handling rate of network events has reached to 99.625%, hence, comprehensively empowers the digital operation of network.

Activating value of data elements

China Unicom has revitalized its Big Data, by giving full play to the value of data and technical elements, focusing on areas such as urban governance, population, economy and employment, and key industries such as government affairs, emergency response, ecology, culture and tourism, transportation, agriculture, industry, housing and construction, and finance. It adhered to independent research and development, and built key industries data platforms and application products.

- Relying on the advantages of data governance, data security and data visualisation, China Unicom has implemented a number of provincial data security projects in Zhejiang, Hainan and Anhui. Among them, the “Construction Project of Hainan Government Big Data Security Guarantee System” was rated as the “2021 Top Ten ‘Digital Government’ Model Project”.

Optimising the Layout of Industrial Innovation

China Unicom has integrated its innovative R&D capabilities, actively applied for and participated in the construction of national laboratories, focused on key areas to explore innovative models of industry, university, research and application, and improved the layout of industrial innovation.

Building a national research and development centre

China Unicom has played the role of central enterprise in innovation, actively applied for and participated in the construction of national-level laboratories, and took the lead in organising the application of the National Engineering Laboratory for the Next Generation of Internet Broadband Business Services. It was officially approved by the National Development and Reform Commission, and was included in the National Engineering Research Centre for new sequence management. During the evaluation period, the National Engineering Laboratory for the Next Generation of Internet Broadband Business Application seized the opportunities that are arising from the development of industrial Internet and the transformation of network broadband and software to achieve breakthroughs in new network architecture, key technologies for mobile and fixed broadband and high-definition video broadband applications. It actively participated in and supported major national strategic tasks and key projects, and made positive contributions to the implementation of major national strategies and projects such as Cyberpower, Digital China, Smart Winter Olympics and pandemic prevention and control. In the future, the Company will further improve its organisational structure, strengthen its own construction, increase investment in R&D resources, gather new network architecture, next generation Internet and broadband technology, and combine with the Company’s new strategy to continuously strengthen, optimise and expand its development.

Creating a consortium of industry, university, research and application

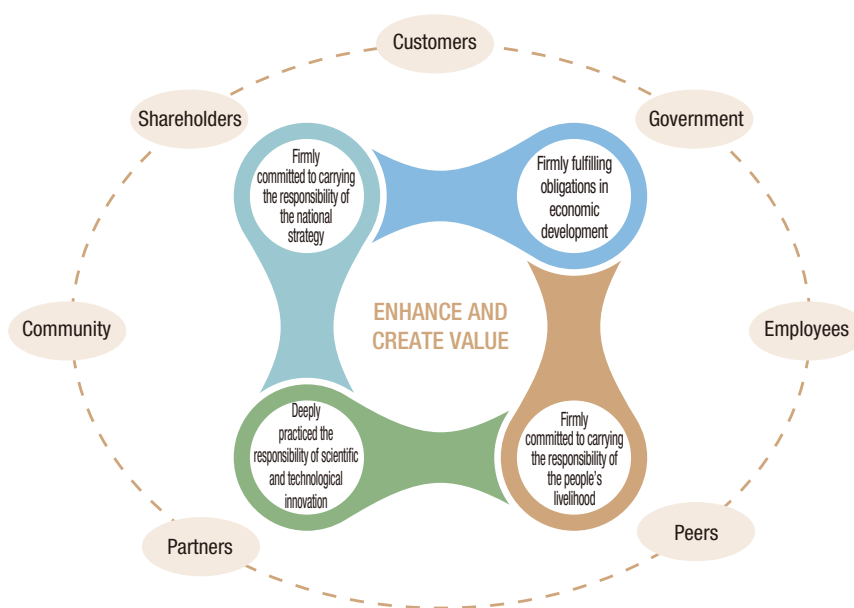
China Unicom focused on key regions such as the Beijing-Tianjin-Hebei Region, the Yangtze River Delta, the Guangdong-Hong Kong-Macao Greater Bay Area and Sichuan-Shaanxi-Chongqing Region, it actively explored the layout of the regional science and technology innovation centres of state-owned enterprises, and built an innovation consortium of industry, university, research and application. In 2021, the Western Innovation Institute and Chongqing 5G Integrated Innovation Centre were established in Xi’an and Chongqing to explore the innovative model of industry-university-research-application.

In April 2021, China Unicom has entered into a strategic cooperation framework agreement with the People’s Government of Shaanxi Province, where China Unicom will be entitled to utilize optimally the resources of the Shaanxi University to jointly establish the Western Innovation Institute in collaboration with Xi’an Jiaotong University, Xidian University and Xi’an University of Posts and Telecommunications. On 6 September 2021, China Unicom Western Innovation Institute Co., Ltd. was officially established; the institute will focus on overcoming the “bottleneck” risks in key core technologies, laying out innovation chains, such as fundamental research, technology development, achievement transformation, talent cultivation and industry incubation around the connections of the industrial chain. The institute will build a collaborative innovation platform to gather together key resources, such as talents, technologies, products and businesses, innovation ecology, and pilot demonstration of scientific and technological innovation.

