



**中华人民共和国工业和信息化部**

Ministry of Industry and Information Technology of the People's Republic of China



# 6G: New Infrastructure for the Digital Age in 2030

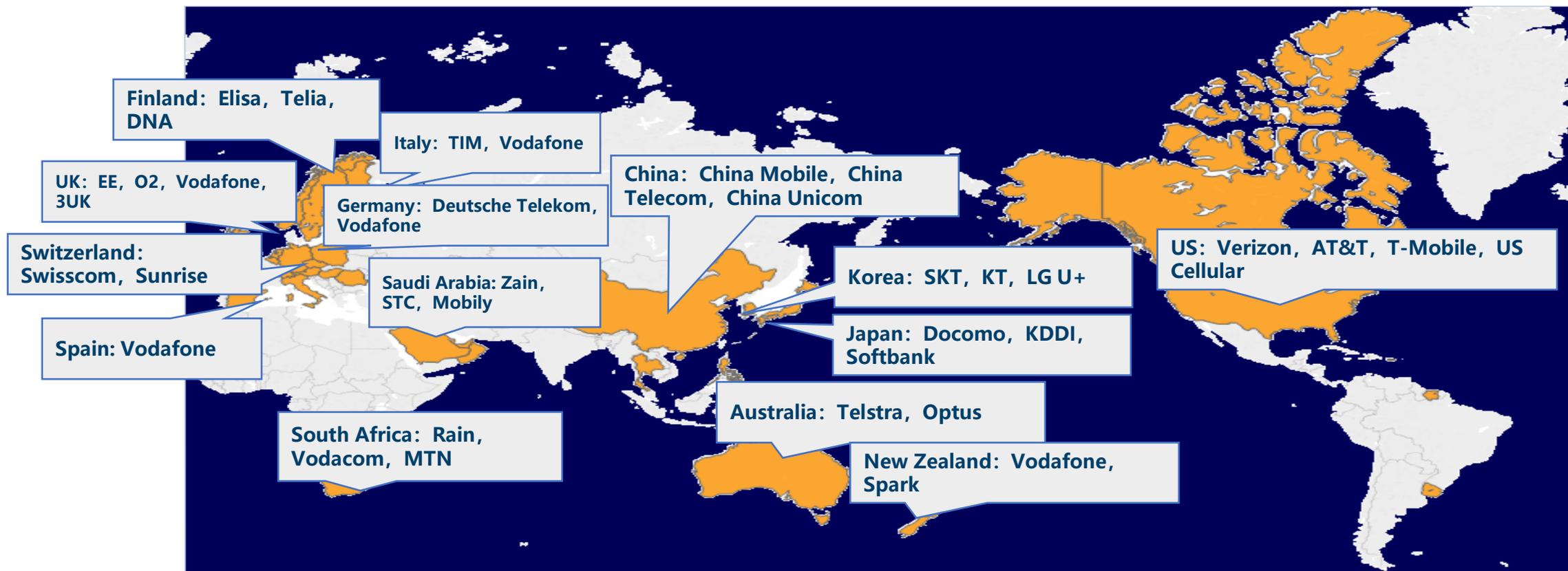
**Wen Ku**

**Information and Communication Development  
Department, MIIT  
November 2020**



## 5G has entered the stage of global large-scale commercialization

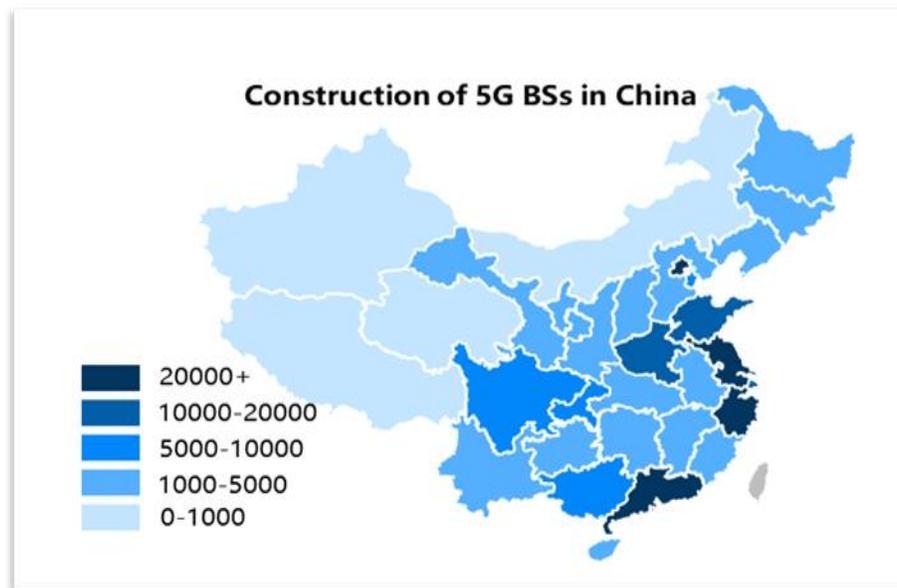
- 2020 is the year of global 5G service. As of September 2020, 115 operators in 52 countries/ regions announced 5G services.





