

The 51st Statistical Report on China's Internet Development

China Internet Network Information Center (CNNIC)

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 50 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.

The 20th National Congress of the Communist Party of China (CPC) was successfully held in October 2022. The report to the 20th CPC National Congress called for accelerating the development of the digital economy, promoting the deep integration of the digital economy and the real economy, and building an internationally competitive digital industrial cluster. In 2022, China's digital economy continued to develop rapidly, and the added value of information transmission, software and information technology services increased by 9.1%; the national online retail sales reached 13.79 trillion yuan, an increase of 4.0% over the previous year, making positive contributions to maintaining the steady growth of the national economy.

The Internet is an important infrastructure for the development of digital economy and plays a key role in the network information industry. China Internet Network Information Center (CNNIC) has been following the development of China's Internet, expanding the scope of research, and subdividing research areas. The Report focuses on the six aspects, including basic Internet development, size of Internet users, Internet applications, industrial Internet, e-government, and Internet security. From a multi-pronged perspective, CNNIC has worked to comprehensively demonstrate the development of China's Internet in 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 extend our sincere thanks to all the institutions and Internet users that have supported this statistical survey on the Internet development.

China Internet Network Information Center (CNNIC)

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Core Data

- ◇ As of December 2022, China had 1,067 million netizens, up 35.49 million over December 2021, and its Internet penetration had reached 75.6%, up 2.6 percentage points over December 2021.
- ◇ Up to December 2022, the number of mobile Internet users in China had reached 1,065 million, up 36.36 million over December 2021. The proportion of China's netizens accessing the Internet via mobile phones was 99.8%.
- ◇ As of December 2022, the size of rural Internet users was 308 million or 28.9% of the national total, while that of urban Internet users was 759 million or 71.1% of the national total.
- ◇ Up to December 2022, the proportions of Chinese netizens accessing the Internet through mobile phones, TVs, desktop computers, laptop computers, and tablet computers were 99.8%, 25.9%, 34.2%, 32.8% and 28.5%, respectively.
- ◇ As of December 2022, the number of IPv6 addresses had increased to 67,369 blocks / 32, up 6.8% over December 2021.
- ◇ Up to December 2022, the number of China's domain names totaled 34.40 million. China had 20.10 million domain names ending with ".CN", making up 58.4% of the national total.
- ◇ As of December 2022, the user size of instant messaging in China reached 1.038 billion, up 31.41 million from December 2021, making up 97.2% of the national total.
- ◇ Up to December 2022, the user size of online video (including video clips) in China had reached 1.031 billion, up 55.86 million from December 2021, making up 96.5% of all Internet users. The number of video clip users totaled 1.012 billion, an increase of 77.70 million over December 2021, accounting for 94.8% of all Internet users.
- ◇ As of December 2022, the user size of online payment in China had reached 911 million, up 7.81 million from December 2021, taking up 85.4% of Chinese netizens.
- ◇ As of December 2022, the user size of online shopping in China was 845 million, up 3.19 million from December 2021, taking up 79.2% of all Internet users.
- ◇ By December 2022, the user size of online news in China had reached 783 million, up 12.16 million from December 2021, making up 73.4% of Chinese netizens.
- ◇ As of December 2022, the user size of live streaming in China had reached 751 million, an increase of 47.28 million over December 2021, accounting for 70.3% of all Internet users.
- ◇ Up to December 2022, the user size of online office in China was 540 million, up 70.78 million from December 2021, accounting for 50.6% of all Internet users.
- ◇ As of December 2022, the number of users of online travel booking in China was 423 million, up 25.61 million from December 2021, accounting for 39.6% of all Internet users.

- ◇ As of December 2022, the user size of online medical services in China had reached 363 million, an increase of 64.66 million over December 2021, accounting for 34.0% of the total Internet users.

Chapter One Basic Internet Development

I Basic Internet Resources

As of December 2022, the number of IPv4 addresses in China was 391.82 million, that of IPv6 addresses was 67,369 blocks/32, and that of active IPv6 users reached 728 million. The total number of domain names in China was 34.40 million, of which 20.10 million ended with “.CN”, accounting for 58.4%. The number of mobile phone base stations in China totaled 10.83 million, the number of Internet broadband access ports reached 1.071 billion, and the total length of fiber optic cable lines amounted to 59.58 million kilometers.

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

Category	Dec. 2021	Dec. 2022
IPv4	392,486,656	391,822,848
IPv6 (block/32)	63,052	67,369
Number of active IPv6 users (100 million)	6.08	7.28
Domain name	35,931,063	34,400,483
Domain names ending with “.CN”	20,410,139	20,101,491
Mobile phone base stations (10,000)	996	1083
Internet broadband access ports (100 million)	10.18	10.71
Length of fiber optic cable lines (10,000 km)	5,488	5,958

(I) IP Address

As of December 2022, the number of IPv6 addresses was 67,369 blocks/32, up 6.8% over December 2021. Fourteen or 60.9% of the 23 globally-known public recursive services monitored by CNNIC offer IPv6 addresses, among which 13 resolution services were normal.

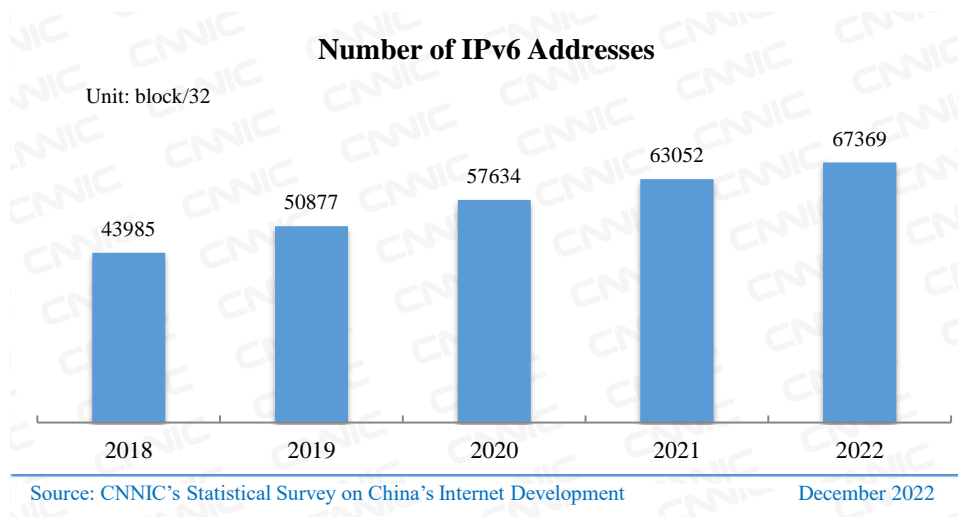


Figure 1 Number of IPv6 Addresses¹

As of December 2022, the number of active IPv6 users in China had reached 728 million.

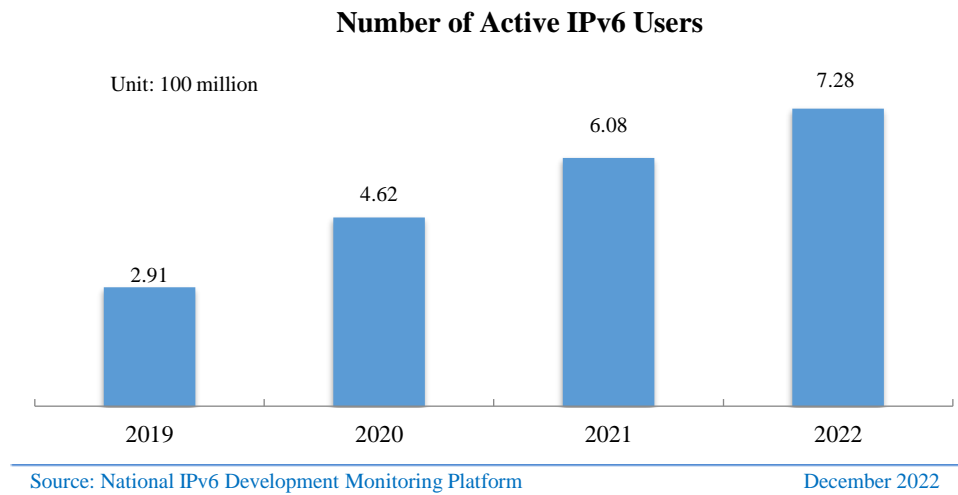


Figure 2 Number of Active IPv6 Users

Up to December 2022, the number of IPv4 addresses in China had amounted to 391.82 million.

¹ The data cover Hong Kong, Macao and Taiwan.

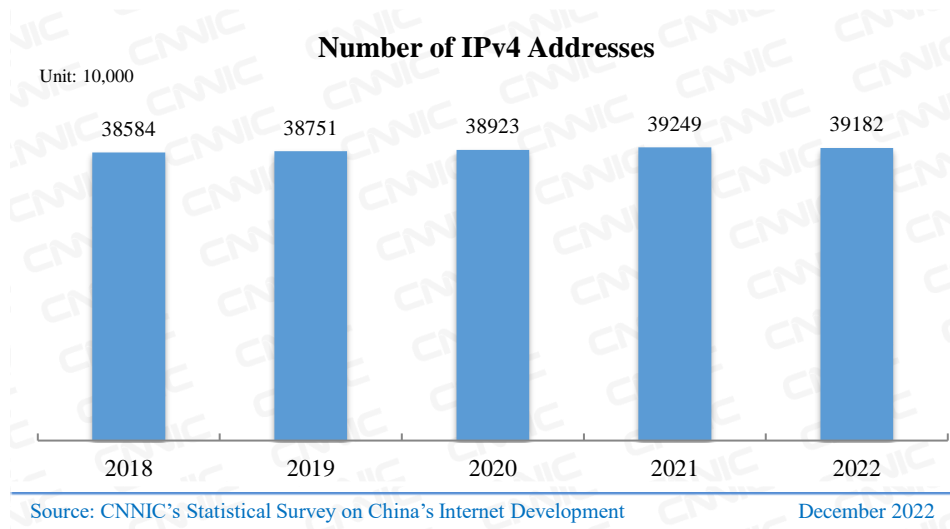


Figure 3 Number of IPv4 Addresses²

(II) Domain Name

Up to December 2022, the number of China's domain names totaled 34.40 million. Specifically, 20.10 million or 58.4% ended with ".CN"; 9.02 million or 26.2% ended with ".COM"; 190,000 or 0.5% ended with ".中国"; and 3.77 million or 11.0% were new generic Top-Level Domains (New gTLDs).

² The data cover Hong Kong, Macao and Taiwan.

Table 2 Number of Domain Names by Category³

Category	Number	Proportion in total domain names
.CN	20,101,491	58.4%
.COM	9,019,281	26.2%
.NET	762,969	2.2%
.中国	185,576	0.5%
.INFO	40,614	0.1%
.ORG	39,668	0.1%
.BIZ	20,253	0.1%
New gTLD	3,769,824	11.0%
Others ⁴	460,807	1.3%
Total	34,400,483	100.0%

Table 3 Number of Domain Names Ending with “.CN” by Category

Category	Number	Proportion in total “.CN” domain names
.cn	13,022,352	64.8%
.com.cn	3,288,847	16.4%
.adm.cn ⁵	1,815,750	9.0%
.net.cn	956,721	4.8%
.org.cn	842,601	4.2%
.ac.cn	153,853	0.8%
.gov.cn	14,487	0.1%
.edu.cn	6,682	0.0%
Others	198	0.0%
Total	20,101,491	100.0%

(III) Number of Mobile Phone Base Stations

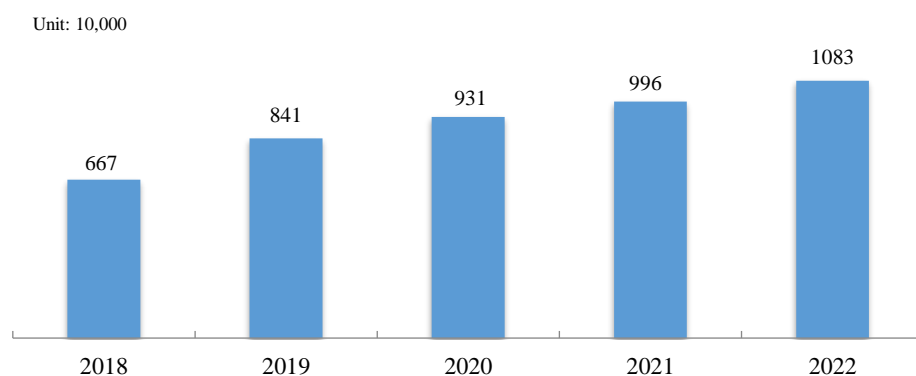
As of December 2022, the number of mobile phone base stations totaled 10.83 million, a net increase of 870,000 compared with December 2021. Specifically, the total number of 5G base stations reached 2.312 million, accounting for 21.3% of the total number of mobile base stations, an increase of 7 percentage points compared with December 2021, among which 887,000 5G base stations were newly built in the whole year of 2022.

³ Generic Top-Level Domains (gTLDs) and new generic Top-Level Domains (New gTLDs) are provided by China’s domain name registration units. The number of “.CN” and “.中国” domain names is the number of global registrations.

⁴ “Others” include domain names ending with “.CO”, “.TV”, “.CC”, “.ME”, etc.

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”.

Number of Mobile Phone Base Stations



Source: The Ministry of Industry and Information Technology

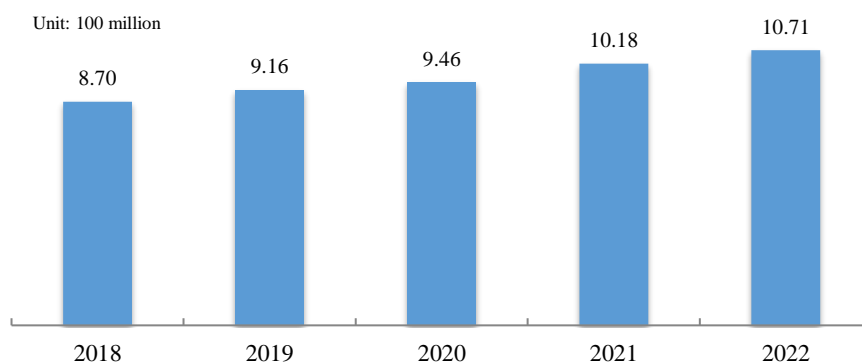
December 2022

Figure 4 Number of Mobile Phone Base Stations

(IV) Number of Internet Broadband Access Ports

As of December 2022, the number of Internet broadband access ports nationwide reached 1,071 million, a net increase of 53.20 million from December 2021. Specifically, the number of FTTH/O ports reached 1,025 million, a net increase of 65.34 million over December 2021, while the proportion increased to 95.7% from 94.3% in 12 months. The number of 10G PON ports with Gigabit network service capability reached 15.23 million, a net increase of 7.371 million over the end of 2021.

Number of Internet Broadband Access Ports



Source: The Ministry of Industry and Information Technology

December 2022

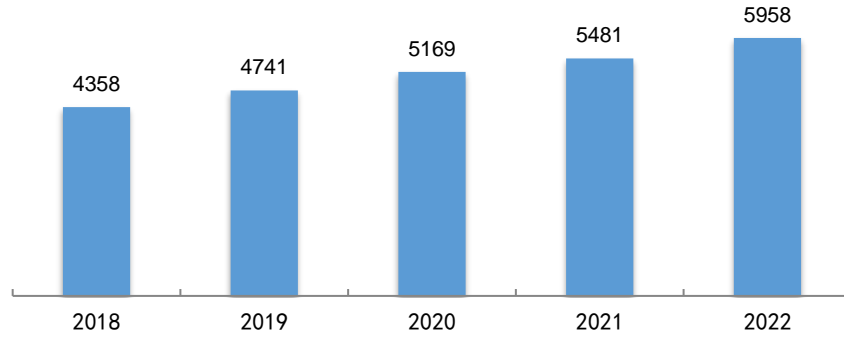
Figure 5 Number of Internet Broadband Access Ports

(V) Length of Fiber Optic Cable Lines

By December 2022, the total length of China's fiber optic cable lines had reached 59.58 million kilometers, of which 4.772 million kilometers were newly built. Among them, long-distance fiber optic cable lines, local relay fiber optic cable lines and access fiber optic cable lines were 1.095 million, 21.46 million and 37.02 million kilometers long, respectively.

Total Length of Fiber Optic Cable Lines

Unit: 10,000 km



Source: The Ministry of Industry and Information Technology

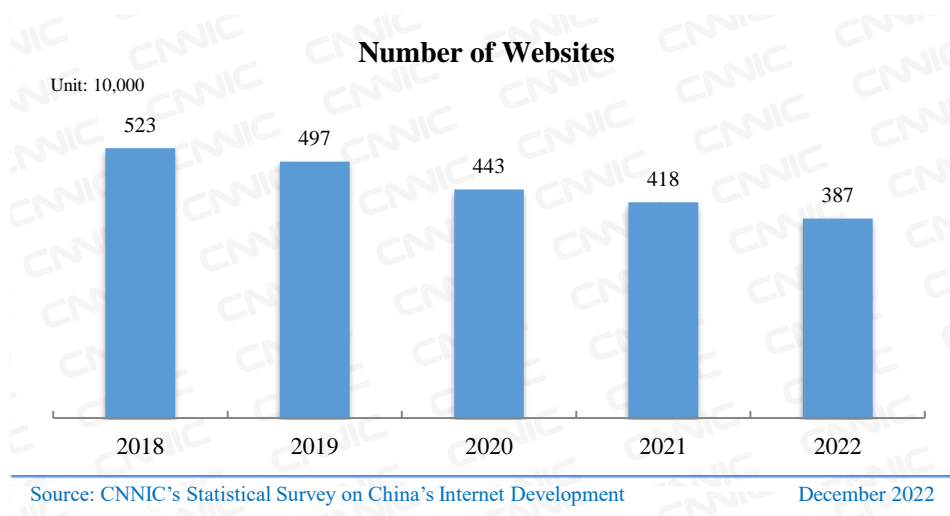
December 2022

Figure 6 Total Length of Fiber Optic Cable Lines

II Application of Internet Resources

(I) Websites

As of December 2022, there were 3.87 million websites in China⁶.



Source: CNNIC's Statistical Survey on China's Internet Development

December 2022

Figure 7 Number of Websites⁷

Up to December 2022, China had 2.24 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”.