RESPONSIBILITY MANAGEMENT

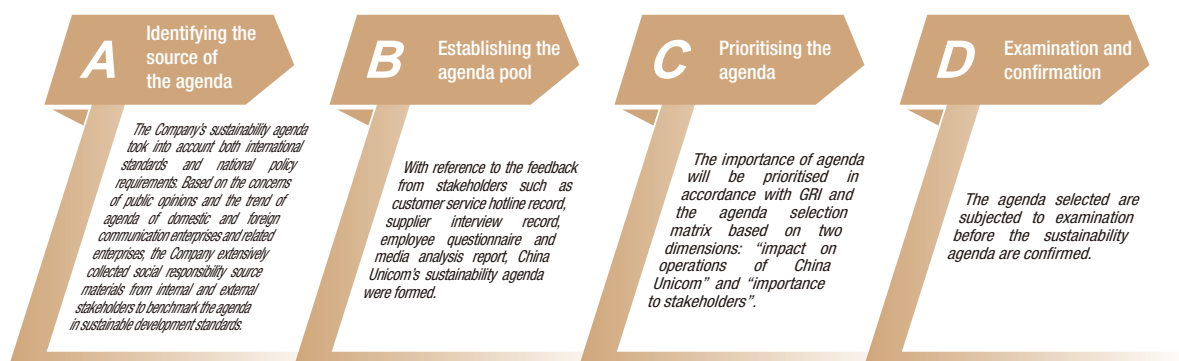
Strategy of Responsibility

China Unicom has always been committed to integrating its own development with broader sustainable development to achieve the harmonious unity of the Company's interests and social objectives. In 2021, China Unicom continued to lead by the new development philosophies of innovation, coordination, green, openness and sharing. The Company implemented national strategies such as Cyber Superpower, Digital China and the "Belt and Road Initiative", etc. with practical actions, and formulated the sustainable development strategy system of China Unicom, expressing the Company's willingness and attitude to assume the responsibility of sustainable development.

