

Statistical Report on Internet Development in China

(April 2020)



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 44 reports. The Report has reflected the process of building up China's strength in cyberspace through core data. It has provided an important reference for Chinese government departments, domestic and foreign industry institutions, experts and scholars to understand the development of China's Internet and formulate relevant policies.

2019 is the 70th anniversary of the foundation of New China and the 25th anniversary of China's full access to the Internet. Over the past 25 years, China's Internet has grown from nothing and from weak to strong, profoundly changing people's production and life. Under the guidance of Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era, especially the important thought on cyber development, China's Internet and information undertakings have achieved historic achievements. The national strategy for cyber development has reached a new level. The main theme of cyberspace is in high spirits. The core technologies in the field of information continue to have breakthroughs. People have fully benefited from the Internet. As a faithful recorder of implementing the national strategy for cyber development, CNNIC has followed the development of China's Internet, expanding the scope of research and subdividing research areas. The Report focuses on the six aspects of basic Internet development, the size and structure of Internet users, the development of Internet applications, the development of e-government applications, industrial and technological development, and Internet security. It strives to comprehensively demonstrate the development of China's Internet in 2019 and the beginning of 2020 through multi-angle and all-round data.

Here, we hereby express our heartfelt thanks to the Office of the Central Cyberspace Affairs Commission, the Ministry of Industry and Information Technology of PRC, the National Bureau of Statistics of China, the E-Government Research Center of the Party School of the Central Committee of C.P.C. (National Academy of Governance), and other departments and units for their guidance and support for the Report. We would also like to express our sincere thanks to the institutions, enterprises and Internet users that have supported this statistical survey on the Internet development.

China Internet Network Information Center (CNNIC)

April 2020





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Summary

- ◇ As of March 2020¹, China had 904 million netizens, up by 75.08 million from the end of 2018, and its Internet penetration had reached 64.5%, up 4.9 percentage points over the end of 2018.
- ◇ Up to March 2020, the number of mobile Internet users in China had reached 897 million, up 79.92 million over the end of 2018. The proportion of Internet users accessing the Internet through mobile phones in China had amounted to 99.3%, up 0.7 percentage point over the end of 2018.
- ◇ As of March 2020, the size of rural Internet users was 255 million or 28.2% of China's total netizen population, up 33.08 million over the end of 2018, while that of urban Internet users had reached 649 million or 71.8% of China's total netizen population, up 42 million from the end of 2018.
- ◇ Up to March 2020, the proportions of Chinese netizens accessing the Internet through mobile phones, TVs, desktop computers, laptops, and tablet computers were 99.3%, 32.0%, 42.7%, 35.1%, and 29.0%, respectively.
- ◇ Up to December 2019, the number of IPv6 addresses in China had reached 50,877 blocks/32, up 15.7% over the end of 2018.
- ◇ As of December 2019, China had a total of 50.94 million domain names, of which 22.43 million or 44.0% were ended with “.CN”, up by 5.6% from the end of 2018.
- ◇ Up to March 2020, the user size of instant messaging was 896 million or 99.2% of China's total netizen population, up 104 million over the end of 2018; the number of mobile instant messaging users had reached 890 million, up 110 million from the end of 2018, accounting for 99.2% of mobile Internet users.
- ◇ As of March 2020, the user size of online news was 731 million or 80.9% of China's total netizen population, up 55.98 million over the end of 2018; the number of mobile news users had reached 726 million, up 73.56 million from the end of 2018, making up 81.0% of mobile Internet users.
- ◇ Up to March 2020, the user size of online shopping was 710 million or 78.6% of China's total netizen population, up 100 million over the end of 2018; the number of mobile shopping users had reached 707 million, up 116 million from the end of 2018, taking up 78.9% of mobile Internet users.
- ◇ As of March 2020, the user size of online payment was 768 million or 85.0% of China's total netizen population, up 168 million over the end of 2018; the number of mobile payment users had reached 765 million, up 182 million from the end of 2018, accounting for 85.3% of mobile Internet users.
- ◇ Up to March 2020, the user size of online video (including short video) was 850 million or 94.1% of China's total netizen population, up 126 million over the end of 2018; among them, 773 million were short video users making up 85.6% of China's Internet users.
- ◇ As of March 2020, 694 million Internet users or 76.8% of all netizens had received e-government services in China.

¹ Affected by the COVID-19 epidemic, the deadline for telephone survey for the Report is March 15, 2020, so the data are up to March 2020, the same below.

Chapter I Basic Internet Development

I. Basic Internet Resources

(I) An Overview of Basic Internet Resources

Up to December 2019, China had 387.51 million IPv4 addresses and 50,877 blocks/32 of IPv6 addresses.

China had a total of 50.94 million domain names, of which 22.43 million or 44.0% were ended with “.CN”.

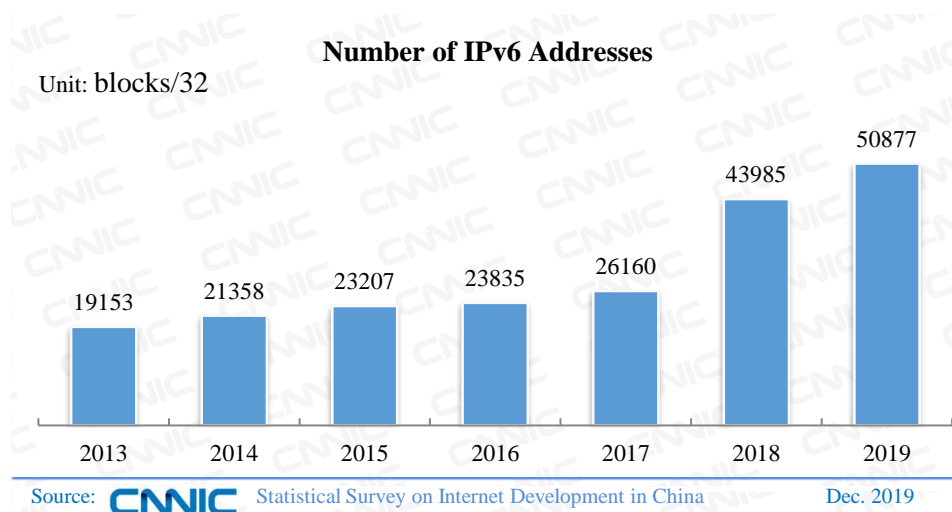
International Internet bandwidth reached 8,827,751 Mbps, up 19.8% over the end of 2018.

Table 1 Comparison - Basic Internet Resources from Dec. 2018 to Dec. 2019

	Dec. 2018	Dec. 2019	Annual increment	Annual growth rate
IPv4 ²	385,843,968	387,508,224	1,664,256	0.4%
IPv6 ³ (block/32)	43,985	50,877	6,892	15.7%
Domain name	37,927,527 ⁴	50,942,295 ⁵	--	--
Wherein, .CN Domain name	21,243,478	22,426,900	1,183,422	5.6%
International Internet bandwidth (Mbps)	7,371,738	8,827,751	1,456,013	19.8%

(II) IP Address

Up to December 2019, the number of IPv6 addresses in China had reached 50,877 blocks/32, up 15.7% over the end of 2018.



² Data for December 2018 and December 2019 cover Hong Kong, Macau and Taiwan.

³ Data for December 2018 and December 2019 cover Hong Kong, Macau and Taiwan.

⁴ The statistics in December 2018 do not include the number of new generic Top-Level Domains (New gTLD).

⁵ The statistics in December 2019 include the number of new generic Top-Level Domains (New gTLD).

Figure 1 Number of IPv6 Addresses ⁶

As of December 2019, the number of IPv4 addresses in China was 387.51 million, up 0.4% over the end of 2018.

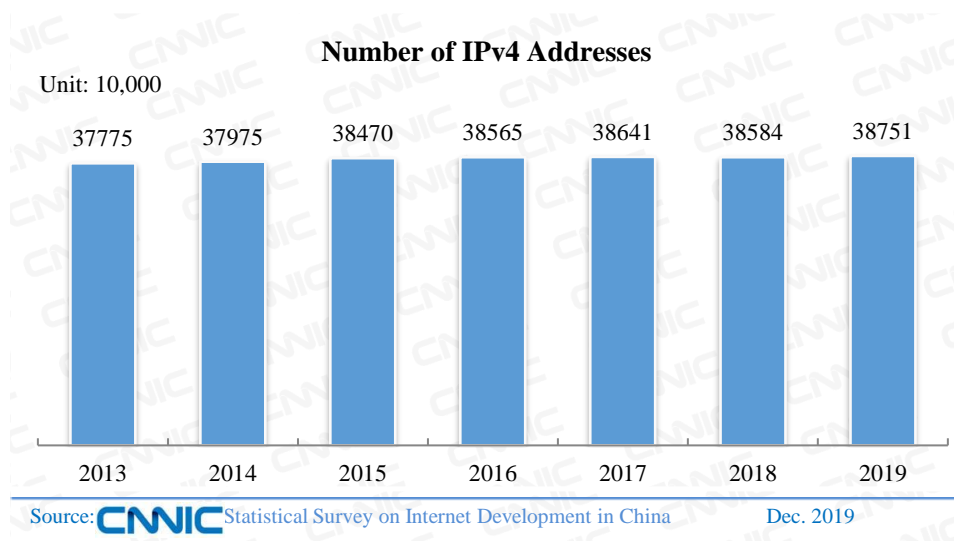


Figure 2 Number of IPv4 Addresses ⁷

(III) Domain Name

As of December 2019, China had a total of 50.94 million domain names. Among them, the number of “.CN” domain names was 22.43 million or 44.0% of the national total, up 5.6% from the end of 2018; the number of “.COM” domain names was 14.92 million or 29.3% of the national total; the number of “.中国” domain names was 1.7 million or 3.3% of the national total; the number of new generic Top-Level Domains (New gTLD) was 10.13 million, or 19.9% of the national total.