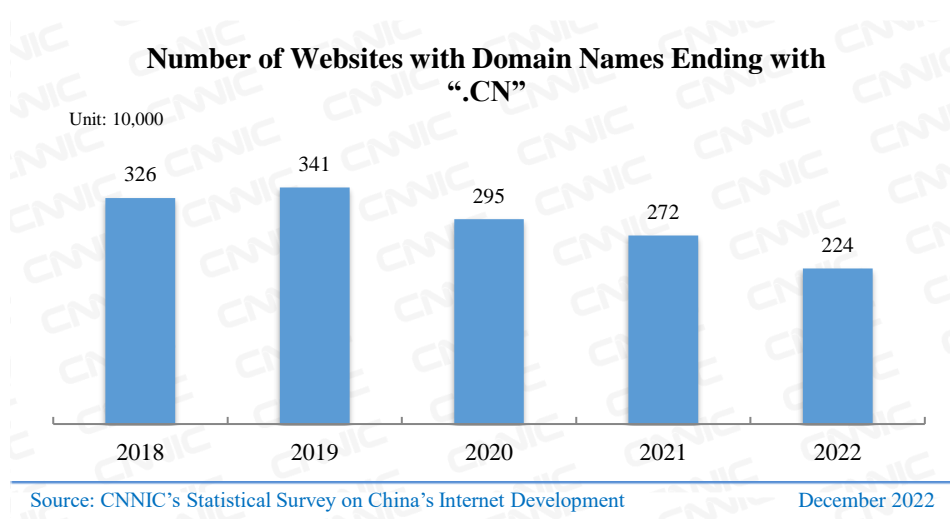


Figure 8 Number of Websites with Domain Names Ending with “.CN”⁸

(II) Web Pages

As of December 2022, there were 358.8 billion web pages in China, up 7.1% from the end of 2021.

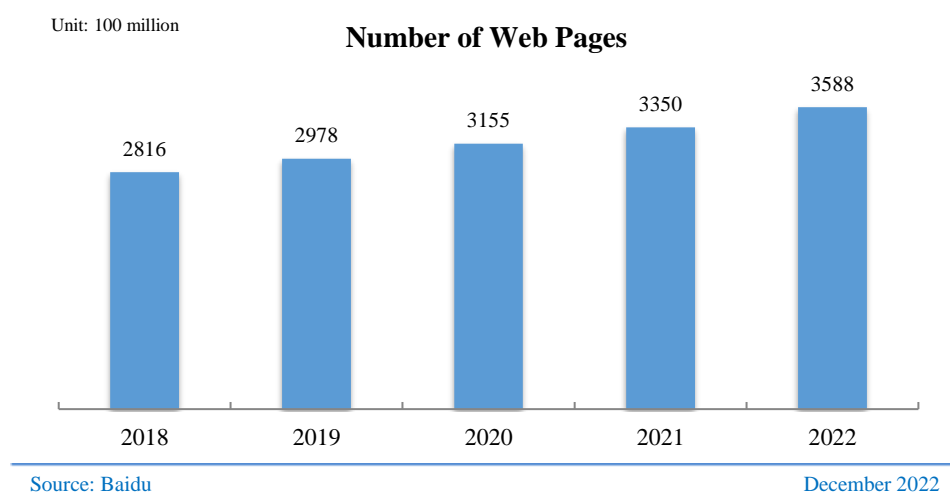


Figure 9 Number of Web Pages

There were 243.7 billion static web pages⁹ and 115.1 billion dynamic web pages¹⁰, accounting for 67.9% and 32.1% of the total, respectively.

Table 4 Number of Web Pages

Category	Unit	December 2021	December 2022	Growth rate
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⁸ The number of websites ending with “.CN” does not include that of those ending with “.EDU.CN”.

⁹ A static web page is a web page in standard HTML format whose extension is either .htm or .html and which contains text, images, audio, flash files, client scripts, ActiveX controls and JAVA programs.

¹⁰ A dynamic web page is a web page that displays different contents with the time, environment or result of database operation although its code is the same as that used for a static page. This is achieved by a combination of basic HTML language specification with advanced programming languages such as Java, VB and VC, database programming techniques and other techniques.

Total web pages		334,963,712,602	358,781,443,052	7.1%
Static web pages		225,618,593,713	243,679,435,621	8.0%
	Proportion in total web pages	67.4%	67.9%	--
Dynamic web pages		109,345,118,889	115,102,007,431	5.3%
	Proportion in total web pages	32.6%	32.1%	--
Web page size (total bytes)		25,835,838,532,975	29,068,342,543,482	12.5%
Average number of bytes per page		77	81	5.2%
	KB			
	KB			

(III) Mobile Internet Access Traffic

As of the end of 2022, China's cumulative mobile Internet access traffic had totaled 261.8 billion GB, a year-on-year increase of 18.1%

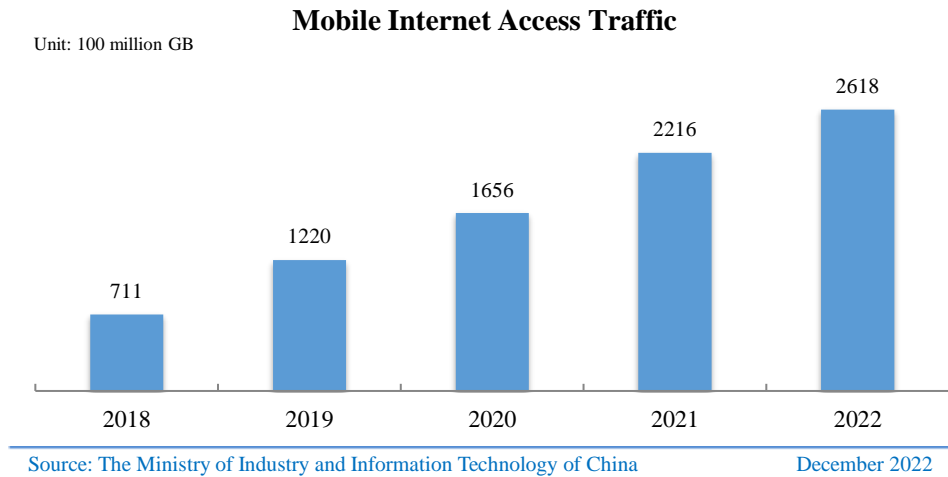


Figure 10 Mobile Internet Access Traffic

III Internet Access Environment

(I) Internet Access Devices

Up to December 2022, the proportions of Chinese netizens accessing the Internet through mobile phones, TVs, desktop computers, laptop computers, and tablet computers were 99.8%, 25.9%, 34.2%, 32.8% and 28.5%, respectively.

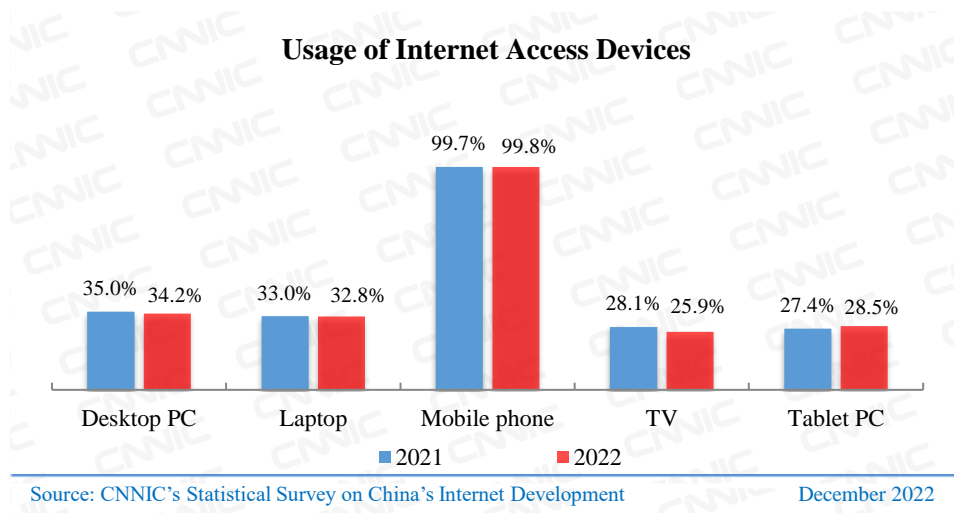


Figure 11 Usage of Internet Access Devices

As of December 2022, the total number of mobile phone subscribers to the three basic telecom operators reached 1.683 billion, a net increase of 40.62 million over December 2021. Among them, 5G mobile phone users¹¹ reached 561 million, accounting for 33.3% of total mobile phone users, up 11.7 percentage points over the end of December 2021.

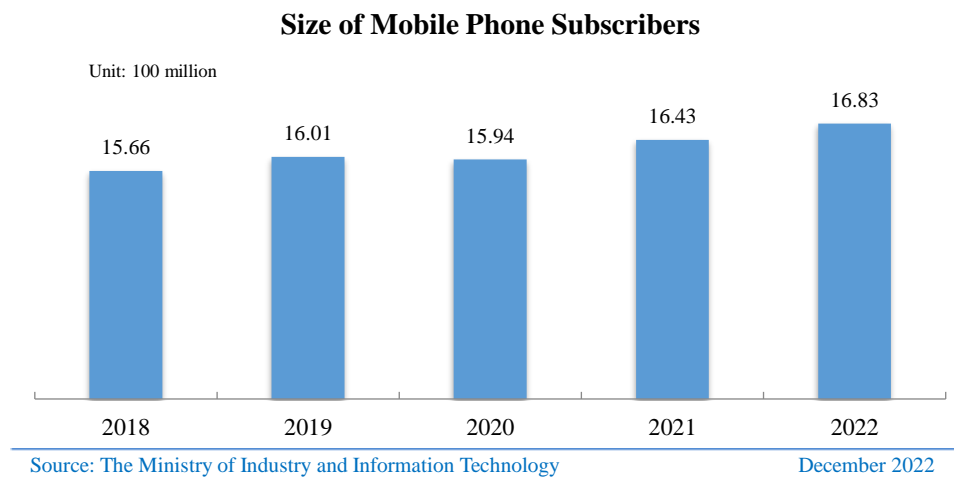
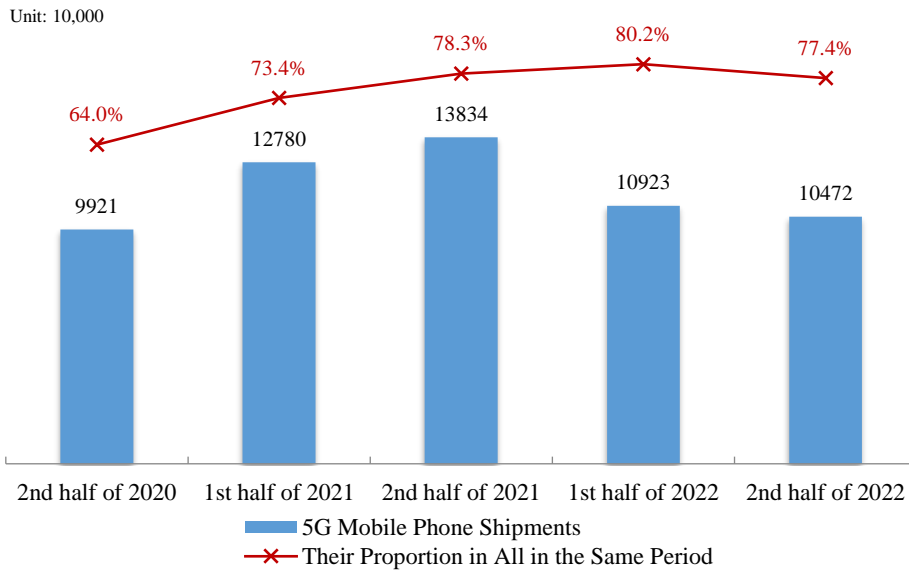


Figure 12 Size of Mobile Phone Subscribers

In 2022, the total shipment of domestic mobile phones was 272 million, down 22.6% year-on-year. In particular, the shipment of 5G mobile phones was 214 million, down 19.6% year-on-year, taking up 78.8% of the total mobile phone shipment in the same period.

¹¹ 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.

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



Source: China Academy of Information and Communications Technology

December 2022

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

(II) Online Duration

As of December 2022, the per capita weekly online duration¹² of China's Internet users was 26.7 hours, down 1.8 hours from December 2021.

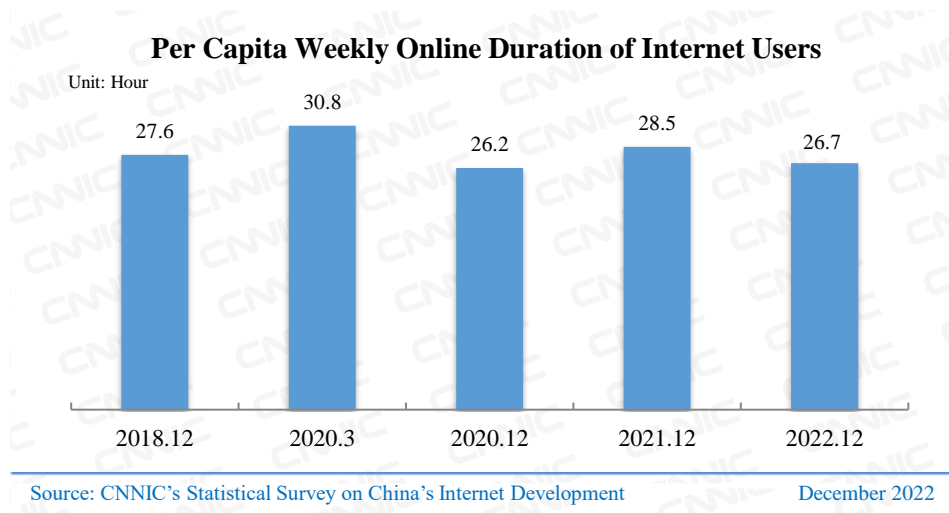


Figure 14 Per Capita Weekly Online Duration of Internet Users

(III) Fixed Broadband Access

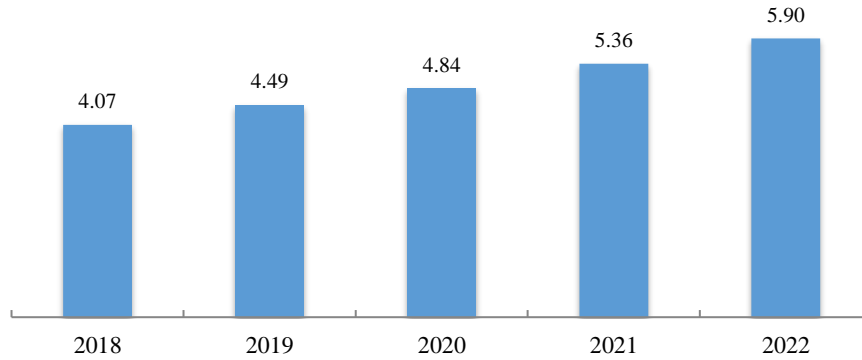
As of December 2022, the three basic telecom operators had 590 million fixed broadband

¹² 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.

subscribers, a net increase of 53.86 million from December 2021. Specifically, fixed Internet broadband subscribers enjoying an access rate of 100Mbps or above reached 554 million, accounting for 93.9% of the total and representing a net year-on-year increase of 55.13 million; those enjoying an access rate of 1,000Mbps or above reached 91.75 million, accounting for 15.6% of all Internet users, with a net increase of 57.16 million over December 2021.

Number of Fixed Broadband Subscribers

Unit: 100 million

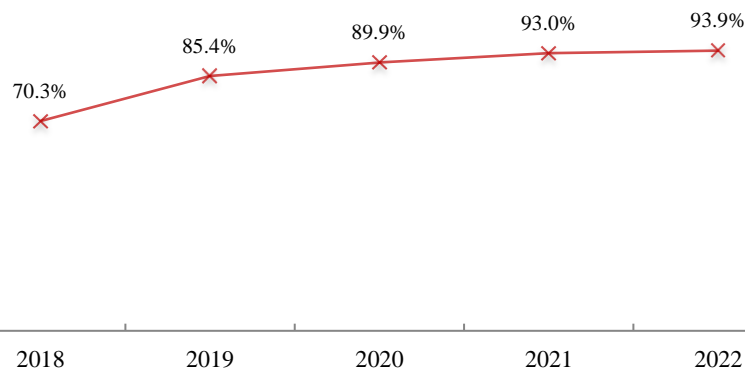


Source: The Ministry of Industry and Information Technology

December 2022

Figure 15 Number of Fixed Broadband Subscribers

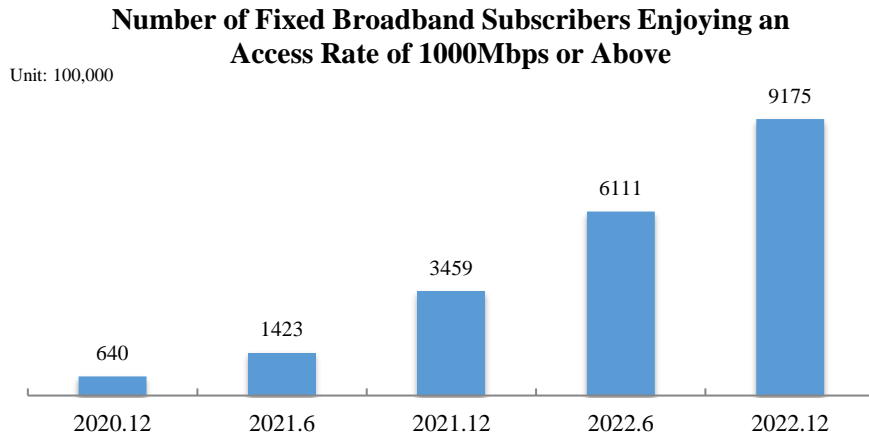
Proportion of Fixed Broadband Subscribers Enjoying an Access Rate of 100Mbps or Above



Source: The Ministry of Industry and Information Technology

December 2022

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



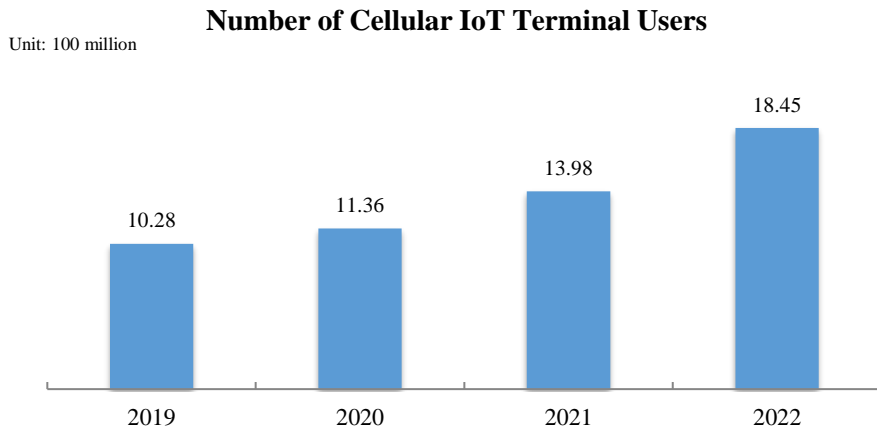
Source: The Ministry of Industry and Information Technology

December 2022

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

(IV) Number of Cellular IoT Terminal Users

By December 2022, the three basic telecom operators had developed 1.845 billion cellular IoT terminal users, a net increase of 447 million compared with December 2021. Cellular IoT terminal users were 161 million more than mobile phone users, accounting for 52.3% of the total mobile network terminal connections (covering both mobile phone users and cellular IoT terminal users).