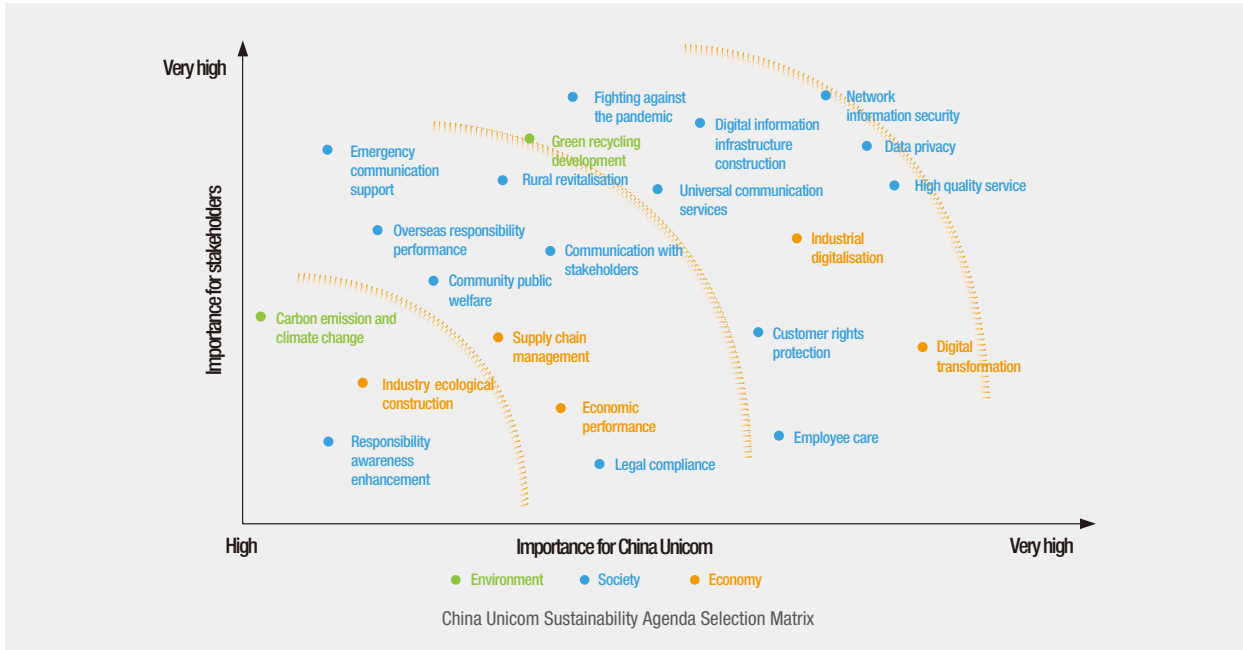


China Unicom Sustainable Development Strategy System

China Unicom has established a selection procedure for sustainability agenda based on the principle of "closely following standards, regularly updating and continuously improving". By keeping abreast of domestic and international situations and social hotspots, China Unicom continued to benchmark against advanced enterprises and constantly updated sustainability agenda. In 2021, the Company led the practice of corporate responsibility with four substantial agenda to ensure that the fulfillment of responsibility meets the needs of society and people's livelihood and responds to the concerns of stakeholders. The Board of Directors of China Unicom attached great importance to the supervision of ESG-related matters, and is responsible for formulating the Company's ESG management policies and strategies, including evaluating, prioritising and managing the Company's material ESG-related matters. The Board of Directors has been actively managing ESG risks and opportunities, integrating sustainable development with business practices, and incorporating climate and ESG-related risks into the risk identification and assessment process for analysis to ensure that the Company has established an effective risk management and internal control system. The Board of Directors continuously supervised the Company's risk management and internal control system, regularly listened to the Company's reports on ESG-related work, reviewed the Company's performance, gave opinions and instructions to the management and relevant departments on ESG optimisation, and approved the disclosure of the Company's ESG report. The Company promoted sustainable development practices in an orderly manner to achieve healthy and sustainable development.



China Unicom's procedures for selection of sustainability agenda

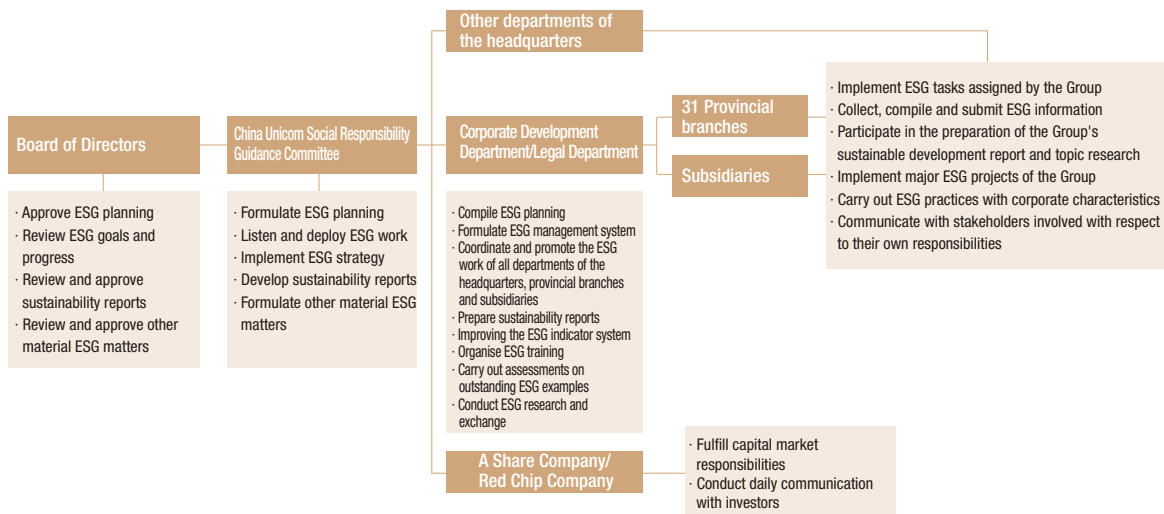


The four major core agenda of China Unicom in 2021 were determined through the analysis and selection of the agenda collected according to the procedures for selection of sustainability agenda and the agenda selection matrix.



Organisation of Responsibility

The Board of Directors of China Unicom is fully responsible for the environmental, social and governance strategy and reporting, including the approval of environmental, social and governance planning, the review of environmental, social and governance objectives and progress, the approval of sustainability reports and other major issues. The Board of Directors authorises the Company's Social Responsibility Guidance Committee to be responsible for the implementation of environmental, social and governance strategy and related operational matters. The Social Responsibility Guidance Committee regularly reports and puts forward suggestions on environmental, social and governance matters to the Board of Directors. The Corporate Development Department/Legal Department is responsible for the daily work. Other relevant departments of the Group, the provincial branches and subsidiaries are responsible for environmental, social and governance implementation and carry out responsibility practice in their respective business specialisations.

