The 50th Statistical Report on China's Internet Development

China Internet Network Information Center (CNNIC)

August 2022

Preface

In 1997, China's competent departments authorized China Internet Network Information Center (CNNIC) to organize relevant Internet entities to jointly carry out the Statistical Survey on Internet Development in China and regularly release the *Statistical Report on Internet Development in China* (hereinafter referred to as the "Report") at the beginning and middle of each year. Ever since then, CNNIC has published 49 reports. The Report has reflected the process of building up China's strength in manufacturing and cyberspace through core data. It has provided an important reference for Chinese government departments, domestic and international industry institutions, experts, scholars, and the general public to understand the development of China's Internet and formulate relevant policies.

In the first half of 2022, the Covid-19 pandemic and the Ukraine crisis led to increased risks and challenges, the complexity, severity and uncertainty of China's economic development environment rose, and steady growth, stable employment and stable prices faced new challenges. In the face of a complex and severe environment and many risks, the national industry and information technology system went all out to ensure smooth operation, help enterprises in difficulty, expand domestic demand, and stabilize expectations, and made significant contributions to maintaining economic operation in a reasonable range. With the joint efforts of all parties, the contribution of China's online retail to market sales growth continued to rise, and the consumption of information services and investment in high-tech manufacturing industries maintained rapid growth. The digital economy has become an important pillar to stabilize growth, promote transformation and improve people's livelihood.

As a faithful recorder of a manufacturing power and network power, CNNIC has been following the development of China's Internet, expanding the scope of research, and subdividing research areas. The Report focuses on the five aspects, including basic Internet development, size of Internet users, Internet applications, industrial Internet, and Internet security. From a multi-pronged perspective, CNNIC has worked to comprehensively demonstrate the development of China's Internet in the first half of 2022 through all-round data.

We hereby express our heartfelt thanks to the Ministry of Industry and Information Technology of PRC, the Office of the Central Cyberspace Affairs Commission, the National Bureau of Statistics

of China, the Central Committee of the Communist Youth League, and other departments and units for their guidance and support for the Report. We would also like to express our sincere thanks to other institutions and Internet users that have supported this statistical survey on China's Internet development.

China Internet Network Information Center

August 2022

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Core Data

◇ As of June 2022, China had 1,051 million netizens, up 19.19 million over December 2021, and its Internet penetration had reached 74.4%, up 1.4 percentage points over December 2021.

◇ Up to June 2022, the number of mobile Internet users in China had reached 1,047 million, up 17.85 million over December 2021. The proportion of China's netizens accessing the Internet via their mobile phones was 99.6%, basically the same as that in December 2021.

◇ As of June 2022, the size of urban Internet users was 758 million or 72.1% of the national total, while that of rural Internet users was 293 million or 27.9% of the national total.

◇ Up to June 2022, the proportions of Chinese netizens accessing the Internet through mobile phones, TVs, desktop computers, laptop computers, and tablet computers were 99.6%, 26.7%, 33.3%, 32.6% and 27.6%, respectively.

◇ As of June 2022, the number of IPv6 addresses had increased to 63,079 blocks / 32, up 0.04% over December 2021.

◇ Up to June 2022, the number of China's domain names totaled 33.80 million. China had 17.86 million domain names ending with ".CN", making up 52.8% of the national total.

◇ As of June 2022, the user size of instant messaging in China reached 1.027 billion, up 20.42 million from December 2021, making up 97.7% of the national total netizens.

◇ Up to June 2022, the user size of online video (including video clips) in China had reached 995 million, up 20.17 million from December 2021, making up 94.6% of all Internet users. The number of video clip users amounted to 962 million, an increase of 28.05 million over December 2021, accounting for 91.5% of all Internet users.

◇ As of June 2022, the user size of online payment in China had reached 904 million, up 810,000 from December 2021, taking up 86.0% of the national total netizens.

◇ As of June 2022, the user size of online news in China had reached 788 million, up 16.98 million from December 2021, making up 75.0% of the national total netizens.

◇ As of June 2022, the user size of live streaming in China had reached 716 million, an increase of 12.9 million over December 2021, accounting for 68.1% of all Internet users.

◇ Up to June, the user size of online medical services in China had amounted to 300 million, up 1.96 million from December 2021, accounting for 28.5% of all Internet users.

Chapter One Basic Internet Development

I Basic Internet Resources

As of June 2022, the number of IPv4 addresses in China was 391.92 million, that of IPv6 addresses was 63,079 blocks/32, and that of active IPv6 users reached 683 million. The total number of domain names in China was 33.80 million[1], of which the number of domain names ending with ".CN" was 17.86 million, accounting for 52.8%. The number of mobile phone base stations in China totaled 10.35 million, the number of Internet broadband access ports reached 1.035 billion, and the total length of fiber optic cable lines amounted to 57.91 million kilometers.

Table 1 Comparison: Basic Internet Resources from Dec. 2021 to June 2022

	Dec. 2021	June 2022
IPv4	392,486,656	391,918,080
IPv6 (block/32)	63,052	63,079
Number of active IPv6 users (100 million)	6.08	6.83
Domain name	35,931,063	33,805,195
Domain names ending with ".CN"	20,410,139	17,861,269
Mobile phone base stations (10,000)	996	1,035
Internet broadband access ports (100 million)	10.18	10.35
Length of fiber optic cable lines (10,000 km)	5,488	5,791

(I) IP Address

As of June 2022, the number of IPv6 addresses was 63,079 blocks/32, up 0.04% over December 2021. Fourteen or 60.87% of the 23 globally-known public recursive services monitored by CNNIC offer IPv6 addresses, among which 13 resolution services are normal.

[1] The total number of domain names is rounded data.

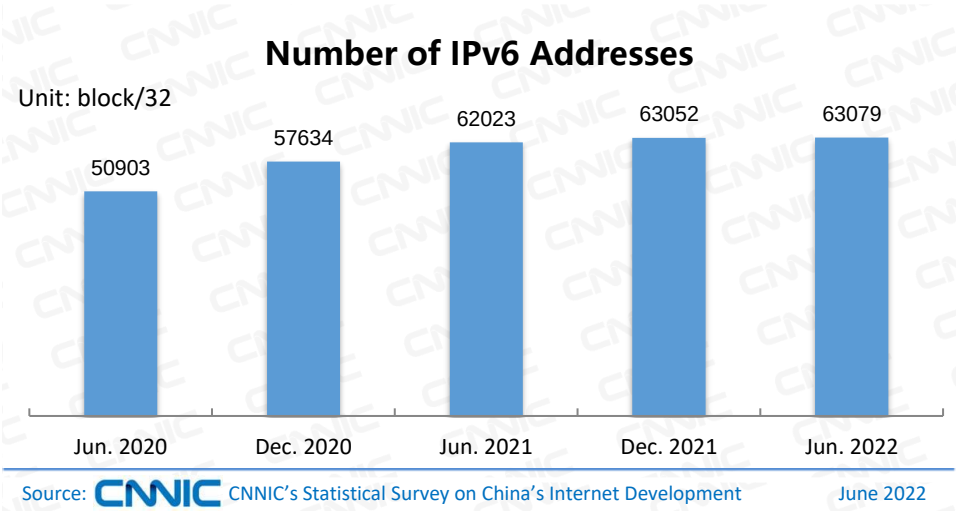


Figure 1 Number of IPv6 Addresses[2]

As of June 2021, the number of active IPv6 users in China reached 683 million.

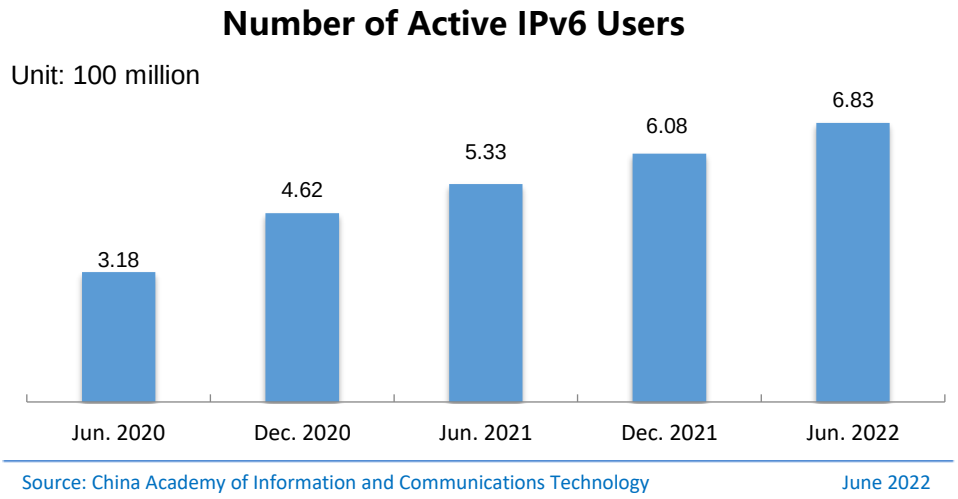


Figure 2 Number of Active IPv6 Users

Up to June 2022, the number of IPv4 addresses in China had amounted to 391.92 million.

[2] The data cover Hong Kong, Macao and Taiwan.

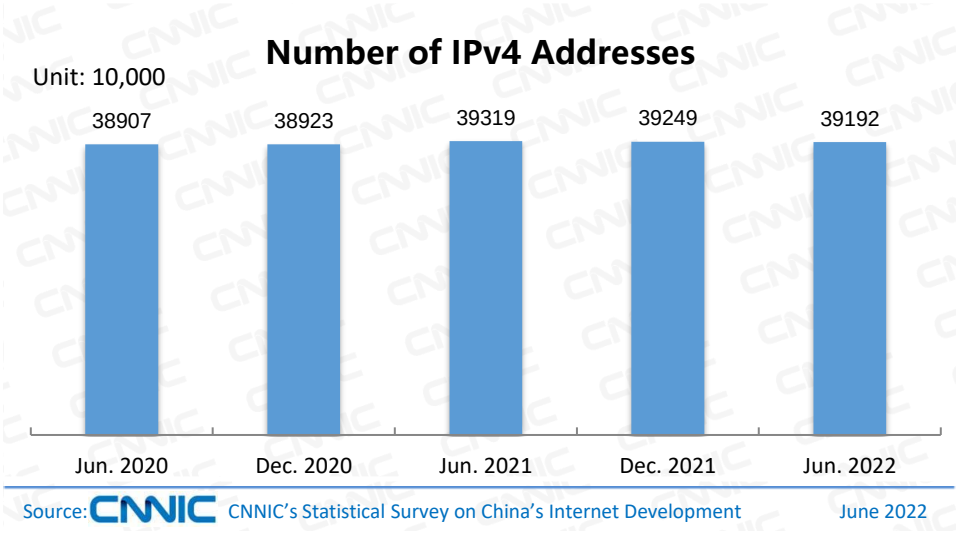


Figure 3 Number of IPv4 Addresses[3]

(II) Domain Name

Up to June 2022, the number of China's domain names totaled 33.80 million. Specifically, 17.86 million or 52.8% ended with ".CN"; 10.09 million or 29.9% ended with ".COM"; 190,000 million or 0.6% ended with ".中国"; and 4.59 million or 13.6% were new generic Top-Level Domains (New gTLDs).

Table 2 Number of Domain Names by Category[4]

	Number	Proportion in total domain names
.CN	17,861,269	52.8%
.COM	10,093,729	29.9%
.NET	893,198	2.6%
.中国	186,292	0.6%
.ORG	55,990	0.2%
.INFO	36,313	0.1%
.BIZ	23,296	0.1%
New gTLD	4,590,705	13.6%
OTHERS	64,403	0.2%
TOTAL	33,805,195	100.0%

[3] The data cover Hong Kong, Macao and Taiwan.
[4] Data about generic Top-Level Domains (gTLDs) and new generic Top-Level Domains (New gTLDs) are provided by China's domain name registration organizations. The number of ".CN" and ".中国" domain names is the number of domestic registrations.

Table 3 Number of ".CN" Domain Names by Category

	Number	Proportion in total ".CN" domain names
.CN	13,262,805	74.3%
.COM.CN	2,783,035	15.6%
.ADM.CN[5]	665,900	3.7%
.NET.CN	610,820	3.4%
.ORG.CN	486,580	2.7%
.AC.CN	30,387	0.2%
.GOV.CN	14,921	0.1%
.EDU.CN	6,630	0.0%
OTHERS	191	0.0%
TOTAL	17,861,269	100.0%

(III) Number of Mobile Phone Base Stations

5G network infrastructure construction was accelerated. As of June 2022, the number of mobile phone base stations totaled 10.35 million, a net increase of 387,000 compared with December 2021. Specifically, the total number of 5G base stations reached 1.854 million, accounting for 17.9% of the total number of mobile base stations, an increase of 3.6 percentage points compared with December 2021, among which 429,000 5G base stations were newly built from January to June.

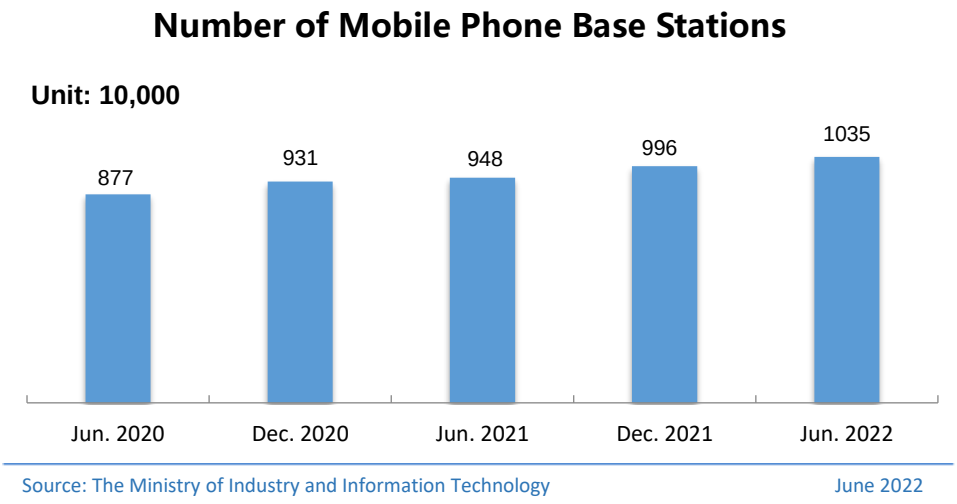


Figure 4 Number of Mobile Phone Base Stations

[5].ADM.CN refers to a virtual secondary domain name that is the collective name for all administrative domain names (second-level domain names) under ".CN".

(IV) Number of Internet Broadband Access Ports

Gigabit optical broadband network coverage and service capability were improved. As of June 2022, the number of Internet broadband access ports nationwide reached 1,035 million, a net increase of 16.85 million from December 2021. Specifically, the number of FTTH/O ports reached 985 million, a net increase of 25.17 million over December 2021, while the proportion increased to 95.2% from 94.3% in half a year. The number of 10G PON ports with Gigabit network service capability reached 11.03 million, a net increase of 3.18 million over the end of last year.

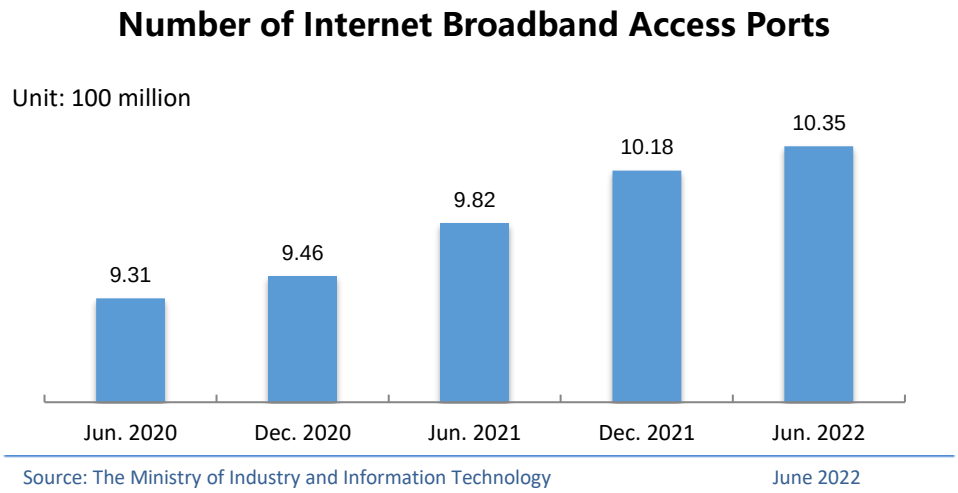


Figure 5 Number of Internet Broadband Access Ports

(V) Length of Fiber Optic Cable Lines

The total length of fiber optic cable lines increased steadily. By June 2022, the total length of China's fiber optic cable lines had reached 57.91 million kilometers, a year-on year increase of 8.2% and a net increase of 3.03 million kilometers compared with December 2021. Of them, access fiber optic cable lines, local relay fiber optic cable lines and long-distance fiber optic cable lines accounted for 62.6%, 35.5% and 1.9% respectively.

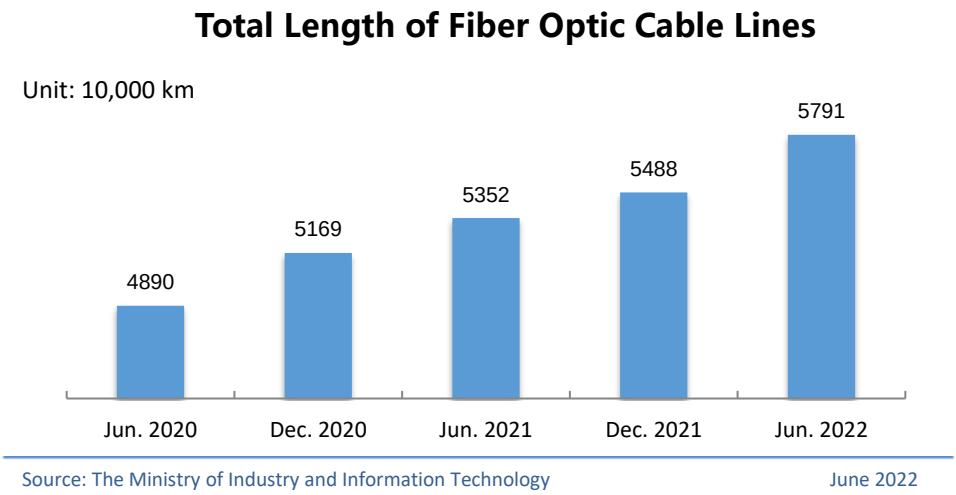


Figure 6 Total Length of Fiber Optic Cable Lines

II Application of Internet Resources

(I) Websites

As of June 2022, there were 3.98 million websites in China[6].