Table 2 Number of Domain Names by Category ⁸

	Number	Proportion in total domain names
.CN	22,426,900	44.0%
.COM	14,924,706	29.3%
.中国	1,703,456	3.3%
.NET	1,075,645	2.1%
.ORG	167,067	0.3%
.BIZ	45,182	0.1%
.INFO	33,588	0.1%
NEW gTLD	10,132,444	19.9%
OTHERS	433,307	0.9%
TOTAL	50,942,295	100.0%

⁶ The data in Figure 2 cover Hong Kong, Macau and Taiwan.

⁷ The data in Figure 2 cover Hong Kong, Macau and Taiwan.

⁸ Source: Generic Top-Level Domains (gTLD) and new generic Top-Level Domains (New gTLD) are provided by China’s domain name registration units.

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

	Number	Proportion in total “.CN” domain names
.CN	19,668,268	87.7%
.COM.CN	2,188,326	9.8%
.NET.CN	285,090	1.3%
.ORG.CN	154,872	0.7%
.ADM.CN	91,139	0.4%
.GOV.CN	21,359	0.1%
.AC.CN	11,446	0.1%
.EDU.CN	6,264	0.0%
OTHERS	136	0.0%
Total	22,426,900	100.0%

(IV) International Internet Bandwidth

Up to December 2019, international Internet bandwidth reached 8,827,751 Mbps, up 19.8% over the end of 2018.

International Internet Bandwidth in China and Its Growth Rate

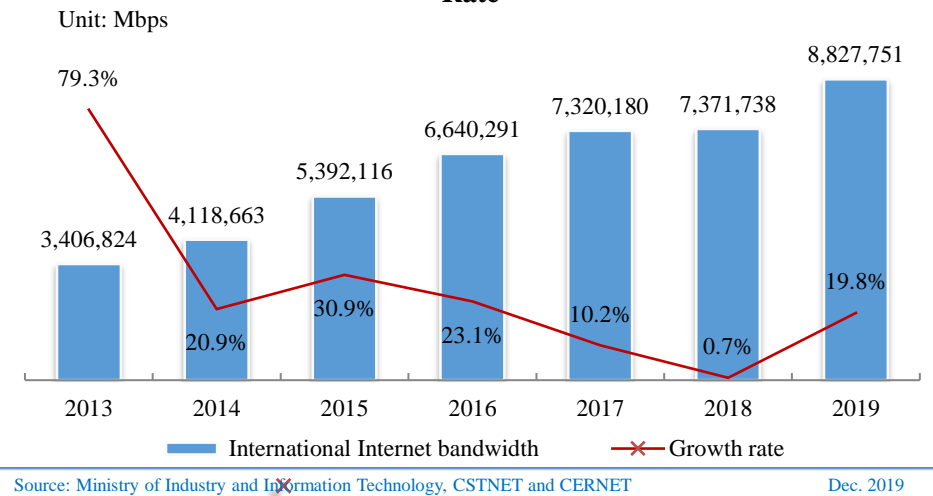


Figure 3 International Internet Bandwidth in China and Its Growth Rate ⁹

Table 4 International Internet Bandwidths of Backbone Networks

	International Internet bandwidth (Mbps)
China Telecom China Unicom China Mobile	8,651,623
China Science and Technology Network	114,688
China Education and Research Network	61,440
Total	8,827,751

⁹ Data for 2018 are adjusted according to the data of the Ministry of Industry and Information Technology.

II. Application of Internet Resources

(I) Websites

As of December 2019, there were 4.97 million websites¹⁰ in China, down 5.1% from the end of 2018.

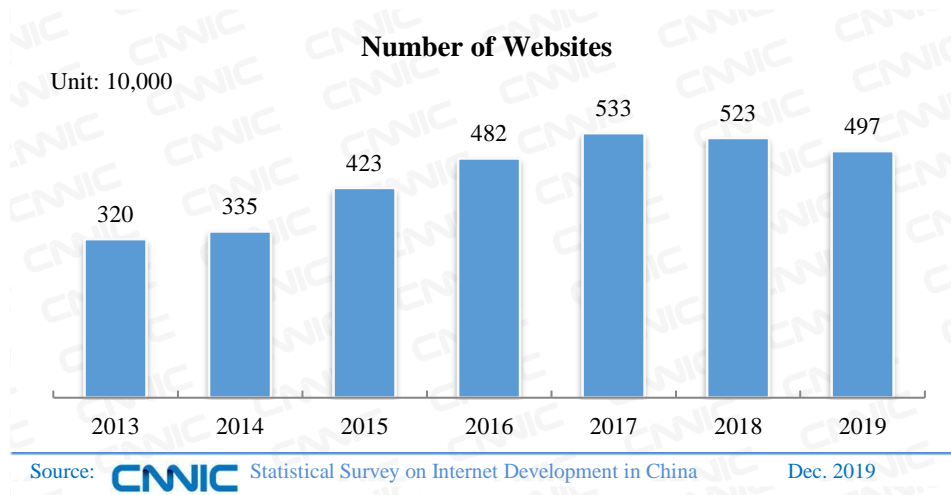


Figure 4 Number of Websites ¹¹

Up to December 2019, China had 3.41 million websites with the domain name of “.CN”, up 4.6% from the end of 2018.

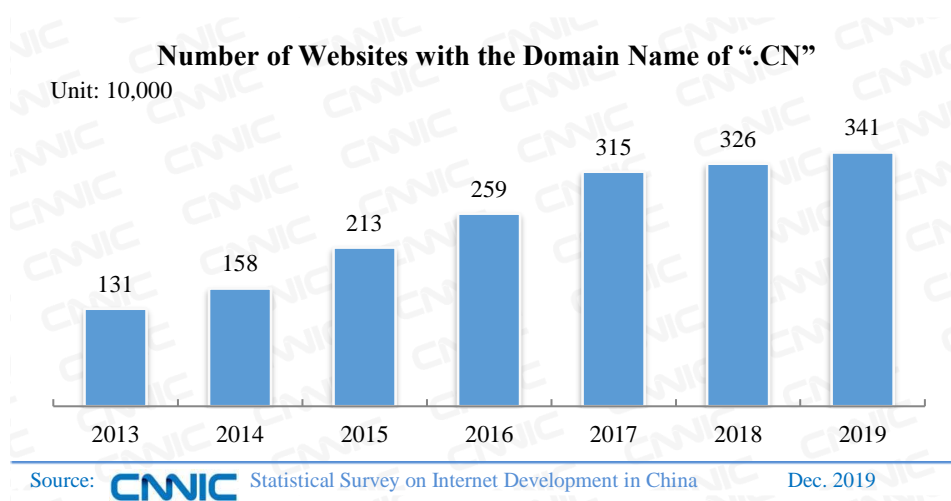


Figure 5 Number of Websites with the Domain Name of “.CN” ¹²

(II) Web Pages

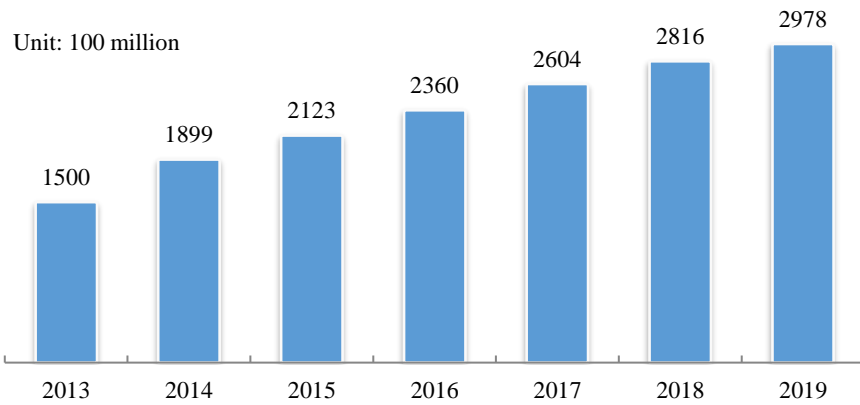
As of December 2019, there were 297.8 billion web pages in China, up 5.8% from the end of 2018.

¹⁰ The websites whose domain name registrants are within the territory of the P.R.C.

¹¹ The number of websites does not include that of those ended with “.EDU.CN”.

¹² The number of websites ended with “.CN” does not include that of those ended with “.EDU.CN”.

Number of Web Pages



Source: Baidu

Dec. 2019

Figure 6 Number of Web Pages

There were 206.3 billion static web¹³ pages and 91.6 billion dynamic web¹⁴ pages, accounting for 69.3% and 30.7% of the total, respectively.

Table 5 Number of Web Pages

	Unit	2018	2019	Growth rate
Total web pages	Page	281,622,406,489	297,829,914,511	5.8%
Static web pages	Page	197,066,105,957	206,255,312,345	4.7%
	Proportion in total web pages	70.0%	69.3%	--
Dynamic web pages	Page	84,556,300,532	91,574,602,166	8.3%
	Proportion in total web pages	30.0%	30.7%	--
Web page size (total bytes)	KB	19,061,579,332,918	20,952,363,890,708	9.9%
Average number of web pages per website	Page	53,810	59,926	11.4%
Average number of bytes per page	KB	68	70	2.9%

(III) Mobile Internet Access Traffic

From January to December 2019, the cumulative mobile Internet traffic totaled 122 billion GB.

¹³ A static web page means 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.

¹⁴ A dynamic web page means a web page that displays different content 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.