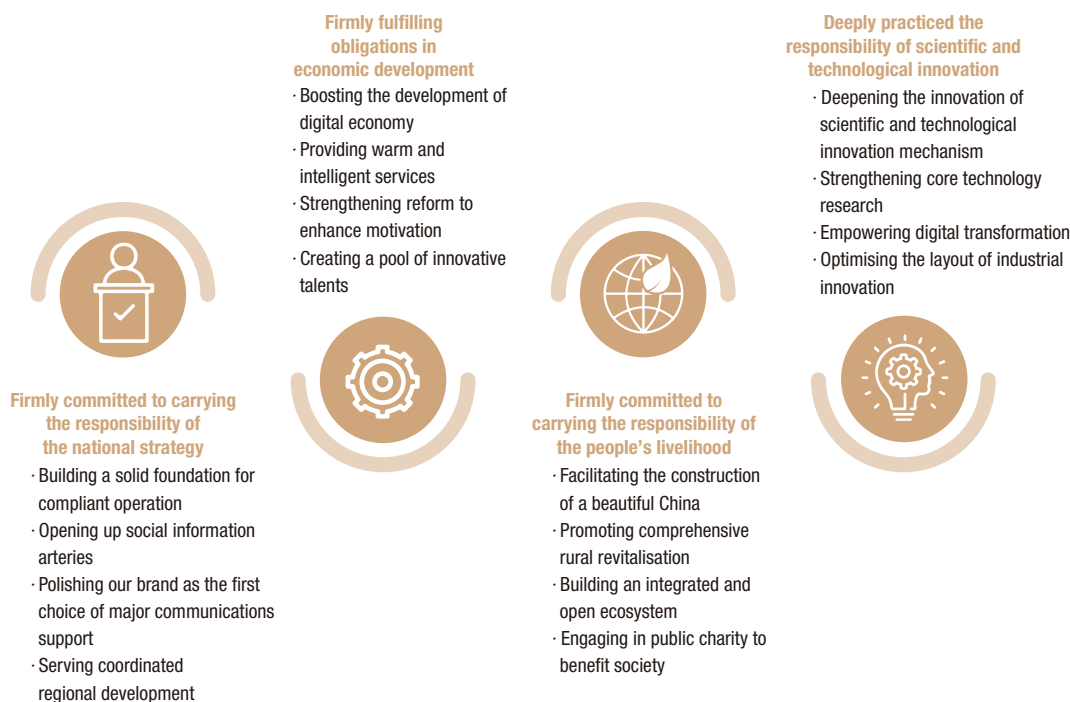


China Unicom Sustainability Working Organisation and Main Responsibilities

System for Responsibility

China Unicom's sustainable development management system is composed of organisational guarantee, planning and implementation, communication management, and performance evaluation, etc. In the course of work, we adhere to the principles of management first, integration into operations, and joint actions by higher and lower levels. We clarify responsibility plans, promote the practice of responsibility performance, and respond to the concerns of all parties.

The Company strictly complied with international and domestic sustainable development responsibility standards, further improved the "China Unicom Sustainable Development Indicator System" focused on the four major substantial agenda of the Company, including 37 categories and 145 indicators, and promoted the integration of sustainable development responsibility into the production and operation of the Company on this basis.



China Unicom Sustainable Development Indicator System

Capabilities on Responsibility

In 2021, China Unicom continued to strengthen the construction of responsibility capacity and continuously promoted the concept of responsibility rooted in the awareness of all employees. We have established a two-level sustainable development responsibility team at the Group, branches and subsidiaries, extensively and deeply promoted the implementation of responsibility practice, and encouraged the improvement of the Group's ability to fulfill its responsibilities through case sharing. Many responsibility practices have won awards from all walks of life. We tracked and disclosed information well, effectively responded to the concerns of stakeholders, and the social responsibility report have been positively evaluated. We have actively participated in various exchange seminars and trainings organised by the social responsibility industry, paying attention to the development trend of social responsibility, learning excellent enterprise experience, contributing ideas and opinions, and helping the sustainable and in-depth development of social responsibility.

- Accredited with "2020 Golden Bull Social Responsibility Award" issued by China Securities Journal in December 2021.
- Accredited with "The Best of Asia-Icon on ESG" and "ESG Influencer" in the 16th Asian ESG Awards 2021 held by Corporate Governance Asia.
- Accredited with the Asia's Best Corporate Social Responsibility, the Best Environmental Responsibility, the Best Corporate Communications and the Best Investor Relations Company at the 11th Asian Excellence Recognition Awards 2021.
- Accredited with the "Platinum Award Excellence in Environmental, Social and Governance" in "The Asset ESG Corporate Awards 2021".
- In the ESG rating of 440 listed companies controlled by central enterprises of the SASAC in 2021, reached the pioneer level and was selected as the "Central Enterprise ESG Pioneer 50 Index".
- Three social responsibility practices were selected into the case collection of the Central Enterprise Corporate Social Responsibility/ESG Series Blue Book (2021) of SASAC.
- The Company was rated AA in the "Social Responsibility Report of Thousand Outstanding Enterprises" by the Ministry of Industry and Information Technology.
- The practice case of responsibility for scientific and technological innovation was selected as the "2021 Best Practice Case (Scientific and Technological Innovation) of Enterprises to Achieve Sustainable Development Goals" by the Global Compact Network China.

Communication on Responsibility

China Unicom has established a sustainable development responsibility communication mechanism for continuous and targeted communication based on the expectations of stakeholders and sustainability agenda.