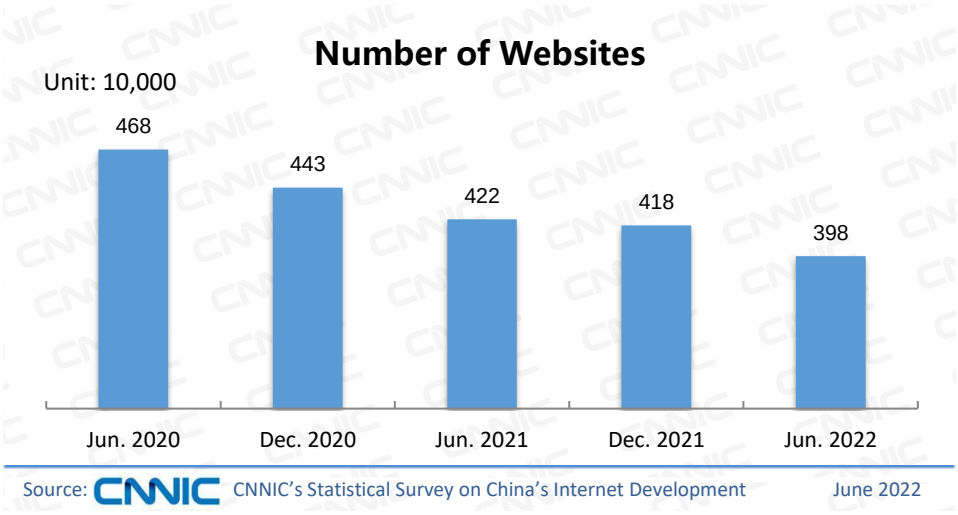


Figure 7 Number of Websites[7]

Up to June 2022, China had 2.22 million websites with domain names ending with ".CN"

[6] The websites whose domain name registrants are within the territory of the P.R.C.
[7] The number of websites does not include that of those ending with ".EDU.CN".

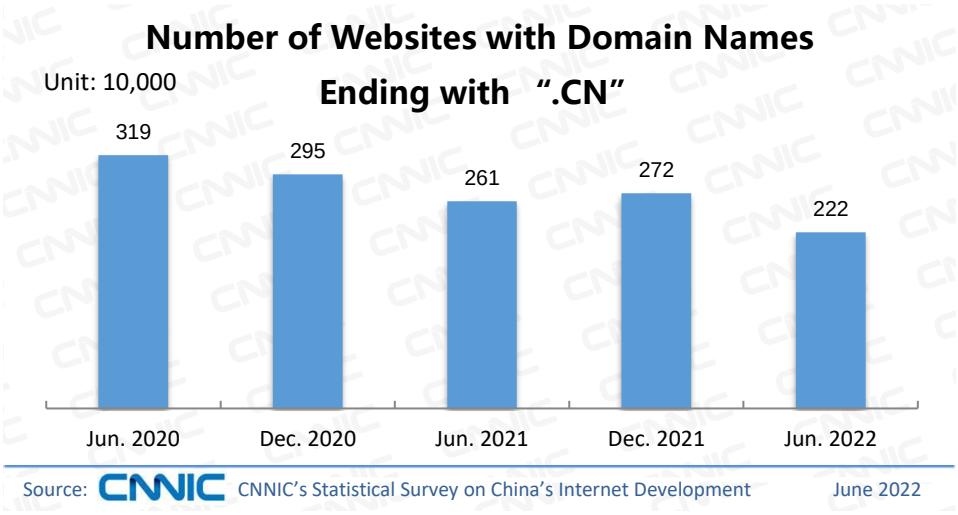


Figure 8 Number of Websites with Domain Names Ending with ".CN"[8]

(II) Mobile Internet Access Traffic

Mobile Internet traffic was growing rapidly. In the first half of 2022, China's mobile Internet access traffic reached 124.1 billion GB, a year-on-year increase of 20.2%.

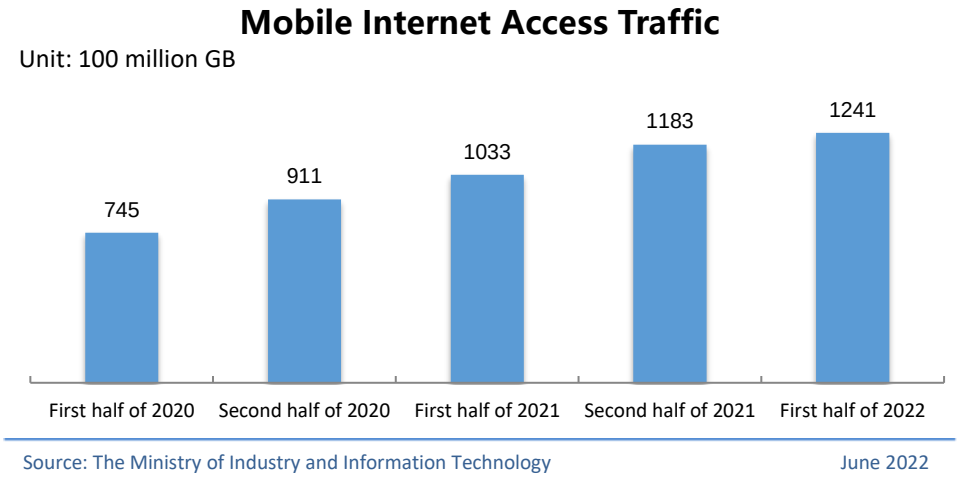


Figure 9 Mobile Internet Access Traffic

(III) Number and Category of Apps

As of June 2022, the number of apps monitored in China's domestic market was 2.32 million.

[8] The number of websites ending with ".CN" does not include that of those ending with ".EDU.CN".

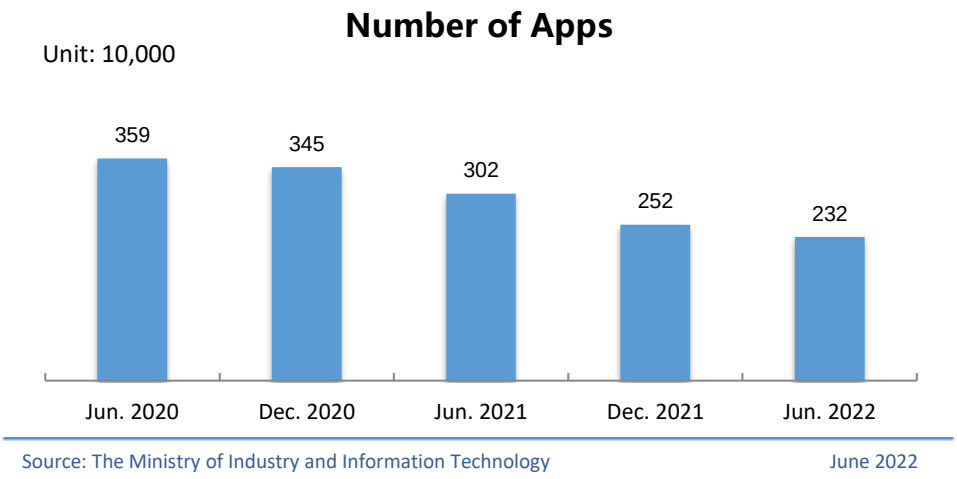


Figure 10 Number of Apps[9]

III Internet Access Environment

(I) Internet Access Devices

Up to June 2022, the proportions of Chinese netizens accessing the Internet through mobile phones, desktop computers, laptops computers, TVs and tablet computers were 99.6%, 33.3%, 32.6%, 26.7% and 27.6%, respectively.

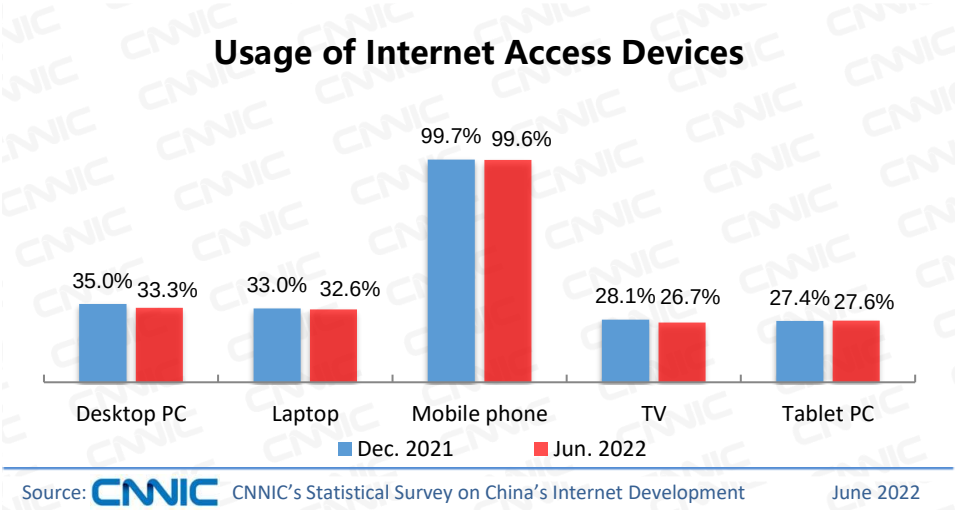


Figure 11 Usage of Internet Access Devices

[9] Number of Apps: In order to reflect the mobile App market dynamics more accurately, the method of monitoring data was changed from a "cumulative method" (i.e., the statistical data are calculated cumulatively) to an "on-shelf method" (i.e., the statistical data only cover available apps, excluding those sold out).

The mobile phone subscriber base grew steadily, with the 5G mobile phone subscriber base expanding rapidly. As of June 2022, the total number of mobile phone subscribers to the three basic telecommunications operators reached 1.668 billion, a net increase of 25.52 million compared with December 2021. Among them, 5G mobile phone users[10] reached 455 million, a net increase of 101 million compared with December 2021, accounting for 27.3% of mobile phone users, up 5.7 percentage points in six months.

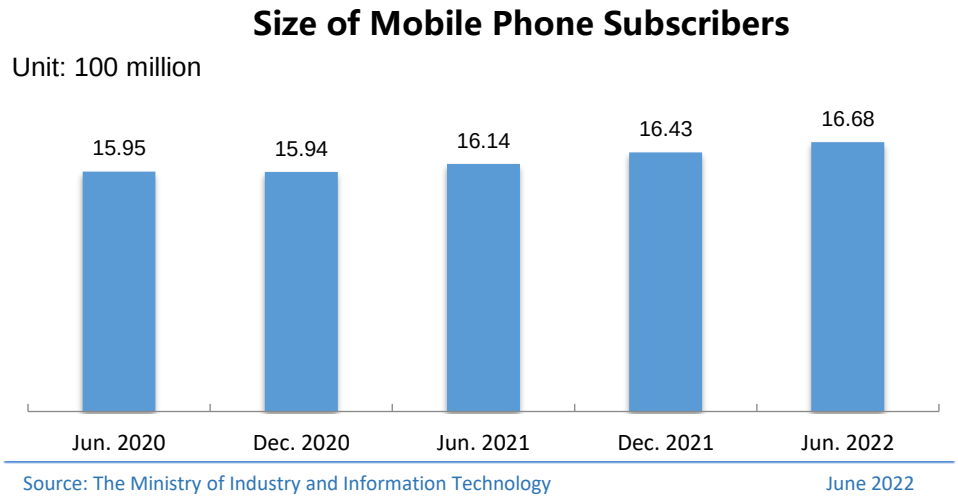


Figure 12 Size of Mobile Phone Subscribers

In the first half of 2022, the shipment of domestic mobile phones amounted to 136 million, down 21.7% year-on-year. In particular, the shipment of 5G mobile phones was 109 million, down 14.5% year-on-year, taking up 80.2% of the total mobile phone shipment in the same period.

[10] 5G mobile phone subscriber base refers to the number of active subscribers who have usage information in the communication billing system and occupy 5G network resources at the end of the reporting period.

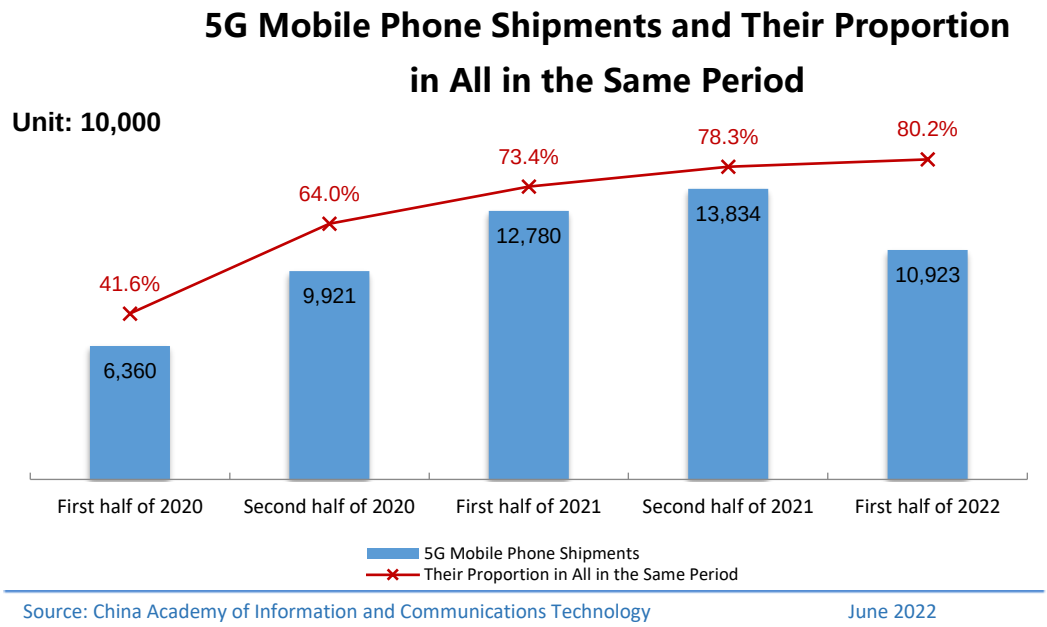


Figure 13 5G Mobile Phone Shipments and Their Proportion in All in the Same Period

(II) Online Duration

As of June 2022, the per capita weekly online duration[11] of China's Internet users was 29.5 hours, up 1.0 hour over December 2021.

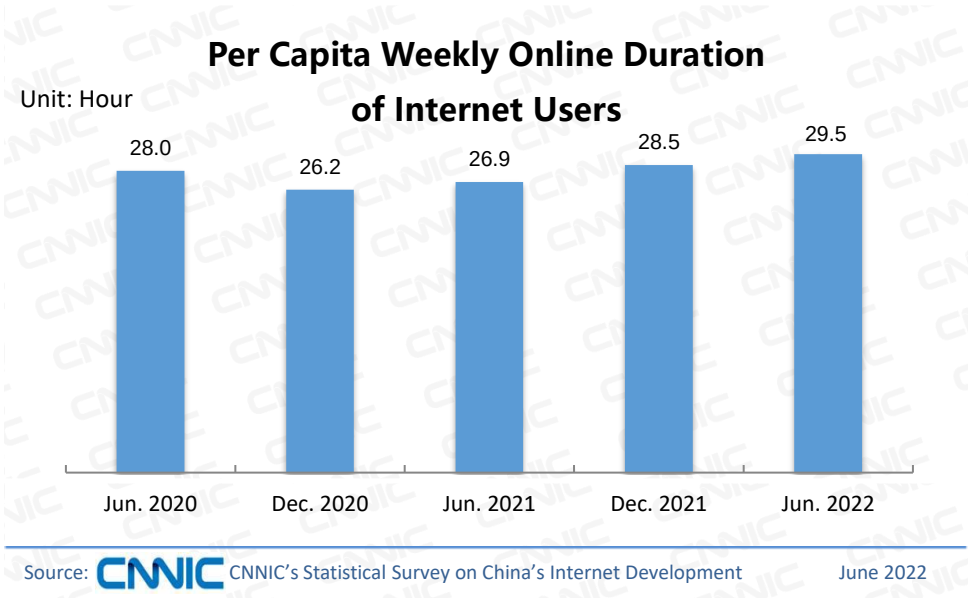


Figure 14 Per Capita Weekly Online Duration of Internet Users

[11] Per capita weekly online duration refers to the average daily number of hours on the Internet multiplied by 7 days in a week in the past six months.

(III) Fixed Broadband Access

The number of fixed broadband users increased steadily, with Gigabit users accounting for over 10%. As of June 2022, the three basic telecommunications operators had 563 million fixed broadband subscribers, a net increase of 27.05 million from December 2021. Specifically, fixed Internet broadband subscribers enjoying an access rate of 100Mbps or above reached 527 million, accounting for 93.7% of the total; those enjoying an access rate of 1,000Mbps or above reached 61.11 million and accounted for 10.9% of all Internet users, with a net increase of 26.56 million from December 2021.