Source: The Ministry of Industry and Information Technology

December 2022

Figure 18 Number of Cellular IoT Terminal Users

Chapter Two Size and Structure of Internet Users

I Size of Internet Users

(I) Size of Internet Users

As of December 2022, China had 1,067 million netizens, up 35.49 million over December 2021, and its Internet penetration had reached 75.6%, up 2.6 percentage points over December 2021.

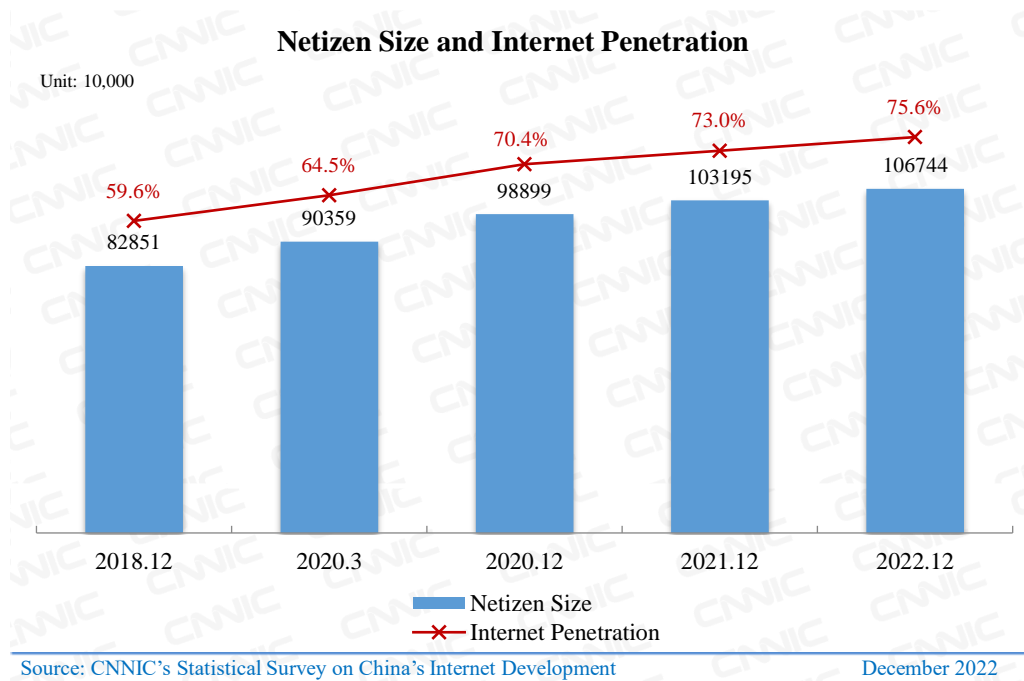


Figure 19 Netizen Size and Internet Penetration

Up to December 2022, the number of mobile Internet users in China had reached 1,065 million, up 36.36 million over December 2021. The proportion of China's netizens accessing the Internet via mobile phones was 99.8%.

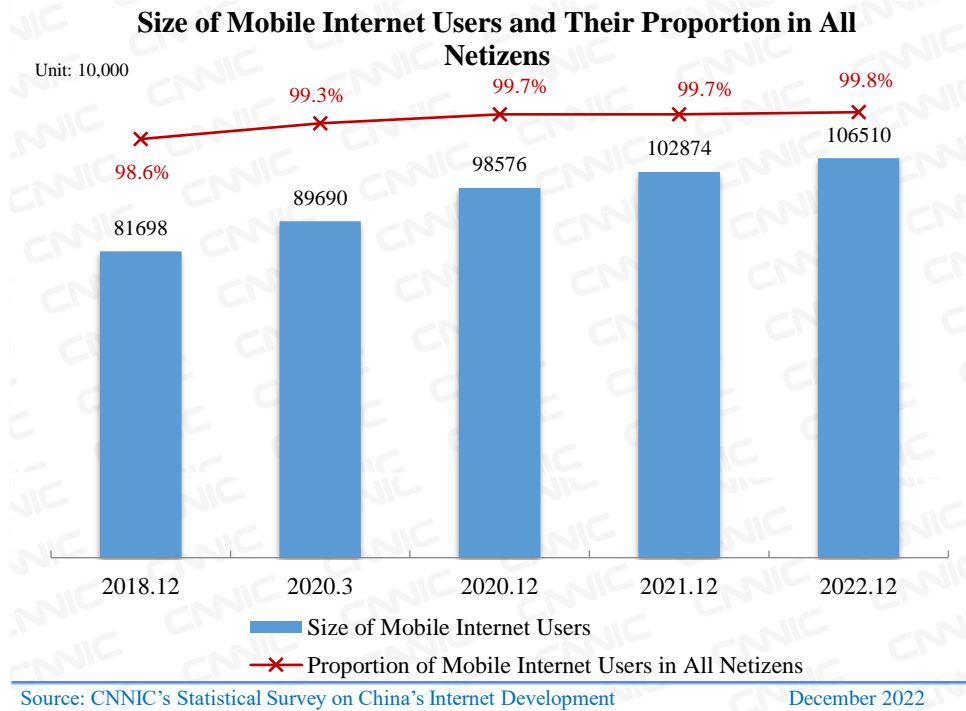


Figure 20 Size of Mobile Internet Users and Their Proportion in All Netizens

In 2022, the Internet access conditions and network experience of China's Internet users were continuously improved, information accessibility was further enhanced, and the Internet was moving from universal access to high-quality development. **First, “double gigabit” network construction continued to advance, providing a higher-quality network environment for the public.** The “double gigabit” network, represented by the gigabit optical network and 5G, forms the base of the new infrastructure. As of December, the number of 10G PON ports with gigabit network service capability in China reached 15.23 million, nearly doubling from the end of the previous year, with 110 cities nationwide reaching the gigabit city standard. China led the world in the construction of 5G mobile networks, with a cumulative total of 2.312 million 5G base stations built and put into operation, accounting for more than 60% of the world's total¹³. **Second, IoT created more diverse access devices and application scenarios to enhance users’ network experience.** As of December, the total number of terminal connections of China's mobile networks had reached 3.528 billion, and the foundation of the Internet of Everything was further consolidated; the user size of cellular IoT terminals in the fields of public services, vehicle-to-everything (V2X), smart retail, and smart home reached 496 million, 375 million, 250 million and 192 million respectively.¹⁴ A huge number of new devices were connected to the Internet, which further enriched the digital terminal devices and application scenarios and improved the user experience. **Third, elderly-oriented renovation and information accessibility services achieved remarkable results and promoted digital inclusion.** The Ministry of Industry and Information Technology issued “General Specification for Elderly-oriented Design of Mobile Internet Applications (APPs)” and “Evaluation System for Elderly-oriented Design and Accessibility of Internet Applications”, and launched a special campaign for this purpose, with more than ten related

¹³ Source: The Ministry of Industry and Information Technology, https://www.miit.gov.cn/zwwk/zcjd/art/2023/art_9f5022a_3fCDF48789484117d9a03e58.html, January 20, 2023.

¹⁴ Source: Same as above.

standards and specifications coming out one after another. By December, relevant departments had instructed enterprises to provide telecom services such as remote handling and troubleshooting for elderly users, and organized elderly-oriented renovations of 648 websites and APPs.¹⁵ **Fourth, Internet penetration continued to increase among minors.** According to the “Research Report on Internet Use among Minors in China in 2021”, the Internet penetration among minors in China reached 96.8% in 2021, an increase of 1.9 percentage points over 2020.

In March 2022, the Office of the Central Cyberspace Affairs Commission, the Ministry of Industry and Information Technology and other departments jointly issued the “2022 Essentials for Enhancing Digital Literacy and Skills for All”, and deployed 29 key tasks in eight areas to optimize the policy environment for the development of digital literacy and skills for all. Against this backdrop, significant progress was made in improving the digital literacy and skills of all citizens. As of December, 40.7% of Internet users had initial mastery of primary digital skills¹⁶; 47.0% had proficiency in primary digital skills¹⁷; 27.1% had initial mastery of intermediate digital skills; and 31.2% had proficiency in intermediate digital skills.

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

As of December 2022, the size of urban Internet users in China was 759 million, making up 71.1% of the national total, while that of rural Internet users was 308 million, up 23.71 million from December 2021, making up 28.9% of the national total.

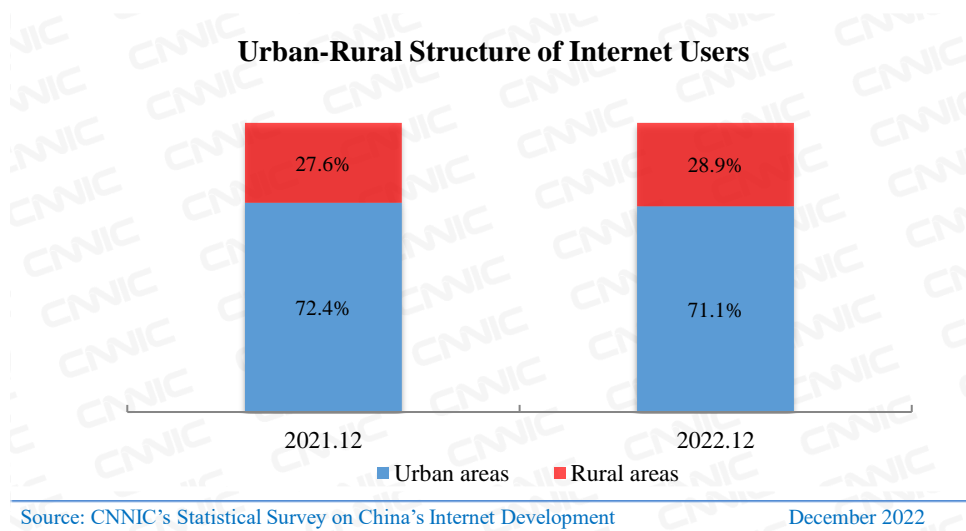


Figure 21 Urban-Rural Structure of Internet Users

Up to December 2022, the Internet penetration in urban China was 83.1%, up 1.8 percentage points over December 2021, while that in rural areas was 61.9%, up 4.3 percentage points over December 2021. The difference in Internet penetration between urban and rural areas narrowed by 2.5

¹⁵ Source: Information Office of the State Council, Press Conference on the Development of Industry and Information Technology in 2022, <http://www.scio.gov.cn/xwfbh/xwfbh/wqfbh/49421/49502/index.htm>, January 18, 2023.

¹⁶ Primary digital skills are defined as the ability to use digital tools to search, access, store, and transfer digital resources, such as being able to use a computer to search for information, transfer files, etc.

¹⁷ Intermediate digital skills are defined as the ability to use digital tools to process, handle, and utilize digital resources, such as the ability to use office software for text editing, data analysis, etc.

percentage points compared to December 2021.

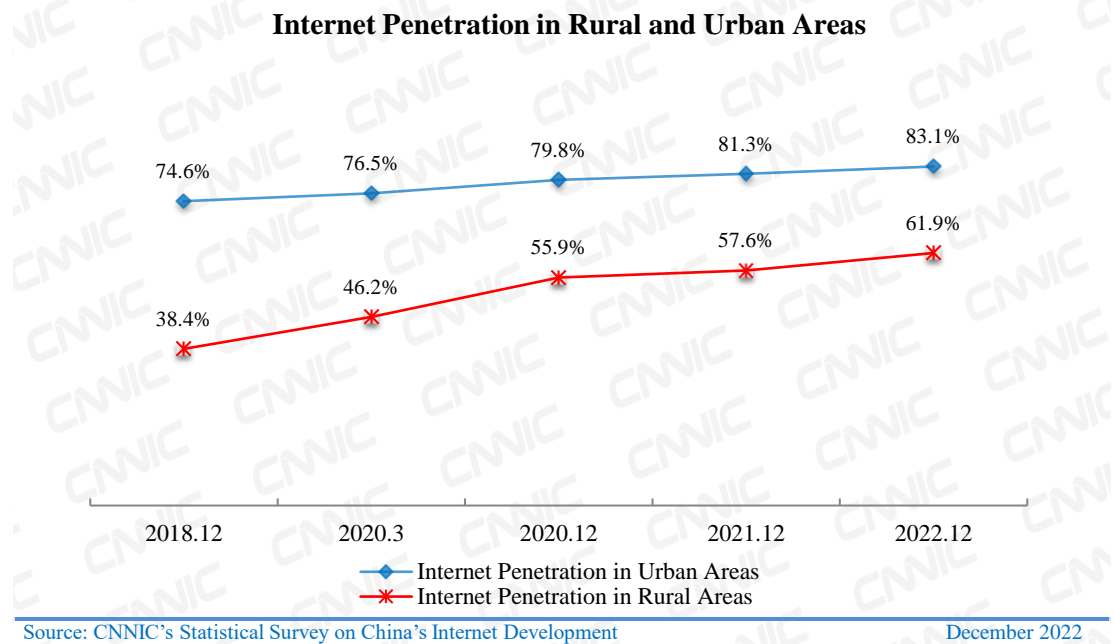


Figure 22 Internet Penetration in Rural and Urban Areas

As an important grip to achieve the goal of rural revitalization, the Internet continued to drive agricultural and rural development. **First, digital infrastructure in rural areas was further improved, and the digital base for rural revitalization was consolidated.** China's gigabit optical network had the capacity to cover more than 500 million households, making gigabit network available in every city and 5G communications available in every county.¹⁸ By the end of 2022, the total number of rural broadband users nationwide reached 176 million, an annual net increase of 18.62 million or 11.8%, with a growth rate 2.5 percentage points higher than that of urban broadband users.¹⁹ **Second, digital technology was deeply integrated with agricultural production and agricultural product circulation to promote rural revitalization.** The increasingly wide use of intelligent agricultural machinery, automatic sprout cultivation and other digital technologies further improved agricultural production efficiency. Data showed that intelligent agricultural machinery, with the ability of continuous work and all-weather operation, improved the efficiency of agricultural production by 20% to 60%.²⁰ E-commerce effectively broadened the sales channels of agricultural products. In the whole year, the total online retail sales of agricultural products nationwide reached 531.38 billion yuan, up 9.2% year-on-year, with a growth rate 6.4 percentage points higher than that in 2021.²¹ **Third, the popularization of rural Internet applications accelerated, and digital services enhanced rural people's livelihood and well-being.** The penetration of information communication and video entertainment APPs in rural

¹⁸ Source: Information Office of the State Council, Press Conference on the Development of Industry and Information Technology in 2022, <http://www.scio.gov.cn/xwfbh/xwfbfh/wqfbh/49421/49502/index.htm>, January 18, 2023.

¹⁹ Source: The Ministry of Industry and Information Technology, https://www.miit.gov.cn/gxsj/tjfx/txy/art/2023/art_77B586A554E64763AB2C28888DCF0B9E3.html, January 19, 2023.

²⁰ Source: CCTV, <https://m.gmw.cn/baijia/2022-05/18/1302952764.html>, May 18th, 2022.

²¹ Source: The Ministry of Commerce, <http://www.mofcom.gov.cn/article/xwfb/xwsj/zr/202301/20230103380919.shtml>, January 30, 2023.

areas was basically the same as that in urban areas. As of December, rural netizens' utilization ratio of short video had exceeded urban netizens' by 0.3 percentage point, and urban-rural gap in the utilization ratio of instant messaging had been narrowed to only 2.5 percentage points. The supply, quality and efficiency of digital services such as online medical services and online education continued to improve in rural areas. As of December, users of online education and those of online medical services in rural areas accounted for 31.8% and 21.5% of rural netizens, up 2.7 and 4.1 percentage points respectively over the previous year.

(III) Size of Non-netizens

As of December 2022, the size of non-netizens in China was 344 million, down 37.22 million from December 2021. **By region**, the majority of non-netizens was still in rural areas; the proportion of non-netizens in rural areas was 55.2%, 19.9 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 December 2022, the proportion of Chinese non-netizens aged 60 and above accounted for 37.4% of all non-netizens, 17.6 percentage points more than that of the national population aged 60 and above.

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, 19.0% of non-netizens said that payment by cash was unfeasible in some cases; 17.1% reported that they could not get the needed information in a timely manner, such as news; 16.1% complained that they could not buy tickets or get registered at the hospital; 15.6% worried that it was difficult for them to handle affairs due to reduced offline service outlets.

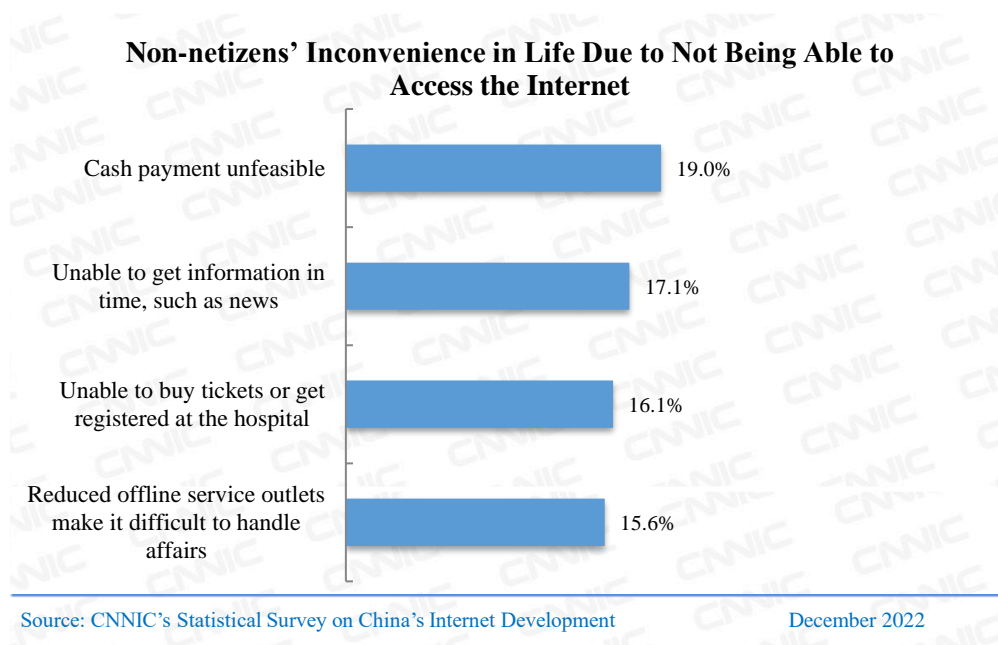
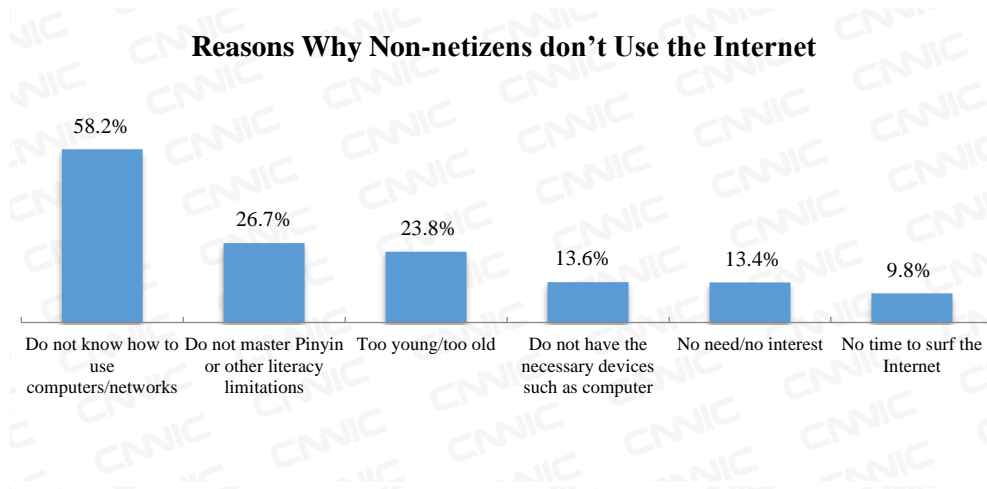


Figure 23 Non-netizens' Inconvenience in Life Due to Not Being Able to Access the Internet

Lack of skills, limited literacy, inadequate devices and age factors were the main reasons why non-netizens were unable to use the Internet. 58.2% of non-netizens were unable to access the Internet

because they did not know how to use the computer/Internet; 26.7% because they did not master Pinyin or due to limited literacy; 23.8% because they were too old or too young to use the Internet; 13.6% because they did not have computers or other necessary devices.