Mobile Internet Access Traffic

Unit: 100 million GB

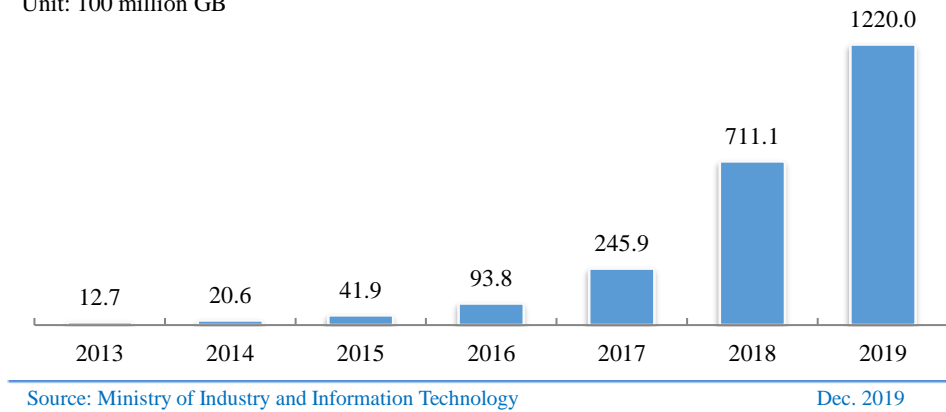


Figure 7 Mobile Internet Access Traffic ¹⁵

(IV) The Number and Classification of APPs

As of December 2019, 3.67 million mobile Internet applications (APPs) were available in the Chinese market, down 850,000 or 18.8% from 2018.

Number of Available APPs

Unit: 10,000

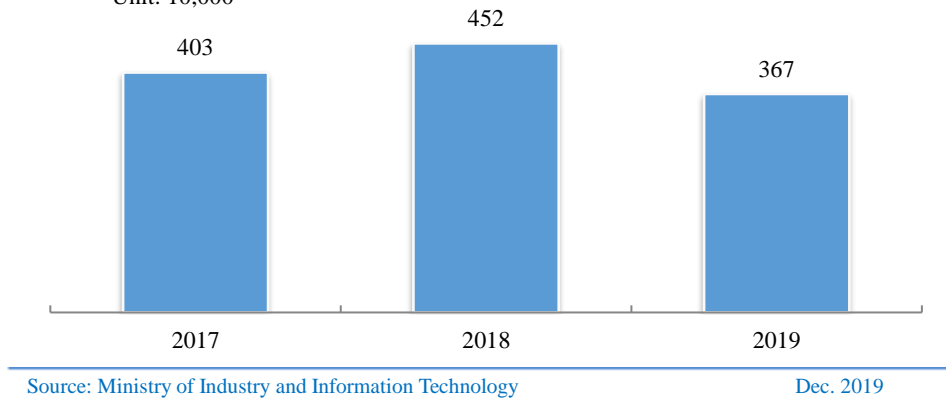
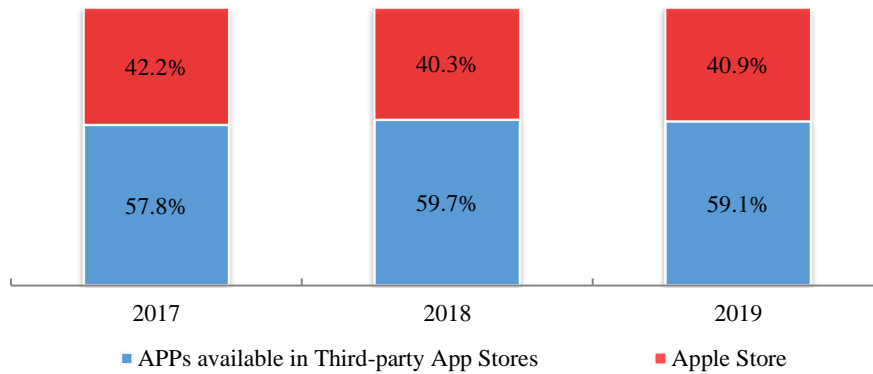


Figure 8 Number of Available APPs

Up to December 2019, 2.17 million APPs were available in local third-party app stores; there were over 1.5 million apps in Apple Store (China).

¹⁵ Source: Data for 2013-2018 are from the *Annual Report on China's Communications Statistics*. Data for 2019 are from the *Statistical Gazette of the Communication Industry in 2019* on the website of the Ministry of Industry and Information Technology.

Number of APPs available in Third-party App Stores vs Apple Store (Percent)



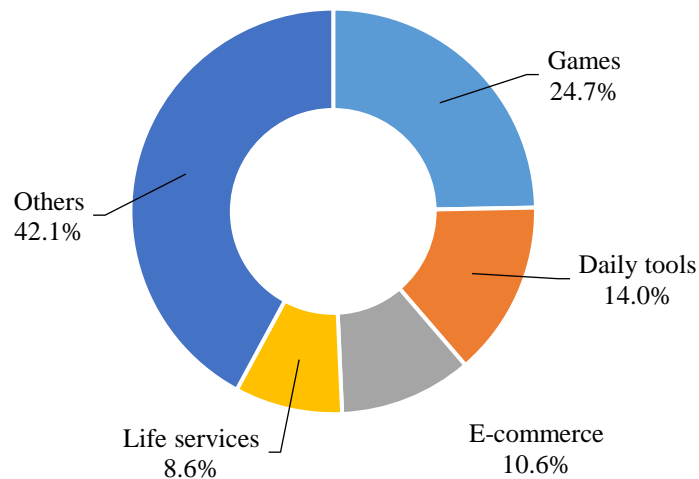
Source: Ministry of Industry and Information Technology

Dec. 2019

Figure 9 Number of APPs available in Third-party App Stores vs Apple Store (Percent)

As of December 2019, the number of mobile Apps under top four categories (games, daily tools, e-commerce, and life services) accounted for 57.9%. Specifically, the number of Apps under games category reached 909,000, accounting for 24.7% of all Apps, down 474,000 from 2018; that of Apps under categories of daily tools, e-commerce, and life services reached 514,000, 388,000, and 317,000, respectively, ranking second, third, and fourth, and accounting for 14.0%, 10.6%, and 8.6% of all APPs, respectively; that of other Apps under 10 categories such as social networking and education accounted for 42.1%.

Proportion of Apps by Category



Source: Ministry of Industry and Information Technology

Dec. 2019

Figure 10 Proportion of Apps by Category

III. Internet Access Environment

(I) Internet Access Devices

As of March 2020, the proportions of Chinese netizens accessing the Internet through mobile phones, TVs, desktop computers, laptops, and tablet computers were 99.3%, 32.0%, 42.7%, 35.1%, and 29.0%, respectively. The proportions of Internet users surfing the Internet through mobile phones and TVs increased respectively by 0.7 percentage point and 0.9 percentage point from the end of 2018. The proportion of desktop computers dropped significantly.

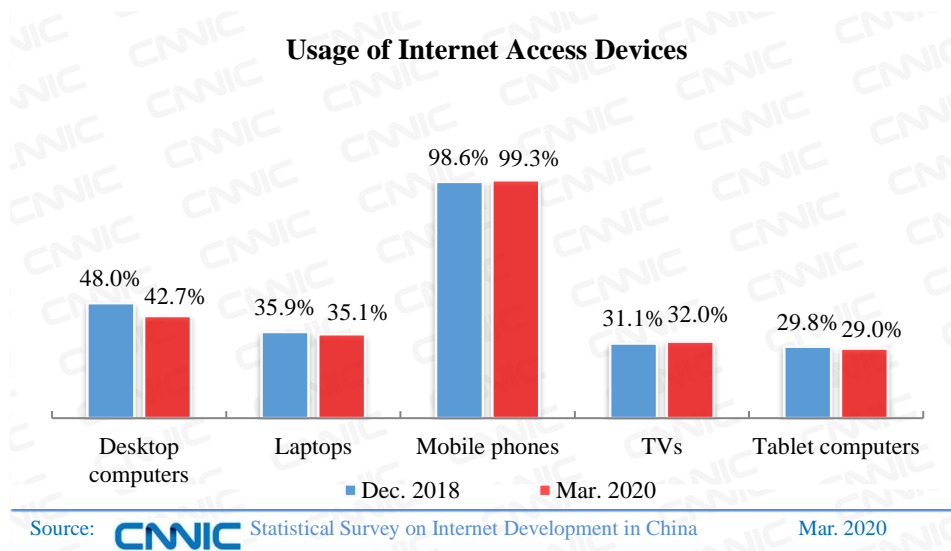


Figure 11 Usage of Internet Access Devices

(II) Online Duration

1. Weekly Per Capita Online Duration of Internet Users

Up to March 2020, the average online duration per netizen in China was 30.8 hours in a week, an increase of 3.2 hours from the end of 2018. Affected by the COVID-19 epidemic in early 2020, the online duration of netizens increased significantly.

