

# Analysis of the 5th Generation Mobile Network Technology

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**Abstract:** 5th Generation Mobile Networks Market is very complicated. By using analytic hierarchy process and analogy analysis method and referring to the changes of previous communication technologies and the innovation of science and technology market brought by the breakthrough of new technologies in the 5G era, we comprehensively analyzed the market situation of 5G era, including user group, cost consumption, equipment installation and distribution, service quality, market share and other aspects, and concluded that in the 5G era, the communication technology market is dominated by 5G and the market operation mode of coexistence of 4G and 5G.

## 1. Introduction

The development of 5G technology has become mature. On June 6, 2019, the Ministry of Industry and Information Technology officially issued a 5G license, and this year has become the first year of 5G in China. Compared with 4G, 5G technology has its advantages in higher data transmission rate and lower network delay. The Internet of things of the Internet of everything will be better realized relying on 5G technology. Accordingly, 5G will soon enter various industries and make great progress. As the most widely used communication technology, 4G has encountered unprecedented challenges.

## 2. The Development of Communication Technology

### 2.1 The 3th Generation Mobile Communication Technology

In 2008, compared with the global 3G development, China's 3G is still in its infancy. But that was a crucial year for 3G development in China. In 2008, China had 600 million mobile phone users and 200 million Internet users. In the same year, Beijing hosted the Olympic Games that attracted worldwide attention. The major operators made technological breakthroughs and 3G key technologies became mature. In 2009, the Ministry of Industry and Information Technology issued 3G licenses, and China officially entered the 3G era.

### 2.2 The 4th Generation Mobile Communication Technology [1]

In 2001, China launched the B3G/4G mobile communication development research program -- Future Technology for Universal Radio Environment. With this plan, China quickly broke through the next generation of mobile communication technology, brought up a large number of communication professionals, and made China's 4G research and development among the top in the world. In December 2013, the Ministry of Industry and Information Technology issued a 4G license, and China's telecommunications industry entered the 4G era.

### 2.3 The 5th Generation Mobile Communication Technology

In February 2013, the European Union announced that it would allocate 50 million euros. Accelerating the development of 5G mobile technology, it plans to introduce a mature standard by 2020. On February 23, 2018, on the eve of mobile world congress, Vodafone and HUAWEI announced that they had completed the world's first 5G call test in Spain by cooperating with the

new wireless standard 3GPP 5G and the Sub6 GHz band. On June 6, 2019, the Ministry of Industry and Information Technology officially issued 5G commercial licenses to China Telecom, China Mobile Communications Group Co., Ltd, China Unicom and China Broadcast Network, marking the first year of 5G commercial use in China.

### **3. Comparative Analysis of 4G and 5G**

#### **3.1 The Advantage of 5G**

The most prominent advantage of 5G over 4G is the data transmission rate, up to 10Gbit/s, which is 100 times higher than 4g-lte cellular network technology. Simply put, watching video with data on 3G is a luxury, while 4G is the norm, and 5G is about downloading a high-definition video in seconds. At the same time, based on this rate, we can boldly imagine that many aspects of science fiction envisioned in the past can be applied to real life.

First, with the help of 5G, there will be a technology explosion. Unmanned driving, intelligent logistics, smart home, intelligent life and the Internet of everything will truly come to ordinary people with the help of 5G technology. You can imagine that after work, you can take a ride in an unmanned car, click on the setting of the mobile terminal, the air conditioner and humidifier at home will start to run, and the garage door will automatically open when the vehicle is near the garage. Back home, the air conditioner and humidifier just adjust the temperature and humidity to the set comfort value, the water heater starts working, and the photosensitive system automatically adjusts the brightness of the room. Everything is so comfortable, which will be better promoted in the 5G era.

Second, with the development of smart mobile devices, after 5G popularization, the components of smart mobile devices such as mobile phones and computers can be greatly simplified, especially the storage part and computing part. With the help of the extremely high data transmission rate, the progress bar can be directly dragged by watching the high-definition video, and the downloading software can be completed almost instantaneously. In the future, the cache and online are almost synchronized, and the storage part can be greatly simplified. The computing part can also completely connect smart devices to cloud computing, greatly simplifying the configuration of the computing part.