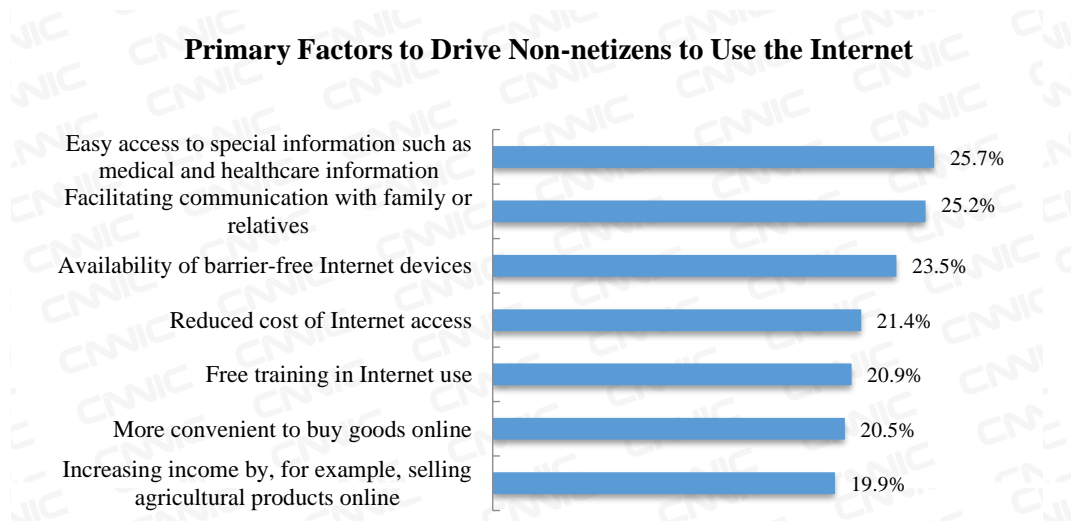


Source: CNNIC's Statistical Survey on China's Internet Development

December 2022

Figure 24 Reasons Why Non-netizens don't Use the Internet

For 25.7%, 25.2% and 23.5% of non-netizens, the primary factor to drive them to use the Internet was easy access to professional information, the convenience of communicating with their family, and the availability of barrier-free Internet devices, respectively.



Source: CNNIC's Statistical Survey on China's Internet Development

December 2022

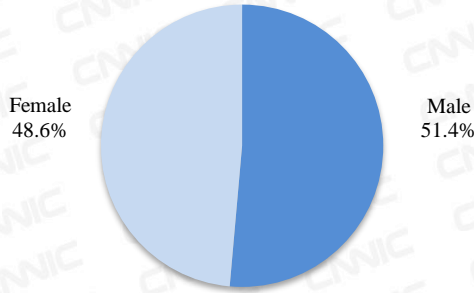
Figure 25 Primary Factors to Drive Non-netizens to Use the Internet

II The Attribute Structure of Internet Users

(I) Gender Structure

As of December 2022, the male-to-female ratio of Chinese netizens was 51.4:48.6, roughly the same as that of China's overall population.

Gender Structure of Internet Users



Source: CNNIC's Statistical Survey on China's Internet Development

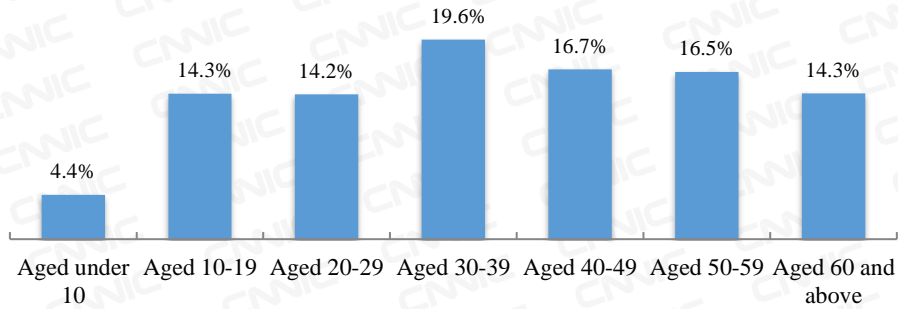
December 2022

Figure 26 Gender Structure of Internet Users

(II) Age Structure

As of December 2022, the proportions of Internet users aged 20-29, 30-39 and 40-49 were 14.2%, 19.6% and 16.7% respectively. In particular, the proportion of Internet users aged 50 and above increased from 26.8% in December 2021 to 30.8% in December 2022, indicating that the Internet further penetrated into middle-aged and elderly people.

Age Structure of Internet Users



Source: CNNIC's Statistical Survey on China's Internet Development

December 2022

Figure 27 Age Structure of Internet Users

Chapter Three Development of Internet Applications

I Overview of Internet Applications

All kinds of personal Internet applications continued to develop in China in 2022. The user size of instant messaging remained the biggest, with an increase of 31.41 million over December 2021, and the utilization ratio reached 97.7%. On a year-on-year basis, the number of users of online medical services and that of online office increased by 64.66 million (21.7%) and 70.78 million (15.1%) respectively.

Table 5 User Size and Utilization Ratio of Internet Applications from December 2021 to December 2022

Applications	December 2021 Number of users (10,000)	December 2021 Percentage of users using the application	December 2022 Number of users (10,000)	December 2022 Percentage of users using the application	Growth rate
Instant messaging	100666	97.50%	103807	97.20%	3.10%
Online video (including short videos)	97471	94.50%	103057	96.50%	5.70%
Video clips	93415	90.50%	101185	94.80%	8.30%
Online payment	90363	87.60%	91144	85.40%	0.90%
Online shopping	84210	81.60%	84529	79.20%	0.40%
Online news	77109	74.70%	78325	73.40%	1.60%
Online music	72946	70.70%	68420	64.10%	-6.20%
Live streaming	70337	68.20%	75065	70.30%	6.70%
Online games	55354	53.60%	52168	48.90%	-5.80%
Online literature	50159	48.60%	49233	46.10%	-1.80%
Online meal ordering	54416	52.70%	52116	48.80%	-4.20%
Online office	46884	45.40%	53962	50.60%	15.10%
Online car-hailing	45261	43.90%	43708	40.90%	-3.40%
Online travel booking	39710	38.50%	42272	39.60%	6.50%

Online medical services	29788	28.90%	36254	34.00%	21.70%
Online fitness training	--	--	37990	35.60%	--

II Basic Apps

(I) Instant Messaging

As of December 2022, the user size of instant messaging in China reached 1,038 million, an increase of 31.41 million over December 2021, accounting for 97.2% of all netizens in the country.

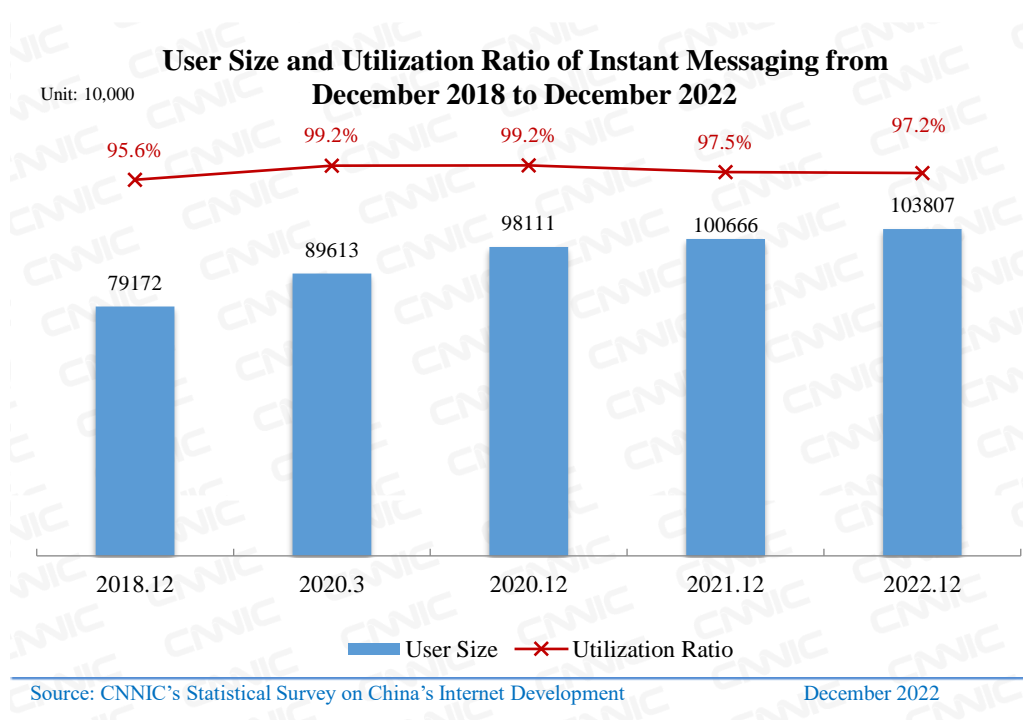


Figure 28 User Size and Utilization Ratio of Instant Messaging from December 2018 to December 2022

In 2022, the instant messaging industry maintained steady overall development, which was mainly manifested in the maturity of enterprise instant messaging market and the continuous exploration of new functions of personal instant messaging products.

On the enterprise side, the increasing maturity of products increased the market's recognition of enterprise instant messaging. First, in terms of products, enterprise instant messaging continued to expand its functions and formed a closed business loop. Currently, enterprise instant messaging products represented by DingTalk and Feishu have identified office collaboration and organizational management as two main service modules. In May, Douyin Group released the

Flying Book People series products, integrating recruitment, performance and OKR²² and other personnel management products. With “talent” as the core of business process, it realized the full cycle management of resume delivery, recruitment, evaluation, incentive and training. **Second, on the customer side, the penetration of enterprise instant messaging into large institutions was further enhanced.** Tencent said in its third-quarter financial report that it had allowed customers to integrate and deploy Tencent's public cloud products on private clouds, thus meeting the security and compliance needs of banks, governments and other customers. DingTalk also explained its key account strategy in September, and announced at the end of the year that it served more than 30 enterprise organizations with more than one million employees and more than 600 enterprise organizations with more than 100,000 employees, and that enterprises with more than 2,000 employees contributed nearly one-third of the activity.²³

On the personal side, the exploration of new functions is expected to bring new growth opportunities for instant messaging enterprises. First, forms of advertising were enriched and sources of income were broadened. In the first half of the year, WeChat launched “out-of-the box advertising”²⁴ in WeChat Moments so that the ad presentation effect was no longer limited by the image frame; and used the technology of naked-eye 3D²⁵ to enhance the visual impact of advertising. In addition, WeChat Mini Program ads and the in-feed ads launched in the third quarter of the year also saw rapid income growth and became a new boost to promote the growth of instant messaging advertising revenue.²⁶ **Second, functional iteration was promoted and video content was enriched.** In August, QQ stopped the operation of “Highlights”, short news in the text form, and replaced it with “Small World”, interesting short videos that can be shared. This functional iteration showed that the form of instant messaging was evolving from texts, pictures to videos, the form of content presentation was optimized and user operation difficulty was lowered.

(II) Online News

By December 2022, the user size of online news in China had reached 783 million, up 12.16 million from December 2021, making up 73.4% of Chinese netizens.

²² OKR is short for “objectives and key results”, a method to formulate quantifiable key results for all aspects of the organization in an open and transparent way, thus promoting the realization of organizational goals.

²³ Source: Dingtalk,

<https://alidocs.dingtalk.com/i/p/nb9XJlJ9bZRqIGyA/docs/k2wz1jPpZ30WorEzwZGN8NnvrL4A6dxE?spm=a217n7.14136887.0.0.5d77573f6qj2k8>, September 21, 2022.

²⁴ Out-of-the box advertising refers to the types of advertising whose presentation effect exceeds the original image frame to enhance the visual impact.

²⁵ Naked-eye 3D is a general term for the technologies to realize stereoscopic vision effect without using external tools such as polarized glasses. The representatives of these technologies mainly include light barrier technology and cylindrical lens technology.

²⁶ Source: Tencent's financial report for the third quarter of 2022,

<https://static.www.tencent.com/uploads/2022/11/16/34c3cf298649E8F63e2377FE902A4818.pdf>, November 16, 2022.

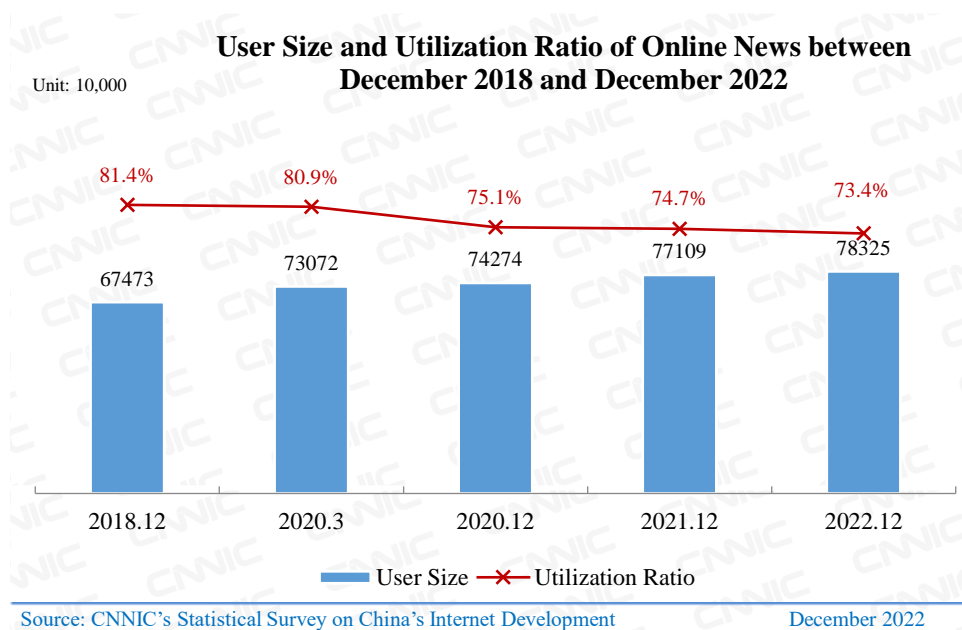


Figure 29 User Size and Utilization Ratio of Online News between December 2018 and December 2022

In 2022, the online news industry focused on reporting major international and domestic events to keep the general public well informed of them. At the same time, news acquisition channels were more diversified, with short videos and life platforms becoming important channels for netizens to obtain news from outside of the “two micros and one client”.²⁷

The 20th National Congress of the Communist Party of China was successfully held in October 2022. The grand occasion was widely covered by online news media in various ways and through multiple channels. **First, live streaming was organized to cover the event in an all-round way.** Online news media broadcast the opening ceremony live through Weibo, WeChat, video websites and news clients, providing a variety of choices for people to watch it. On the day of the opening ceremony, the live broadcast on Sina Weibo alone received 126 million views.²⁸ **Second, study activities were carried out.** During the Congress period, Weibo joined hands with the official WeChat accounts of various central departments, local governments and media outlets to attract users’ attention to the related topics and engage in related interactive activities, setting off an upsurge of learning the spirit of the 20th CPC National Congress. CCTV News Weibo opened hot topics related to the Congress, which received more than 14.7 billion hits.²⁹

In the meantime, Douyin, Kwaishou, Xiaohongshu and other APPs have gradually changed from entertainment, life and social platforms to information platforms with news attributes, becoming an important channel for netizens to obtain news information. **First, the mainstream media actively got involved to enhance their influence.** In the first half of the year, eight major central media organizations, including Xinhua News Agency, China Central Radio and Television, and People's Daily, produced a total of 15,000 widespread short videos.³⁰ **Second, various parties actively participated in building information channels.** Internet users and self-media also used short

²⁷ “Two micros and one client” refers to Weibo, WeChat and news client.

²⁸ Source: Weibo.

²⁹ Source: Same as above.

³⁰ Source: CNR, http://ad.cnr.cn/hyzz/20220714/t20220714_525914643.shtml, July 14, 2022.

videos and life platforms to follow up the hotspots of public opinions and spread news information, creating good conditions for the people to obtain hot information in time.

(III) Online Office

Up to December 2022, the user size of online office in China was 540 million, up 70.78 million from December 2021, accounting for 50.6% of all Internet users.

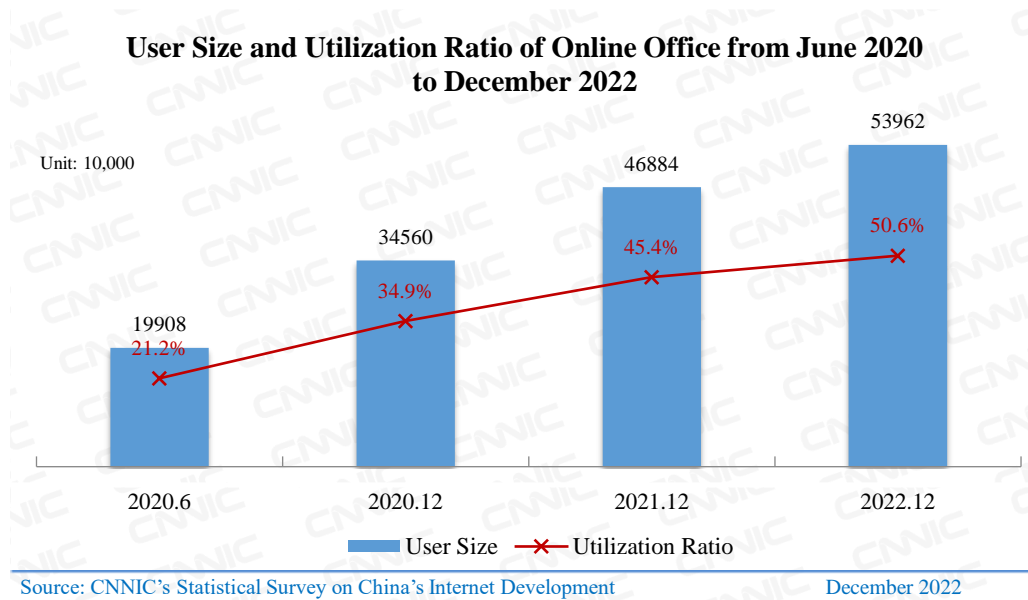


Figure 30 User Size and Utilization Ratio of Online Office from June 2020 to December 2022

In 2022, the online office market grew rapidly and online office vendors carried out innovations in new technology application.