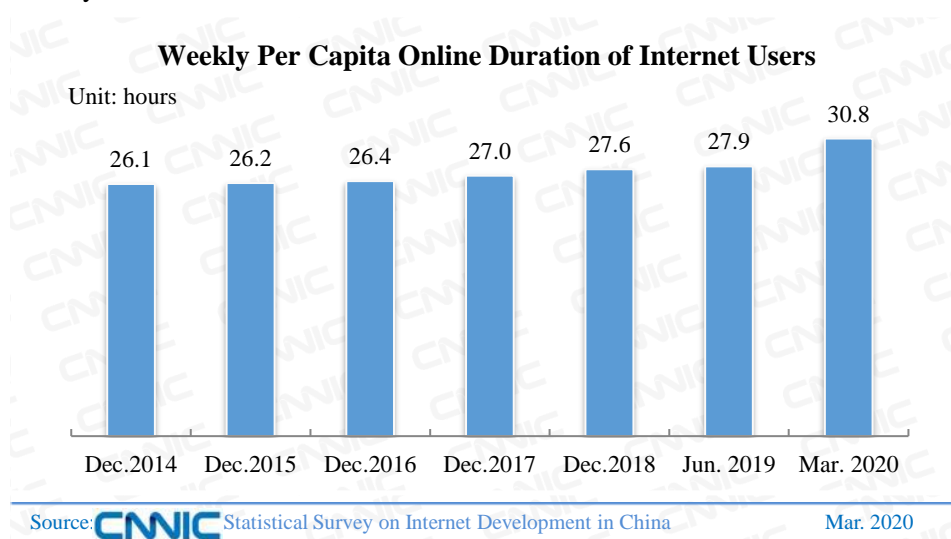
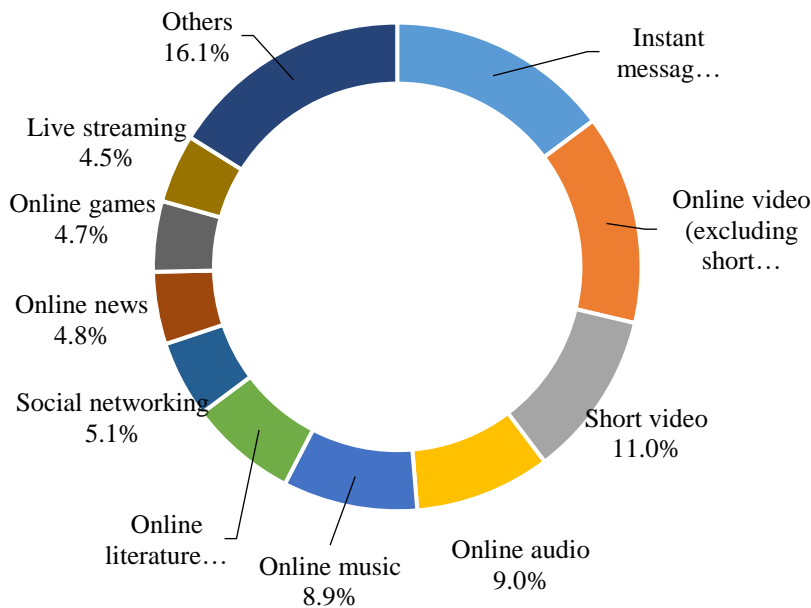


Figure 12 Weekly Per Capita Online Duration of Internet Users

2. Proportion of Usage Duration by Type of Application

In December 2019, of all Apps frequently used by mobile Internet users, instant messaging Apps were used for the longest duration, accounting for 14.8%; by usage duration, the proportions of online video (excluding short video), short video, online audio¹⁶, online music, and online literature Apps were 13.9%, 11.0%, 9.0%, 8.9% and 7.2%, respectively. The proportion of the usage duration of short video Apps increased significantly by 2.8 percentage points year-on-year.

Proportion of Usage Duration by Type of Application



Source: China Telecom

Dec. 2019

Figure 13 Proportion of Usage Duration by Type of Application ¹⁷

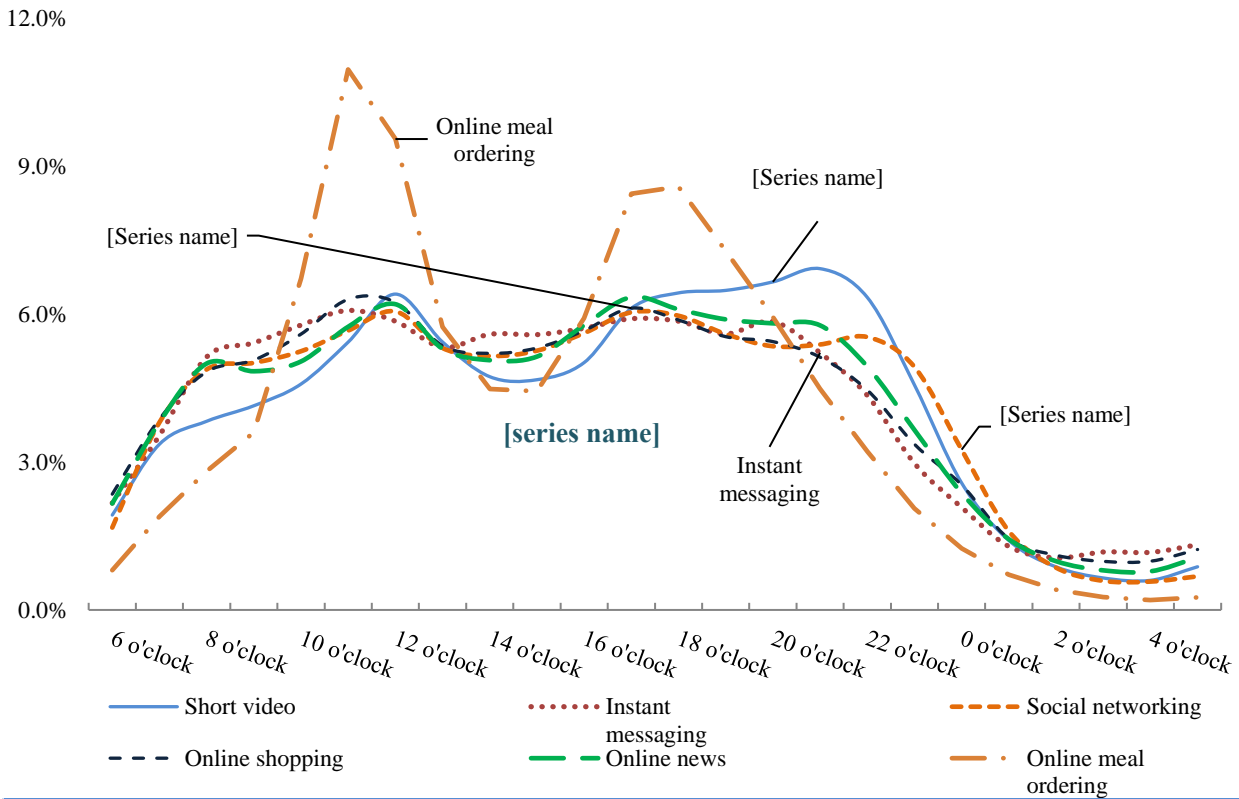
3. Distribution of Usage Periods by Type of Application

Up to December 2019, of the six types of Apps, the distribution curves of usage periods of instant messaging, social networking, online news and online shopping Apps were relatively close. Their usage periods were evenly distributed with peaks beginning between 8:00 and 10:00 and ending between 21:00 and 22:00, accounting for around 5% to 6%. The usage duration of short video Apps had a peak between 17:00 and 22:00, accounting for over 6%. The usage duration of online meal ordering Apps had obvious peaks between 11:00 and 12:00 and between 17:00 and 19:00, accounting for 20.5% and 24.3%, respectively.

¹⁶ Internet audio means Internet Apps through which users can listen to online radio and other audio programs.

¹⁷ Source: China Telecom. The indicators are based on online log data and telecom App tag data of China Telecom's full-scale mobile phone users in December, and the daily average total duration of each type of application is calculated by building a data model.

Distribution of Usage Periods for Six Types of Applications



Source: China Telecom

Dec. 2019

Figure 14 Distribution of Usage Periods for Six Types of Applications ¹⁸

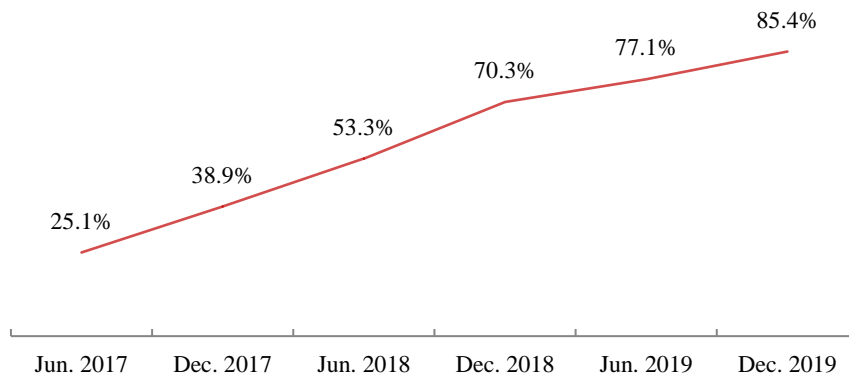
(III) Proportion of Subscribers of Broadband at the Speed of 100 Mbps or above

As of December 2019, the number of subscribers of fixed Internet broadband at the speed of 100 Mbps or above had accounted for 85.4% of all fixed Internet broadband subscribers.

¹⁸ Distribution of usage period refers to the period distribution of usage duration of Apps in all fields. For example, if a user uses an instant messaging App for 15 minutes or 0.25 hour during the period from 6 o'clock to 7 o'clock, then the duration of using the application is 4 hours throughout the whole day. The calculation method is 0.25/4.