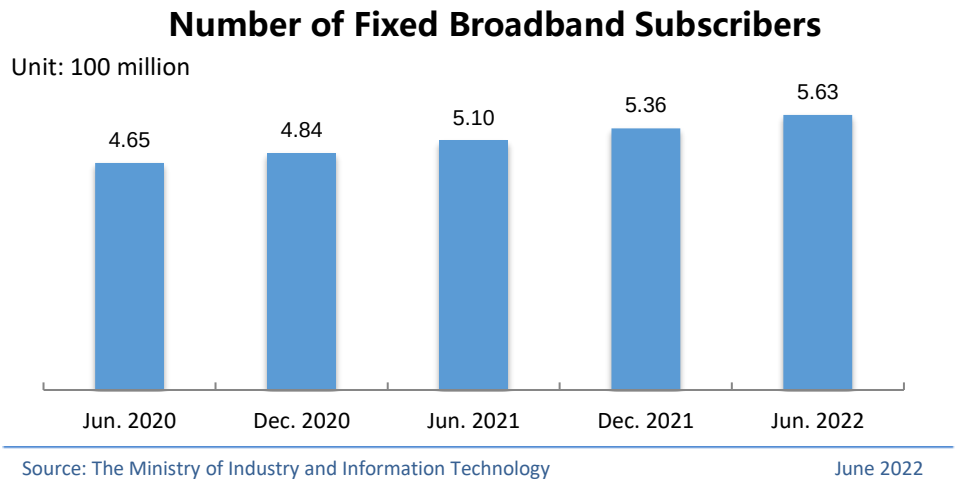


Figure 15 Number of Fixed Broadband Subscribers

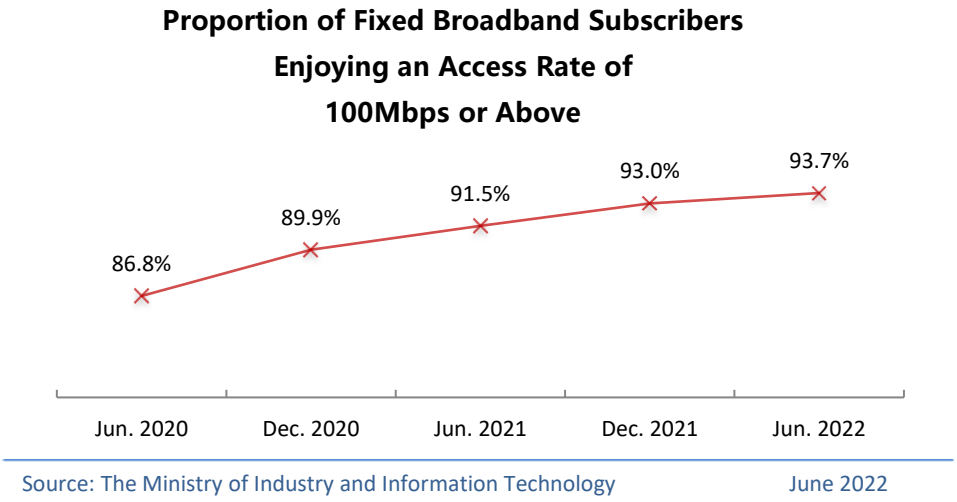


Figure 16 Proportion of Fixed Broadband Subscribers enjoying an Access Rate of 100Mbps or above

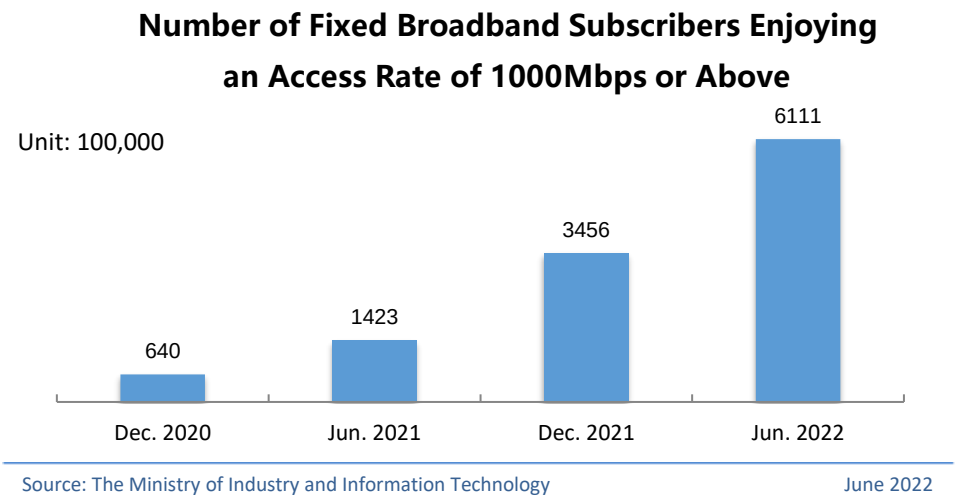


Figure 17 Number of Fixed Broadband Subscribers Enjoying an Access Rate of 1000Mbps or Above

As of June 2022, the number of FTTH/O users had reached 534 million, accounting for 94.9% of all fixed Internet broadband subscribers.

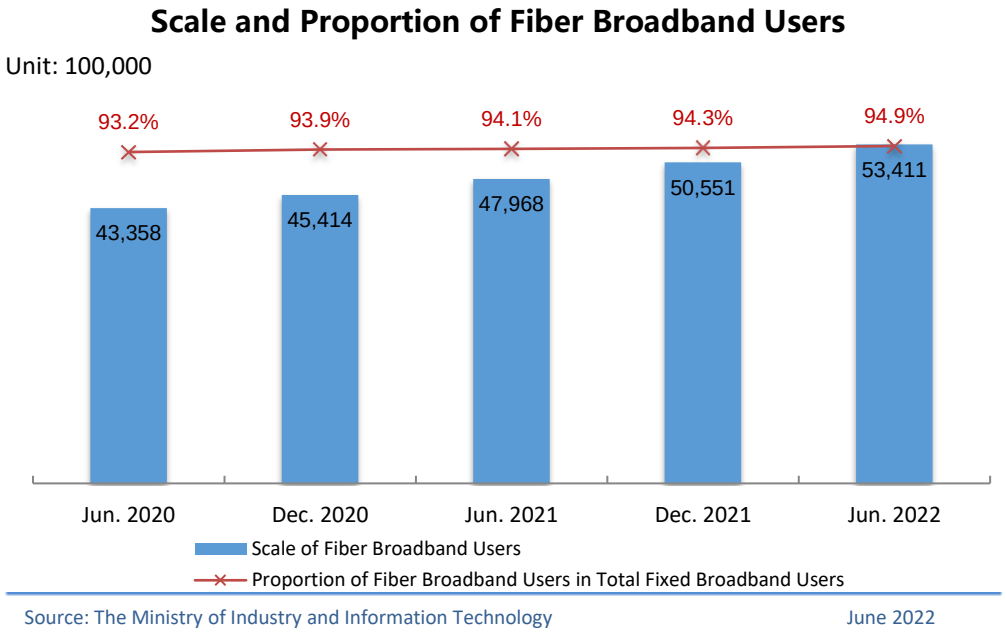


Figure 18 Scale and Proportion of Fiber Broadband Users

(IV) Number of Cellular IoT Terminal Users

Cellular IoT terminal users accounted for nearly half of the total mobile network terminal connections. By June 2022, the three basic telecommunications operators had developed 1.639 billion cellular IoT terminal users, a net increase of 240 million compared with December

2021. The number of cellular IoT terminal users was rapidly approaching the number of mobile phone users, accounting for 49.6% of the total mobile network terminal connections (covering both mobile phone users and cellular IoT terminal users).

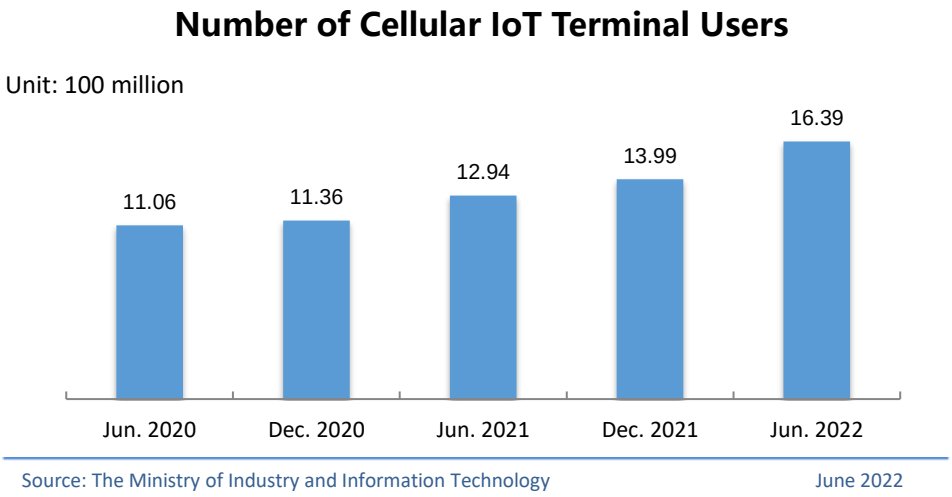


Figure 19 Number of Cellular IoT Terminal Users

Chapter Two Size and Structure of Internet Users

I Size of Internet Users

(I) Overall Size of Internet Users

Up to June 2022, China had 1,051 million netizens, up by 19.19 million over December 2021, and its Internet penetration had reached 74.4%, up 1.4 percentage points over December 2021.

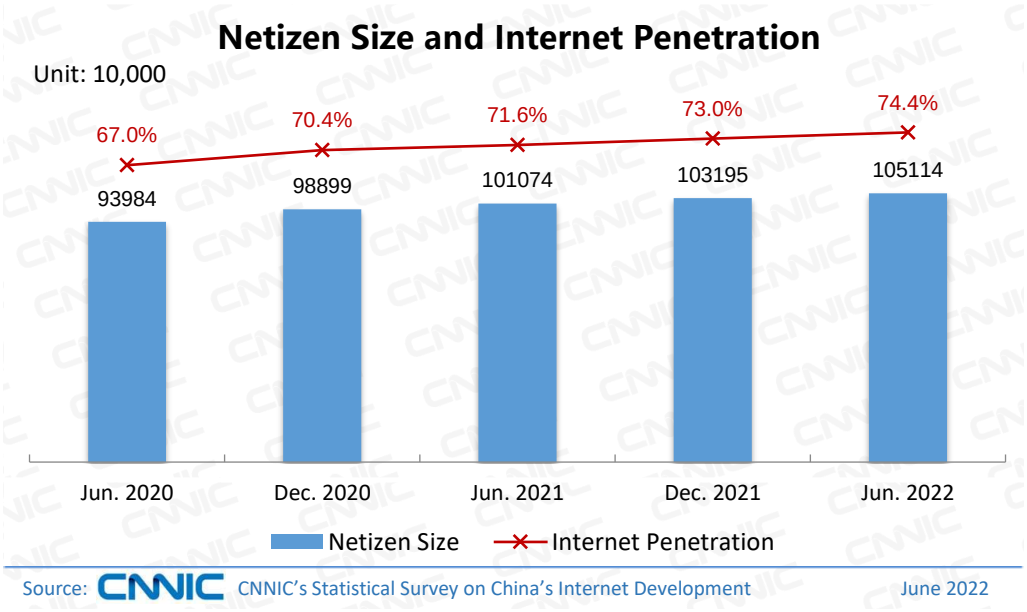


Figure 20 Netizen Size and Internet Penetration

Up to June 2022, the number of mobile Internet users in China had reached 1.047 billion, up 17.85 million over December 2021. The proportion of China's netizens accessing the Internet via mobile phones was 99.6%.

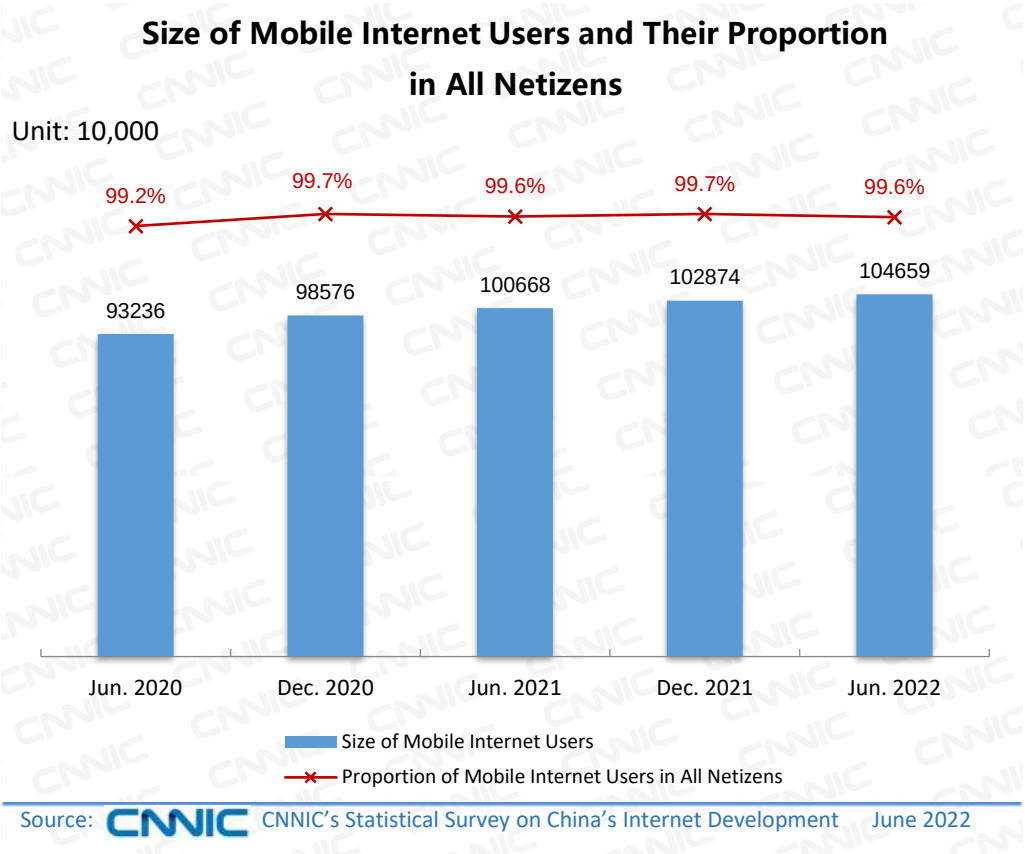


Figure 21 Size of Mobile Internet Users and Their Proportion in All Netizens

In the first half of 2022, China's Internet infrastructure construction was sped up, digital and information barrier-free services continued to improve to cater for an aging society, and the size of China's Internet users registered a further increase. **First, the construction and popularization of 5G networks were intensified.** In the first half of the year, the scale of China's 5G networks continued to expand. By June 2022, a total of 1.854 million 5G base stations had been built and put into operation, realizing the goal of "5G being available in every county and broadband available in every in village". Remarkable results were recorded in 5G application. The converged application of 5G and Gigabit optical networks was extended to the industrial, medical, educational, transportation and other fields, and the number of 5G application cases exceeded 20,000.[12] **Second, digital and information barrier-free services continued to advance to better meet the needs of an aging society.** By June, 2022, under the leadership of the Ministry of Industry and Information Technology, 452 websites and apps had been modified and evaluated for accessibility[13] to meet the

[12] Source: Press conference on the development of industry and information technology in the first half of 2022, held on July 19, 2022 by Information Office of the State Council.
[13] Source: Same as Footnote 12.

needs of the elderly and the disabled, helping special groups to share IT achievements, and making their life smarter and more convenient.

(II) Size of Internet Users in Urban and Rural Areas

As of June 2022, the size of rural Internet users in China was 293 million or 27.9% of the national total, while that of urban Internet users was 758 million, up 10.39 million from December 2021, making up 72.1% of the national total.

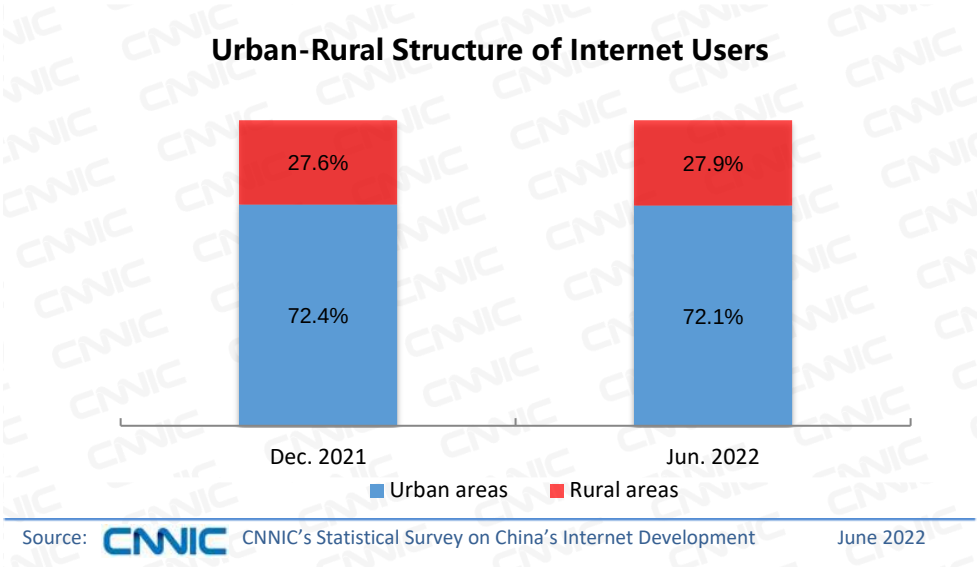


Figure 22 Urban-Rural Structure of Internet Users

Up to June 2022, the Internet penetration in urban China was 82.9%, up 1.6 percentage points over December 2021, while that in rural areas was 58.8%, up 1.2 percentage points over December 2021.

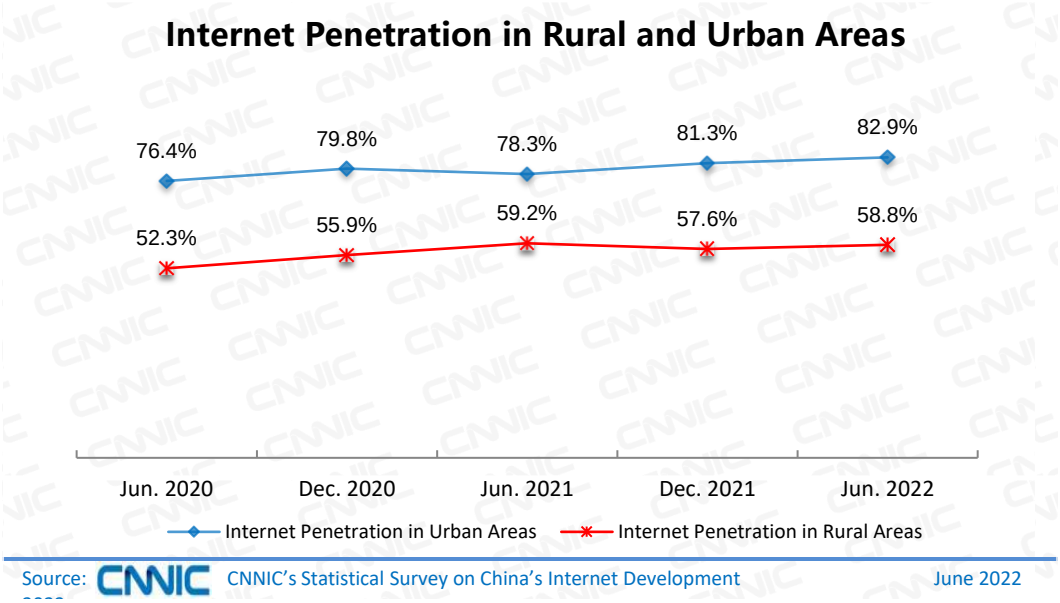


Figure 23 Internet Penetration in Rural and Urban Areas

Internet development boosted rural revitalization and digital transformation in rural areas continued to deepen. First, the construction of rural Internet infrastructure has been comprehensively strengthened. In 2021, China's existing administrative villages realized "broadband access to every village". In April 2022, the Ministry of Industry and Information Technology and other four ministries/commissions jointly issued *Key Points of Digital Rural Development in 2022*, proposing that 5G networks would cover key townships and some key administrative villages by the end of the year. As of June, Internet penetration in rural areas of China reached 58.8%, 1.2 percentage points higher than that in December 2021. **Second, digital technology was widely used in agricultural production, helping rural digital transformation and upgrading.** The new generation of information technologies such as IoT, big data, AI and cloud computing were deeply integrated with planting, animal husbandry and fishery. In 2021, the operating area of Beidou navigation equipment in the whole country's agricultural system exceeded 60 million mu (about four million hectares). A total of nine agricultural IoT demonstration provinces and 100 digital agriculture pilot projects were established nationwide, and 426 cost-saving and efficiency-enhancing agricultural IoT application achievements and models were recorded and released.[14] In May 2022, under the guidance of the Ministry of Industry and Information Technology, China released the first road map for the development of intelligent agricultural machinery, taking

[14] Source: GMW.CN, https://m.gmw.cn/baijia/2022-04/29/35700700.html , April 29, 2022.

unmanned agricultural machinery as the final form of product, and put forward nine frontier and key technologies such as smart whole-machine architecture and universal digital chassis. **Third, the rapid development of rural e-commerce opened up the urban-rural consumption cycle.** In the first half of 2022, rural online retail and online retail of agricultural products increased by 2.5% and 11.2% respectively.[14] E-commerce has effectively helped rural revitalization and become an important means to consolidate and expand the achievements of poverty alleviation.