The online office market grew rapidly. First, online office applications accelerated the commercialization process. Affected by the epidemic, the demand for online office expanded, which promoted the continuous growth of user base. After the early stage of free training for users, online office applications accelerated the commercialization process. DingTalk put forward a commercial layout plan, and online office applications such as Tencent Conference and Feishu also launched charged services. Commercial development not only opened up new revenue sources for enterprises, reduced operational pressure, but also realized differentiated services by distinguishing the needs of different users. **Second, online office applications became more and more platform-based.** Enterprise WeChat provided a rich collaborative office experience by integrating with Tencent Conference, Tencent Docs and other applications; the Tencent Conference online application market integrated multiple applications, and provided pre-, in- and post-conference services through one portal to meet more needs. So, platform-based online office applications attracted more netizens to use. As of December, the utilization ratios of online video conference/teleconference, collaborative online document editing, online contract signing, online task management/process approval were 36.8%, 29.0%, 17.2% and 16.9% respectively.

Online office vendors carried out innovations in new technology application. First, solutions were worked out through cooperation. Following the cooperation between DingTalk and a

domestic AR³¹ glasses manufacturer to launch digital office through the use of AR smart glasses, the two sides deepened their cooperation and released AR digital showroom solutions to help enterprises create personalized and customized showrooms that combine the real and virtual worlds, bringing a new way of working and a fresh digital experience. **Second, scene integration innovation was carried out.** With the integration of naked-eye 3D technology and office scene, speakers at both ends of the screen do not need to wear headset device and can experience realistic video effect in a standard office network environment. It has become a new direction of exploration for online office manufacturers. In the future, with the upgrading of new technologies, office scenes will be more diversified and the office experience will be enriched.

III Business Transaction Applications

(I) Online Payment

As of December 2022, the user size of online payment in China had reached 911 million, up 7.81 million from December 2021, taking up 85.4% of Chinese netizens.

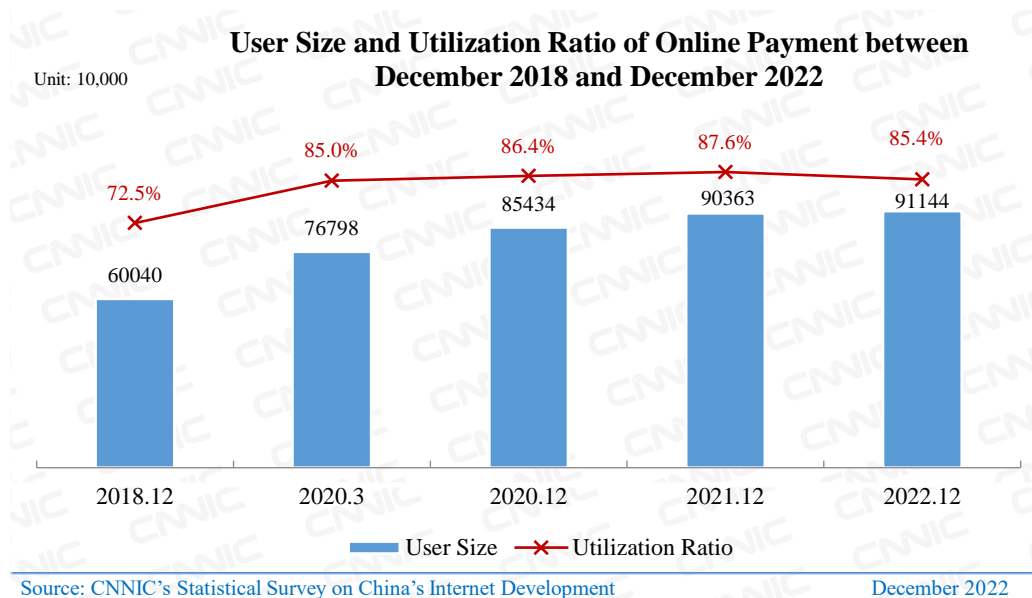


Figure 31 User Size and Utilization Ratio of Online Payment between December 2018 and December 2022

China's online payment system was running smoothly, with a steady increase in business volume. Data shows that in the first three quarters of 2022, China's banks handled 75.707 billion online payment transactions, amounting to 1,858.38 trillion yuan, up 1.5% and 6.4% year on year respectively; the number of mobile payment transactions reached 116.769 billion, with an amount of 378.25 trillion yuan, up 7.4% and 1.1% year on year respectively.³² Online payment services constantly strived for innovation and expanded application scenarios to benefit people's livelihood and support economic and social development.

Elderly-oriented online payment renovations continued to advance and the digital divide was

³¹ AR is short for augmented reality.

³² Source: Report on the Overall Operation of the Payment System of the People's Bank of China, <http://www.pbc.gov.cn/zhifujiesuansi/128525/128545/128643/index.html>, January 6, 2023.

further narrowed. By the end of 2021, there were 267.36 million elderly people aged 60 and above in China, accounting for 18.9% of the total population; among them 200.56 million were aged 65 and above, accounting for 14.2% of the national population.³³ With the further aging of the population, various payment service providers carried out elderly-oriented renovations, launched secure APP versions dedicated to the elderly and strengthened the application of new technologies to meet their needs for online payment services. Through concerted efforts of the government and enterprises, by December 2022, the utilization ratio of online payment reached 70.7% among the elderly aged 60 and above, and the difference between their utilization ratio and the average utilization ratio of all netizens as a whole narrowed by 2.2 percentage points year-on-year.

Major payment service providers implemented fee and profit reduction measures to alleviate the burdens on small and micro enterprises. Since the release of the Notice on Reducing Payment Fees for Small and Micro Enterprises and Individual Businesses, banks and payment service providers have made positive responses one after another. **On the one hand, by reducing payment fees, they helped small and micro businesses reduce operating costs and operating pressures.** For example, the People's Bank of China Shenzhen Central Branch actively coordinated and promoted the reduction of fees and profits, instructing banks and payment service providers under its jurisdiction to implement preferential interest rates, strengthen online financial services and other measures. From September 2021 to June 2022, a total of 6.3 million small and micro enterprises, individual businesses and 20.6 million individuals with business practices had their payment processing fees reduced by more than 3.6 billion yuan.³⁴ **On the other hand, payment service providers helped merchants improve their private domain operations by opening up post-payment scenarios for them.** For example, Alipay allowed merchants to put coupons on their own or nearby merchants' payment-completion pages, so as to increase old customers' shopping frequency and average transaction value (ATV), while attracting new customers.

Digital RMB pilot application and scenario construction were well underway, and services continued to be upgraded. First, pilot application and scenario construction were progressing smoothly. In 2022, the scope of the digital RMB pilot was expanded twice, and as of December, 26 localities in 17 provinces had launched digital RMB pilots.³⁵ The governments of pilot localities carried out nearly 50 digital RMB consumption bonus distribution activities around the themes of "promoting consumption", "fighting the epidemic" and "low-carbon travel", with pilot scenarios covering a wide range of areas such as wholesale, retail, catering, cultural tourism and administrative payment, and the stock of digital RMB in circulation reached 13.61 billion yuan.³⁶ Data shows that 128 million netizens used digital RMB in the second half of the year, with online life service platforms being the most frequently used channel, followed by various banking APPs and the Digital RMB APP. **Second, the product development and service upgrade of Digital RMB APP continued to advance.** On the one hand, the Digital RMB App provided users with convenient exchange, payment and wallet management services, and supported online and offline applications; on the other hand, it introduced various forms of hardware wallets, explored the capabilities of hardware-software integration, and developed corresponding functions for extreme

³³ Source: National Health Commission, <http://www.nhc.gov.cn/Lljks/PQT/202210/E09F046AB8F14967B19C3B5c1D934B5.shtml>, October 24, 2022.

³⁴ Source: People's Bank of China Shenzhen Central Branch, <http://shenzhen.pbc.gov.cn/shenzhen/122807/4607449/index.html>, July 15, 2022.

³⁵ Source: Mobile Payments Network, <https://www.mpaypass.com.cn/news/202212/16142932.html>, December 16, 2022.

³⁶ Source: People's Daily, http://paper.people.com.cn/rmrb/html/2023-02/06/nw.D110000renmrb_20230206_1-18.htm February 6, 2023.

situations such as “no network available” and “power outage” to further broaden application scenarios.

(II) Online Shopping

As of December 2022, the user size of online shopping in China was 845 million, up 3.19 million from December 2021, taking up 79.2% of all Internet users.

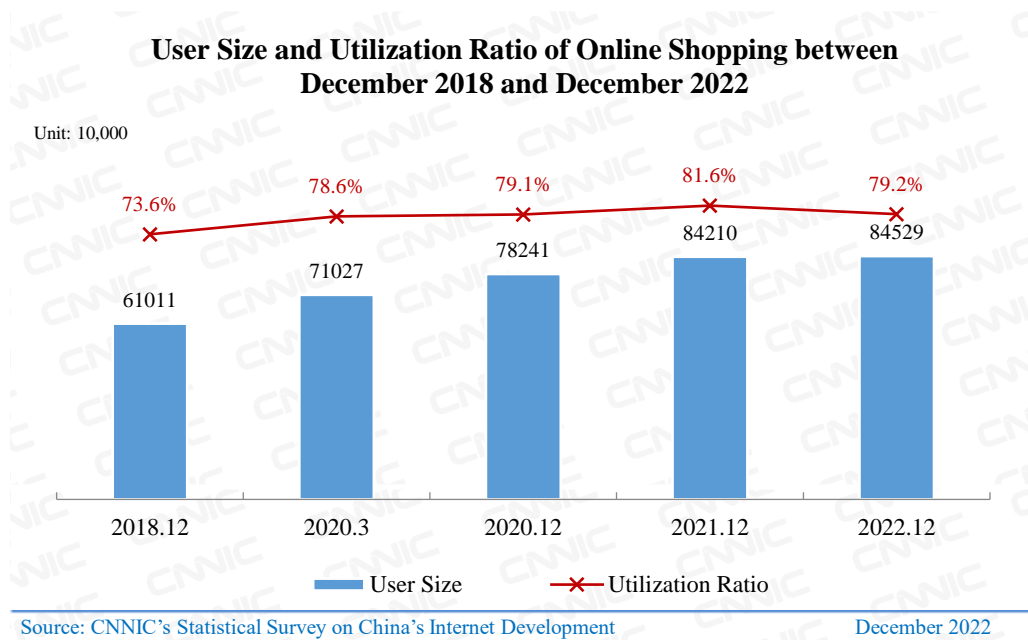


Figure 32 User Size and Utilization Ratio of Online Shopping between December 2018 and December 2022

In 2022, online retailing continued to grow and became an important force to promote consumption. The annual online retail sales reached 13.79 trillion yuan, a year-on-year increase of 4.0%. In particular, the online retail sales of physical goods was 11.96 trillion yuan, up 6.2% year-on-year, accounting for 27.2% of the total retail sales of social consumer goods³⁷, and its proportion in total consumption continued to increase. In 2022, the trend of new-product consumption, green consumption, intelligent consumption, and consumption of M2C products was relatively obvious, which further promoted the development of green, digitalized and intelligent manufacturing.

First, consumption of new products became a new highlight. In 2022, e-commerce platforms paid increasing attention to rooting in the real economy, helped brand merchants explore new growth points, provided them with marketing, data and scenario support, and assisted them to launch new products and open up new growth paths. During the “Double Eleven Shopping Carnival”, JD.COM launched a total of nearly 20 million new products, and the turnover increased by 1.57 times from the previous month, of which the turnover of 10 million new products increased by over 200% from the previous month.³⁸ Data shows that those who bought new products or new brands online in the second half of 2022, such as debut products, new products, upgraded products,

³⁷ Source: National Bureau of Statistics, http://www.stats.gov.cn/tjsj/zxfb/202301/t20230117_1892087.html, January 17, 2023.

³⁸ Source: Global Times, <https://3w.huanqiu.com/a/c36dc8/4AQoJuY817v>, November 11, 2022.

and IP co-branded limited-edition products, accounted for 15.2% of the total online shoppers.

Second, green low-carbon consumption became a new fashion. With the in-depth implementation of carbon peaking and carbon neutrality goals, consumers' awareness of environment-friendly consumption gradually increased, green consumption, recycling consumption and other consumption patterns gradually became a new trend in online shopping. Data shows that 22.3% of the total online shoppers were involved in green consumption³⁹ online in the second half of the year, of whom 15.9% purchased energy-saving home appliances and 9.6% purchased second-hand goods or traded in their old things for new ones.

Third, smart home consumption was booming. From 2016 to 2021, the size of China's smart home market increased from 260 billion yuan to 580 billion yuan, with an average annual growth rate of nearly 20%.⁴⁰ During the "2022 Double Eleven Shopping Carnival", JD.COM's turnover of more than 20 categories of smart home products increased by more than five times year-on-year.⁴¹ According to statistics, 30.6% of total online shoppers bought smart home products, home appliances, wearable devices and other smart products online in the second half of 2022, of whom 40.2% and 34.4% were aged 25-34 and 35-44, taking up the biggest proportion.

Fourth, consumption of M2C products and customized consumption were on the rise. On the one hand, e-commerce platforms, by releasing the productivity of consumption data, helped factories and brands to better meet the diversified and personalized needs of consumers and further enhance their capacity of digitalized and flexible production. On the other hand, by enabling factories to directly face consumers, e-commerce platforms helped them enrich the supply of goods. Data shows that 41.9% and 13.4% of online shoppers purchased goods directly supplied by factories and customized products online in the second half of 2022, respectively. According to its financial report, Alibaba's trading volume of M2C⁴² products in the second quarter of 2022 rose by more than 60% year on year⁴³.

(III) Online Meal Ordering

Up to December 2022, the user size of online meal ordering was 521 million or 48.8% of China's total netizen population, down 22.99 million from the end of 2021.

³⁹ Green consumption in this report includes purchasing energy-saving home appliances or other products, participating in trade-in activities, or purchasing second-hand goods.

⁴⁰ Source: China Government Network, http://www.gov.cn/zhengce/2022-09/07/content_5708669.htm, September 7, 2022.

⁴¹ Source: Sohu.com, https://business.sohu.com/a/605658234_116082, November 14, 2022.

⁴² M2C is the abbreviation of "Manufacturers to Consumers", a business model by which consumers purchase goods directly from the manufacturer via the e-commerce platform.

⁴³ Source: Alibaba's financial report for the second quarter of fiscal year 2022, <https://data.alibabagroup.com/ecms-files/1532295521/591b1767-1631-4EA9-8EF-422c963f5766.pdf>, November 17, 2022.

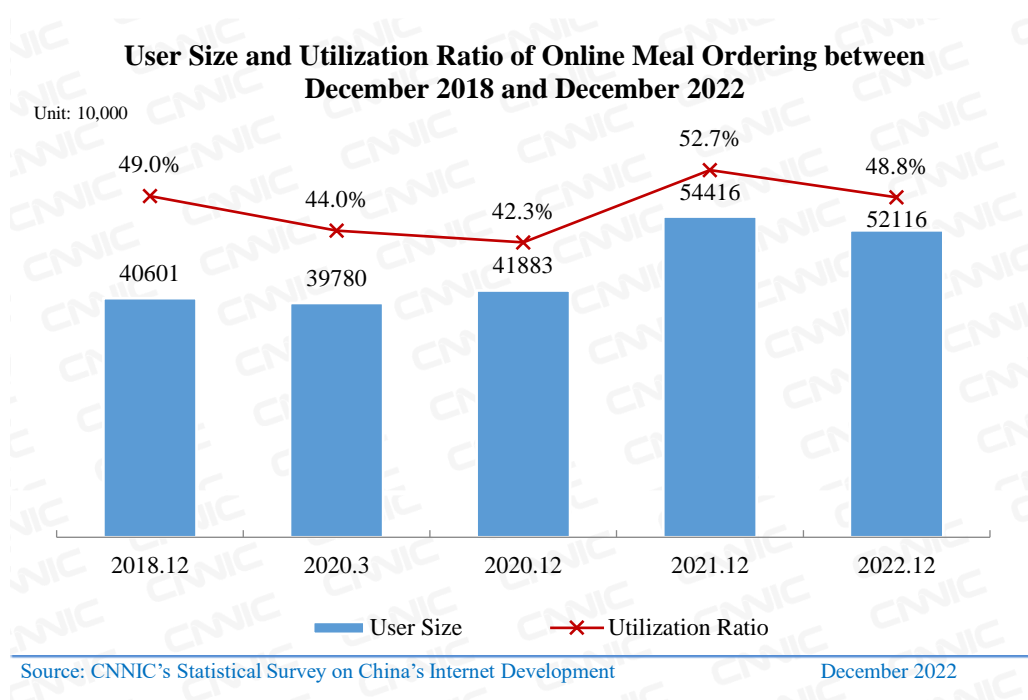


Figure 33 User Size and Utilization Ratio of Online Meal Ordering between December 2018 and December 2022

Online meal ordering has become an important Internet application in many people's daily lives, which is of great significance to facilitating the lives of netizens and stimulating daily consumption.

The online takeaway industry developed steadily, the market scale continued to expand, and platforms' service capability was further enhanced. First, the revenue of the online takeaway industry maintained an upward momentum. Data shows that in the third quarter of 2022, the "core local business revenue"⁴⁴ of Meituan, including take-away business, increased by 24.6% year on year; the operating profit rate reached 20.1%, an increase of 8.9 percentage points over the same period in 2021.⁴⁵ Alibaba's total orders for local life services in the third quarter increased by 5% year on year, and by continuously improving merchants' service quality and marketing models, it further improved the operational efficiency of Ele.me and achieved positive growth in GMV⁴⁶ in the third quarter.⁴⁷ **Second, the service capacity of online takeaway platforms continued to grow.** On the consumer side, the platforms better met the needs of users in more scenarios through optimized marketing strategies, refined operations and diversified activities, and further enhanced user stickiness. On the merchant side, online takeaway platforms diversified their services for breakfast, afternoon tea, supper and other businesses, and iterated marketing tools to help merchants attract and retain customers, improve operational efficiency, and promote the digitalization of the catering industry.

⁴⁴ Core local business revenue is a category of revenue in Meituan's financial report, involving food and beverage take-out, Meituan's flash purchase, store, hotel and tourism business, etc.

⁴⁵ Source: Meituan's financial report for the third quarter of 2022, http://media-meituan.todayir.com/2022125164002739810517889_tc.pdf, November 25, 2022.

⁴⁶ GMV is the abbreviation of "Gross Merchandise Volume".