Proportion of Subscribers of Fixed Internet Broadband at the Speed of 100 Mbps or above



Source: Ministry of Industry and Information Technology

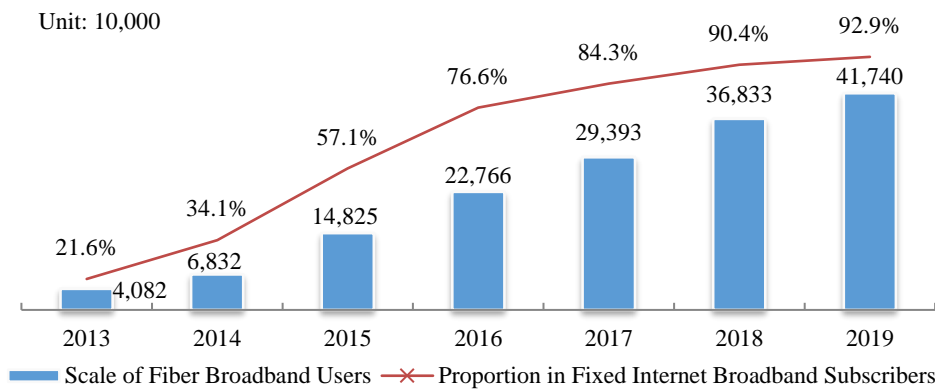
Dec. 2019

Figure 15 Proportion of Subscribers of Fixed Internet Broadband at the Speed of 100 Mbps or above

(IV) Scale and Proportion of Fiber Broadband Users

As of December 2019, the number of FTTH/O¹⁹ users had reached 417 million, accounting for 92.9% of all fixed Internet broadband subscribers, up 2.5 percentage points from the end of 2018.

Scale and Proportion of Fiber Broadband Users



Source: Ministry of Industry and Information Technology

Dec. 2019

Figure 16 Scale and Proportion of Fiber Broadband Users ²⁰

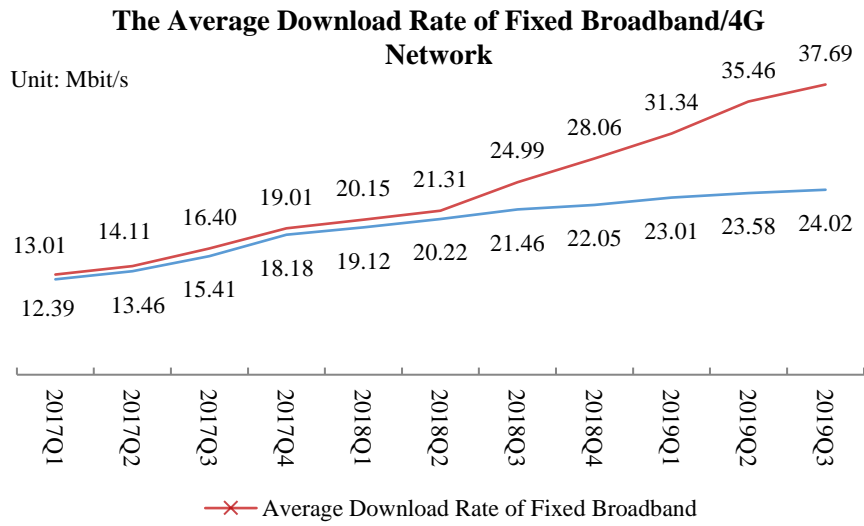
(V) Download Rate of Broadband

As of the third quarter of 2019, the average download rate of China’s fixed broadband was 37.69 Mbit/s, up 50.8% year on year. The average download rate of China’s mobile broadband users accessing the Internet through 4G (fourth-generation mobile communication technology) network had reached 24.02 Mbit/s, up 11.9% year on year.

¹⁹ FTTH/O refers to FTTH and FTTO. FTTH means Fiber to the home. FTTO stands for Fiber to the office.

²⁰ Source: Data for 2013-2016 are from the *Annual Report on China’s Communications Statistics*. Data for 2017-2018 are from the *Report on the Completion of Key Indicators for the Communication Industry* on the website of the Ministry of Industry and Information Technology of China. Data for 2019 are from the *Economic Operation of the Communication Industry in January to February 2020* on the website of the Ministry of Industry and Information Technology.





Source: Broadband Development Alliance

Sep. 2019

Figure 17 The Average Download Rate of Fixed Broadband/4G Network

Chapter II Size and Structure of Internet

Users

I. The Size of Internet Users

(I) Overall Size of Internet Users

As of March 2020²¹, China had 904 million netizens, up by 75.08 million from the end of 2018, and its Internet penetration had reached 64.5%, up 4.9 percentage points over the end of 2018.

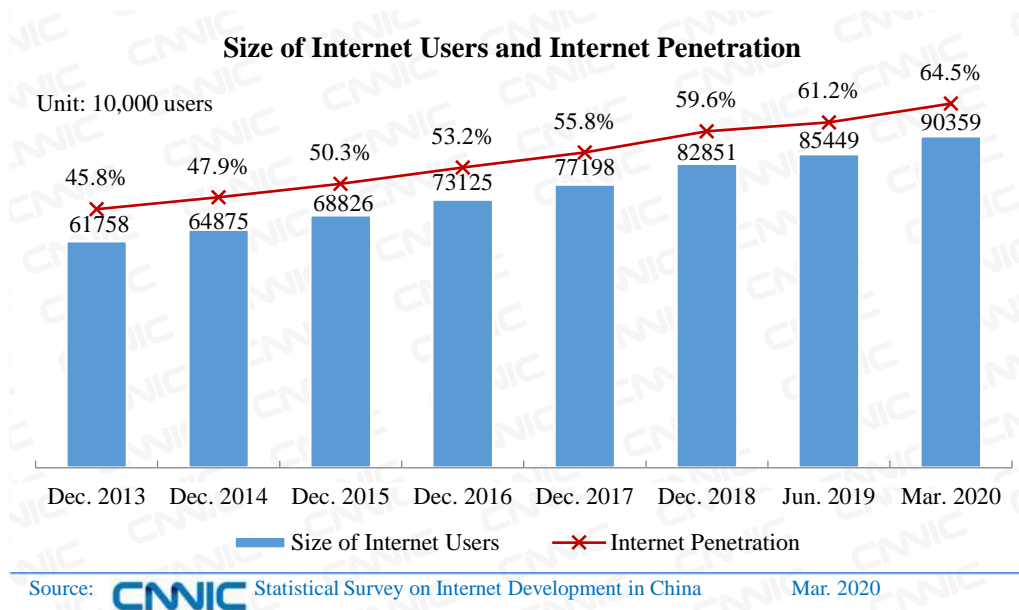


Figure 18 Size of Internet Users and Internet Penetration

Up to March 2020, the number of mobile Internet users in China had reached 897 million, up 79.92 million over the end of 2018. The proportion of Internet users accessing the Internet through mobile phones in China had amounted to 99.3%, up 0.7 percentage point over the end of 2018.

²¹ Affected by the COVID-19 epidemic, the deadline for telephone survey for the Report is March 15, 2020, so the data are up to March 2020, the same below.

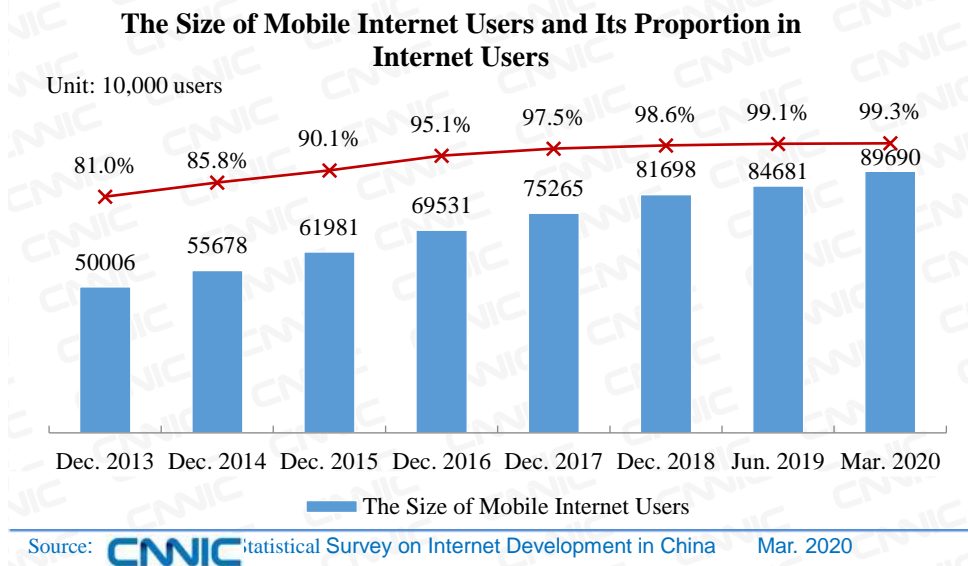


Figure 19 The Size of Mobile Internet Users and Its Proportion in Internet Users

Since 2019, China has made remarkable achievements in Internet development and multiple measures have driven the continuous growth of Internet users. First, the implementation of Enhanced Speeds of Fixed Broadband and Mobile Broadband²² has been accelerated, and rural broadband users have grown rapidly. As of December 2019, the total number of fixed Internet broadband subscribers in China reached 449 million, of which 384 million or 85.4% were subscribers of fixed Internet broadband at the speed of 100 Mbps or above, and 870,000 were subscribers of fixed Internet broadband at the speed of 1,000 Mbps or above. The total number of 4G users reached 1.28 billion, accounting for 80.1% of all mobile phone users. The total number of rural broadband users reached 135 million, up 14.8% from the end of 2018, and the growth rate was 6.3 percentage points higher than that of urban broadband users²³. Second, online Apps have continued to improve, and the growth rate of mobile traffic has remained at a high level. As of December 2019, 3.67 million Apps were available on shelves in China, and Apps on shelves in third-party App stores were distributed 950.2 billion times²⁴. Online Apps have met the needs of users for consumption, entertainment, information acquisition, social networking, travel, etc., been increasingly integrated with people's lives, and attracted users in fourth- and fifth-tier cities and rural areas, to improve their quality of life. In particular, Apps such as WeChat, short video, and live streaming have lowered the use threshold for users and promoted the usage by Internet users. In 2019, the consumption of mobile Internet access traffic reached 122 billion GB, an increase of 71.6% from the end of 2018²⁵. Third, information benefiting the people and for the people has been accelerated, and social informatization has continuously been improve. Governments at all levels have conscientiously implemented the *2019 Key Tasks for Transparency of Government Affairs* and other policy requirements, actively promoted the application of informatization in the fields of government services and people's livelihood, comprehensively improved the standardization and convenience of government services, and fully met the needs of the people. At the beginning of 2020, Internet government services provided a strong support in the prevention and control of the COVID-19 epidemic, and the size of users increased

²² Enhanced Speeds of Fixed Broadband and Mobile Broadband mean the promotion of both fixed broadband and mobile broadband to the gigabit (Gbit) era.