(III) Size of Non-Internet Users

As of June 2022, the size of non-netizens in China was 362 million, down 19.66 million from December 2021. **By region**, the majority of non-netizens in China was still in rural areas; the proportion of non-netizens in rural areas was 41.2%, 5.9 percentage points higher than that of the national rural population. **By age**, the elderly aged 60 and above were the main group of non-netizens. As of June 2022, the proportion of Chinese non-netizens aged 60 and above accounted for 41.6% of all non-netizens, 22.5 percentage points more than that of the national population aged 60 and above[15].

Non-netizens are unable to access the Internet, so they cannot fully enjoy the convenience brought by intelligent services in travel, consumption, medical treatment, handling of affairs, and other aspects of daily life. According to statistics, when it comes to the biggest inconvenience caused by not being able to access the Internet, 27.9% of non-netizens said that they could not enter some public places without the "health code", 27.0% complained that it was difficult for them to handle affairs due to decreased offline service outlets, 24.0% reported that they could not buy tickets or get registered at the hospital, 23.6% said they could not get the needed information in a timely manner, such as news, and 22.2% worried that their payment by cash was unfeasible in some cases.

15 Source: mofcom.gov.cn, http://www.mofcom.gov.cn/xwfbh/20220714.shtml, Jul 14, 2022.

[15] The proportions of the national rural population and the population aged 60 and above are calculated based on the Bulletin of the *Seventh National Census* by China's National Bureau of Statistics.

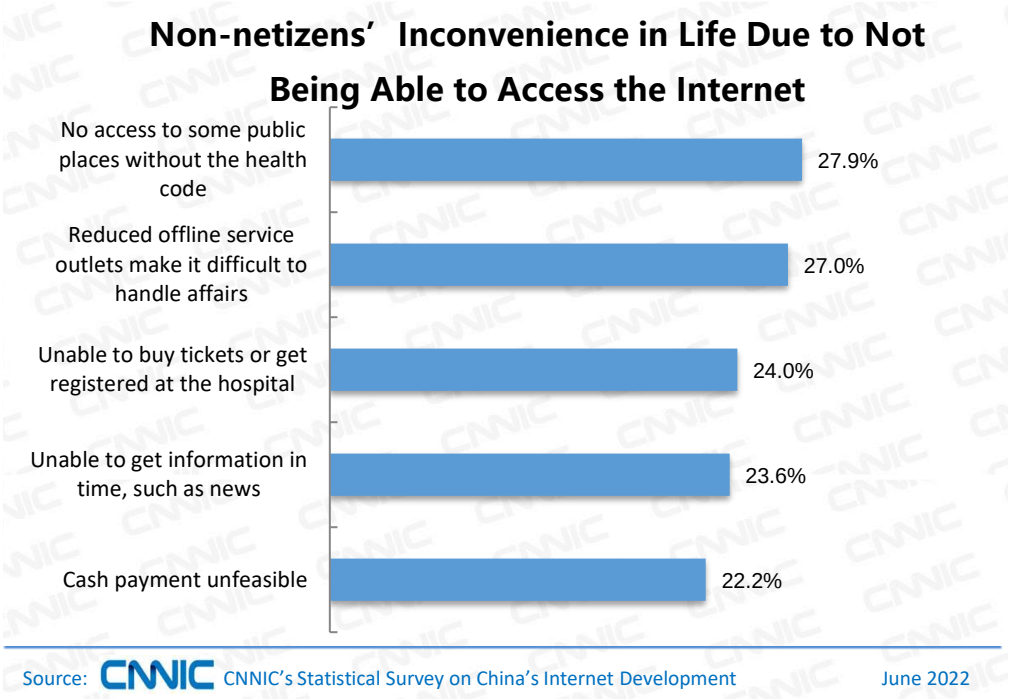


Figure 24 Non-netizens' Inconvenience in Life Due to Not Being Able to Access the Internet

Lack of skills, limited literacy, age factors and inadequate devices are the main reasons why non-netizens are unable to use the Internet. 60.7% of non-netizens was unable to access the Internet because they did not know how to use the computer/Internet; 28.0% because they did not master Pinyin or due to limited literacy; 19.8% because they were too old or too young to use the Internet, 16.0% because they did not have computers or other devices.

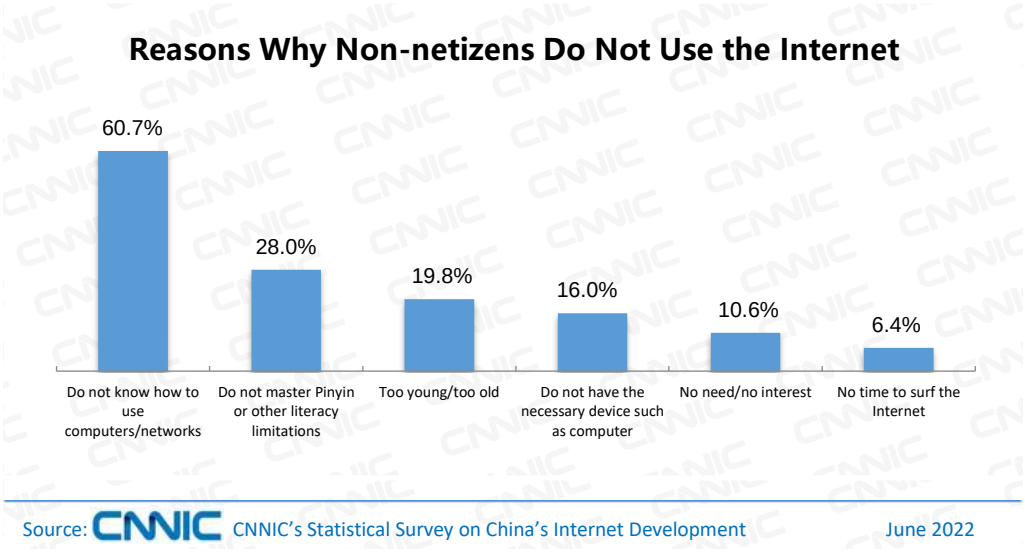


Figure 25 Reasons Why Non-netizens Do Not Use the Internet

For 26.7%, 25.1% and 24.9% of non-netizens, the primary factor to drive them to use the

Internet was the convenience of communicating with their family, easy access to professional information, and the availability of barrier-free Internet devices, respectively.

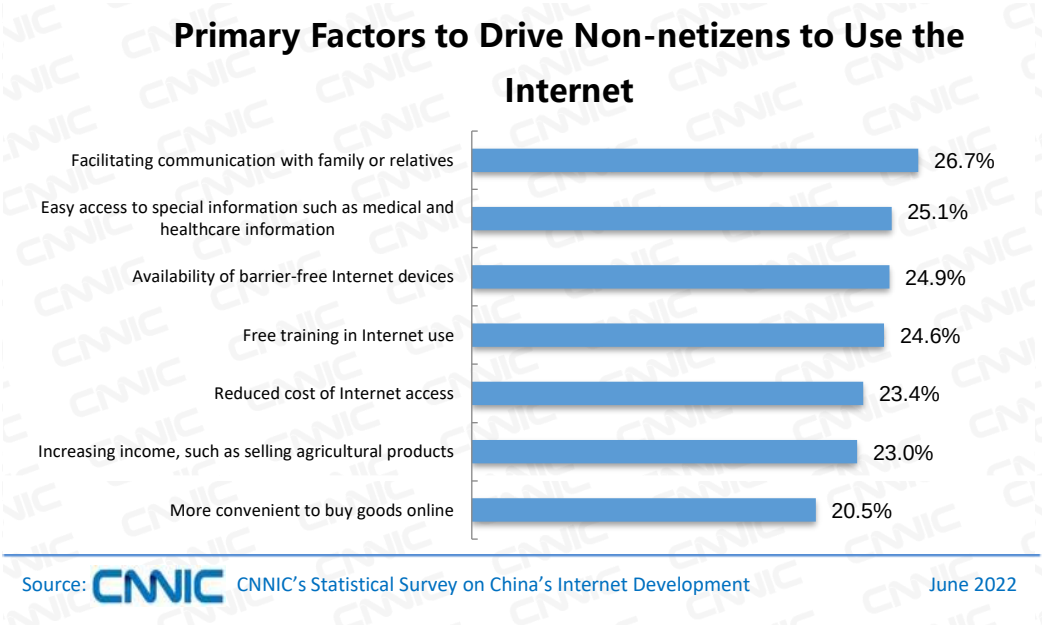


Figure 26 Primary Factors to Drive Non-netizens to Use the Internet

II The Attribute Structure of Internet Users

(I) Gender Structure

As of June 2022, the male-to-female ratio of Chinese netizens was 51.7:48.3, roughly the same as that of China's overall population.

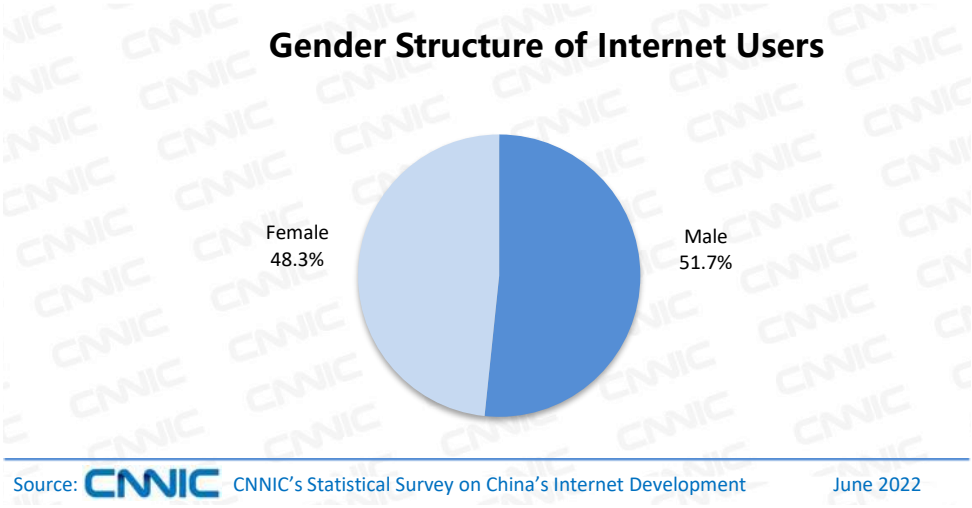


Figure 27 Gender Structure of Internet Users

(II) Age Structure

As of June 2022, the proportions of Internet users aged 20-29, 30-39 and 40-49 were 17.2%, 20.3% and 19.1% respectively, higher than those of other age groups. The proportion of Internet users aged 50 and above was 25.8%.

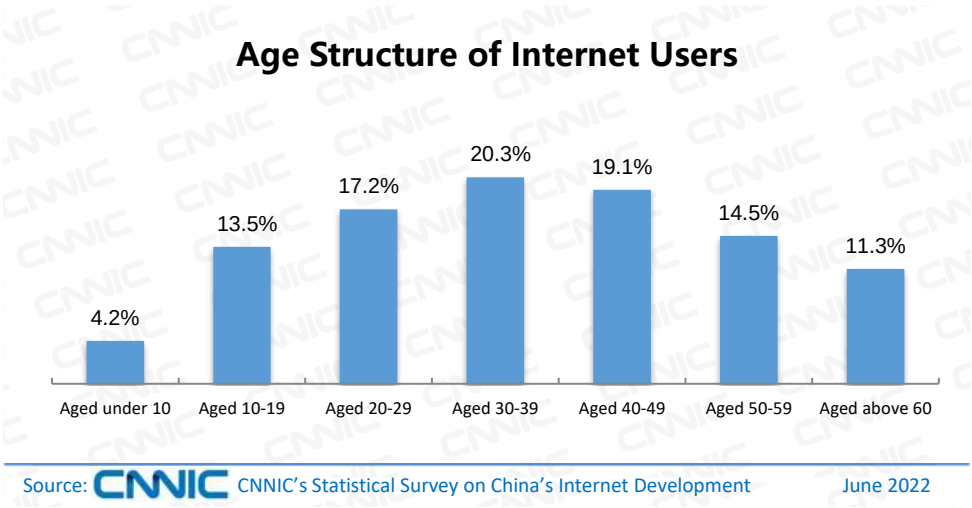


Figure 28 Age Structure of Internet Users

Chapter Three Development of Internet Applications

I Overview of Internet Applications

In the first half of 2022, all kinds of personal Internet applications in China continued to develop. The size of video clip users increased most obviously by 3.0%, with an increase of 28.05 million compared with December 2021, driving the utilization ratio of online video up to 94.6%. The user size of instant messaging remained the biggest, with an increase of 20.42 million compared with December 2021, and the utilization ratio reached 97.7%. Compared with December 2021, the number of users of online news and that of live streaming increased by 16.98 million (2.2%) and 12.9 million (1.8%) respectively.

Table 4 User Size and Utilization Ratio of Internet Applications from December 2021 to June 2022

	December 2021		June 2022		
Applications	**Number of Internet users (10,000)**	**Percentage of Internet users using the application**	**Number of Internet users (10,000)**	**Percentage of Internet users using the application**	Growth rate
Instant messaging	100666	97.5%	102708	97.7%	2.0%
Online video (including video clip)	97471	94.5%	99488	94.6%	2.1%
Video clip	93415	90.5%	96220	91.5%	3.0%
Online payment	90363	87.6%	90444	86.0%	0.1%
Online shopping	84210	81.6%	84057	80.0%	-0.2%
Search engine	82884	80.3%	82147	78.2%	-0.9%
Online news	77109	74.7%	78807	75.0%	2.2%
Online music	72946	70.7%	72789	69.2%	-0.2%
Live streaming	70337	68.2%	71627	68.1%	1.8%
Online games	55354	53.6%	55239	52.6%	-0.2%

Applications	December 2021		June 2022		
	Number of Internet users (10,000)	**Percentage of Internet users using the application**	**Number of Internet users (10,000)**	**Percentage of Internet users using the application**	Growth rate
Online literature	50159	48.6%	49322	46.9%	-1.7%
Online office	46884	45.4%	46066	43.8%	-1.7%
Online car-hailing services	45261	43.9%	40507	38.5%	-10.5%
Online travel booking	39710	38.5%	33250	31.6%	-16.3%
Online medical services	29788	28.9%	29984	28.5%	0.7%

II Basic Applications

(I) Instant Messaging

As of June 2022, the user size of instant messaging in China reached 1,027 million, an increase of 20.42 million compared with December 2021, accounting for 97.7% of all netizens in the country.

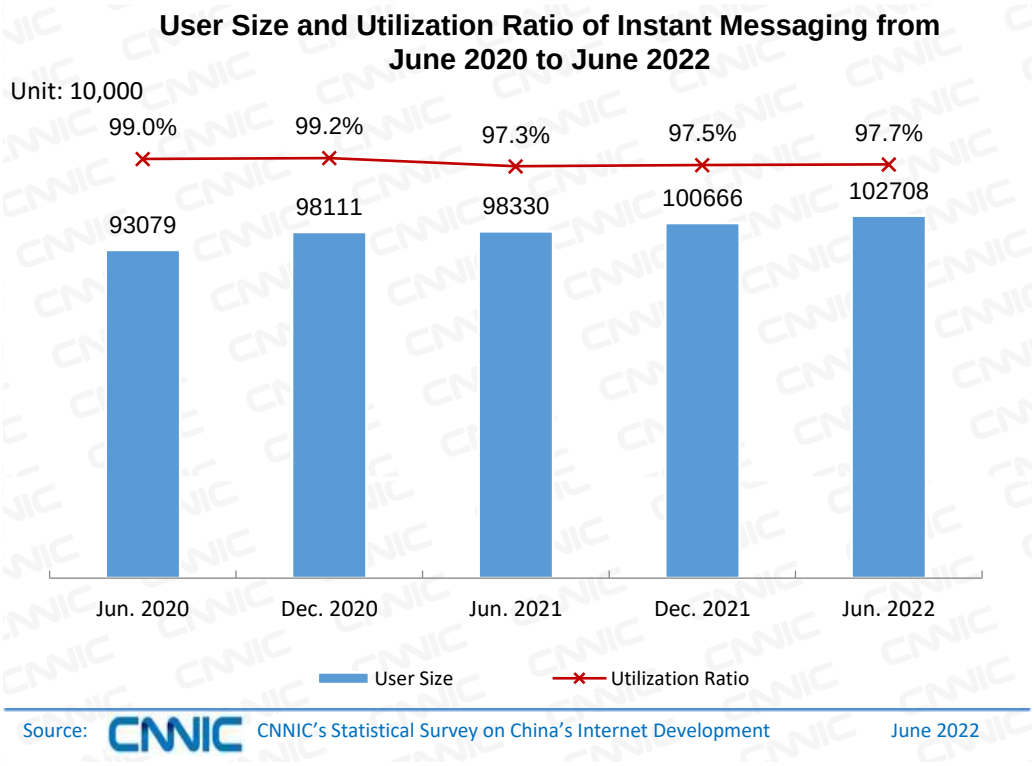


Figure 29 User Size and Utilization Ratio of Instant Messaging from June 2020 to June 2022

As the most frequently used Internet application in the daily life of Chinese netizens, instant messaging continued its steady development in the first half of 2022.