⁴⁷ Source: Alibaba's financial report for the third quarter of 2022, <https://data.alibabagroup.com/ecms-files/1532295521/591b1767-1631-4EA9-8EF-422c963f5766.pdf>, November 17, 2022.

(IV) Online Travel Booking

As of December 2022, the number of users of online travel booking in China was 423 million, up 25.61 million from December 2021, accounting for 39.6% of all Internet users.

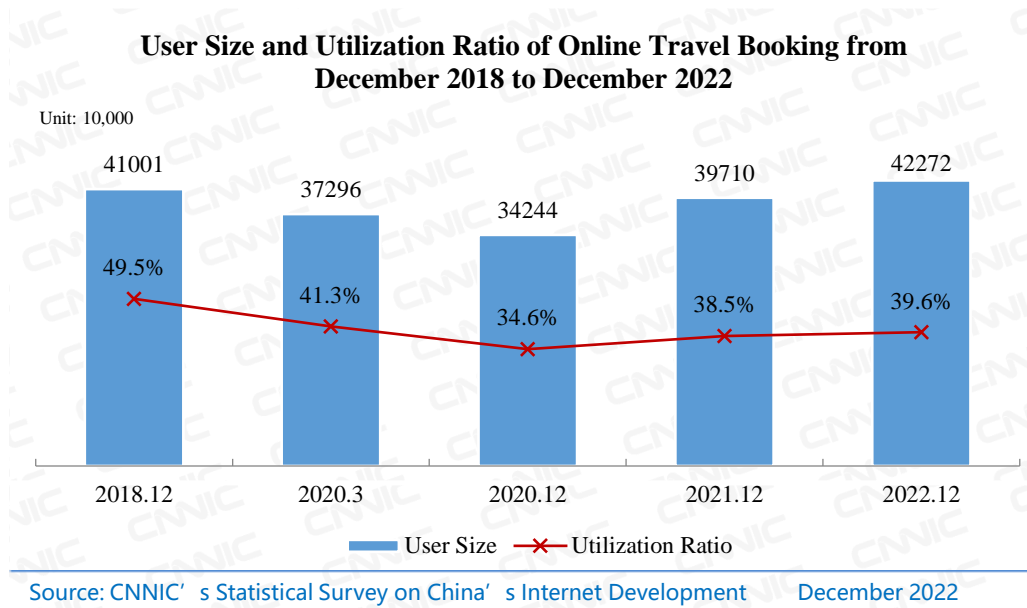


Figure 34 User Size and Utilization Ratio of Online Travel Booking from December 2018 to December 2022

In 2022, governments at all levels introduced various policies to bail out and benefit enterprises, increased assistance to tourism operators, and further activated the vitality of market players. At the same time, travel booking companies worked hard to keep up with the changes in market demand, explore product and service innovation, and expand overseas and lower-tire markets in an effort to promote the recovery of the tourism market.

A number of policies in combination were launched to bail out enterprises and activate the vitality of market players. In 2022, governments at all levels successively introduced a number of corporate bail-out measures, which demonstrated the state's determination to help enterprises and the service industry and boosted their confidence in the recovery and development of the tourism economy. For example, the National Development and Reform Commission, together with other 13 central departments, issued “Several Policies on Promoting the Recovery and Development of Difficult Industries in the Service Sector” to expand the coverage of reduction and exemption of taxes and fees and help the tourism industry to recover its development. As can be expected, the abolition of the inbound flight meltdown mechanism and cross-province tour meltdown mechanism as well as the optimization of anti-epidemic measures will further enhance the confidence of tourism operators, create a market environment conducive to medium and long-distance travels, and promote the rebound of the tourism market.

Travel booking companies actively responded to the changing situation and expanded various types of business. First, enterprises kept up with the changes in market demand and actively seized market opportunities such as local consumption and short-distance tourism. Due to the epidemic, the overall travel booking market in 2022 was characterized by short-distance tourism, which became an important contributor to the recovery of the domestic travel market. For example, Ctrip

Group's local hotel bookings grew by approximately 60% in the third quarter compared to the same period in 2019.⁴⁸ Second, companies actively expanded into overseas markets and maintained a high-growth trend in overseas business. Trip.com, the international version of Ctrip, was ranked for the first time among the world's top 10 online travel APPs in terms of the number of downloads, and Ctrip Group's revenue in the European and US markets also exceeded that in the same period in 2019.⁴⁹ Third, enterprises continued to tap into lower-tier markets to find new growth points. Data shows that as of September 2022, the share of registered users of Tongcheng Travel in non-Tier 1 cities reached 86.7%, and about 60% of new paying users on the WeChat platform came from Tier-3 cities and below.⁵⁰

IV Online Entertainment Applications

(I) Online Video

Up to December 2022, the user size of online video (including video clips) in China had reached 1.031 billion, up 55.86 million from December 2021, making up 96.5% of all Internet users. The number of video clip users totaled 1.012 billion, an increase of 77.70 million over December 2021, accounting for 94.8% of all Internet users.

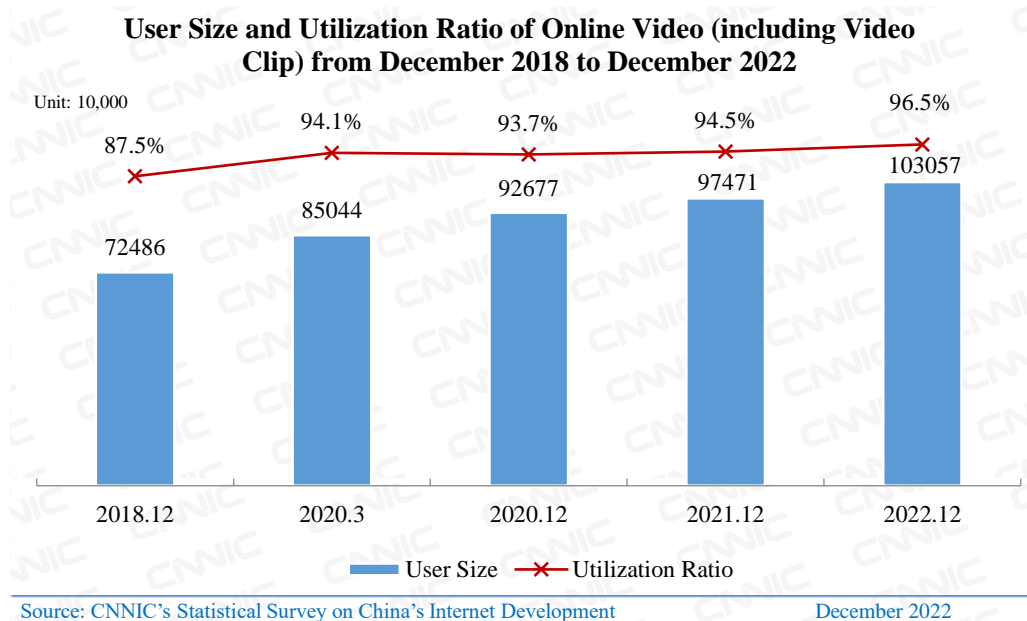


Figure 35 User Size and Utilization Ratio of Online Video (including Video Clips) from December 2018 to December 2022

Network audiovisual platforms continued to launch high-quality programs and tell the story of the new era. First, historic achievements of the new era were shown through a variety of network audiovisual programs. In 2022, major network audiovisual platforms such as iQiyi, Tencent Video, Youku, and Mango TV carried out in-depth publicity on the major theme of

⁴⁸ Source: Ctrip's financial report for the third quarter of fiscal year 2022, <https://investors.trip.com/node/13741/pdf>, December 14, 2022.

⁴⁹ The data was collected before the end of June 2022.

⁵⁰ Source: Tongcheng Travel's Financial Report for the Third Quarter of FY 2022, https://pdf.dfcfw.com/pdf/H2_AN202211221580473618_1.pdf?1669134802000.pdf, November 22, 2022.

“Striving for Greater Success in the New Era” and exhibition activities on the theme of “Our New Era”, strengthened the development of “Home Page, First Screen, First Article”, made overall use of news, theoretical programs and other forms, planned and implemented key projects such as TV dramas and documentaries, and displayed the historic achievements of the new era in a panoramic, multi-dimensional and diversified way. **Second, more good programs and good works were launched to tell the story of the new era.** On the one hand, a number of high-quality online audiovisual products were planned and launched around important time nodes and major strategic arrangements; on the other hand, Chinese stories were told to the world through audiovisual programs, documentaries and cultural exchange activities.

Network audiovisual platforms extended the layout of membership interests and promoted the application of in-car mobile cinemas. At the beginning of 2022, a number of network audiovisual platforms announced a comprehensive upgrade of their membership interests to provide paying members with “one-stop” services from entertainment video content to life scenes, in an effort to transform into comprehensive service platforms. In addition, **network audio-visual platforms cooperated with automobile brands to promote the application of in-car mobile cinemas and make traveling in car more enjoyable.** In January, for example, iQiyi released an APP suitable for the car, and announced that it had reached a cooperation agreement with FAW-Volkswagen to provide download service in the car app store. At present, iQiyi has cooperated with more than 30 automakers in V2X business to provide in-car video entertainment services for more than 80 models. In June, Mango TV announced its cooperation with more than ten car brands to jointly explore in-car video entertainment services, and let users enjoy popular programs on the platform through the car-mounted Mango TV client.⁵¹

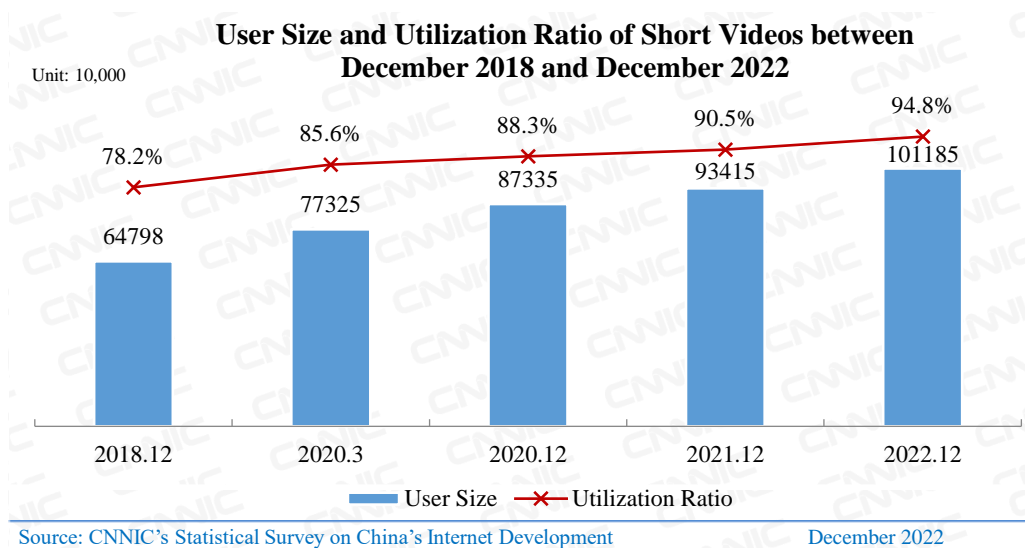


Figure 36 User Size and Utilization Ratio of Short Videos between December 2018 and December 2022

The pattern of “two strongest players” in the short video industry continued to strengthen, each forming a differentiated competitive advantage. Douyin and Kwaishou, as head platforms of short video, had much larger user size than other short video applications, and with the development of their internal short video applications, the market concentration was further

⁵¹ Source: Lanjing Finance, <https://www.lanjinger.com/d/188923>, August 2, 2022.

enhanced.⁵² Although other large Internet platforms have been trying to enter the field of short video in recent years, they have failed to break the “two-strongest” market pattern, which has “discouraged” new challengers. At the same time, **the two largest platforms strive to form comparative advantages by continuously cultivating niche vertical markets.** For example, Kuaishou has won the rights of live broadcast, video on demand and short video of important sports events such as the Beijing Winter Olympics, the 2021 Copa America and the NBA, driving the penetration and consumption of sports content to grow rapidly, and the “short video + sports” ecosystem is becoming increasingly mature. Douyin has strengthened its layout in the field of online music by building a one-stop music cooperation solution platform “Hot Star”, launching the “Soda Music” APP, promoting the 2022 plan “Douyin Sees Music”, etc., to achieve deep binding with music.

Short video content was further integrated with e-commerce, and the ecology of e-commerce industry was gradually improved. In recent years, short video platforms such as Douyin and Kuaishou have been promoting the transformation from content diversion to e-commerce marketing on the one hand, and accelerating the development of online payment services on the other, through which the short video e-commerce industry ecology has gradually taken shape. In 2022, the two major short video platforms launched the “Mall” portal, which formed interoperability with “shelf scenes” such as search, shops and shopping windows, and the combination of “goods looking for people” and “people looking for goods” covered the shopping behavior and needs of users in all scenes. In June, the number of short video broadcasts on Douyin and the total transaction volume of goods brought by these broadcasts increased by 44% and 161% year-on-year, respectively.⁵³ In the third quarter, Kuaishou’s total transaction volume of e-commerce commodities reached 222.5 billion yuan, a year-on-year increase of 26.6%; relying on its advantages of large traffic and high efficiency, the platform continued to attract more businesses to settle in, and the number of newly opened businesses increased by nearly 80% year-on-year.⁵⁴

(II) Live Streaming

As of December 2022, the user size of live streaming in China had reached 751 million, an increase of 47.28 million over December 2021, accounting for 70.3% of all Internet users. Among them, 515 million were e-commerce live streaming users, an increase of 51.05 million compared with December 2021, taking up 48.2% of the total netizens; 266 million were game live streaming users, a decrease of 35.76 million compared with December 2021, accounting for 24.9% of the total netizens; 187 million were users of live streaming of reality shows, a decrease of 6.99 million compared with December 2021, accounting for 17.5% of the total netizens; 207 million were users of live streaming of concerts, an increase of 64.91 million, accounting for 19.4% of the total netizens; and 373 million were users of sports live streaming, an increase of 89.55 million, representing 35.0% of the total netizens.

⁵² Note: Internal short video applications refer to those under Douyin and Kuaishou, such as Douyin Speed Edition, Ixigua, Douyin Volcano, Kuaishou Express Edition, etc.

⁵³ Source: Douyin E-commerce “Creating Consumption with Content: 2022 Douyin E-commerce Commodity Development Report”, <http://www.199it.com/archives/1509281.html>, October 24, 2022.

⁵⁴ Source: Kuaishou Financial Report, [https://ir.kuaishou.com/system/files-encrypted/nasdaq_kms/assets/2022/11/22/2-32-50/C_889584_KUAISHOU-W_1122_1000_ESS.pdf](https://ir.kuaishou.com/system/files/encrypted/nasdaq_kms/assets/2022/11/22/2-32-50/C_889584_KUAISHOU-W_1122_1000_ESS.pdf), November 22, 2022.

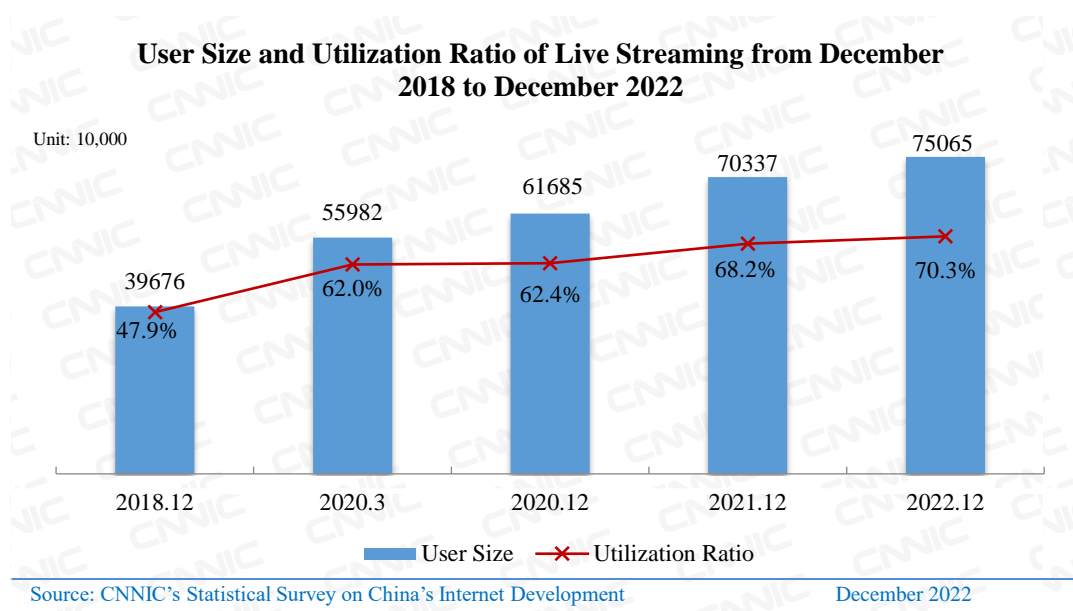


Figure 37 User Size and Utilization Ratio of Live Streaming from December 2018 to December 2022

The development of live streaming industry in 2022 was mainly reflected in three aspects: the maturity of e-commerce live streaming, the popularity of specialized and public welfare-oriented content and the closer integration with emerging technologies.

First of all, the development of e-commerce live streaming was becoming more and more mature, driving corporate revenue. First, e-commerce live streaming business became an important way to increase the revenue of traditional e-commerce platforms. According to Alibaba e-commerce live streaming data, during the Tmall “Double Eleven” Shopping Carnival, 62 Taobao live-streaming rooms each had a turnover of over 100 million yuan, 632 Taobao live streaming rooms each had a turnover of more than 10 million yuan, and the turnover of new anchors increased 345% year-on-year.⁵⁵ **Second, short video platforms' exploration of e-commerce live streaming business was beginning to bear fruit.** During the “Double Eleven” period, for example, the number of merchants participating in the activities of Douyin E-commerce grew 86% year-on-year, with 7,667 live-streaming rooms each generating sales of more than one million yuan; and the number of buyers participating in the activities of Kuaishou increased more than 40% year-on-year.⁵⁶

Then, the content of live streaming was becoming more specialized and public welfare oriented. First, specialized content was increasingly favored. Data shows that Douyin live streamed more than 32 million operas, instrumental concerts, dances, dramas and other artistic performances, with the amount of rewards increasing 46% year-on-year, and more than 60,000 talented anchors achieved an average monthly live streaming income of more than 10,000 yuan.⁵⁷ **Second, public welfare-oriented content was more and more popular.** Data shows that more than 10,000 rural anchors participated in the activities of “Homeland Harvest Festival” co-sponsored by Ali Public Welfare and Taobao Live. Since September 2022, Taobao Live has

⁵⁵ Source: Guangming.com, <https://m.gmw.cn/baijia/2022-11/17/36167752.html>, November 17, 2022.

⁵⁶ Source: QQ.com, <https://new.qq.com/rain/a/20221114A0144500>, November 14, 2022.