Practical Issue	Stakeholder	Communication method	Expectations for China Unicom
Firmly committed to carrying the responsibility of the national strategy	Government	<ul style="list-style-type: none"> Face-to-face communication Meetings 	<ul style="list-style-type: none"> Improve the level of compliance operation Law-abiding and clean operation
	Shareholders	<ul style="list-style-type: none"> General meeting of shareholders Investor meeting 	<ul style="list-style-type: none"> Timely and transparent information access Long-term stable investment income Corporate governance and risk management
Firmly fulfilling obligations in economic development	Government	<ul style="list-style-type: none"> Face-to-face communication Meetings 	<ul style="list-style-type: none"> Fair competitive market order Improve efficiency and reduce costs Modernisation of governance capabilities and systems
	Customers	<ul style="list-style-type: none"> Meetings Service hotline Weibo/WeChat NPS (Net Promoter Score) survey 	<ul style="list-style-type: none"> High speed and smooth network Innovative smart network services Favourable and transparent tariff policies Convenient and efficient service assurance Network information security assurance
	Public and media	<ul style="list-style-type: none"> Phone communication and forums Internet-based communication 	<ul style="list-style-type: none"> Timely acquire of the Company's information Interactive communication with the Company
	Employees	<ul style="list-style-type: none"> Staff forums Staff representative assemblies Democratic informal meetings Online communication with the General Manager 	<ul style="list-style-type: none"> Protection of legitimate rights and interests Training and career development opportunities Opportunities to participate in democratic management Support in adversity Comfortable and safe working environment
Firmly committed to carrying the responsibility of the people's livelihood	Customers	<ul style="list-style-type: none"> Interviews/hotline 	<ul style="list-style-type: none"> Promote partners' accountability High-quality network in remote areas
	Peers	<ul style="list-style-type: none"> Face-to-face communication Meetings 	<ul style="list-style-type: none"> Resource complementarity improvement Cost savings and efficiency improvements
	Community	<ul style="list-style-type: none"> Meetings Forums 	<ul style="list-style-type: none"> Continuous and effective donation Comprehensively promote rural revitalisation Carry out public welfare volunteer activities
	Ecological environment	—	<ul style="list-style-type: none"> Green and eco-friendly operations Recycling to reduce pollution
	Partners	<ul style="list-style-type: none"> Partners' conference Meetings, interviews Self-service portals of partners 	<ul style="list-style-type: none"> Wide scope of cooperation Fair and open opportunities for cooperation Extensive and convenient supporting services
Deeply practiced the responsibility of scientific and technological innovation	All stakeholders	<ul style="list-style-type: none"> Meetings Interviews Weibo/WeChat 	<ul style="list-style-type: none"> Increase the proportion of high-tech talents Increase the proportion of R&D investment Smart products to improve quality of life Innovative forward-looking communications technology Management system adapting to the Internet

APPENDICES

Key Performance

Category	Indicator	Unit	2019	2020	2021
Operations and development	Total assets	RMB billion	562.5	580.62	591.08
	Operating revenue	RMB billion	290.51	303.84	327.85
	Service revenue	RMB billion	264.39	275.81	296.15
	Profit before income tax	RMB billion	14.17	16.03	17.93
	Mobile billing subscribers	Thousand	318,475	305,811	317,115
	Fixed-line local access subscribers	Thousand	54,215	47,339	47,193
	Fixed-line broadband subscribers	Thousand	83,478	86,095	95,046
	Online 2I subscribers	Thousand	54,140	50,940	50,390
Network capabilities	Number of 4G base stations	Thousand	1,407	1,503	1,560
	4G population coverage	%	93	94	95
	5G network coverage cities	Number	50	348	348
	Number of fixed network broadband access ports	Billion	0.221	0.225	0.239
	Broadband coverage rate in administrative villages in ten northern provinces	%	95	96	98
	Urban 100M or above broadband network coverage rate	%	86.3	85.3	93.7
	Urban 20M or above broadband network coverage rate	%	96	96	99
	Gigabit fibre network coverage capacity	Billion households	/	/	0.108
	Rural 4M or above broadband network coverage rate	%	100	100	100
	Coverage rate of mobile network in township	%	100	97.34	100
	Coverage rate of mobile network in administrative villages	%	90	86	93
	Number of administrative villages with broadband coverage	Thousand	299	306	327
	Co-construction rate of pole lines	%	91	95	95
	Sharing rate of pole lines	%	97	92	93
	co-construction rate of pipelines	%	92	94	85
	Sharing rate of pipelines	%	93	97	92
	International interconnection bandwidth	G	2,460	2,460	3,260
	Internet of Things connections	Billion	0.187	0.238	0.302
	Number of data centre racks	Thousand	234	277	312
	Commitment in major assurance initiatives	Total times of emergency communication assurance	Times	578	612
Emergency communication vehicles called out		Thousand vehicle-time	152	153	155
Emergency communication equipment inputted		Thousand set-time	119	180	172
Personnel used		Thousand person-time	641	660	670