On the personal side, the functions of mini programs and video channels of instant messaging applications were becoming more and more mature, and the user experience for people with reading difficulties was also improved, allowing the digital dividend to benefit more people and make their life more convenient. **First, the social value and commercial value of mini programs were further highlighted.** Data shows that by the end of 2021, the cumulative number of users of WeChat health code reached 1.3 billion, and the cumulative number of visits reached 180 billion, making it the most commonly used electronic pass to verify health and travel status during the COVID-19 pandemic. At the same time, the total amount of self-operated physical goods transactions of WeChat mini program merchants also doubled year-on-year in 2021[16]. **Second, the exploration of the commercialization prospect of video channels was still going on.** Short video streaming media advertising, live streaming e-commerce and other services were integrated with instant messaging products through video channels, which led to a significant increase in video playback volume and usage duration in the first quarter of 2022[17]. **Third, user experience of the caring mode was further improved.** In April, 2022, the WeChat Care Mode launched the function of "listening to text messages". With this function, the user can click on the text message to hear a voice reading it aloud, thus allowing those with reading difficulties to better enjoy the convenience brought by digital life.

On the enterprise side, instant messaging vendors actively explored new software functions, and continued to strengthen the layout of intelligent hardware products to provide enterprises with integrated services "from cloud to end". **First, in terms of software services,** the main products represented by Dingtalk and Enterprise WeChat launched new versions or new functions in the first half of 2022, with the digitalization of enterprise architecture and business as the core direction of product development. In January, Enterprise WeChat was integrated with Tencent Conference and Tencent Document to form a complete digital collaboration scheme and introduce new functions such as upstream and downstream management and WeChat customer service, helping enterprises

[16] Source: Tencent's financial report for the fourth quarter of 2021, released on March 23, 2022. https://static.www.tencent.com/uploads/2022/03/23/cd1fcbdc7ba47fd0ac523ccc4f9daf7b.pdf
[17] Source: Tencent's financial report for the first quarter of 2022, released on May 18, 2022. https://static.www.tencent.com/uploads/2022/05/18/9a46878abd6009cacd79f241a814442b.pdf

to achieve business collaboration with consumers and upstream and downstream partners. In March, a "Cool Application" function was launched in the new version of Dingtalk, which opened the application components of the work group to partners, supported the customized development of enterprises, and improved the organization and collaboration ability. **Second, in terms of intelligent hardware,** instant messaging vendors further strengthened the R&D of hardware products, forming an integrated "cloud-to-end" software and hardware service system. In the first half of the year, Dingtalk released hardware products such as video conference all-in-one machine, and announced that it was in cooperation with more than 180 hardware companies[18], with business covering audio and video hardware, attendance machines, access control devices, printers, wearable devices and so on.

(II) Search Engine

As of June 2022, the number of search engine users in China was 821 million, a decrease of 7.37 million compared with December 2021, accounting for 78.2% of all netizens.

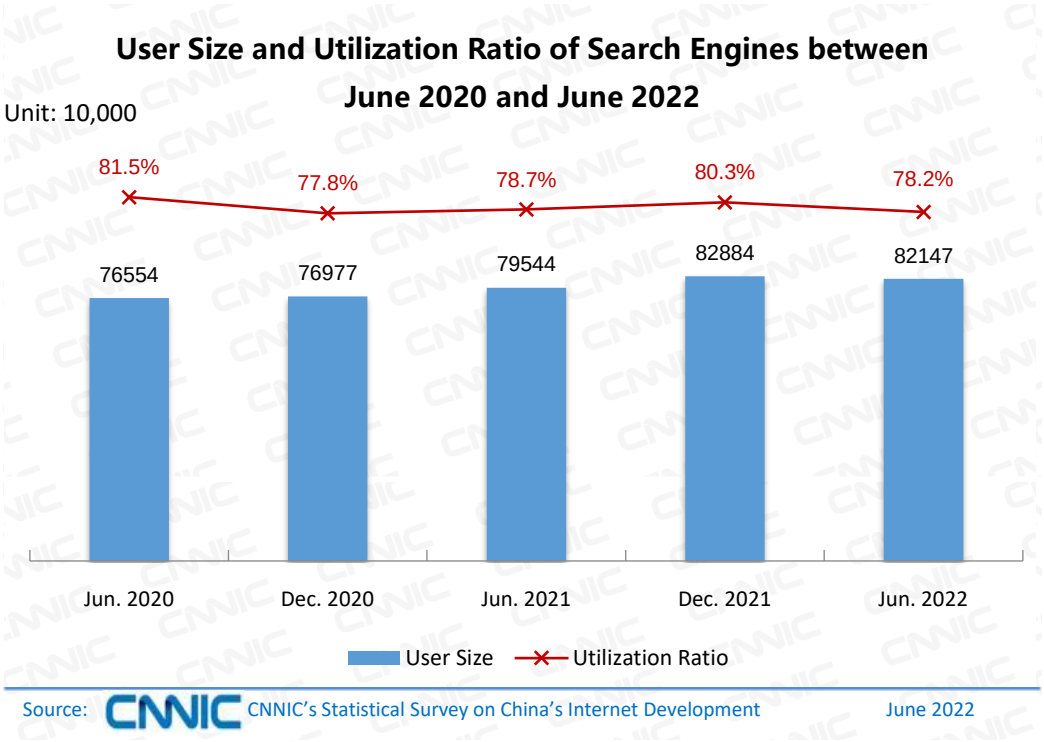


Figure 30 User Size and Utilization Ratio of Search Engines between June 2020 and June 2022

[18] Source: Dingtalk 2022 Press Conference on March 26, 2022. http://www.jjckb.cn/2022-03/26/c_1310530170.htm

In the first half of 2022, China's Internet companies continued to make a deep layout in the field of search engines, and the number of in-app search[19] users kept growing. **First, Internet companies continued to invest in the development of search engines.** In the first half of 2022, ByteDance launched the independent search product "Wukong Search", and formed a product matrix of "Headline Search + Wukong Search + Tik Tok Search", in an attempt to grab more market segments. **Second, the number of in-app search users continued to grow.** With the vigorous development of the WeChat ecology, WeChat "Search" was gradually able to meet the diversified needs of users and provide support for content creators, service providers and merchants to better connect with users. By the end of 2021, the number of monthly active users of WeChat "Search" had exceeded 700 million, and the search traffic of some categories had increased by 139%; it had served more than 100 million patients' registration [20]with more than 5,100 public hospitals.

(III) Online News

As of June 2022, the user size of online news in China had reached 788 million, up 16.98 million from December 2021, making up 75.0% of all Internet users.

[19] In-app search means that, corresponding to the traditional web search, the problem of content indexing and searching in the app can be solved through technical means, so that the content such as music, videos, tools and services of other apps can be obtained and indexed by subjects other than users.
[20] Source: 2022 WeChat Open Class PRO on January 6, 2022. http://k.sina.com.cn/article_1652484947_627eeb5302001am4w.html

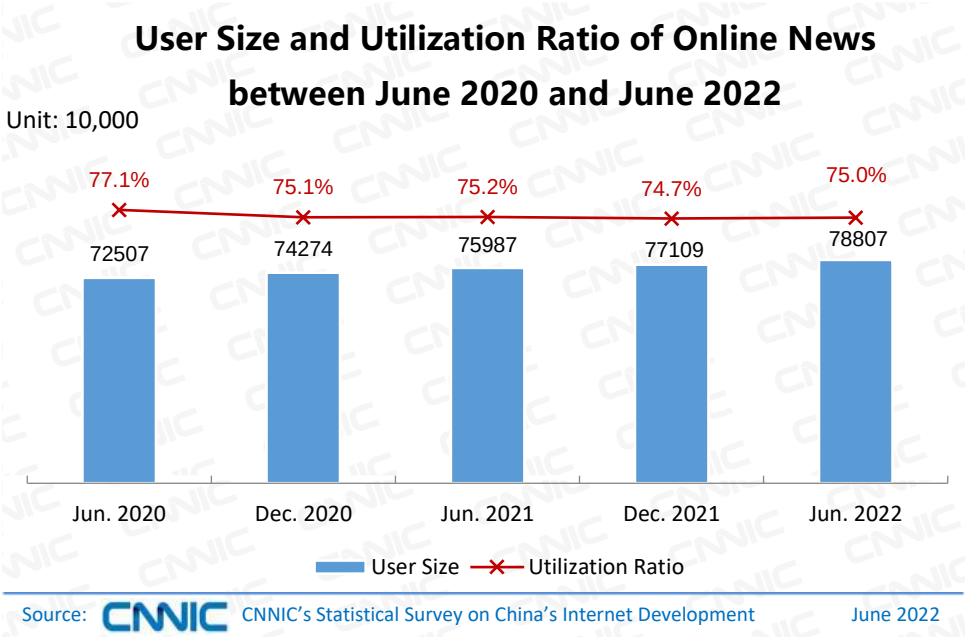


Figure 31 User Size and Utilization Ratio of Online News between June 2020 and June 2022

Online news media reported the 2022 Winter Olympics in an all-round way, triggering an upsurge of people watching the games. Data shows that the digital media and online live broadcast data of Beijing Winter Olympics reached a record high, and the total output of broadcast content reached 6,000 hours, more than the 5,600 hours[21] of Pyeongchang Winter Olympics. Beijing Winter Olympics is the most-watched Winter Olympics so far, attracting more than two billion people's attention[22] on global social media. In order to further meet the users' demand for watching the games, the live discussion function of Weibo brought users a new experience of large-screen viewing and small-screen discussion. According to Weibo data, there were 16 live discussions during the Winter Olympics, with the highest number of participants reaching 9.51 million. Migu Video enhanced the fun of the event commentary and users' experience of watching the games by inviting well-known Winter Olympic athletes to participate in the event commentary and other activities.

(IV) Online Office

Up to June 2022, the user size of online office in China was 461 million, down 8.18 million from December 2021, accounting for 43.8% of all Internet users.

[21] Source: The official website of the Chinese Olympic Committee on February 17, 2022. http://www.olympic.cn/news/Olympic_comm/2022/0217/400730.html

[22] Source: m.gmw.cn on February 14, 2022. https://m.gmw.cn/baijia/2022-02/14/1302803607.html

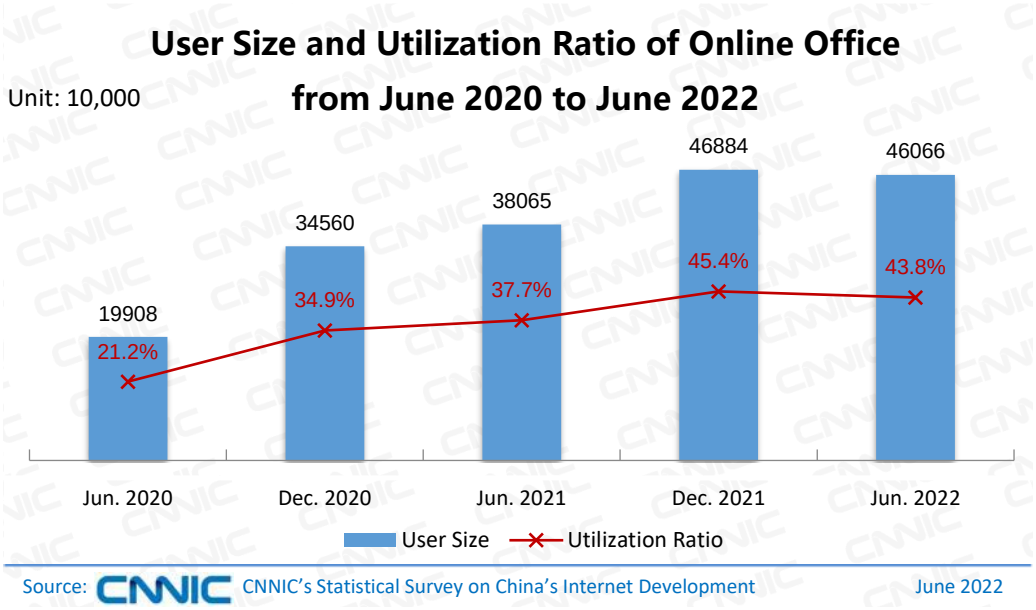


Figure 32 User Size and Utilization Ratio of Online Office from June 2020 to June 2022

In the first half of 2022, the online office industry developed steadily and the user experience was upgraded. At the same time, service providers promoted the concept of collaborative office to help the digital transformation of government and enterprises.

On the demand side, first, against the background of normalization of the pandemic, online office developed steadily. In the first half of 2022, online video/teleconferencing performed well, and the number of users increased by 5.9% compared with December 2021. Affected by the pandemic, the utilization ratio of online office in first-tier cities[23] increased significantly by 8.4 percentage points in half a year. Obviously, online office played an important role in fighting against the pandemic, resuming work and production, and stabilizing employment. As of March 2022, Dingtalk had served more than 21 million institutional users[24], and Tencent Meeting had developed over 300 million registered users, with monthly active users exceeding 100 million[25]. Second, the mode of "AR[26] /VR[27] + Office" brought a new digital experience. Thanks to the cooperation between Dingtalk and Rokid, users could enter the mobile digital office space by wearing smart AR glasses, display multiple office

[23] First tier cities include Beijing, Shanghai, Guangzhou and Shenzhen. For the classification of first-tier to fifth-tier cities, please refer to the *2021 Commercial Attraction Ranking of Cities* issued by New First-tier Cities Research Institute, YICAI.
[24] Source: Alibaba Group's quarterly report by the end of March 2022 and the report for fiscal year 2022, released on May 26, 2022. https://www.alibabagroup.com/document-1489047618746056704
[25] Source: China National Radio on May 18, 2022. http://tech.cnr.cn/techph/20220518/t20220518_525830311.shtml
[26] AR: Augmented reality
[27] VR: Virtual reality

scenes such as chat, meeting, and document at the same time, and achieve digital office anytime and anywhere. In the future, as the development direction of "AR/VR + office" becomes clearer, more application scenarios for online office will be realized, and AR/VR technology will drive the continuous development of online office functions.

On the supply side, the *Fourteenth Five-Year Digital Economy Development Plan* issued by the State Council in January 2022 proposed to expand the coverage of online services such as collaborative office and promote the optimization and upgrading of remote collaborative office products and services. **The top-level planning has promoted the development and practice of the concept of collaborative office**, and collaborative office has become an important support for the digital transformation of government and enterprises. **First, in support of digital government,** cloud service providers such as Huawei Cloud and Tencent Cloud have strengthened the construction of government collaborative office platforms to help realize cross-level, cross-departmental and cross-regional service collaboration and provide a strong guarantee for meeting diverse needs for government services and improving the efficiency of collaborative office. **Second, in support of enterprises' digital transformation,** the collaborative office platforms have continuously enriched application scenarios, expanded service coverage, and empowered the whole industrial chain to be more intelligent and digitalized. In the first half of the year, the utilization ratios of online document collaborative editing, online task management and process approval were 27.9% and 14.3% respectively.

III Business Transaction Applications

(I) Online Payment

As of June 2022, the user size of online payment in China had reached 904 million, up 810,000 from December 2021, taking up 86.0% of all Internet users.

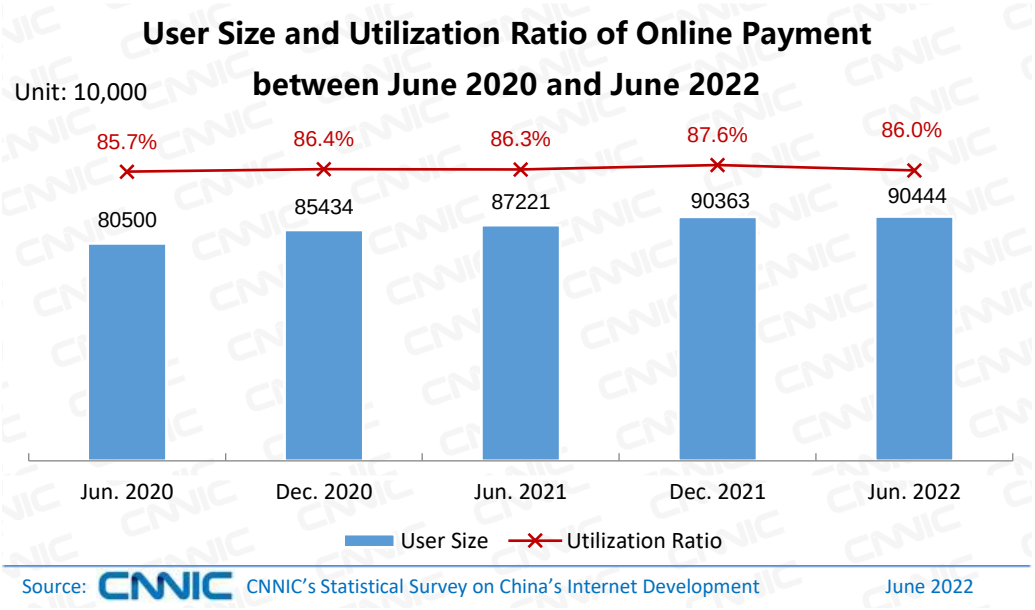


Figure 33 User Size and Utilization Ratio of Online Payment between June 2020 and June 2022

The order of China's online payment market was further standardized, the quality of payment services continued to improve, and the industry maintained a healthy development trend. Data shows that in the first quarter of 2022, China's banks handled 23.57 billion online payment transactions, amounting to 585.16 trillion yuan, up 4.60% and 5.72% year on year respectively; the number of mobile payment transactions reached 34.653 billion, with an amount of 131.58 trillion yuan, up 6.24% and 1.11% year on year respectively[28].