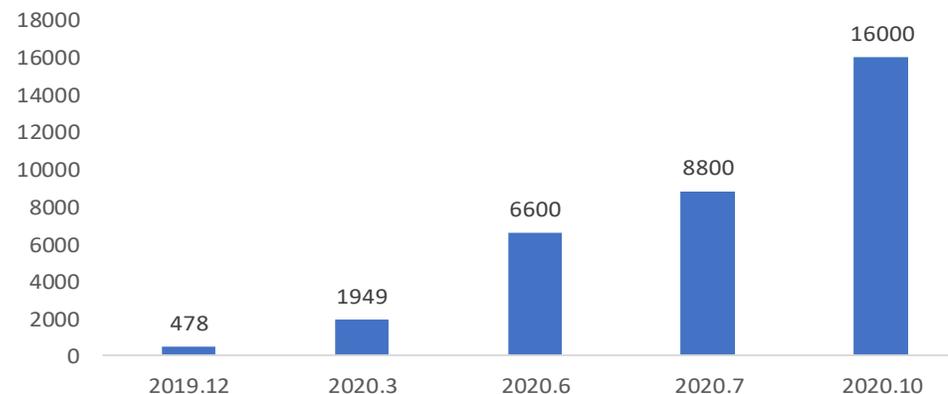
## China keeps a steady pace to deploy 5G networks

- China has 5G with the principle of "promoting 5G applications while accelerating network construction".
- 700,000 5G base stations and 160 million 5G terminal connections by the end of October.
- SA mode has also achieved large-scale commercial use.



Unit: 10 thousand

### 5G Terminal connections in China



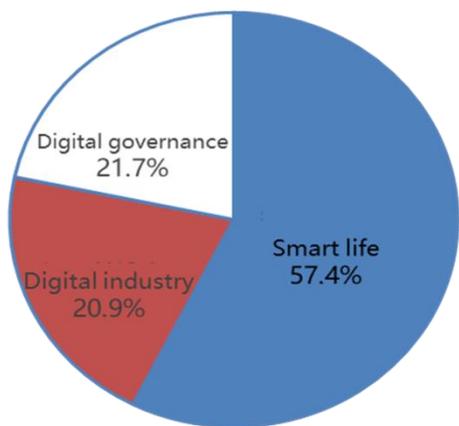
Data source: MIIT(by October, 2020)



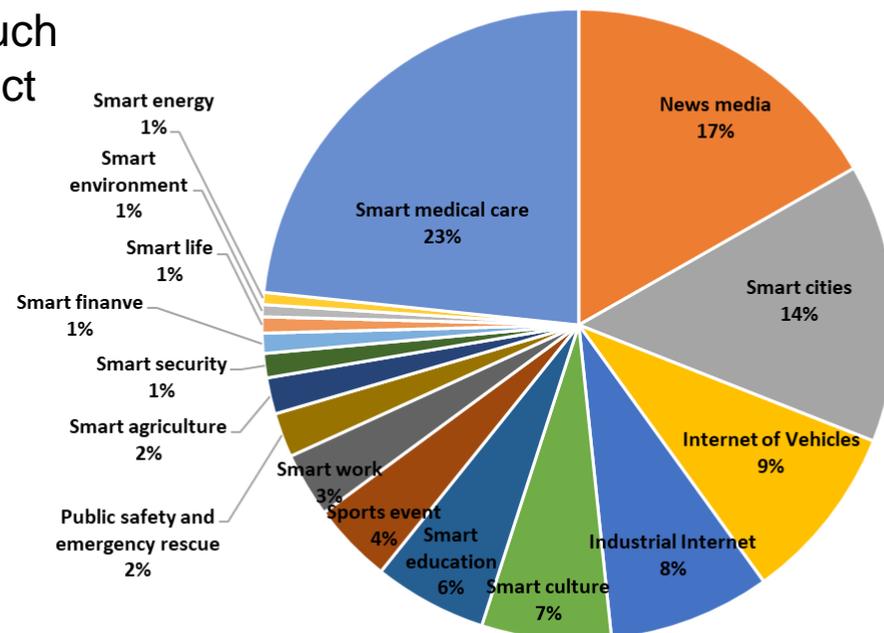
## 5G application is moving from exploration into practice