²³ Source: *Statistical Gazette of the Communication Industry in 2019* of the Ministry of Industry and Information Technology.

²⁴ Source: *Operation of the Internet and Related Service Industries in 2019* of the Ministry of Industry and Information Technology.

²⁵ Source: *Statistical Gazette of the Communication Industry in 2019* of the Ministry of Industry and Information Technology.

significantly. As of March 2020, 694 million Internet users or 76.8% of all netizens had received e-government services in China, up 76.3% over the end of 2018.

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

As of March 2020, the size of rural Internet users was 255 million or 28.2% of China's total netizen population, up 33.08 million over the end of 2018, while that of urban Internet users had reached 649 million or 71.8% of China's total netizen population, up 42 million from the end of 2018.

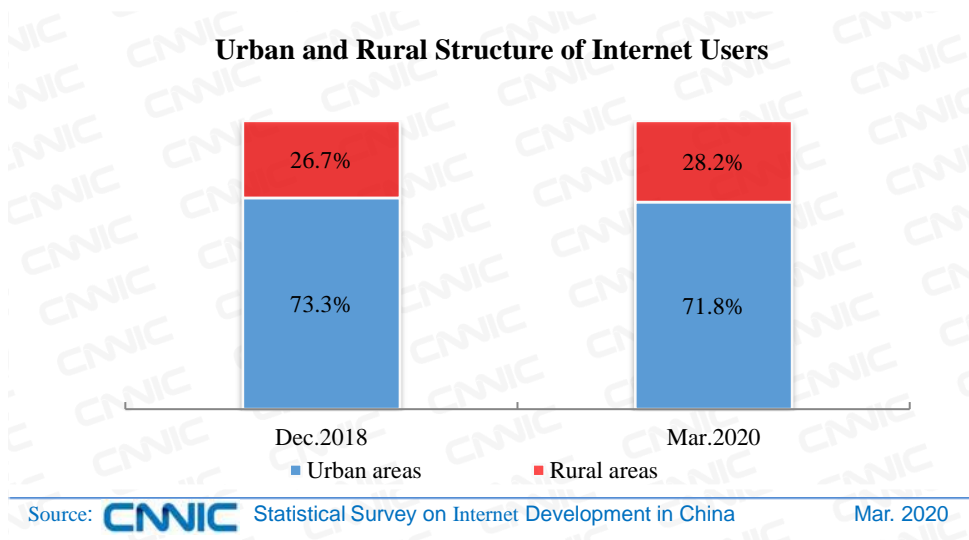


Figure 20 Urban and Rural Structure of Internet Users

The difference in Internet penetration between urban and rural areas narrowed by 5.9 percentage points. As of March 2020, China's Internet penetration in urban areas was 76.5%, up 1.9 percentage points over the end of 2018; and that in rural areas was 46.2%, up 7.8 percentage points over the end of 2018.

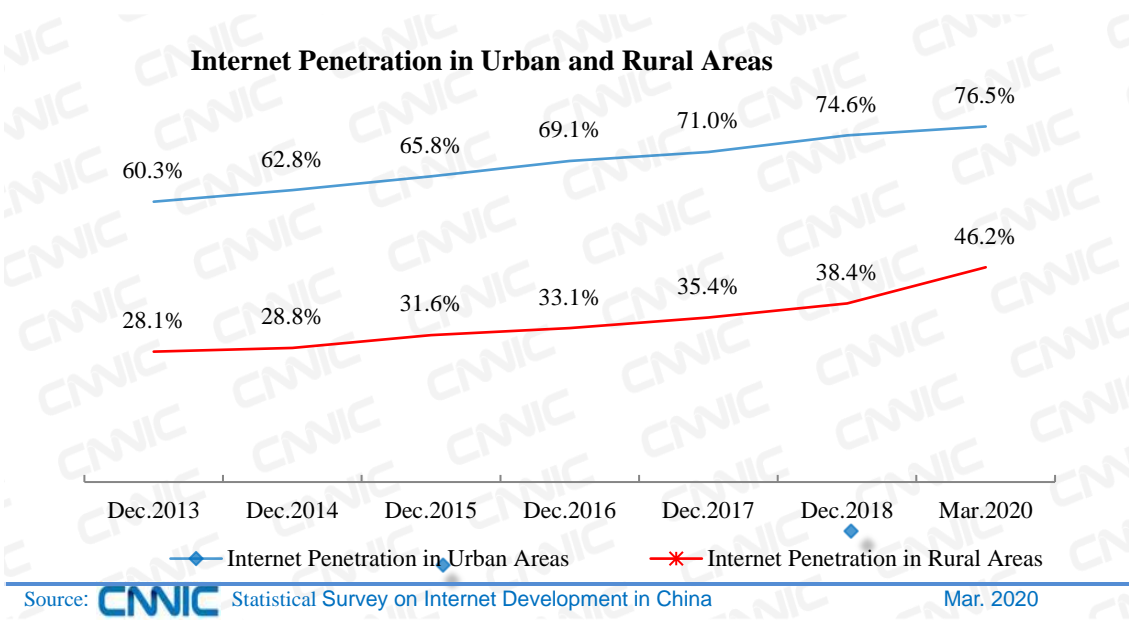


Figure 21 Internet Penetration in Urban and Rural Areas

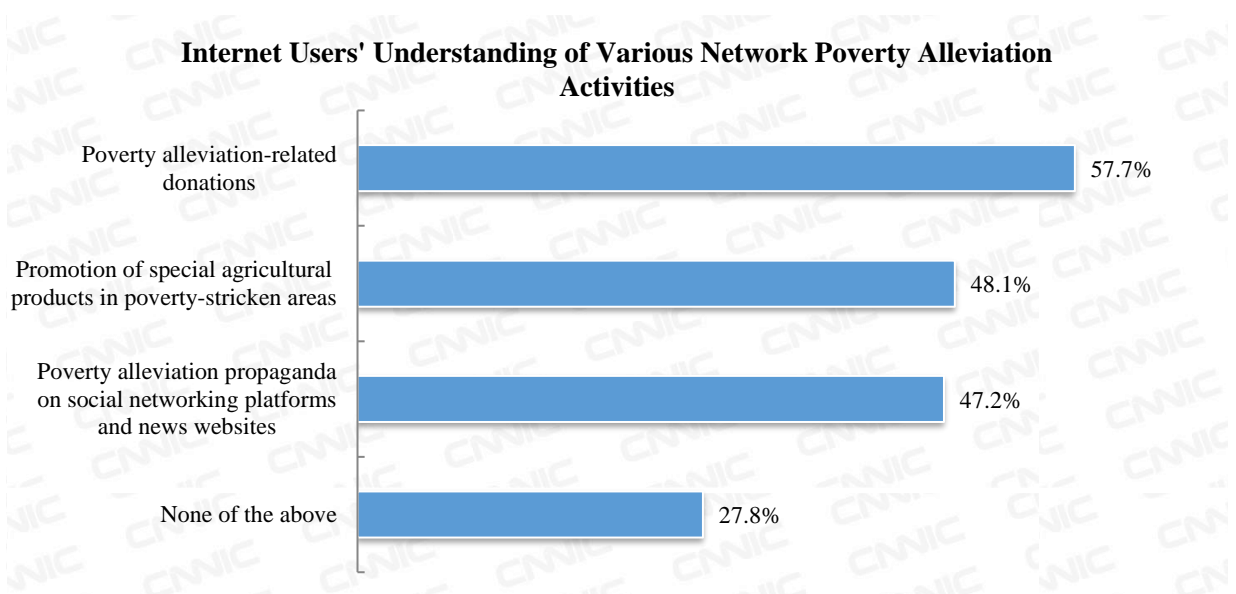


(III) Effectiveness of Network-based Poverty Alleviation

In April 2019, the Office of the Central Cyberspace Affairs Commission, the National Development and Reform Commission, the State Council Leading Group Office of Poverty Alleviation and Development, and the Ministry of Industry and Information Technology jointly issued the 2019 Key Tasks for Network Poverty Alleviation, proposing to fully release the digital benefits and to increase the efforts of network poverty alleviation. The network-empowered poverty alleviation has tackled tough problems and achieved remarkable results. **First, network infrastructure in poverty-stricken areas has been significantly improved through network poverty alleviation.** In 2019, with the in-depth implementation of “Village-level Coverage of Internet” and “Pilot Program for Universal Telecommunication Services”, people in the vast rural and remote areas of China had gradually kept pace with the Internet era and simultaneously enjoyed the convenience of the information society. As of October 2019, the proportion of China’s administrative villages with access to fiber optic and 4G had exceeded 98%, and the proportion of poverty-stricken villages with access to broadband had reached 99%, achieving the world’s leading rural network coverage; the average download rate in pilot areas had exceeded 70M, basically realizing “same network and same speed” in rural and urban areas. The network access conditions for schools in rural and remote areas have continued to improve, and the proportion of primary and secondary schools nationwide connected to the network had exceeded 96%, helping to achieve education equalization and laying a solid foundation for network poverty alleviation²⁶.