With the continuous integration of digital RMB into Internet platforms, the payment ecology has gradually taken shape. As of December 2021, digital RMB transactions had been supported by more than 50 third-party platforms[29], with the payment ecosystem being increasingly rich. **First, life service platforms provided diversified consumption scenarios for digital RMB to attract users.** The Internet life service platforms represented by Meituan, JD, Ctrip, etc. connected a large number of offline merchants and users, and helped digital RMB quickly enter the daily life of Internet users. In January 2022, Meituan began to issue digital RMB daily consumption subsidies to residents in pilot cities across the country, covering more than 200 types of

[28] Source: *General Report on the Payment System Operation in the First Quarter of 2022* released by the Payment and Settlement Department of the People's Bank of China on August 2, 2022. http://www.pbc.gov.cn/zhifujiesuansi/128525/128545/128643/4621677/2022080218370771222.pdf

[29] Source: A New Inclusive Pillar to Boost Consumption and Serve People's Livelihood: Report on 2022 Digital RMB Social Value, released by the Future Media Convergence Institute on August 2, 2022. http://www.xinhuanet.com/20220427/shbbg.pdf

consumption scenarios. As of April, it had generated more than 14 billion yuan[30] of daily consumption in various forms. **Second, third-party payment platforms actively participated in the digital RMB pilot program to seek new business opportunities.** In November 2021, YeePay opened digital RMB business and launched it on the official website of Xiamen Airlines. As of January 2022, Lakala had participated in the pilot work of all digital RMB pilot areas, and developed a variety of digital RMB application products. In April, WeChat announced that it had started to support the use of digital RMB in pilot areas; Alipay launched the "digital RMB" online search function to help new users more easily open digital RMB wallets. As of May 5, nearly 6 million digital RMB sub-wallets had been pushed to Alipay-served merchants[31].

Online payment continued to develop in the countryside and further promoted the development of inclusive finance. Data shows that as of June 2022, the number of online payment users in rural areas of China was 227 million, accounting for 77.5% of rural netizens. **First, policies continued to promote the popularization of rural online payment.** In 2022, policy documents such as the *Action Plan for Digital Rural Development (2022-2025)*, the *Fourteenth Five-Year Plan for Promoting Agricultural and Rural Modernization*, and the *Opinions on the Key Work of Comprehensive Financial Support for Rural Revitalization in 2022* were issued one after another, requiring that the popularization of online payment should be accelerated by strengthening the construction of rural digital infrastructure and increasing financial support for agriculture, rural areas and farmers. **Second, rural online payment scenarios were enriched and the use of online payment was more convenient.** In recent years, the mobile payment facilitation project has been implemented in rural areas. Apart from covering the traditional life service fields such as transportation, medical care, retail, education and public payment, mobile payment has also been applied in rural characteristic industries, agricultural products purchase and other fields, through which the way of serving farmers is improved, payment in rural areas becomes more convenient, the use of mobile payment is popularized among rural netizens.

(II) Online Shopping

[30] Source: Same as the Footnote 30.
[31] Source: Official WeChat account of Alipay on May 5, 2022. https://mp.weixin.qq.com/s/PGzRMDgttZ6PLne7Yb4seg

As of June 2022, the user size of online shopping in China was 841 million, down 1.53 million from December 2021, taking up 80.0% of all Internet users.

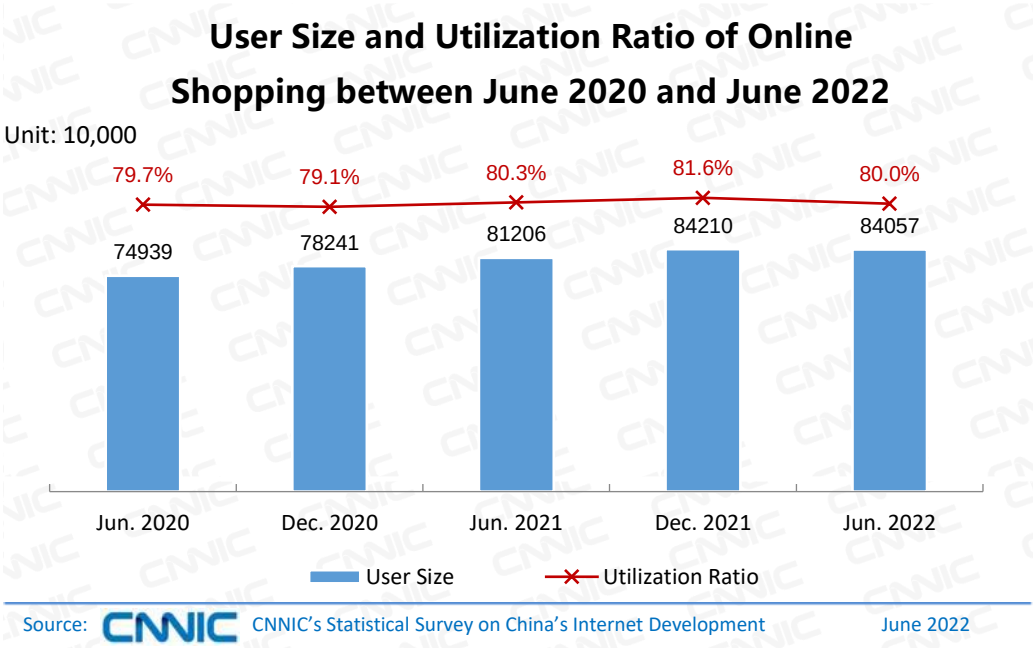


Figure 34 User Size and Utilization Ratio of Online Shopping between June 2020 and June 2022

In the first half of 2022, the proportion of online consumption in total consumption continued to increase. In particular, online consumption of food, daily necessities and other life-related commodities performed more prominently.

Online consumption is an important consumption driver in the pandemic situation. In the first half of 2022, online consumption played an active role in stabilizing consumption. Data shows that in the first half of the year, the national online retail sales amounted to 6.3 trillion yuan, a year-on-year increase of 3.1%. Specifically, the online retail sales of physical goods was 5.45 trillion yuan, up 5.6% year-on-year, accounting for 25.9% of the total retail sales of social consumer goods, up 2.2 percentage points from the same period last year[32].

In the first half of the year, online consumption showed new development features in categories and sales channels. First, online shopping for food and other daily necessities was prominent. Data shows that in the online retail sales of physical goods in the first half of the year,

[32] Source: National Bureau of Statistics on July 15, 2022. http://www.stats.gov.cn/tjsj/zxfb/202207/t20220715 _ 1886422.html

food, clothing and other consumer goods increased by 15.7%, 2.4% and 5.1% respectively[33]; and consumers who spent more on food, drinks and other daily necessities online accounted for 22.6% and 29.0% of online shoppers, respectively. **Second, online consumption channels were obviously diversified.** With more and more Internet platforms involved in e-commerce, online consumption channels for shoppers gradually spread from traditional e-commerce platforms such as Taobao and JD.COM to short video, community group buying and social platforms. In the first six months of 2022, the proportion of online shoppers who only spent on traditional e-commerce platforms[34] was 27.3%, and the proportions of online shoppers who spent through other channels such as short video live streaming, fresh food e-commerce, community group purchase and WeChat platforms were 49.7%, 37.2%, 32.4% and 19.6% respectively.

(III) Online Travel Booking

As of June 2022, the number of users of online travel booking in China was 333 million, down 64.6 million from December 2021, accounting for 31.6% of all Internet users.

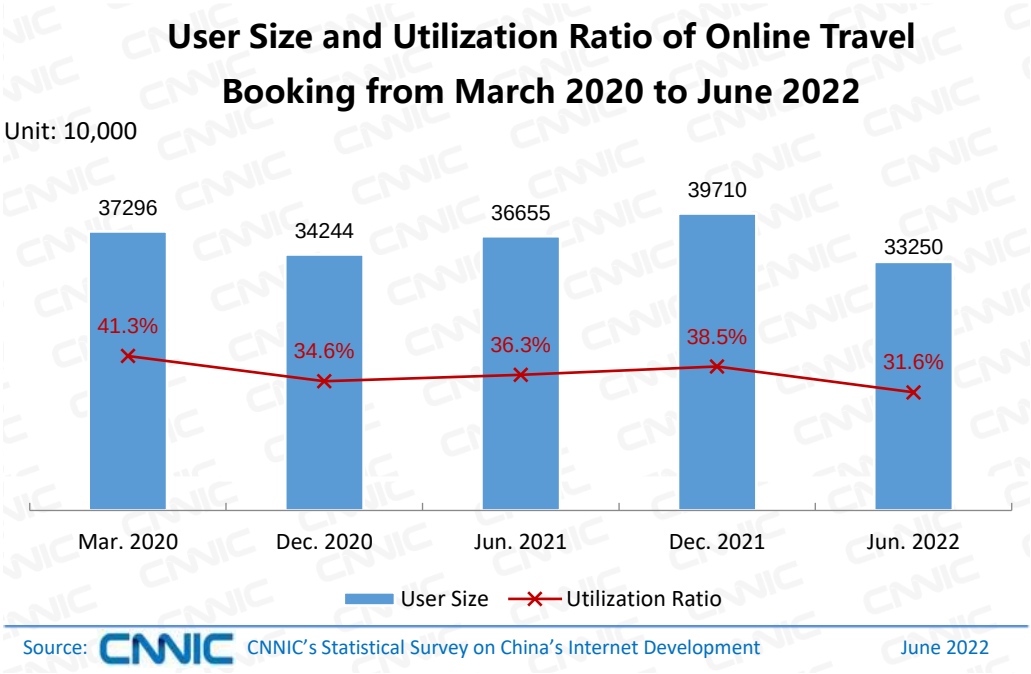


Figure 35 User Size and Utilization Ratio of Online Travel Booking from March 2020 to June 2022

[33] Source: Same as the Footnote 33.
[34] Traditional e-commerce platforms refer to Taobao, Tmall, JD, Pinduoduo, Vipshop, Dangdang and other Internet platforms that mainly engage in e-commerce business.

Affected by the pandemic, the pace of recovery of China's travel booking market slowed down in the first half of 2022. The central and local governments successively issued various policies to bail out and benefit travel booking enterprises and help them effectively cope with the impact of the pandemic and promote the recovery of the industry. At the same time, enterprises actively adapted to market changes, relied on information technology for digital transformation and upgrading, and sought new growth points, laying a good foundation for future high-quality development.

Relief policies were introduced one after another to help enterprises effectively deal with the impact of the pandemic. Due to the pandemic, the recovery of domestic tourism market slowed down in the first half of the year. According to statistics, the number of domestic tours decreased by 26.2% during the holiday period of the Tomb-Sweeping Day and by 30.2% during the May Day holiday period, with domestic tourism revenue falling by 30.9% and 42.9% respectively[35]. In this context, 14 departments including the National Development and Reform Commission and the Ministry of Culture and Tourism issued *Several Policies on Promoting the Recovery and Development of Difficult Industries in the Service Sector*, and the governments of Hainan, Sichuan, Fujian, Yunnan and other provinces successively issued corresponding policies to help industries and enterprises recover and develop.

The travel booking market was characterized by short-distance and local trips. Affected by the pandemic, in the first half of 2022 the travel booking market as a whole showed the characteristics of proximity and locality, and local leisure and short-distance vacation became the mainstream. During the holiday period of the Tomb-Sweeping Day, 94.9% of the tourists received in various places were from the same province, a record high since the pandemic prevention and control was normalized[36]. According to Ctrip's data, during the “May Day” holiday, local travel orders accounted for 40%, more than 10 percentage points higher than the figures of the same period in 2020 and 2021. In addition, camping and leisure travel became a new trend in this year's May Day holiday period. According to Qunar.com's data, the number of bookings of camping-related accommodation and travel products during the May Day holiday was three times that of the same

[35] Source: Ministry of Culture and Tourism on May 4, 2022. https://mct.gov.cn/whzx/whyw/202205/t20220504_932779.htm

[36] Source: gmw.cn on April 6, 2022. https://news.gmw.cn/2022-04/06/content_35636289.htm

period last year.

Science and technology empower tourism to transform and innovate, and digitalization creates a new ecology of smart tourism. First, "tourism + technology" continued to create a new ecology of smart tourism. For example, through big data, AI, AR and other technologies, Ctrip actively expanded new scenes of immersive, experiential and interactive consumption to promote the transformation and upgrading of the tourism industry, and create a new ecology of smart tourism. **Second**, enterprises accelerated the digital transformation of the upstream and downstream links of the tourism industry chain, striving to improve the efficiency of the entire industry chain and better meet people's multi-level, diversified and personalized travel consumption needs. For example, Tongcheng Travel launched new functions for elderly users and sign language services for the hearing impaired, helping special groups to cross the "digital divide" and promoting the construction of a warmer industry ecology. In addition, "tourism + live streaming" is increasingly favored by users. According to Weibo data, from January to May 2022, the cumulative number of views of travel live-streaming on Weibo increased by 230% compared with the same period of last year.

IV Online Entertainment Applications

(I) Online Video

Up to June 2022, the user size of online video in China had reached 995 million, up 20.17 million from December 2021, making up 94.6% of all Internet users. The number of video clip users increased to 962 million, up 28.05 million from December 2021, accounting for 91.5% of all Internet users.

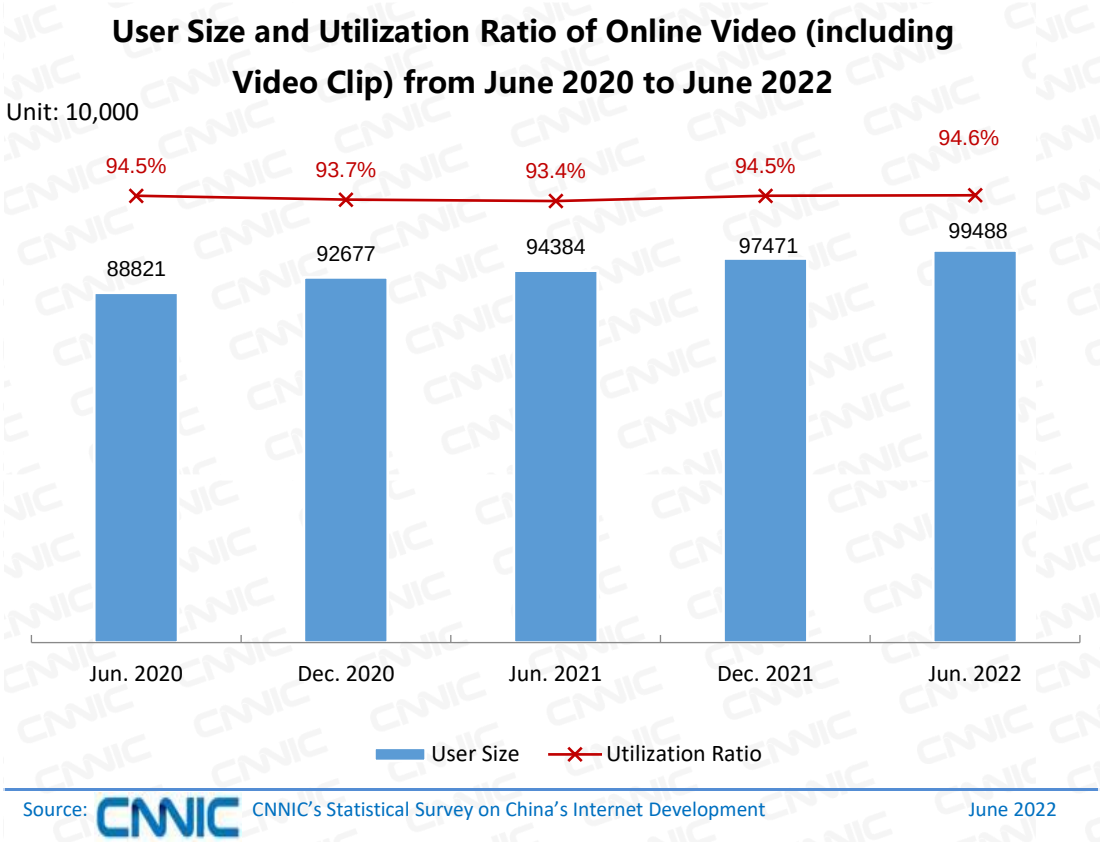


Figure 36 User Size and Utilization Ratio of Online Video (including Video Clip) from June 2020 to June 2022

In the first half of 2022, the competition in the online video market became more intense. On the one hand, major platforms launched a series of self-made programs around the theme of 2022 Beijing Winter Olympics to attract users' attention; On the other hand, they continued to explore new business models to reduce costs, increase efficiency and ease the pressure on revenue.

Around the Beijing Winter Olympics, online video platforms attracted users' attention by focusing on hot content and creating "virtual images". In terms of content, at the beginning of 2022, these platforms launched variety shows related to ice and snow sports and the winter Olympics to enhance the depth and breadth of users' exposure to these sports and create an atmosphere of "300 million people on ice and snow". For example, iQiyi's "Super Fun of Skiing" and Youku's "Winter Dream" achieved good ratings. **In terms of technology,** major video platforms used digital technologies such as 5G, 8K and AR to innovate on live athlete broadcasting and "virtual image" interaction, enhance the value of content and promote user participation. In

February, Migu Video launched Eileen Gu' virtual image, Meet Gu, which interacted with viewers live in the studio and participated in the commentary of several skiing events to help popularize ice and snow sports.

Online video platforms further reduced costs and increased efficiency in an attempt to reverse the loss situation. First, they deepened their content and increased the proportion of paying users. By deeply cultivating the vertical market, they vigorously developed self-made dramas, customized dramas, etc., to attract and retain paying users and increase the income from them. In the first quarter of 2022, the number of paying users of Bilibili reached 20.10 million, a year-on-year increase of 25%, among whom nearly 80% were annually-paying members or automatic renewal members[37]; IQIYI's member service revenue was 4.5 billion yuan, up 4% year on year[38]. **Second, content arrangement and advertising promotion were strengthened to reach the target users more accurately.** With respect to content arrangement, theatrical operation was pursued to form scale effects, build brand theaters, and increase user stickiness. In terms of advertising promotion, algorithms were optimized to match advertisers with target consumers and achieve efficient advertising. **Third, the mode of revenue sharing was further adjusted to reduce the cost risks.** In March, 2022, Tencent Video upgraded its revenue-sharing rules for micro and short dramas[39], and implemented different charging standards for different micro and short dramas. In April, iQiyi upgraded its online movie distribution mode and adjusted the revenue-sharing mode accordingly. In the first quarter of 2022, iQiyi recorded a net profit of 169 million yuan, achieving a single-quarter profit for the first time, and showing initial results in cost reduction and efficiency enhancement[40].