Third, the development of virtual reality technology. In terms of education, students can learn and even experiment anytime and anywhere with the help of VR technology in the 5G era. Through built-in experiments and calculations, students can more conveniently receive knowledge and observe experimental phenomena directly, thus saving educational resources. In terms of life, high-speed data transmission rate makes holographic projection call possible, real-time meeting, no need to be on the spot, compared with video meeting, it can use body language to show the views you need to express, more appealing, greatly reducing the space needed for office. In terms of military affairs, the daily training of soldiers can also make use of this. Virtual reality technology enables soldiers in different regions to better exercise their ability to meet emergencies and improve their operational quality without crossing over remote places for collaborative training.

Four, with the continuous deployment and development of 5G, its social value will be enormous. Industries involved in 5G technology will provide more jobs and industrial values for the society. It is estimated that by 2035, the industry that promotes productivity with 5G will create \$12 trillion of global output value, and 22 million jobs will be created directly or indirectly, which will lead to healthy competition around the world.

#### **3.2 The Disadvantage of 5G**

At the same time, the initial commercial use of 5G also faces some inevitable problems, and mature 4G technology can do better in these aspects.

First, as of July 2019, the number of 4G users in China has reached 1.24 billion. In the initial stage of 5G, 4G can still meet the needs of most users and enterprises. Only a small number of users or enterprises will choose to use 5G to meet their needs in some aspects at a great cost.

Second, cost. In the early days of 5G, the cost is bound to be huge. According to the change of the previous mobile communication technology, the cost of the initial charge is difficult for ordinary people to afford. However, with the maturity of 4G technology, the charge of 4G data rate has been reduced to a very low level. More and more free data plans have appeared, and casual use of data has become a daily phenomenon. With the continuous development of 5G, the only way for it is to reduce the cost. I believe that popularization will be its development trend.

Third, the deployment speed, 5G network deployment is different from 3G, 4G technology. The high speed and high frequency band make it need more base stations and complex equipment. In the initial stage, only the key coverage can be selected, and the comprehensive coverage will be gradually selected after the technology is gradually mature. Moreover, due to the large capital gap, the time of comprehensive coverage will be longer, while 4G is now fully covered

Four, the use of 5G is no longer the rigid demand like 4G replacing 3G. Ordinary people do not need to upgrade 4G to 5G in order to meet their daily entertainment and work. Only when new products or demands appear, 5G will truly enter their daily life.

#### **4. Summary**

The popularization of 5G is a long process, which means most users will still use 4G network in the meantime. However, some users said that the speed of 4G network seemed to decrease in recent experience. [2] The reasons may be as follows. This year is the first year of 5G commercial use in China. Secondly, in order to save resources, operators gradually phase out 2G and 3G networks and correspondingly reduce 2G and 3G base stations, and users can only choose 4G networks. Meanwhile, the emergence of various free data rate plans makes users use 4G networks without limit, causing congestion. At the same time, 5G base stations will be built and the number of 4G base stations will not increase, so 4G speed will decrease. However, I believe this is only temporary. With the gradual coverage of 5G, 4G users will be separated from 4G users, and the focus of work will be changed to the simultaneous construction and deployment of 5G and guarantee of 4G services, so as to build a new pattern of communication technology.

5G technology brings not only the speed increase, but also the impact of the technology on industry and society. The road of 5G deployment will not be smooth and will inevitably face various difficulties at the beginning, but the innovation of this technology will have a profound impact on social development. In the long run, 5G will replace 4G. However, based on the current situation, it is not realistic to phase out 4G. Due to the cost and technical limitations, the deployment of 5G will take 5-10 years to complete. As consumers, appropriate price and good experience are what we expect. In the initial stage of 5G commercial application, 4G technology is still the main choice for users, and 5G will gradually occupy more market share. In the future, the long-term deployment situation may be the new pattern of urban deployment of 5G and rural deployment of 4G, and the real elimination of 2G and 3G May be.[3] 4G and 5G will coexist for a long time.

#### **References**

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