Second, Internet users’ awareness of poverty alleviation has been effectively improved through the network poverty alleviation work. According to the data, more than 70% of Internet users have some understanding of network poverty alleviation activities. As of March 2020, the proportion of Internet users seeing the content related to “poverty alleviation-related donations” on the Internet was 57.7%, ranking the highest; the proportions of Internet users seeing the content related to “promotion of special agricultural products in poverty-stricken areas” and “poverty alleviation propaganda on social networking platforms and news websites” were 48.1% and 47.2%, respectively.

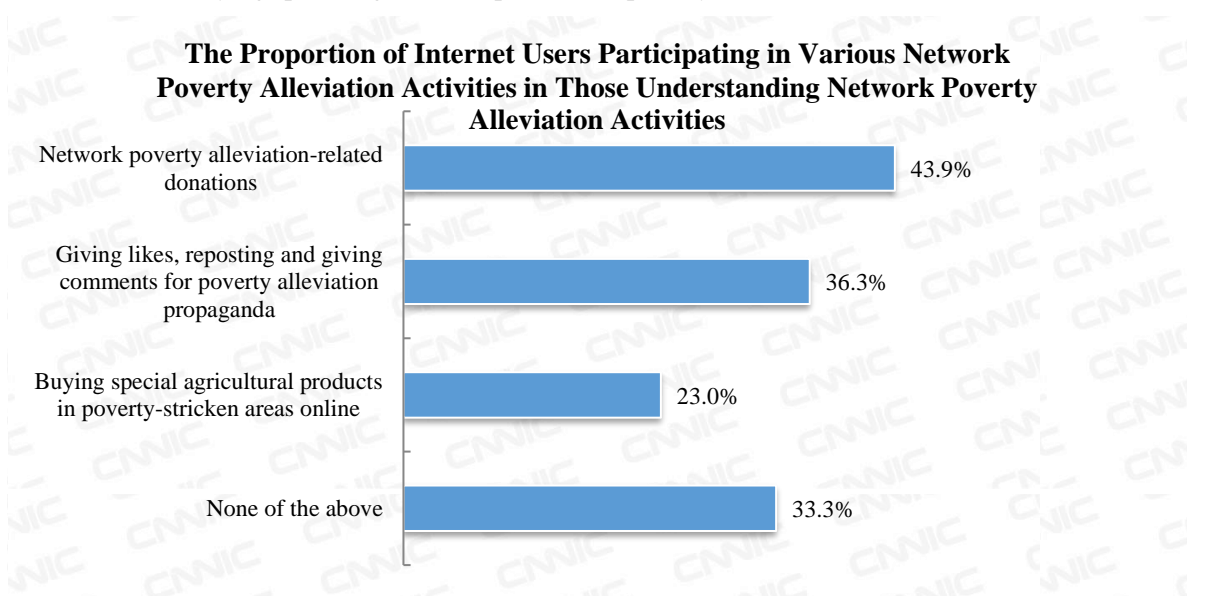
²⁶ Source: 2019 Network Poverty Alleviation Forum of the Ministry of Industry and Information Technology, <http://www.miit.gov.cn/n973401/n6394828/n6394843/c7467766/content.html>, October 16, 2019.



Source: CNNIC Statistical Survey on Internet Development in China Mar.2020

Figure 22 Internet Users' Understanding of Various Network Poverty Alleviation Activities

Third, the majority of Internet users have been actively promoted to participate in poverty alleviation actions through the network poverty alleviation work. According to the data, of Internet users who understand network poverty alleviation activities, nearly 70% have participated in various network poverty alleviation activities. As of March 2020, of the Internet users understanding network poverty alleviation activities, the proportion of those participating in “network poverty alleviation-related donations” was 43.9%, ranking the highest, followed by those “giving likes, reposting and giving comments for poverty alleviation propaganda”, accounting for 36.3%; the proportion of those “buying special agricultural products in poverty-stricken areas online” was 23.0%.



Source: CNNIC Statistical Survey on Internet Development in China Mar. 2020

Figure 23 The Proportion of Internet Users Participating in Various Network Poverty Alleviation Activities in Those Understanding Network Poverty Alleviation Activities

Fourth, the achievements of poverty alleviation have been continuously consolidated through the network poverty alleviation work. According to the data, nearly 90% of Internet users agree that the Internet plays an



important role in poverty alleviation. As of March 2020, more than 70% of Internet users believed that the Internet can play an important role in “consolidating the power of Internet users to provide help for the poor”, “helping the poor expand the sales of agricultural products through e-commerce” and “facilitating the poor’s acquisition of information on jobs, social insurance, and medical care”. Slightly less Internet users (69.7%) recognized the “provision of high-quality learning resources for children in poverty-stricken areas through distance education”.

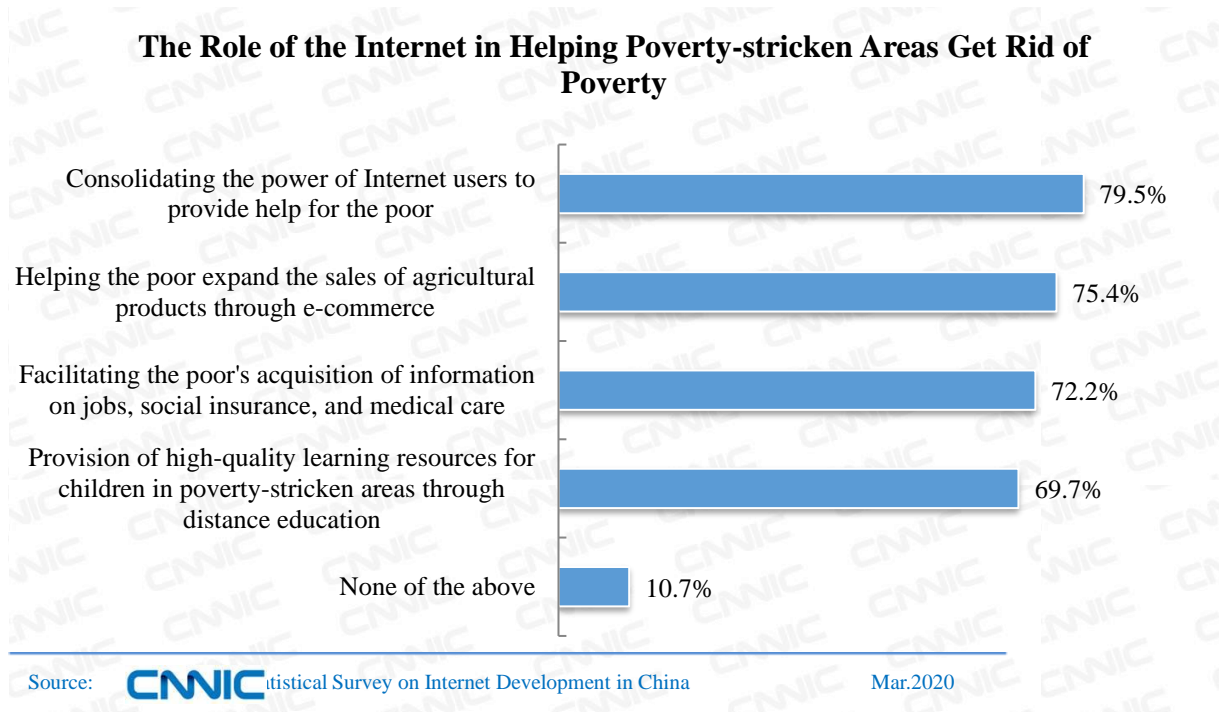


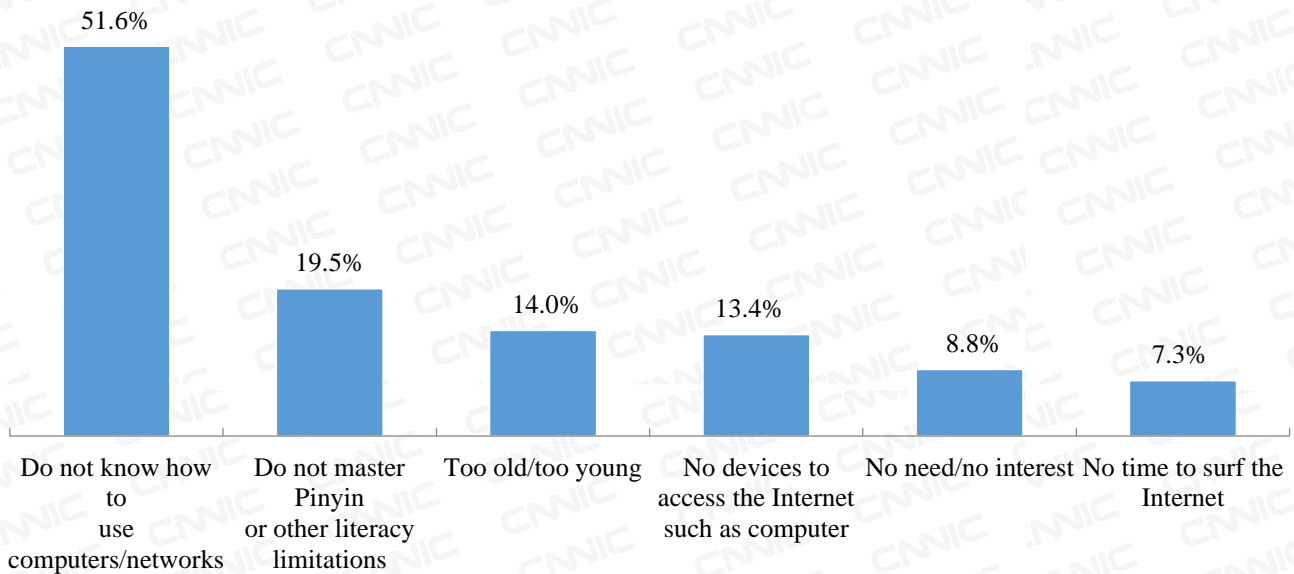
Figure 24 The Role of the Internet in Helping Poverty-stricken Areas Get Rid of Poverty

(IV) The Size of Non-netizens

As of March 2020, of 496 million non-netizens in China, these in urban areas accounted for 40.2%, while those in rural areas took up 59.8%. The majority of non-netizens were still in rural areas.