Category	Indicator	Unit	2019	2020	2021
Independent innovation	Research and development investment ⁵	RMB billion	1.709	2.964	4.792
	Number of leading international standard conclusion	Items	24	23	25
	Number of leading industry standard conclusion	Items	43	37	38
	Number of patent applied	Items	1,439	1,734	2,224
	Number of patents granted	Items	658	518	1,128
Customer service	Monthly average complaint rate in the year	Person-times/ million users	18.26	11.84	8.75
	Comprehensive satisfaction rate	Points	81.11	81.32	81.68
	Including: Mobile service subscribers satisfaction rate ⁶	Points	80.26	80.72	80.62
	Fixed line phone subscribers satisfaction rate	Points	87.9	87.7	88.41
	Fixed broadband subscribers satisfaction rate	Points	81.51	80.49	81.84
People-oriented	Gender proportion of employees	Male: female	1.53: 1	1.54: 1	1.62: 1
	Proportion of ethnic minority employees	%	7.33	6.72	6.8
	Proportion of female in senior management	%	11.9	12.5	12.4
	Input in employee training	RMB million	374.36	364.86	340.99
	Training hours per employee	Hours	63	88	94
	Network college online learning person-time	Thousand person-times	18,080	51,000	42,000
	Network college total online learning hours	Thousand credit hours	9,160	21,780	23,730
	Proportion of contracted employees in labor union	%	100	100	100
	Input to help and support employees suffered from difficulties	RMB thousand	79,000	78,800	70,220
	Input in condolence fund	RMB thousand	28,750	42,590	42,100
	Employee turnover rate	%	1.85	1.87	1.69
	Number of new employees	Persons	9,831	10,281	12,479
	Number of new male employees	Persons	6,076	6,422	7,947
	Number of new female employees	Persons	3,755	3,859	4,532
	Number of employees who voluntarily resign	Persons	4,521	4,692	3,939
	Number of male employees who voluntarily resign	Persons	2,674	2,806	2,515
	Number of female employees who voluntarily resign	Persons	1,847	1,886	1,424
	Number of employees dismissed	Persons	914	1,244	1,458
	Number of male employees dismissed	Persons	560	797	927
	Number of female employees dismissed	Persons	354	447	531
	Turnover rate of employees aged below 30	%	6.84	7.07	6.23
	Turnover rate of employees aged 30-50	%	1.07	1.18	0.94
	Turnover rate of employees aged over 50	%	0.14	0.13	0.1
	Turnover rate of male employees	%	1.78	1.88	1.67
	Turnover rate of female employees	%	1.95	2.02	1.53
	Turnover rate of domestic employees	%	/	/	1.69
Turnover rate of oversea employees	%	/	/	0.58	
Number of work-related fatalities	Persons	0	0	0	
Rate of work-related fatalities	%	0	0	0	

Category	Indicator	Unit	2019	2020	2021
Low-carbon development	Special investment in energy conservation and emission reduction	RMB billion	0.104	0.123	0.13
	Energy consumption per unit of information flow	kg standard coal/TB	3.48	2.83	3.65
	Petrol consumption ⁷	Thousand tons	41.75	40.5	27
	Diesel consumption ⁷	Thousand tons	13.74	11.2	16.4
	Natural gas consumption ⁷	Thousand m ³	7,858.5	5,423	5,810
	Electricity consumption ⁷	Billion KWH	15.81	17.22	20.4
	Water consumption	Thousand tons	18,095	14,990	16,980
	Water consumption density	Tons/RMB million	61.51	47.21	51.65
	Coal consumption ⁷	Thousand tons	94	23	40
	Energy consumption	Thousand tons of standard coal	172.8	245	77
	Greenhouse gas emission ⁸	Million tons	13.2	14.23	12.97
	Total direct emission of GHG (category I)	Million tons	0.39	0.2	0.53
	Total indirect emission of GHG (category II)	Million tons	12.81	14.03	12.44
	Carbon emission intensity	Tons/RMB million	45.4	46.6	39.5
	Sulphur dioxide emission	Thousand tons	0.04	0.01	0.02
	Recycling upon scrappage and disposal	RMB billion	0.965	0.733	0.456
	Scrappage and disposal of batteries	Thousand tons	10.2	11.3	12.2
	Scrappage and disposal of general materials	Thousand tons	10.9	24.7	33.4
Compliance management	Compliance training sessions	Times	2,514	4,580	8,010
	Participant attending the compliance training	Thousand persons	245	243	243
	Production safety training sessions	Times	87	93	119
	Production safety training coverage rate	%	100	100	100
	Number of domestic suppliers	Number	/	/	71,000
	Number of overseas suppliers	Number	/	/	20
Community responsibility	Number of registered volunteers	Persons	47,930	55,006	57,550
	Participants in volunteer activities	Person-times	55,004	58,095	68,735
	Credit rating ¹	Grade	AAA	AAA	AAA
	Total tax paid	RMB billion	5.25	6.59	7.93
	Employment creation	Persons	9,913	10,652	13,038
	Total donations	RMB thousand	2,230	6,374	2,082