⁵⁷ Source: People's Daily Online, <http://ent.people.com.cn/n1/2022/1109/c1012-32562348.html>, November 9, 2022.

launched 200,000 village-based live streaming activities, attracting more than 700 million views and receiving four million orders.⁵⁸ **Third, bilingual live streaming commerce became a new hot spot.** Relying on its own advantages, New Oriental launched bilingual live commerce that combines with English education, forming a novel live-streaming business format, and staying on the top of Douyin's monthly live commerce list for several months.

Finally, artificial intelligence, 5G, VR⁵⁹ and other emerging technologies injected new momentum into the development of the live streaming industry. First, digital human⁶⁰ products applied to the live streaming industry were emerging. Baidu Intelligent Cloud released a digital human live streaming platform in July, realizing 24-hour pure AI⁶¹ live streaming by V humans, reducing digital human production cost from millions of yuan to thousands of yuan, and shortening the production time to several hours.⁶² **Second, 5G technology helped the media transform the live streaming process.** Operators launched commercial-grade 5G live streaming solutions such as "5G Live Streaming Backpack". Based on 5G, cloud computing, artificial intelligence and other technologies and through front-end signal acquisition, cloud transmission & processing and remote broadcasting & production, cloud-based broadcasting equipment and remote services were made possible, so that journalists and cameramen could get rid of the restriction of cables and visit the exhibition while conducting interviews and making live streaming. **Third, panoramic VR live streaming improved the viewing experience of audience.** At the 5th China International Import Expo, the operator completely presented the real scene through multiple VR panoramic cameras, so that the audience could not only watch the video images in a holistic approach, but also adjust the viewing angle at will, and realize "cloud" viewing from the best perspective.

(III) Online Games

As of December 2022, the user size of online games was 522 million, accounting 48.9% of China's total netizen population, down 31.86 million from December 2021.

⁵⁸ Source: CNR, https://tech.cnr.cn/techph/20220926/t20220926_526020323.shtml, Sept. 26, 2022.

⁵⁹ VR is the abbreviation of "Virtual Reality".

⁶⁰ Digital human refers to a human-like thing created using digital technology.

⁶¹ AI is the abbreviation of "Artificial Intelligence".

⁶² Source: China Youth Network, https://t.m.youth.cn/transfer/index/url/news.youth.cn/jsxw/202207/t20220706_13826664.htm, July 6, 2022.

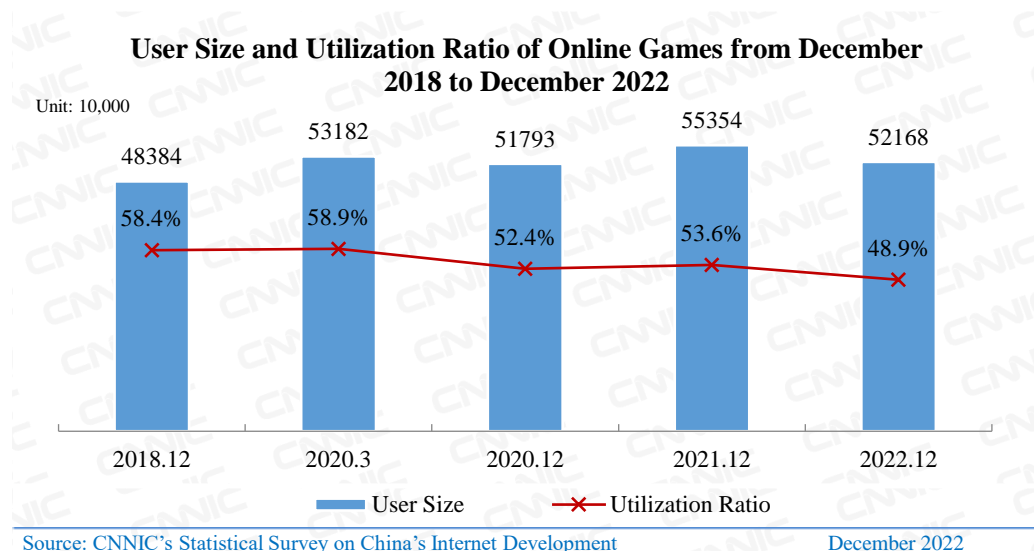


Figure 38 User Size and Utilization Ratio of Online Games from December 2018 to December 2022

In 2022, China's online games industry showed a steady development trend. Favorable policies continued to be released, supporting the steady development of the industry. At the same time, VR devices and games became an important part of the online games industry. Since the release of the game version numbers was resumed in April 2022, the National Press and Publication Administration had approved 512 games by December, covering mobile, client and game machines. This move played a positive role in stabilizing the market expectation and maintaining the sound development of the industry.

The innovative integration of online games and VR technology achieved rapid progress. In recent years, with the rapid development of China's VR industry, VR game software and game equipment have gradually spread to the public. Users can do online fitness training, shooting and other activities through VR, and experience virtual kitchens, gas stations, forests and other environments. In September, PICO Company under Douyin Group released PICO4 and PICO4 Pro, a new generation of all-in-one VR machines, which comprehensively upgraded users' audiovisual experience and interactive experience.

(IV) Online Music

As of December 2022, the user size of online music was 684 million or 64.1% of China's total netizen population, down 45.26 million from December 2021.

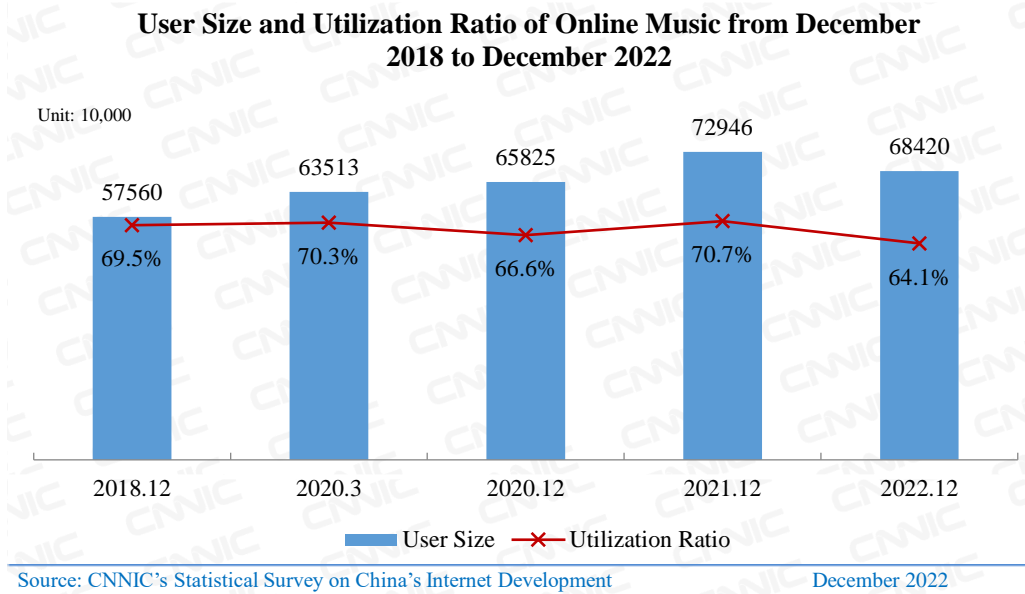


Figure 39 User Size and Utilization Ratio of Online Music from December 2018 to December 2022

In 2022, the technical application level of China's online music platforms continued to improve, and the copyright market was further standardized.

Online music platforms continued to improve the level of technology application. Technological innovation enhanced users' online music experience and promoted the digital upgrade of the music industry. **First, the form of “Music + Meta-universe⁶³” was explored.** CCTV, together with Tencent Music, launched a “digital-real fusion virtual music world⁶⁴” concert in its May 4th Youth Day special program. Douyin Group's VR equipment manufacturers created a meta-universe concert which the audience could enjoy in a brand-new way by wearing VR glasses. **Second, AI technology application was enhanced.** Netease launched its AI music creation platform “Tianyin” to improve the efficiency of music creation with the support of AI technology. In the “Baidu Meta-universe Singing Festival”, virtual humans interacted with real singers to sing with them songs written and composed by AI. Tencent Music developed an AI-empowered virtual human that can automatically identify and sing songs after the lyrics are entered.

The copyright market of online music was further standardized. In January 2022, the National Copyright Administration interviewed major record companies, music copyright companies and digital music platforms, requiring them not to sign exclusive copyright agreements except in special circumstances, so as to further standardize the online music copyright market. The opening up of the music copyright market is, on the one hand, conducive to the formation of a fair market competition order, the rationalization of copyright fees, and the building of a good online music

⁶³ Meta-universe refers to a new type of Internet application and social form that combines reality with virtual reality. It provides an immersive experience based on augmented reality technology, generates a mirror image of the real world based on digital twin technology, and builds an economic system based on blockchain technology. It closely integrates the virtual world with the real world in economic system, social system and identity system, and allows each user to produce content and edit the world. For more information, please see the Research Report on the Development of Meta-universe in 2020-2021 by Tsinghua University New Media Research Center.

⁶⁴ Digital-real fusion refers to the integration and interaction between “digital world” and “real world”. “Digital-real fusion virtual music world” means that users enter the digital world in a virtual identity, interact with others in real time, and watch real-life programs together.

copyright ecology; on the other hand, it promotes the continuous innovation of online music platforms and advances the layout in content, technology and service, so as to make the copyright market more prosperous and healthy.

(V) Online Literature

As of December 2022, the user size of online literature was 492 million or 46.1% of China’s total netizen population, down 9.25 million from December 2021.

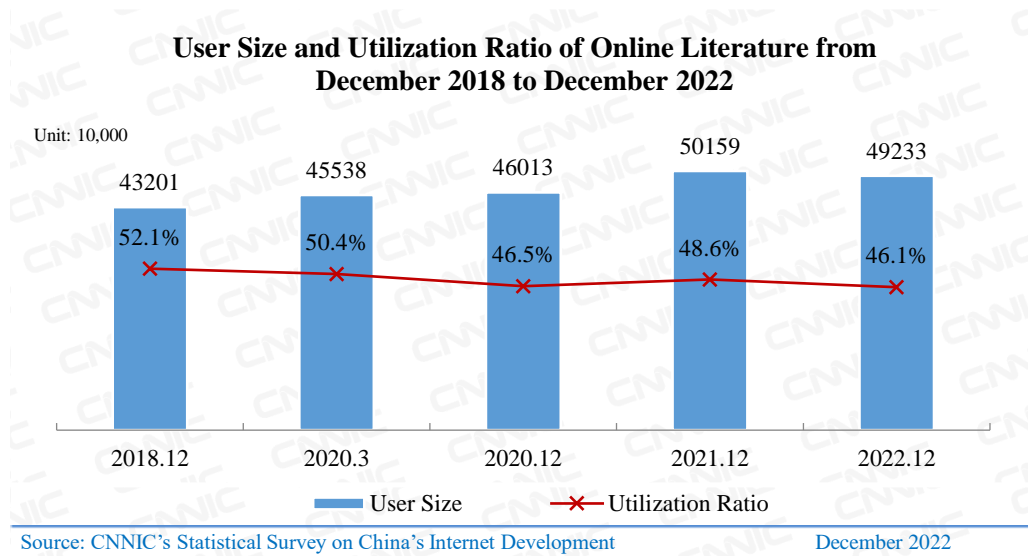


Figure 40 User Size and Utilization Ratio of Online Literature from December 2018 to December 2022

In 2022, China's online literature continued to develop healthily, and relevant platforms actively absorbed traditional cultural elements and increased their international influence.

Online literature gradually became an important carrier to carry forward traditional culture and took it as one of its important themes. This injected traditional cultural elements into online literature, while online literature helped to revitalize traditional culture. First, online literature made innovative expressions of traditional Chinese stories. The themes of historical romance, metaphysical fantasy, *xiuxian* (immortal cultivation) and fairy tales in online literature are based on traditional cultural accumulation. Chinese culture has provided rich soil for the creation of online literature. Second, traditional cultural elements such as tea ceremony, traditional Chinese medicine, sculpture, horticulture, costume art, and culinary art gradually became the focus of creation and important materials of online literature, excellent online literature works related to them came out one after another, and films or TV shows adapted from them were highly popular.

The themes of online literature were increasingly enriched, with overseas audience further expanded. First, the subject matter of online literature was more diverse, receiving good market response. In recent years, movies, TV dramas, games and cartoons based on online literature have appeared frequently and are widely welcomed by the market, and online literature is still one of the most valuable IP⁶⁵ sources for adaptation. **Second, the literary value of China’s**

⁶⁵ IP is the abbreviation of “intellectual property”. In the field of online literature, IP refers to a carrier of cultural property rights that has core value and unique appeal in content creation, can be deeply developed, has a large number of fans, and can achieve cross-media operation without the limitation of a single platform.

online literary works has been continuously improved, and their overseas influence has been enhanced. In 2022, sixteen Chinese online literary works, such as “Heavy Industry of a Great Power” and “My Heroic Husband”, were included for the first time in the Chinese collection of the British Library⁶⁶, one of the largest academic libraries in the world. In addition, a large number of online literary works have reached overseas users in more than 200 countries and regions through publishing authorization, serialization and translation. Yueswen Group alone has licensed to overseas customers more than 800 online literary works, some of which have been read by 120 million readers and cultivated more than 300,000 overseas original writers.⁶⁷ With the increase of overseas local authors, the international influence of China's online literature has been further enhanced.

V Public Service Applications

(I) Online Car-hailing Services

As of December 2022, the user size of online car-hailing services in China was 437 million, down 15.53 million from December 2021, making up 40.9% of all Internet users.

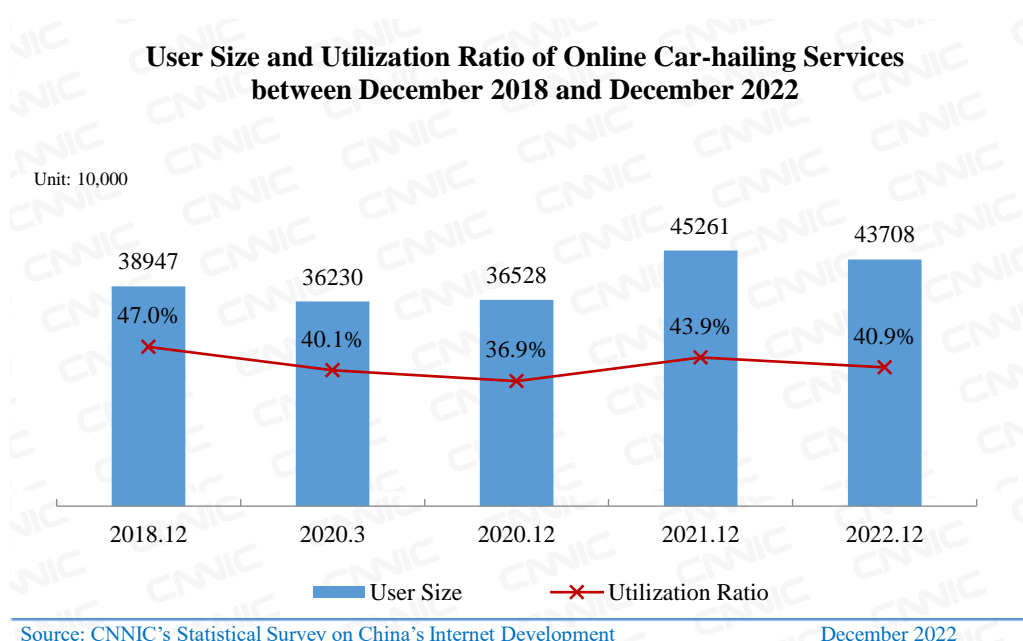


Figure 41 User Size and Utilization Ratio of Online Car-hailing Services between December 2018 and December 2022

In 2022, China's major online car-hailing platforms actively explored new business models, deployed autonomous driving technologies, and promoted the commercial operation of self-driving taxis.

In terms of market competition, online car-hailing platforms took various measures to compete for greater market share. In 2022, the market changes in the online car-hailing industry

⁶⁶ Source: People's Daily, <https://wap.peopleapp.com/article/6864251/6729364>, September 13, 2022.

⁶⁷ Source: China Writers Network, <http://www.chinawriter.com.cn/n1/2023/0116/c404023-32607584.html>, January 16, 2023.

drove the platforms to explore new business models. **With regard to aggregation model⁶⁸**, in July, Huawei launched Petal Travel, a taxi application in the third-generation HarmonyOS operating system. In the same month, Tencent Travel was connected to the WeChat service column to provide driving services. **In terms of the self-operated model⁶⁹**, Gaode launched in Beijing in October “Rocket Travel”, a self-operated platform for online car-hailing services, in an effort to carry out technological innovation and experimentation and explore the next-generation online car-hailing service model.

With respect to technical application, the operation of self-driving taxis steadily advanced and became a hotspot in the development of online car-hailing platforms. With rich service experience and massive operational data, these platforms were accelerating the commercial operation of self-driving taxis. In September 2022, T3Go announced the official operation of self-driving taxis in Suzhou, and applied the self-driving technology to the online car-hailing platform. In November, two companies, Baidu Apollo and Pony.ai, became the first enterprises approved for self-driving tests with “no one in the front seat but someone in the back seat”.

(II) Online Medical Services

As of December 2022, the user size of online medical services in China had reached 363 million, an increase of 64.66 million over December 2021, accounting for 34.0% of the total Internet users.

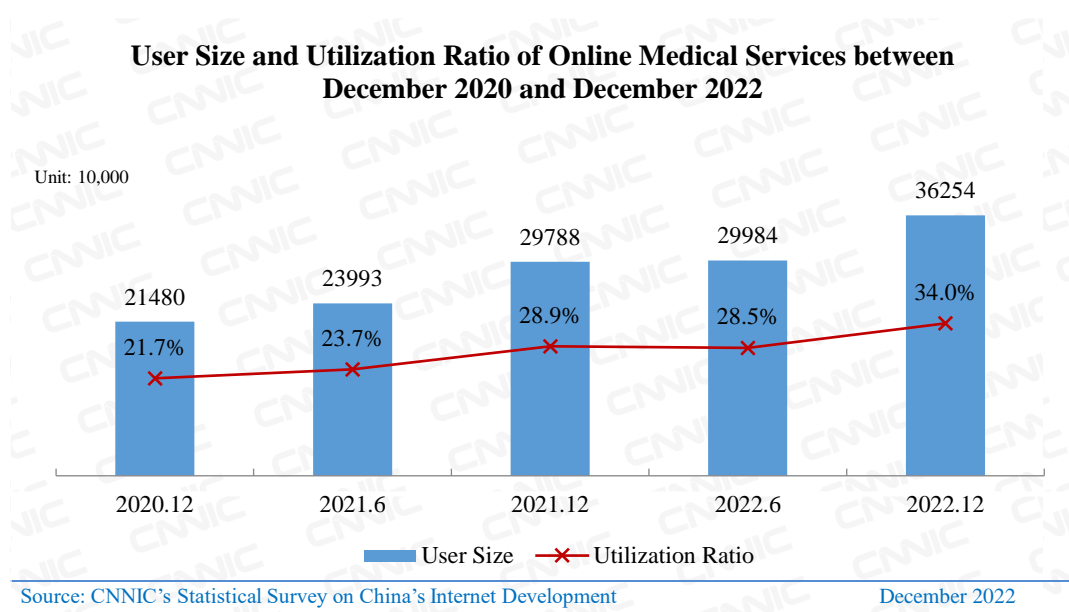


Figure 42 User Size and Utilization Ratio of Online Medical Services between December 2020 and December 2022

In 2022, policy-guided development of the Internet medical industry was further standardized, and the regulatory framework for Internet medical treatment and online drug sales became more mature. In this context, Internet healthcare companies made active investments in digital healthcare, medical devices, health technology and other fields to expand their business scope.