- Since 2018, China had organized the "Bloom Cup" 5G application contest yearly, which promote 5G application in many area.
- more than 4,200 projects were received this year contest event . Smart medical care, news media, smart cities, Internet of Vehicles and industrial are 5G pioneer applications.
- 5G converged applications in vertical industries still have problems such as insufficient business innovation, unclear business models, imperfect laws and regulatory policies, etc.

Proportion of 5G's three major application directions



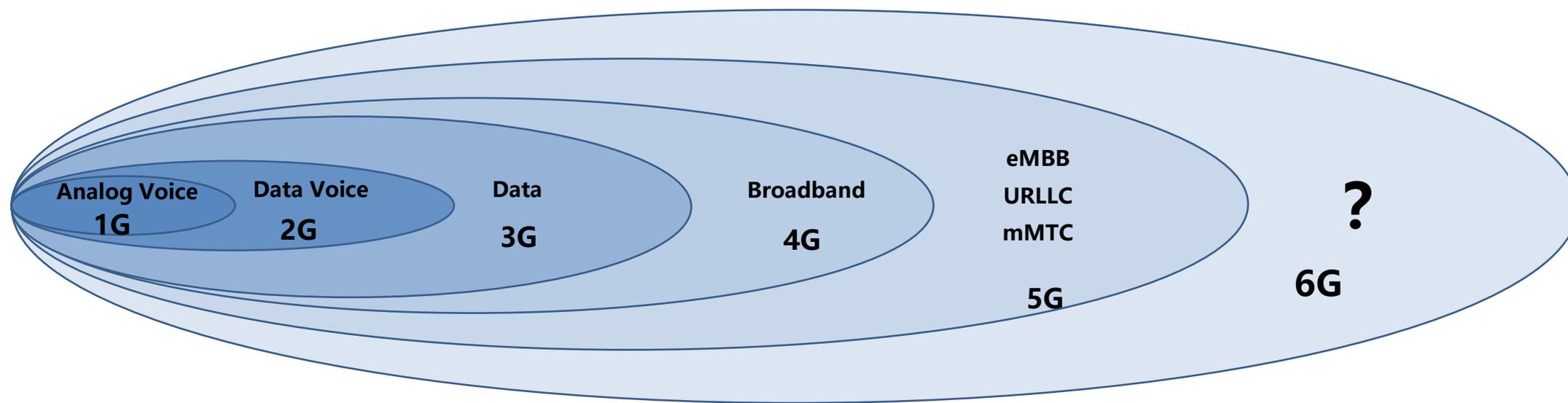
Distribution of 5G applications in China by industry





## The success of 5G is the foundation of 6G

- History: two generations for one service mature. Voice service: 1G-2G. Data service: 3G-4G.
- 5G expands from mobile Internet to Internet of Things for the first time
- 5G will become the start of the industry Internet. 6G will rich the scenarios and applications that 5G created.