Notes:

- The credit rating of China United Network Communications Corporation Limited, a wholly-owned subsidiary of the Company, was granted by United Credit Ratings Co., Ltd. and China Chengxin International Credit Rating Co., Ltd.
- Data description: The data and information collection of this report mainly sourced from the Company's internal data collection system and relevant statistical reports, as well as the corporate sustainable development practice cases submitted by provincial companies. There is no material change in relation to the methods used for prepping the disclosure. The data for 2021 quoted in this report is the final statistical data. If there is any discrepancy between the financial data and the annual report, the annual report shall prevail. The monetary unit adopted in this report is RMB.
- Please refer to the Description to the Report for the details of the report reference standards.
- Quality assurance: The Board of Directors and all directors undertake that the information disclosed in the report is authentic, complete and correct, with no false record or misleading statement.
- The original input data of scientific and technological innovation was adjusted to R&D investment according to the statistical caliber required by the superior regulatory authorities, and the corresponding historical data was updated.
- According to the regulatory requirements and industry practices of the telecommunications industry, the satisfaction evaluation of mobile phone and mobile internet business was cancelled in 2021, and the satisfaction evaluation of mobile business was newly added. Therefore, the score of mobile business in 2019 and 2020 was calculated using the average score of the original mobile phone and mobile internet businesses.
- The data statistics of petrol consumption, diesel consumption, natural gas consumption, electricity consumption and coal consumption cover the headquarters and 31 provincial branches. The conversion factor of each energy consumption shall refer to GB/T 2589-2020 "General Rules for the Calculation of the Comprehensive Energy Consumption".
- Statistical methods of greenhouse gas emissions mainly refer to ISO 14064.

Honors and Recognition

- China Unicom ranked 260th in “Fortune Global 500” for the year 2021.
- China Unicom was rated as the highest level (Grade A) for information disclosure by Shanghai Stock Exchange for four consecutive years.
- China Unicom accredited with “Tianma Award” for Investor Relations of Chinese Listed Companies by Securities Times.
- China Unicom was voted six years in a row as “Asia’s No. 1 Most Honored Telecom Company” in “2021 All-Asia Executive Team” by Institutional Investor, and was awarded “Asia’s Best ESG (Telecoms)” and “Asia’s Best IR Team (Telecoms)”.
- China Unicom was awarded as the “Most Outstanding Company in China – Telecommunication Services Sector” in the “Asia Outstanding Companies Poll 2021” organised by Asiamoney.
 - China Unicom was awarded “Asia’s No.1 Best Telecommunications Company”, “Best Managed Listed Company in China – 1st” and “Best Investor Relations in China – 1st” by FinanceAsia.
 - China Unicom won the “2020-2021 Best Digital Investor Relations Award” at the Excellent IR Summit.
 - China Unicom received the 2021 Asian Mobile Industry Outstanding Contribution Award at the GSMA Mobile World Congress.
 - China Unicom won the “Excellent Examination of the Board of Directors” in 2021, ranking among the top ten state-owned enterprises.
 - China Unicom was selected as the “Best Case of Performance Briefing” and the “Best Practice Case of Board Office” by China Association for Public Companies.
- China Unicom was awarded “Outstanding IR Enterprise Award” and “Best New Media Operation Award” by Panorama network.
- The official account of China Unicom’s customer service was awarded the “2021 Top 10 Brand Account” award by Bilibili.
- China Unicom was awarded the Best “Solution” of the 2021 ICT China Innovation Award by the China Association of Communication Enterprises at PT Expo China.
 - China Unicom won the Champion Award in the ICT Electronic and Environmental Group at the WSIS.
 - China Unicom received the 2021 Science and Technology Award from the Chinese Institute of Electronics.
 - China Unicom Digital Technology Co., Ltd. was awarded the “2020 CMP Excellent Case” by Cloud Computing Standards and Open Source Promotion Committee.