⁶⁸ Aggregation model refers to the operation model where the aggregation platform distributes its own traffic to the connected online car-hailing platforms to allow them to provide passenger services.

⁶⁹ Self-operated model refers to the operation model where online car-hailing platforms provide passenger services themselves.

Online medical services were further standardized. With regard to online diagnosis and treatment, the National Health Commission and the State Administration of Traditional Chinese Medicine jointly issued in March 2022 *Detailed Rules for the Regulation of Online Diagnosis and Treatment (for trial implementation)*, which clarified the regulatory requirements for the quality and safety of the whole process of online diagnosis and treatment, covering drug prescription, medical care and medical technology. The Detailed Rules also clarified the boundary and development direction of online medical services including diagnosis and treatment. With the improvement of the framework of relevant regulatory policies, high-quality medical service enterprises that meet compliance requirements are expected to gain more development opportunities. As for online drug sales, the National Medical Products Administration issued in September *Measures for the Regulation of Online Drug Sales*, laying down a set of rules for the management of online drug sales, the fulfillment of platform responsibilities, the measures of supervision and inspection, and the undertaking of legal responsibilities. The promulgation of the Measures shows the Chinese government's high concern with the quality and safety of drugs sold online, makes online drug sales to have rules to follow, and will improve the governance of online drug sales.

Internet companies increasingly penetrated into the medical field, with digital healthcare and health technology becoming the focus of their business layout. The improvement of the regulatory environment requires standardized and diversified development of Internet medical enterprises. Against the backdrop, Internet companies enhanced their strength in advantageous fields (such as online diagnosis, treatment and drug retail) and expanded their business scope. They explored the business model of deep integration of online and offline services, extending their business into the fields of digital healthcare, medical devices and health technology based on real-world healthcare. In August 2022, Xiaohe Health under Douyin Group increased its stakes in Amcare Healthcare and held it as a wholly-owned company. In September, JD Health and Omron Healthcare reached a strategic cooperation agreement, announcing that they would carry out in-depth cooperation in many fields such as service model innovation and digital intelligent marketing.⁷⁰

(III) Online Fitness Training

As of December 2022, the user size of online fitness training in China reached 380 million, accounting for 35.6% of the total netizen population. Among them, 18.9% used mobile APPs for online fitness training, 17.4% used smart devices, and 14.6% attended online fitness coaching programs. By frequency, 40.0% of users of online fitness training were low-frequency⁷¹ users, 41.2% were medium-frequency⁷² users, and 18.8% were high-frequency⁷³ users.

⁷⁰ Source: 2022 Third-quarter Performance Report of JD.com, Inc. https://ir.jd.com/system/files-encrypted/nasdaq_kms/assets/2022/11/18/18-19-23/JD.com%20Announces%20Third%20Quarter%202022%20Results.pdf, Nov. 18, 2022.

⁷¹ Lower frequency: 1-3 times of online fitness training per month.

⁷² Medium frequency: 1-3 times of online fitness training per week.

⁷³ High frequency: 4-6 times of online fitness training per week, or more.

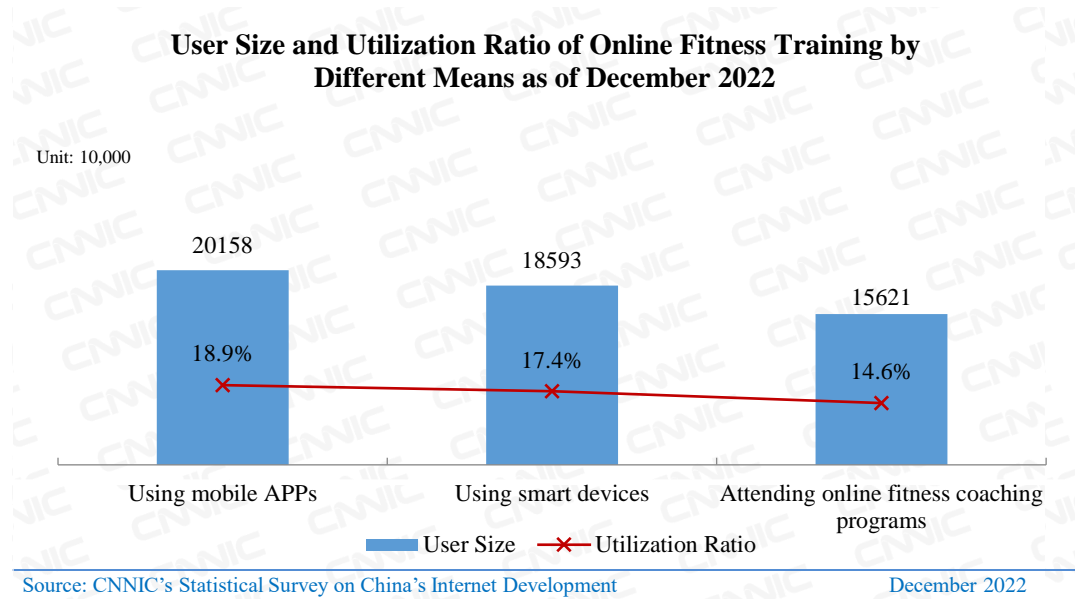


Figure 43 User Size and Utilization Ratio of Online Fitness Training by Different Means as of December 2022

China's sports industry has made great progress in recent years, and national fitness has risen to a national strategy. Online fitness has become one of the important channels to promote national fitness. It plays an active role in activities such as cycling, jogging, running, strength training, dancing and so on, and a large number of sports enthusiasts participate in it.

Technological progress is driving the continued growth of the online fitness industry. Firstly, with the rise of sports for all, the model of multi-person-attended fitness training through wearable devices has emerged. Secondly, with the development of mobile communication, the online fitness model with mobile phones as the carrier has gradually taken shape, attracting a large number of netizens to participate. Thirdly, 5G, big data and AI technologies are applied to online platforms and offline smart devices to record the data of sports and physical conditions, making online fitness develop from mere fitness training or mere sports state sharing to comprehensive management of personal health.

The online fitness industry is booming. As people pay more and more attention to their health, the number of online fitness users is rapidly growing, and a variety of online fitness exercises are gradually formed. For example, the “National Online Fitness Games” initiated by the General Administration of Sport of China received positive responses from major Internet platforms, and the number of direct participants had exceeded ten million⁷⁴ by July 2022. In addition, the online fitness activities represented by online live exercise attract a large number of participants, and some celebrity “online fitness coaches” have tens of millions of fans, with online viewers reaching millions during their live streaming.

⁷⁴ Source: General Administration of Sport of China, <https://www.sport.gov.cn/n20001280/n20001265/n20067533/c24498439/content.html>, July 18, 2022.

Appendix 1 Survey Methodology

I. Survey Methodology

(I) Telephone Survey

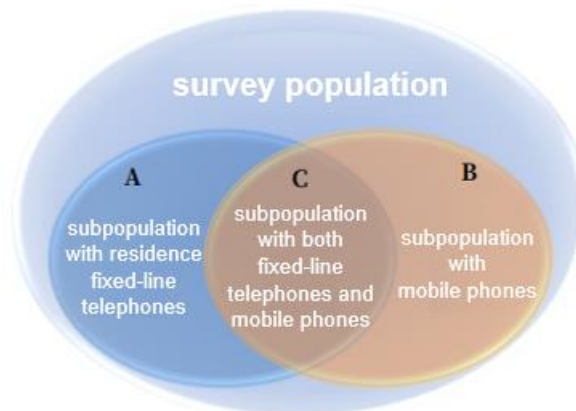
1.1 Survey Population

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

The samples cover 31 provinces, autonomous regions and municipalities in Chinese mainland, and do not include Chinese 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), $C=A\cap B$.

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 district, 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); randomly order the number library; dial and visit the randomly ordered number library. Survey of the subpopulation with fixed-line telephones is similar to that of the

subpopulation with mobile phones: 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, 0.35 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 through 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, New gTLD, “.CO”, “.TV”, “.CC”, and “.ME”, 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:** It refers to a web site with a domain name itself or “www. + domain name”.

Such domain names include those, which are registered under China's ccTLDs, namely .CN and .中国, or gTLDs, and whose registrants are within the territory of P.R.C. For example, the domain name of "cnnic.cn" 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 Dec. 31, 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	343,227,648	20A+121B+66C
Hong Kong SAR	12,565,504	169B+50C
Macau SAR	337,152	5B+37C
Taiwan	35,692,544	2A+41B+210C

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 ^{Note 1}	4A+42B+21C
IP Address Allocation Alliance of CNNIC	63,879,616 ^{Note 2}	3A+206B+152C
China Mobile	35,294,208	2A+26B+140C
China Education and Research Network	16,649,984	254B+16C
China Mobile Tietong	15,796,224 ^{Note 3}	241B+8C
Others	15,977,536	243B+204C
Total	343,227,648	20A+121B+66C

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 Allocation 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 Dec. 31, 2022.

Table 3 The Number of IPv6 Addresses in Different Regions of China (unit: /32^{note1})

Region	Number of Addresses
Chinese mainland	64,318
Hong Kong SAR	470
Macau SAR	8
Taiwan	2,573

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

Organization Name	Number of IPv6 Addresses
IP Address Allocation Alliance of CNNIC	26,645 ^{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	768
Total	64,318

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 28711/32. 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 Dec. 31, 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	0.98%
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 Dec 31, 2022.

Table 6 The Numbers of .CN Domain Names and .中国 Domain Names in Each Province / Autonomous Region / Municipality Directly under the Central Government

Province / Autonomous Region / Municipality Directly under the Central Government	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	7388747	21.5%	5279861	26.3%	25906	14.0%
Guangdong	5438449	15.8%	3194969	15.9%	15872	8.6%
Fujian	4049711	11.8%	3369420	16.8%	5663	3.1%
Guizhou	1811627	5.3%	1671125	8.3%	3193	1.7%
Shandong	1731255	5.0%	932263	4.6%	29153	15.7%
Jiangsu	1507336	4.4%	575655	2.9%	8313	4.5%
Sichuan	1401929	4.1%	447007	2.2%	11904	6.4%
Shanghai	1302602	3.8%	446026	2.2%	7522	4.1%
Zhejiang	1282966	3.7%	379819	1.9%	7314	3.9%
Anhui	983930	2.9%	245184	1.2%	3486	1.9%
Henan	942026	2.7%	388674	1.9%	4156	2.2%
Hunan	748376	2.2%	360059	1.8%	2411	1.3%
Hubei	670339	1.9%	303423	1.5%	3197	1.7%
Hebei	555914	1.6%	211907	1.1%	5888	3.2%
Guangxi	541066	1.6%	293160	1.5%	1573	0.8%
Jiangxi	481790	1.4%	245511	1.2%	2022	1.1%
Shaanxi	426784	1.2%	170634	0.8%	7017	3.8%
Chongqing	379557	1.1%	170828	0.8%	5448	2.9%
Liaoning	376600	1.1%	160983	0.8%	5494	3.0%
Yunnan	340871	1.0%	162630	0.8%	5019	2.7%
Shanxi	308437	0.9%	151019	0.8%	2032	1.1%
Heilongjiang	231305	0.7%	111636	0.6%	2233	1.2%
Tianjin	218166	0.6%	77039	0.4%	1284	0.7%
Jilin	174557	0.5%	84246	0.4%	1394	0.8%
Inner Mongolia	163653	0.5%	104444	0.5%	1448	0.8%
Hainan	146346	0.4%	65187	0.3%	767	0.4%
Gansu	103035	0.3%	56093	0.3%	1200	0.6%

Xinjiang	84108	0.2%	37644	0.2%	820	0.4%
Ningxia	44469	0.1%	21978	0.1%	612	0.3%
Qinghai	22712	0.1%	11681	0.1%	271	0.1%
Tibet	13481	0.0%	7435	0.0%	478	0.3%
Others	528339	1.5%	363951	1.8%	12486	6.7%
Total	34400483	100.0%	20101491	100.0%	185576	100.0%

Data sources: CNNIC

Note: The deadline for the above statistical data is Dec 31, 2022.

Table 7 Web pages classified by suffix form

Web Suffix Form	Proportion
html	49.81%
/	22.90%
php	6.46%
htm	4.17%
shtml	3.55%
aspx	1.96%
asp	1.18%
jsp	0.31%
Other suffix forms	9.66%
Total	100.00%

Data sources: Baidu Online Network Technology (Beijing) Co., Ltd

Table 8 The Number of Webpages in Each Province / Autonomous Region / Municipality
Directly under the Central Government

	Total Number of Webpages after Duplicated Ones Are Removed	Static Webpages	Dynamic Webpages	Static-to-dynamic Ratio
Beijing	131885700214	83434759634	48450940580	1.72
Guangdong	46170854937	31122241508	15048613429	2.07
Zhejiang	42801708843	30324081947	12477626896	2.43
Shanghai	25536694178	18515633536	7021060642	2.64
Henan	21671183883	17135800035	4535383848	3.78
Jiangsu	15721485295	9340550655	6380934640	1.46
Hebei	13681899593	10174703161	3507196432	2.90
Fujian	10383398655	7810398773	2572999882	3.04
Shandong	6959051460	4640530475	2318520985	2.00
Sichuan	6156038225	4158626822	1997411403	2.08
Tianjin	5979820345	3916506041	2063314304	1.90
Shanxi	4052853908	3057483488	995370420	3.07
Liaoning	3270836980	2370773907	900063073	2.63
Hubei	3236358956	2069562963	1166795993	1.77
Anhui	3092887070	2375967127	716919943	3.31
Jiangxi	2835548230	2321081515	514466715	4.51
Guangxi	2608351433	1949662676	658688757	2.96
Jilin	2045740535	1435782702	609957833	2.35
Hunan	2032994216	1402984545	630009671	2.23
Hainan	1910669550	1541727327	368942223	4.18
Shaanxi	1828362120	1119804919	708557201	1.58
Yunnan	1812863690	1237943745	574919945	2.15
Heilongjiang	1802659608	1433989130	368670478	3.89
Chongqing	593552449	378578750	214973699	1.76
Inner Mongolia	224539936	125413129	99126807	1.27
Gansu	193956046	95295042	98661004	0.97
Guizhou	138530009	95148201	43381808	2.19
Xinjiang	92099023	49536316	42562707	1.16
Qinghai	35881011	25766413	10114598	2.55
Ningxia	20705273	15993856	4711417	3.39
Tibet	4217381	3107283	1110098	2.80
The Whole Country	358781443052	243679435621	115102007431	2.12

Data sources: Baidu Online Network Technology (Beijing) Co., Ltd

Table 9 The Number of Webpage Bytes in Each Province / Autonomous Region / Municipality Directly under the Central Government

	Total Webpage Size	Average Webpage Size (KB)
Beijing	12185855860647	92.40
Guangdong	3276986973488	70.98
Zhejiang	3265891130389	76.30
Shanghai	2577033525759	100.91
Henan	1484166907765	68.49
Hebei	1260239823604	92.11
Jiangsu	1050206110182	66.80
Shanxi	722834983496	178.35
Fujian	655063271094	63.09
Shandong	445189518922	63.97
Tianjin	407157092594	68.09
Sichuan	322594972184	52.40
Hubei	177946809476	54.98
Anhui	150997658583	48.82
Liaoning	149153876404	45.60
Guangxi	142516493514	54.64
Heilongjiang	126350933299	70.09
Jiangxi	124720095697	43.98
Hunan	121611827627	59.82
Shaanxi	94339829609	51.60
Yunnan	91886358331	50.69
Jilin	83650366946	40.89
Hainan	68833373519	36.03
Chongqing	39679954940	66.85
Gansu	15483602974	79.83
Inner Mongolia	13508957367	60.16
Guizhou	6648607522	47.99
Xinjiang	3997330129	43.40
Qinghai	2924951401	81.52
Ningxia	710264278	34.30
Tibet	161081741	38.19
The Whole Country	29068342543482	81.02

Data sources: Baidu Online Network Technology (Beijing) Co., Ltd

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 Jinluoshen E-commerce Co., Ltd.
Beijing Wanweitonggang Technology Co., Ltd.
Beijing Xinnet.com Co., Ltd.
Beijing BrandCloud.cn Co., Ltd.
Beijing Zihai Technology Co., Ltd.
Chengdu 51web.com Co., Ltd.
Doumai (Shanghai) Network Technology Co., Ltd.
Foshan Yidong Network Co., Ltd.
Guangdong HUYI Internet & IP Services Co., Ltd.
Guangdong Now.cn Co., Ltd.
Guangzhou Yunxun Information Technology Co., Ltd.

China Telecom
Beijing Ucap Information Technology 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 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 Digital Technology Co., Ltd.
Fanxi Corporation Service (Shanghai) Co., Ltd.
Fujian Litian Network Technology Co., Ltd.
Guangdong Jinwanbang Technology Investment Co., Ltd.
Guangzhou Mingyang Information Technology Co., Ltd.
Guest Internet Industry Co., Ltd.

Hefei Juming Network Technology Co., Ltd.	Henan Weichuang Network Technology Co., Ltd.
Heilongjiang E-link Network Co., Ltd.	ZDNS Beijing Engineering Research Center Co., Ltd.
Global Business Domain Technology Co., Ltd.	Jiangsu Bangning Science & Technology Co., Ltd.
MarkMonitor Information Technology (Shanghai) Co., Ltd	Xiamen Nawang Technology Co., Ltd
Xiamen 35.Com Technology Co., Ltd.	Xiamen ZZY.cn Co., Ltd.
Xiamen Shusheng QYT Technology Co., Ltd	eName Technology Co., Ltd.
Shangzhong Online Technology Co., Ltd.	Shanghai Oray Co., Ltd.
Shanghai cndns.com Co., Ltd.	Shanghai Yovole Network Co., Ltd.
Shenzhen idcicp.com Co., Ltd.	Internet Works Online Co., Ltd.
Shenzhen EIMS Information Technology Co., Ltd.	Sichuan Cloud Yuqu LLC Co., Ltd.
Tianjin Zhuri Technology Development Co., Ltd.	Vantage of Convergence (Chengdu) Co., Ltd.
WangJu Brands Management Co., Ltd.	Xi'an Qianxinet Technology Co., Ltd.
Yantai DNSpod Network Technology Co., Ltd.	Ejee Group Beijing Co., Ltd.
Zhejiang 22net Inc.	Zhengzhou Shijichuanglian Electronic Technology Co., Ltd.
Grow Force Co., Ltd.	Knet Registrar (Tianjin) Co., Ltd
Zunyi zhongyuzhike Network Technology Co., Ltd.	

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