(II) Live Streaming

As of June 2022, the user size of live streaming in China had reached 716 million, up 12.90 million from December 2021, accounting for 68.1% of all Internet users. Specifically, the user size of live-streaming e-commerce was 469 million, up 5.33 million from the end of 2021, accounting

[37] Source: *Financial Report of Bilibili for the First Quarter of 2022*, released on June 9, 2022. https://ir.bilibili.com/static-files/2d575cb2-d73e-4ef9-948d-a025421c33d5
[38] Source: *Financial Report of iQIYI for the First Quarter of 2022*, released on May 26, 2022. https://iqiyiinc.gcs-web.com/static-files/4710831e-8307-48d1-9e1f-77e77954e0af
[39] A micro and short drama refers to a single episode of online dramas that is less than 10 minutes in duration.
[40] Source: Same as the Footnote 39.

for 44.6% of all Internet users. That of game live streaming was 305 million, up 2.90 million in six months, making up 29.0% of the total. That of host live show was 186 million, down 7.93 million in half a year, taking up 17.7% of the total. That of live concert streaming was 162 million, up 19.14 million from December 2021, representing 15.4% of all Internet users. That of live sport broadcast was 306 million, up 22.32 million in six months, accounting for 29.1% of all Internet users.

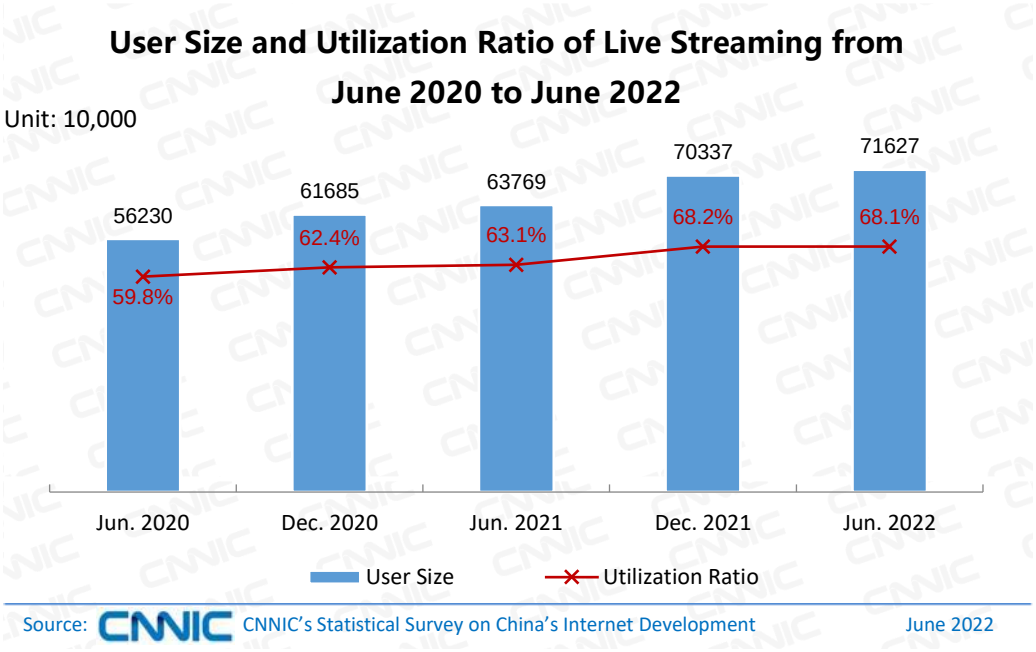


Figure 37 User Size and Utilization Ratio of Live Streaming from June 2020 to June 2022

Against the background of pandemic, live streaming applications played an important role in marketing and entertainment. At the same time, the continuous progress of live streaming technology and the improvement of supervision system continued to promote the healthy and orderly development of live streaming-related industries.

In terms of content, non-for-profit content and traditional cultural content became the main content supported by live streaming platforms. First, e-commerce live streaming platforms actively helped merchants fight the pandemic, and further increased the assistance for small and medium-sized merchants and those of special agricultural products that were seriously affected by the pandemic. For example, Kuaishou E-commerce launched the "Warm Spring Plan 2022" for merchants who were in difficulty and were severely affected by the pandemic, to reduce or exempt their promotion service fees, and provided incentive policies such as traffic and activity support. Second, reality show live streaming platforms strengthened their support for the creation of traditional cultural content. For example, Tik Tok Live launched the "Incentive Plan for High-

quality Anchors", to support the creation of seven kinds of content, such as folk songs, folk music and folk dances, and encourage outstanding anchors to carry forward excellent traditional culture.

In terms of technology, relevant companies explored the application of real-time computing, virtual reality and other technologies to further improve the user experience of live streaming. The "*White Paper on Ultra-Low Latency Live Streaming*" jointly released by Tencent Cloud and China Academy of Information and Communications Technology pointed out that while optimizing web real-time communication technology[41], edge computing and other technologies should be applied to transform the traditional CDN[42] architecture to form an ultra-low latency live streaming technology scheme and reduce the traditional live streaming latency by more than 90%. During the Beijing Winter Olympics, CCTV launched the 8K[43] VR immersive viewing mode for the first time, allowing users to watch live broadcasts through VR devices and experience 8K ultra-high definition content.

In terms of regulation, the regulatory measures for the behavior of network anchors and underage anchors were further improved. In response to the problem of tax evasion in the e-commerce live streaming industry, the Cyberspace Administration of China and two other departments issued, in March 2022, the *Opinions on Further Regulating the Profit-making Behavior of Live Streaming on the Internet for the Healthy Development of the Industry*, which is conducive to the standardized and healthy development of the live streaming industry. In view of the problems of underage anchors and giving bounties in live games and reality shows, the Office of Steering Commission for Socialist Culture and Ethics and other three departments issued in May the *Opinions on Regulating Live Streaming Rewards and Strengthening the Protection of Minors*, which is conducive to the improvement of minors' network environment. In response to the lack of a unified code of conduct for network anchors, the State Administration of Radio and Television and another department jointly issued in June the *Code of Conduct for Network Anchors*, which stipulates 31 types of behaviors prohibited for network anchors and is conducive to improving the overall quality of network anchors.

[41] Web real-time communication technology is the core technology of video conferencing, including audio and video collection, encoding and decoding, network transmission, display and other functions.
[42] CDN is the abbreviation of "content delivery network".
[43] "8K", or 8K UHD, refers to a resolution of 7680x4320.

(III) Online Games

Up to June 2022, the user size of online games in China was 552 million, down 1.14 million from December 2021, making up 52.6% of all Internet users.

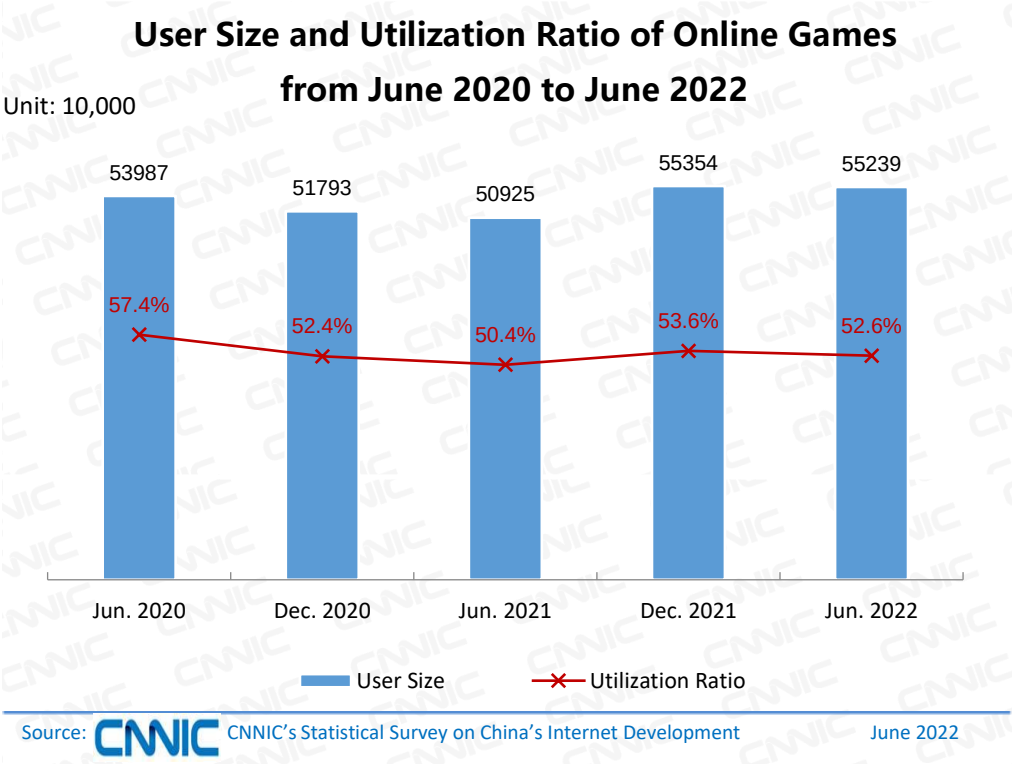


Figure 38 User Size and Utilization Ratio of Online Games from June 2020 to June 2022

In the first half of 2022, the re-issuance of game version numbers brought new opportunities to the online game industry. Under the influence of relatively stable market expectations, online game companies continued to invest and improve their industrial layout. At the same time, the relevant state departments further strengthened the supervision and management of live games, and curbed the irregular dissemination of online games from the source.

With the re-issuance of game version numbers by the competent department, the online game industry came into a better development situation. In April, 2022, the State Press and Publication Administration announced a new list of game version numbers, covering a total of 45 games. This was the first release of game version numbers since July 2021, which has played an important role in stabilizing the development expectation of domestic online game industry and promoting the healthy and sustainable development of the industry, especially small and medium-sized online game enterprises.

Online game companies continued to invest and improve their industrial layout. In the first half of 2022, Tencent, Netease, Bilibili, ByteDance and other enterprises continued to invest in online game-related industries at home and abroad, in order to maintain competitive advantage, expand income channels and improve industrial layout. Among them, Tencent invested in its game studios in Spain, New Zealand and other countries to expand its global business; Bilibili focused its investment on web games and mobile games to further improve its revenue performance in online games.

Relevant departments strengthened the supervision over and standardized the dissemination of live games and online games. In April 2022, the Network Audiovisual Program Management Department of the State Administration of Radio and Television and the Publication Bureau of the Publicity Department of the CPC Central Committee jointly issued the *Notice on Strengthening the Management of Live Game Broadcasting on Network Audiovisual Program Platforms*, which requires strictly prohibiting the dissemination of illegal games on network audiovisual platforms, strengthening the management of live game broadcasting, and urging network broadcasting platforms to establish and implement a juvenile protection mechanism. Strengthening the regulation of live game content is conducive to curbing the "traffic-only" phenomenon on platforms, avoiding the spread of illegal online games, and creating a good online entertainment environment for minors.

V Public Service Applications

(I) Online Car-hailing Services

As of June 2022, the user size of online car-hailing services in China was 405 million, down 47.54 million from December 2021, making up 38.5% of all Internet users.

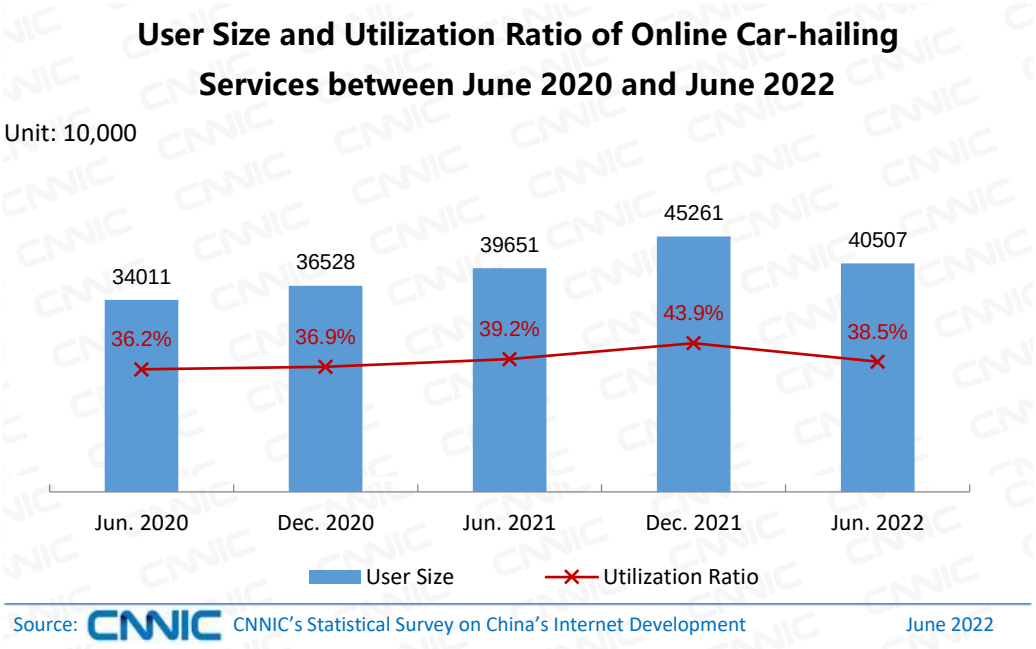


Figure 39 User Size and Utilization Ratio of Online Car-hailing Services between June 2020 and June 2022

The online car-hailing industry was developing in a standardized way. First, market supervision was further improved. In February 2022, the Ministry of Transport proposed to implement the "Sunshine Action", urging major online car-hailing platforms to disclose pricing rules to the public, and set a reasonable cap on their share of revenue. This will help regulate the business operation of online car-hailing companies and effectively protect the legitimate rights and interests of drivers. In July 2022, the Cyberspace Administration of China, in accordance with the *Network Security Law*, the *Data Security Law*, the *Personal Information Protection Law* and other laws and regulations, imposed a penalty on Didi Global Inc., to safeguard the national network security, data security and public interests, and protect the legitimate rights and interests of the people. **Second, enterprises took measures to promote compliance.** Meituan Taxi launched a "compliance incentive" in some cities to encourage drivers to take the compliance examination of the Ministry of Transport. It promised to give a certain amount of cash incentive to drivers who pass the examination and obtain the qualification certificate within a specific period. **Third, the technology of automatic driving was steadily promoted.** After the Beijing municipal government released the *Management Rules for Unmanned Road Testing and Demonstration Application of Intelligent Networked Vehicles in Pilot Areas* in April 2022, Baidu and Xiaoma Zhixing became the first enterprises approved to provide the public with self-driving travel services with no safety

officer in the main driver's seat and a safety officer in the co-driver's seat.

(II) Online Medical Services

As of June 2022, the user size of online medical services in China had reached 300 million, an increase of 1.96 million over December 2021, accounting for 28.5% of the total Internet users.

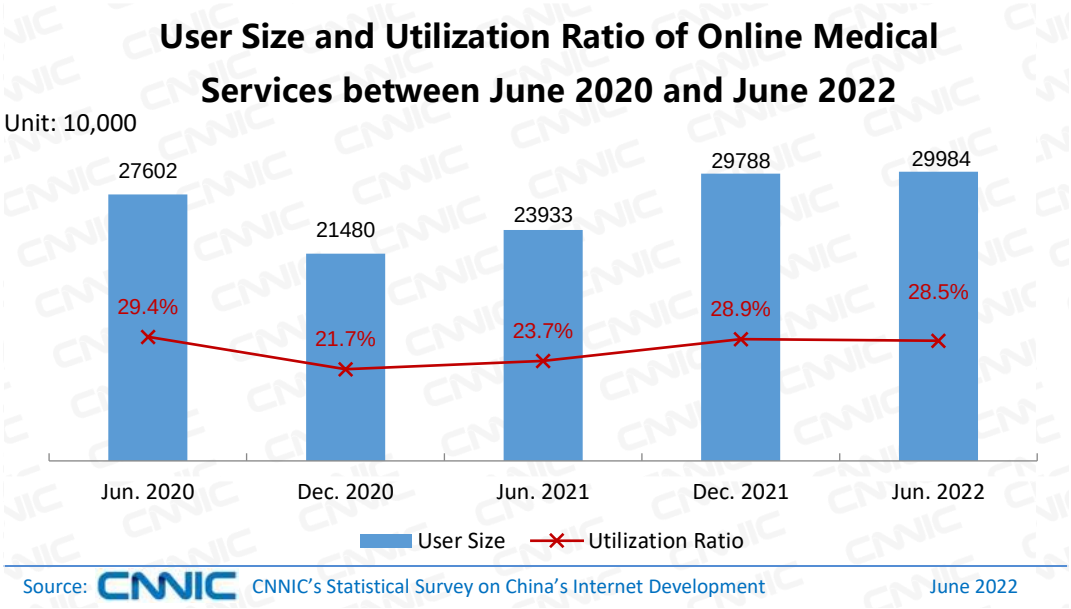


Figure 40 User Size and Utilization Ratio of Online Medical Services between June 2020 and June 2022

In the first half of 2022, online medical platforms explored diversified services. At the same time, the relevant departments issued a number of policies and regulations to create a favorable policy environment for the online medical industry.

Online medical platforms explored diversified forms of services. On the basis of providing medical and pharmaceutical services, big platforms expanded digital health management and promoted innovation in insurance, medical insurance payment, doctor services and other related fields. For example, Baidu introduced "Medical Notes", which can help medical professionals quickly record and sort out medical documents, and can convert medical materials in the form of pictures into texts; Ping An Health made efforts at both the consumer end and the enterprise end to create diversified products such as health management and insurance and seek new growth engines.

Policies and regulations are favorable for the high-quality development of online medical services industry. In January, 2022, the Ministry of Industry and Information Technology, together

with eight other departments, issued the *14th Five-Year Plan for the Development of Pharmaceutical Industry*, proposing to develop a new model and new ecology, adapt to the rapid development of smart medical care and Internet hospitals, and form a new "Internet + Medicine" ecology with the participation of medical institutions, pharmaceutical enterprises, insurance companies and information technology service providers. In February, the National Health Commission and the State Administration of Traditional Chinese Medicine jointly issued the "Detailed Rules for the Regulation of Online Medical Diagnosis and Treatment (Trial)", which put forward clear supervision requirements for medical institutions, medical staff and medical services, so as to standardize online diagnosis and treatment, strengthen the construction of a corresponding supervision system, prevent and resolve the risks in online diagnosis and treatment, and ensure the safety and quality of online medical services.