Description to the Report

Reporting period	From 1 January to 31 December 2021, with some contents exceeding the aforesaid period.
Release frequency	The Sustainability Report of China Unicom (Hong Kong) Limited is an annual report.
Organisational coverage	This report covers China Unicom (Hong Kong) Limited and its subsidiaries. For the convenience of expression, “China Unicom”, “the Group”, “the Company” and “we” are used respectively in the presentation of this report.
References	Guiding Opinions on Better Fulfilling Social Responsibilities of State-owned Enterprises, The State-owned Assets Supervision and Administration Commission of the State Council (SASAC); Ten Principles of the UN Global Compact; Guidelines for preparation of Report on Performance of Corporate Social Responsibility, Shanghai Stock Exchange; Environmental, Social and Governance Reporting Guide, HKEX; Guidelines for Preparation of Social Responsibility Report, AQSIQ and SAC; Guidelines for Preparation of China Enterprise Social Responsibility Report (Telecommunications Industry) (CASS-CSR3.0), Chinese Academy of Social Sciences; Guidelines for Preparation of China Enterprise Social Responsibility Report (CASS-CSR4.0), Chinese Academy of Social Sciences; Sustainability Reporting Guidelines (Latest Edition), Global Reporting Initiative (GRI); Social Responsibility Management System of China Information and Communication Industry Enterprises, China Association of Communications Enterprises.
Clarification about the data	The 2021 data quoted in this report are final statistical data. In case of any discrepancy between the financial data herein and those in annual report, the annual report shall prevail.
Quality assurance	The Board of Directors and all directors undertake that the information disclosed in the report is authentic, complete and correct, with no false record or misleading statement.
Language versions and availability	The Company’s Sustainability Report is available in both Chinese and English versions in both printed and online versions. The online English and Chinese versions of the report are available on the website of China Unicom: http://www.chinaunicom.com.hk .
Contact information	Address: China Unicom Corporate Development Department/Legal Department, No. 21 Jinrong Street, Xicheng District, Beijing Zip Code: 100033 Fax: 86-10-66258604 Email: cuijc15@chinaunicom.cn

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- For details of 102-24, 102-25 and 201-4, please refer to the 2021 annual report of the Company and download at <http://www.chinaunicom.com.hk>.
- Material gases such as ozone-depleting substances (ODS), nitrogen oxides (NO_x) and sulphur oxides (SO_x) cited in 305-6 and 305-7 are not the major emissions of the Company.
- The corresponding systems or processes as described in 102-28 and 102-56 will be gradually established.

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Notes:

- As China Unicom is a massive entity and its business covers a wide geographical region, currently the Company is not able to produce full statistics over its waste production (including hazardous and non-hazardous categories) as prescribed in A1.3 and A1.4. Upon identification of material topics, we mainly report on the recycling and reuse of main resources utilised by the Company in the course of operation including cables, battery, terminals and comprehensive supplies. The Company will establish related data collection system in the future.
- As the amount of waste in network operation is directly related to the rapid development of the network and the constant update and iteration of equipment, and the generation and disposal of hazardous waste is not an important aspect of the Group's operation, the waste reduction target involved in A1.6 cannot be disclosed for the time being. We mainly reported on measures such as building a green supply chain and strengthening recycling.
- As the Company mainly engages in the provision of telecommunication services, packaging material used for the finished products as prescribed in A2.5 is not applicable to the Company's business practice.
- Product recycling indicator involved in B6.1 is not applicable to the actual business of the Company. Through the identification of substantive agenda, the Company mainly reported on the maintenance of network information security, the protection of emergency communication, and the protection of customer rights and interests in accordance with the law.

FEEDBACK

Dear Reader,

Thank you for reading the 2021 Sustainability Report of China Unicom (Hong Kong) Limited, which is the sixth sustainability report published by the Company to the public. In order to better provide you and other stakeholders with valuable information while facilitating the supervision of social responsibility works as well as enhancing the capability and standard of performing social responsibility, we would like to have your valuable opinions and suggestions regarding this report.

Email: cuijc15@chinaunicom.cn

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● **Your capacity:**

A. Customer B. Shareholder C. Government D. Community E. Business partner F. Media
 G. Social organisation H. Others (please specify) _____

● **Overall evaluation of China Unicom's Sustainability Report:**

A. Excellent B. Good C. Fair D. Not Satisfactory E. Poor

● **Overall evaluation of China Unicom's performance in economic, social and environmental responsibilities:**

Economic responsibility	A. Excellent	B. Good	C. Fair	D. Not Satisfactory	E. Poor
Social responsibility	A. Excellent	B. Good	C. Fair	D. Not Satisfactory	E. Poor
Environmental responsibility	A. Excellent	B. Good	C. Fair	D. Not Satisfactory	E. Poor

● **Response and disclosure in this report in connection with the concerns of stakeholders?**

A. Excellent B. Good C. Fair D. Not Satisfactory E. Poor

● **Overall evaluation of this report in terms of the clarity, accuracy and integrity of the disclosure of information, data and index:**

Clarity	A. Excellent	B. Good	C. Fair	D. Not Satisfactory	E. Poor
Accuracy	A. Excellent	B. Good	C. Fair	D. Not Satisfactory	E. Poor
Integrity	A. Excellent	B. Good	C. Fair	D. Not Satisfactory	E. Poor

● **Readability of this report in terms of content arrangement and layout design?**

Content Arrangement	A. Excellent	B. Fair	C. Poor
Layout Design	A. Excellent	B. Fair	C. Poor

● **Any other opinion/suggestion for our work and report of sustainability?**

Thank you for your feedback and precious time.



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