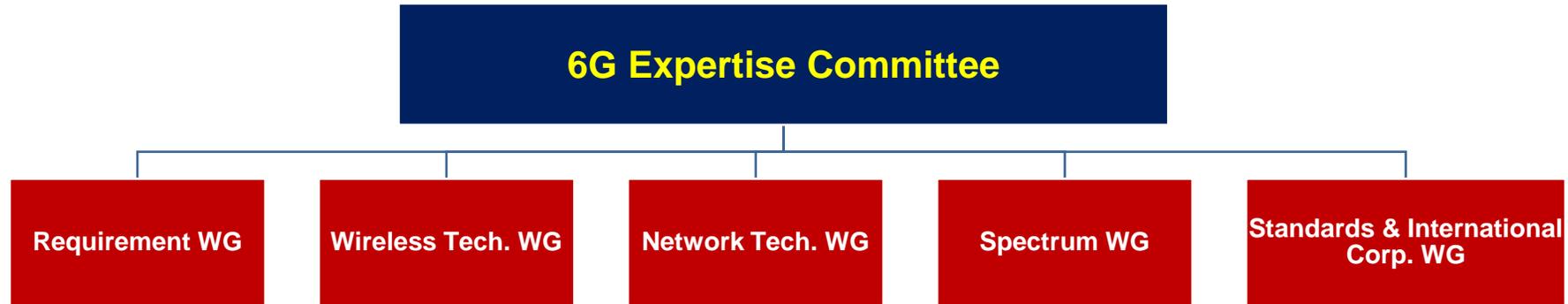


# 中华人民共和国工业和信息化部

Ministry of Industry and Information Technology of the People's Republic of China



## China's IMT-2030 (6G) Promotion Group Approach 6G research



- 57 member in the IMT-2030 promotion group, world members are welcomed, Samsung, DoCoMo, Ericsson, etc.

**Research institution**

**Operator**

**System equipment provider**

**Chipset and terminal provider**

**University**



## Future trends of network information technology development



(1) ICDT will form a multiplier effect of a new generation of network information technology innovation



(2) AI will promote network into the intelligence era



(3) Open source will release the innovative vitality of network information technology



(4) Integration of terrestrial and satellite network will expand the development space of network information technology



## 6G will explore from the Internet of Things to the Intelligent Connection of Everything

- 5G expanded from mobile internet to the internet of things. B5G/6G will further expand and deepen the IoT applications, and combine with AI and big data technologies to serve the intelligent society and life, to realize intelligent connection of everything.

### 6G Features

Stronger performance	<ul style="list-style-type: none"><li>• Higher transmission rate , shorter delay latency, lager connection</li></ul>
More intelligent	<ul style="list-style-type: none"><li>• Introduce artificial intelligence, big data and other technologies, which enable the network nodes to have intelligent capabilities the network will achieve comprehensive self-organization and self-optimization.</li></ul>
More green	<ul style="list-style-type: none"><li>• Reduce costs and energy consumption, improve system energy efficiency per bit, support the concept of low-carbon green development, and achieve sustainable development.</li></ul>
Wilder coverage	<ul style="list-style-type: none"><li>• The coverage is further extended to space and even deep sea, realizing an integrated air-space-ground communication network.</li></ul>
Ensure security	<ul style="list-style-type: none"><li>• Through physical signal design, architecture design, protocol design, and the application of blockchain, quantum communication and other technologies to ensure network security, improve communication reliability and information security.</li></ul>



## Challenges of 6G development



With 5G era of "Internet of things", more "things" will be connected to the network. Efficiently and flexibly use limited spectrum resource for 6G will become a key challenge;



6G, diversified scenarios and differentiated user needs will be strong technical challenges for system design;



6G, with multiple working frequency bands, variety of service rate, system capacity, coverage, and mobility. The transmission technology has various challenges such as performance, complexity, and efficiency.



6G, innovations are needed in the fields of material technology, device design, packaging and integration of chips and devices.



## Cooperation is the foundation for global 6G development



6G is huge stone which needs support legs from world's companies, countries and regions. No one can complete all the links in the industry chain alone;



The successful development of mobile communications from 1G to 5G is the positive experience of the global industry.



The global development of mobile communications is facing severe challenges. Do less political, do more technical,.



Openness, sharing and win-win cooperation, work together with the world are the philosophy of Chinese 6G. China hopes to jointly promote the healthy development of 6G and make positive contributions to the well-being of all mankind.



## Suggestions to global 6G development

◆ One world, one standard (6G)

◆ More technical, Less political dispute , contribute a harmonized environment

◆ Successful 5G is the mother of 6G

◆ Promote multi stake holds cooperation, and jointly advance the healthy development of global 6G



**中华人民共和国工业和信息化部**

Ministry of Industry and Information Technology of the People's Republic of China



**Thank You!**