Appendix 1 Survey Methodology

I. Survey Methodology

(I) Telephone Survey

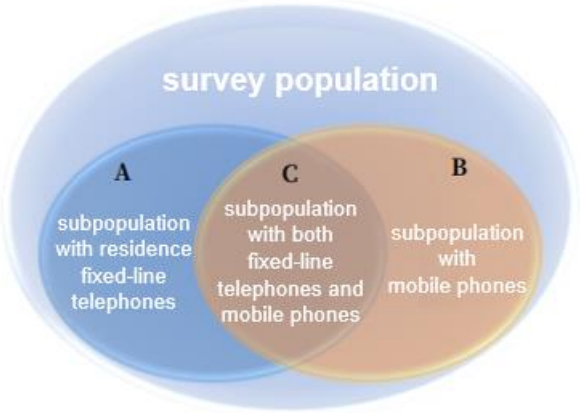
1.1 Survey Population

Chinese permanent residents at the age of 6 or above who have residence fixed-line telephones (including home phones and dormitory telephones) or mobile phones

◇ Sample scale

There are 30,000 samples, covering 31 provinces, autonomous regions and municipalities in Chinese mainland, excluding Hongkong, Macao and Taiwan.

◇ Division of survey population



The survey population can be divided into three categories:

Subpopulation A: Survey subpopulation using residence fixed-line telephones (including residents with home phones, students with dormitory telephones, and other users with dormitory telephones);

Subpopulation B: Survey subpopulation with mobile phones;

Subpopulation C: Survey subpopulation with both residence fixed-line telephones and mobile phones (there is an overlap between subpopulation A and subpopulation B, and the overlapped part is subpopulation C), C=A∩B.

1.2 Sampling Method

CNNIC surveys subpopulation A, B and C. Double sampling is adopted for the survey so as to cover as many Internet users as possible. The first sampling frame is subpopulation A, the people with residence fixed-line telephones. The second sampling frame is subpopulation B, the people with mobile phones.

For the survey population with fixed-line telephones, stratified two-stage sampling is adopted. To ensure the sufficient representativeness of samples, the whole country is divided into 31 tiers according to the province, autonomous region and municipality directly under the central government and the sampling is made independently at each tier.

The self-weighted sampling method is adopted for each province. The sample sizes for each city and prefecture (including the governed districts and counties) are allocated in accordance with the proportion of the people at the age of 6 or above covered by residence fixed-line telephones in the local area compared to the total covered population in the whole province.

Sampling in subpopulation B is similar to that in subpopulation A. The whole country is divided into 31 tiers according to the provinces, autonomous regions and municipalities directly under the central government, and sampling is made independently in each tier. Samples are allocated in accordance with the proportion of the residents in each district or city, in order to make the sample allocation in each province conform to the self-weighting method.

To ensure the telephones are taken with almost the same probability in each district, city or prefecture, that is, the local bureau number with more telephones will more likely be taken, and to make the phone visit more feasible, the telephone numbers in each district, city and prefecture are taken according to the following procedures:

For mobile phone user groups, all the mobile bureau numbers in each district, city and prefecture are sampled. A certain quantity of 4-digit random numbers are generated according to the valid sample size in each district, city or prefecture, and then combined with the mobile bureau numbers in each district, city or prefecture to form a number library (local bureau number + the random 4-digit number). The number library is randomly ordered, dialed and visited. Survey of subpopulation A is similar to that of subpopulation B. A random number is generated and combined with the local bureau number to form a telephone number, and then such number is dialed and visited. To avoid repeated sampling, only residence fixed-line telephones are visited.

According to the latest population attribute structure published by the provincial statistical bureaus, we use the method of multi-variable joint weighting to estimate the size of netizens.

1.3 Sampling Error

Based on the design, analysis and calculation of sampling, 0.50 percentage point is the estimated maximum allowable absolute error of the proportional target quantity (e.g. the popularity rate of netizens) among the individual netizen survey results, when the confidence is 95%. From this, we can deduce the error range of estimating other kinds of target quantities, such as the scale of netizens.

1.4 Survey Method

The Computer-assisted Telephone Interviewing (CATI) system is adopted for the survey.

1.5 Differences between Survey Population and Targeted Population

A study for the subpopulation who are not covered by telephones, conducted by CNNIC at the end of 2005, shows that Internet users are very few in this subpopulation. Currently, the subpopulation is downsizing gradually with the development of our telecom industry. In this survey, there is an assumption, i.e., Internet users who are not covered by fixed-line telephones or mobile phones are negligible.

(II) Automatic Online Search and Statistical Data Reporting

Automatic online search mainly makes technical statistics on the number of websites, and the reported data mainly includes the number of IP addresses and domain names.

2.1 Number of IP Addresses

The data of IP addresses counted by province come from the IP address databases of Asia-Pacific Network Information Center (APNIC) and CNNIC. Registered data in each database, that can be distinguished by the province which the addresses belong to, can be added respectively by province to generate data of each province. As address allocation is a dynamic process, the statistical data are only for reference. The Ministry of Industry and Information Technology, as the national competent department for IP addresses, also requires IP address allocation organizations to report the quantity of IP addresses they own semiannually. To ensure the accuracy of IP data, CNNIC will compare and verify APNIC statistical data with the reported data to confirm the final

quantity of IP addresses.

2.2 Number of Websites

The number of websites is detected and obtained by CNNIC according to domain name lists.

The lists of ".CN" and ".中国" are obtained though the database of CNNIC, while the list of gTLD is provided by international relevant registries.

2.3 Number of Domain Names

The numbers of domain names under ".CN" and ".中国", respectively, are derived from CNNIC database, while those under gTLD and New gTLD are provided by domestic registrars.

II. Definitions of Terms in the Report

◇ **Internet Users or Netizens:** Chinese residents at the age of 6 or above who have used the Internet in the past 6 months.

◇ **Mobile Internet Users:** Internet users who have used mobile phones to access and surf the Internet in the past 6 months.

◇ **Computer Internet Users:** Internet users who have used computers to access and surf the Internet in the past 6 months.

◇ **Rural Internet Users:** Internet users who have been living in rural areas of China in the past 6 months.

◇ **Urban Internet Users:** Internet users who have been living in urban areas of China in the past 6 months.

◇ **IP Address:** As the basic resource on the Internet, the IP address functions to identify computers, servers and other devices connected to the Internet. Connection with the Internet can be realized only when an IP address (in any form) is acquired.

◇ **Website: 网站：** It refers to a web site with a domain name itself or "www. + domain name". Such domain names include Chinese ccTLD, such as .cn and .中国, and gTLD, and registrants of the domain names are within the territory of P.R.C. For example, for the domain name of "cnnic.cn", it has only one website and the corresponding web address is "cnnic.cn" or "www.cnnic.cn". Other web addresses with such domain name as the suffix, like "whois.cnnic.cn" and "mail.cnnic.cn", are regarded as different channels of the website.

◇ **Scope of Survey:** Unless otherwise expressly indicated, data in this Report only refer to mainland China, excluding Hong Kong, Macao and Taiwan.

◇ **Deadline of Survey Data:** The deadline of the statistical survey data is Jun. 30, 2022.

◇ **Data Explanation：** Most of the data in this Report are approximate values after rounding and retaining significant digits.

Appendix 2 Attached Tables of Basic Internet Resources

Table 1 The Number of IPv4 Addresses in Different Regions of China

Region	Number of Addresses	Equivalence
Chinese mainland	343,321,856	20A+122B+178C
Hong Kong SAR	12,567,296	169B+57C
Macao SAR	336,640	5B+33C
Taiwan	35,692,288	2A+41B+209C

Table 2 The Allocation of IPv4 Addresses among Organizations in Chinese mainland

Organization Name	Number of Addresses	Equivalence
China Telecom	125,763,328	7A+126B+255C
China Unicom	69,866,752 注1	4A+42B+21C
IP Address Allocation Alliance of CNNIC	63,868,864 注2	3A+206B+110C
China Mobile	35,294,208	2A+26B+140C
China Education and Research Network	16,649,984	254B+16C
China Mobile Tietong	15,796,224 注3	241B+8C
Others	16,082,496	245B+102C
Total	343,321,856	20A+122B+178C

数 Data sources: APNIC and CNNIC

Note 1: The addresses of China Unicom include the addresses of former China Unicom and former China Netcom. Specifically, the IPv4 addresses 6316032（96B+96C）of former China Unicom are assigned by CNNIC.

Note 2: As a national Internet registry (NIR) approved by APNIC and national competent authorities in China, CNNIC has organized ISPs, enterprises and public institutions of certain size in China to set up IP Address Allocation Alliance. So far, the total number of IPv4 addresses held by the members of IP Address Allocation Alliance is 86 million, equivalent to 5.1A. The IPv4 addresses of the IP Address Assignment Alliance listed in the above table do not include those IPv4 addresses already assigned to former China Unicom and China Mobile Tietong.

Note 3: The IPv4 addresses of China Mobile Tietong are assigned by CNNIC.

Note 4: The deadline for the above statistical data is Jun. 30, 2022.

Table 3 The Number of IPv6 Addresses in Different Regions of China (unit: /32[note1])

Region	Number of Addresses
Chinese mainland	60,020
Hong Kong SAR	478
Macao SAR	7
Taiwan	2,574

Table 4 The Allocation of IPv6 Addresses among Organizations in Chinese mainland

Organization Name	Number of IPv6 Addresses
IP Address Allocation Alliance of CNNIC	22,402[note 2]
China Telecom	16,387
China Education and Research Network	10,258
China Unicom	4,097
China Mobile	4,097
China Mobile Tietong	2,049[note 3]
China Science and Technology Network	17[note 4]
Others	713
Total	60,020

Data sources: APNIC and CNNIC

Note 1: /32 as shown in the IPv6 address tables is a method to present IPv6 addresses, and the corresponding number of addresses is $2^{(128-32)}=2^{96}$.

Note 2: At present, the number of IPv6 addresses held by the members of IP Address Allocation Alliance of CNNIC is 24468/32. The IPv6 addresses held by the members of IP Address Allocation Alliance listed in the above table do not include those IPv6 addresses already assigned to China Mobile Tietong and China Science and Technology Network (CSTNET).

Note 3: The IPv6 addresses of China Mobile Tietong are assigned by CNNIC.

Note 4: The IPv6 addresses of CSTNET are assigned by CNNIC.

Note 5: The deadline for the above statistical data is Jun. 30, 2022.

Table 5 The Proportion of IPv4 Addresses in Each Province / Autonomous Region / Municipality Directly under the Central Government

Province / Autonomous Region / Municipality Directly under the Central Government	Proportion
Beijing	25.49%
Guangdong	9.54%
Zhejiang	6.47%
Shandong	4.89%
Jiangsu	4.76%
Shanghai	4.52%
Liaoning	3.33%
Hebei	2.85%
Sichuan	2.77%
Henan	2.63%
Hubei	2.40%
Hunan	2.36%
Fujian	1.95%
Jiangxi	1.73%
Chongqing	1.68%
Anhui	1.65%
Shaanxi	1.63%
Guangxi	1.38%
Shanxi	1.28%
Heilongjiang	1.21%
Jilin	1.21%
Tianjin	1.05%
Yunnan	0.97%
Inner Mongolia	0.77%
Xinjiang	0.60%
Hainan	0.47%
Gansu	0.47%
Guizhou	0.44%
Ningxia	0.28%
Qinghai	0.18%
Tibet	0.13%
Others	8.92%
Total	100.00%

Data sources: APNIC and CNNIC

Note 1: The above statistics are made on the basis of the location of the IP address owners.

Note 2: The deadline for the above statistical data is Jun 30, 2022.

Table 6 The Numbers of .CN Domain Names and .中国 Domain Names by Province

Province	Domain Names		".CN" Domain Names		".中国" Domain Names	
	Number	Proportion in total domain names	Number	Proportion in ".CN" domain names	Number	Proportion in ".中国" domain names
Beijing	5635538	16.7%	3254712	18.2%	27156	14.6%
Guangdong	4438498	13.1%	2289998	12.8%	17516	9.4%
Fujian	4074309	12.1%	3424522	19.2%	6758	3.6%
Shandong	2000756	5.9%	1010968	5.7%	28622	15.4%
Guizhou	1925671	5.7%	1762319	9.9%	3228	1.7%
Shanghai	1798924	5.3%	501192	2.8%	7878	4.2%
Jiangsu	1692384	5.0%	598362	3.4%	9184	4.9%
Sichuan	1539575	4.6%	477651	2.7%	12146	6.5%
Zhejiang	1365623	4.0%	399561	2.2%	8240	4.4%
Henan	1204152	3.6%	555487	3.1%	4494	2.4%
Anhui	896394	2.7%	309038	1.7%	3999	2.1%
Hunan	859328	2.5%	444766	2.5%	2648	1.4%
Hebei	771889	2.3%	263843	1.5%	6445	3.5%
Hubei	699124	2.1%	363578	2.0%	3494	1.9%
Jiangxi	626111	1.9%	307994	1.7%	2239	1.2%
Guangxi	586022	1.7%	327527	1.8%	1507	0.8%
Shaanxi	516232	1.5%	216013	1.2%	6911	3.7%
Chongqing	454355	1.3%	211658	1.2%	5522	3.0%
Liaoning	426658	1.3%	166495	0.9%	5735	3.1%
Yunnan	393133	1.2%	191246	1.1%	5102	2.7%
Shanxi	292941	0.9%	149589	0.8%	2186	1.2%
Tianjin	225847	0.7%	83189	0.5%	1394	0.7%
Heilongjiang	206723	0.6%	99895	0.6%	2479	1.3%
Hainan	176491	0.5%	61638	0.3%	832	0.4%
Jilin	167179	0.5%	100099	0.6%	1510	0.8%
Inner Mongolia	160062	0.5%	81879	0.5%	1072	0.6%
Xinjiang	138200	0.4%	50191	0.3%	882	0.5%
Gansu	110153	0.3%	53332	0.3%	1178	0.6%
Ningxia	43454	0.1%	22111	0.1%	578	0.3%
Qinghai	35116	0.1%	12722	0.1%	266	0.1%
Tibet	12944	0.0%	6967	0.0%	479	0.3%
Others	331409	1.0%	62727	0.4%	4612	2.5%
Total	33805195	100.0%	17861269	100.0%	186292	100.0%

Data sources: CNNIC

Note: The deadline for the above statistical data is Jun. 30, 2022.

Appendix 3 Supporting Organizations

We would like to express our heartfelt thanks to the following organizations that have supported the collection of data in this report. (Not listed in any particular order)

Ministry of Industry and Information Technology
Office of the Central Cyberspace Affairs Commission
National Bureau of Statistics
Central Committee of the Communist Young League

China Organizational Name Administration Center
E-governance Research Center of Party School of the Central Committee of C.P.C (National Academy of Governance)
China Academy of Information and Communications Technology
Reporting Center for Illegal and Inappropriate Internet Information of Cyberspace Administration of China（12377）
Computer Network Information Center of Chinese Academy of Sciences

China Mobile
China Unicom
Baidu Online Network Technology (Beijing) Co., Ltd.
Beijing Micro Dream Network Technology Co., Ltd. (Micro-blog)
Alibaba Cloud Computing (Beijing) Co., Ltd.
Beijing Baidu Netcom Technology Co., Ltd.
Beijing Guoxu Network Technology Co., Ltd
Beijing Shouxinwangchuang Network Information service Co., Ltd.
Beijing DNS.com Co., Ltd.
Beijing ZW.cn Co., Ltd.
Beijing Zhuoyueshengming Technology Co., Ltd.
Chengdu Feishu Technology Co., Ltd.
Chengdu West Dimension Digital Technology Co., Ltd
Foshan Yidong Network Co., Ltd.
Guangdong Jinwanbang Technology Investment Co., Ltd.
Guangzhou Yunxun Information Technology Co., Ltd.
Hefei Juming Network Technology Co., Ltd.
Heilongjiang E-link Network Co., Ltd.
Global Business Domain Technology Co., Ltd.

China Telecom
Beijing Ucap Information Techonology Co., Ltd.
Tencent Cloud Computing (Beijing) Co., Ltd.
Beijing ByteDance Technology Co., Ltd.
Alibaba Cloud Computing Co., Ltd.
Beijing Oriental Wangjing Information Technology Co., Ltd.
Beijing HuaRui Wireless Technology Co., Ltd.
Beijing Wanweitonggang Technology Co., Ltd.
Beijing Xinnet Information Technology Co., Ltd.
Beijing BrandCloud.cn Co., Ltd.
Beijing Zihai Technology Co., Ltd.
Chengdu 51web.com Co., Ltd.
Fanxi Corporation Service (Shanghai) Co., Ltd.
Fujian Litian Network Technology Co., Ltd.
Guangdong Now.cn Co., Ltd.
Guest Internet Industry Co., Ltd.
Henan Weichuang Network Technology Co., Ltd.
ZDNS Beijing Engineering Research Center Co., Ltd.
Jiangsu Bangning Technology Co., Ltd.

Maoming Qunying Network Co., Ltd.
Xiamen 35.Com Technology Co., Ltd.
Xiamen Shushengqi Youtong Technology Co., Ltd
Shangzhong Online Technology Co., Ltd.
Shanghai Hufu Information Technology Co., Ltd.
Shanghai Yovole Network Co., Ltd.
Shenzhen Internet Works Online Co., Ltd.
Sichuan Yuqu Network Technology Co., Ltd.
Vantage of Convergence (Chengdu) Co., Ltd.
Xi'an Qianxinet Technology Co., Ltd.
Ejee Group Beijing Co., Ltd.
Zhengzhou Shanglu Technology Co., Ltd.
Grow Force Co., Ltd.
Knet Registrar (Tianjin) Co., Ltd
Zunyi zhongyuzhike Network Technology Co., Ltd.
Xiamen Nawang Technology Co., Ltd
Xiamen zzy.cn Co., Ltd.
eName Technology Co., Ltd.
Shanghai Best Oray Information S&T Co., Ltd.
Shanghai Meicheng Technology Information Co., Ltd.
Shenzhen idcicp.com Co., Ltd.
Shenzhen Yingmaisi Information Technology Co., Ltd.
Tianjin Zhuiri Technology Development Co., Ltd.
WangJu Brands Management Co., Ltd.
Yantai DNSpod Network Technology Co., Ltd.
Zhejiang 22net Inc.
Zhengzhou Shijichuanglian E-Technology Development Co., Ltd.
ChinaCC.Net (Suzhou) Co., Ltd.
Chongqing Zhijia Information Technology Co. Ltd.

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