Shortage of Internet skills, limited literacy level, and age were major factors preventing non-netizens from accessing the Internet. According to the data, 51.6% and 19.5% of non-netizens did not access the Internet because they did not master computer/network skill or Pinyin, respectively. 14.0% of non-netizens were too old or too young to surf the Internet. The proportion of non-netizens who did not surf the Internet because they did not have computers or other Internet devices was 13.4%. Less than 10% of non-netizens did not access the Internet because they had no demand for or were not interested in surfing the Internet or had no time to surf the Internet.

Reasons Why Non-netizens don't Access the Internet



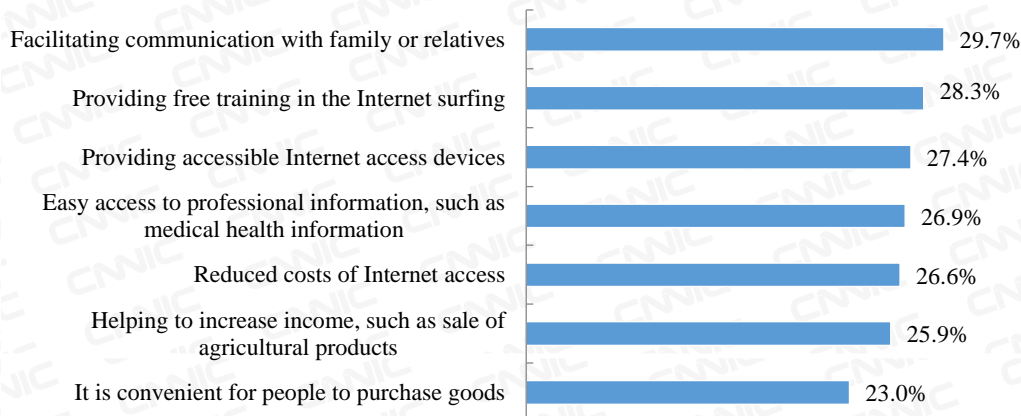
Source: CNNIC Statistical Survey on Internet Development in China

Mar.2020

Figure 25 Reasons Why Non-netizens don't Access the Internet

According to the data, the primary factor of non-netizens accessing the Internet was to facilitate communication with their families and relatives, accounting for 29.7%. The second factor was to provide free training on Internet surfing, making up 28.3%. The third was to provide accessible Internet devices, taking up 27.4%.

Factors Facilitating Non-netizens to Access the Internet



Source: CNNIC Statistical Survey on Internet Development in China

Mar.2020

Figure 26 Factors Facilitating Non-netizens to Access the Internet

II. The Attribute Structure of Internet Users

(I) Gender Structure

As of March 2020, the gender ratio of China's Internet users was 51.9:48.1, with the proportion of male Internet

users slightly higher than that of male population (51.1%²⁷).

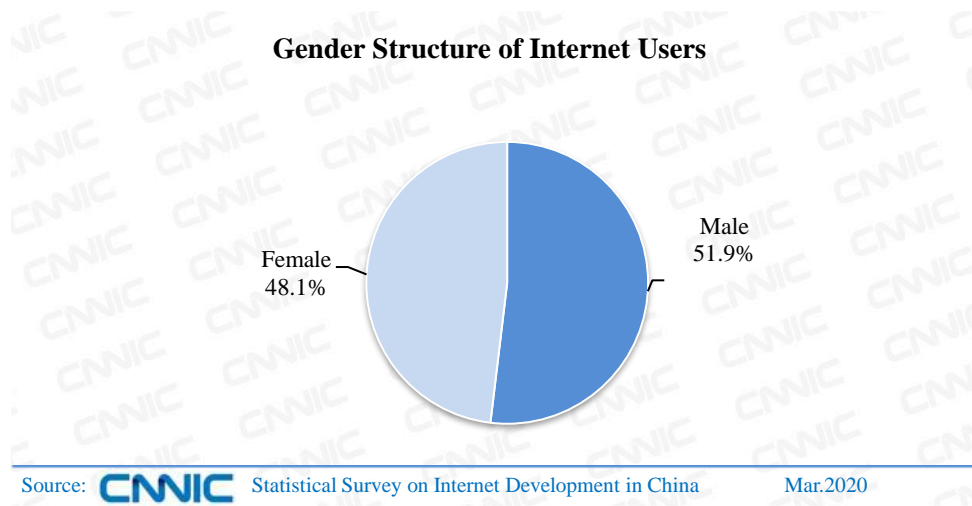


Figure 27 Gender Structure of Internet Users

(II) Age Structure

As of March 2020, the proportions of Internet users aged 20-29 and 30-39 made up 21.5% and 20.8%, respectively, higher than those of other age groups. Internet users aged 40-49 accounted for 17.6%. Internet users aged 50 and above took up 16.9%. The Internet continued to expand its presence among the middle-aged and elderly.

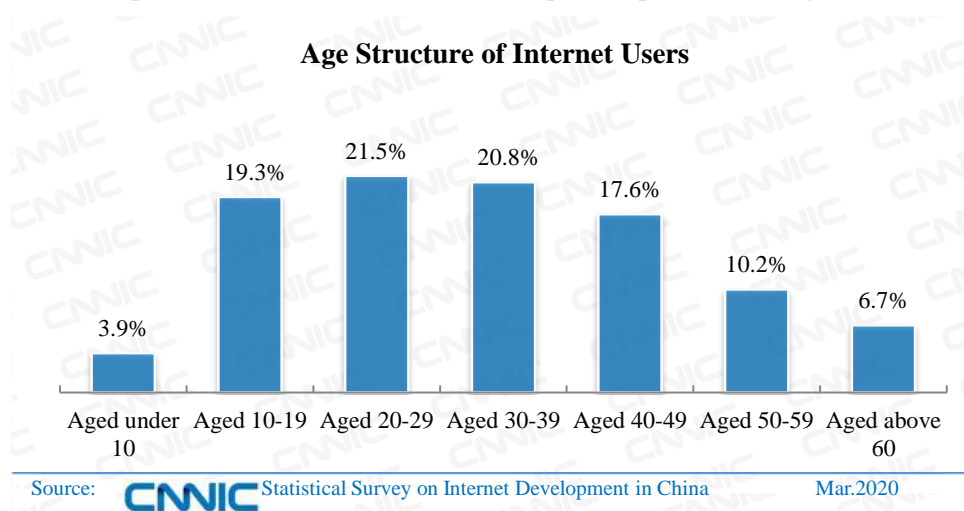


Figure 28 Age Structure of Internet Users

²⁷ Source: *China Statistical Yearbook 2019* of the National Bureau of Statistics.

(III) Educational Background

As of March 2020, the proportions of Internet users graduating from junior middle schools as well as senior middle schools, vocational schools or technical schools were 41.1% and 22.2%, respectively. The proportion of Internet users holding a diploma from colleges or above was 19.5%.

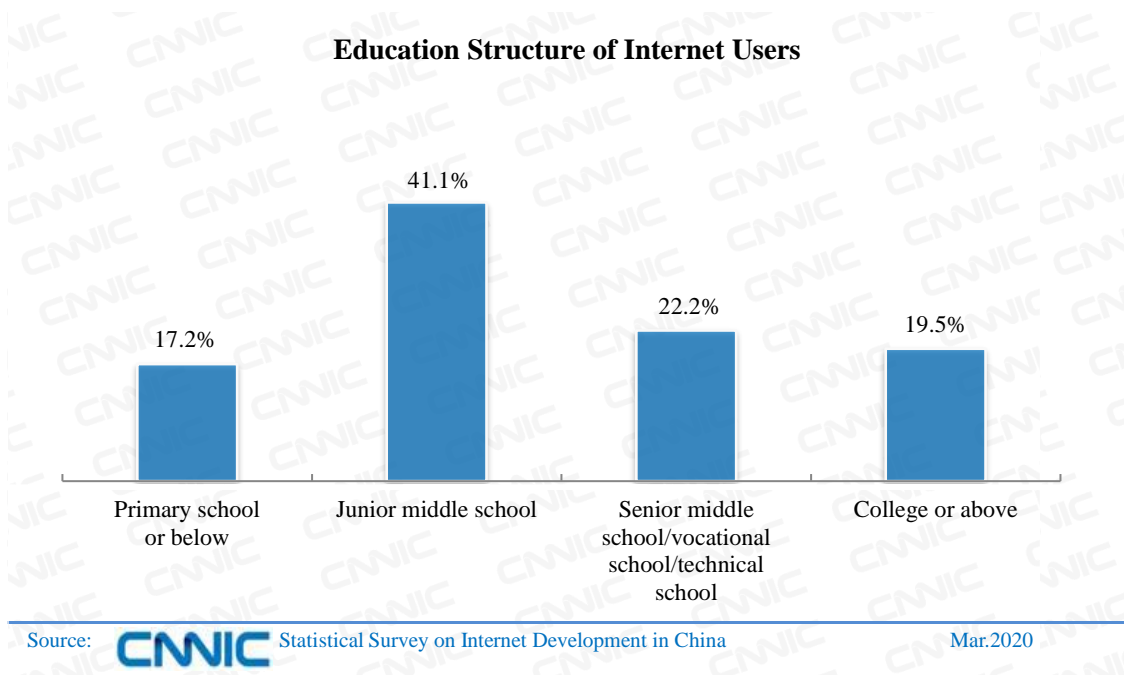
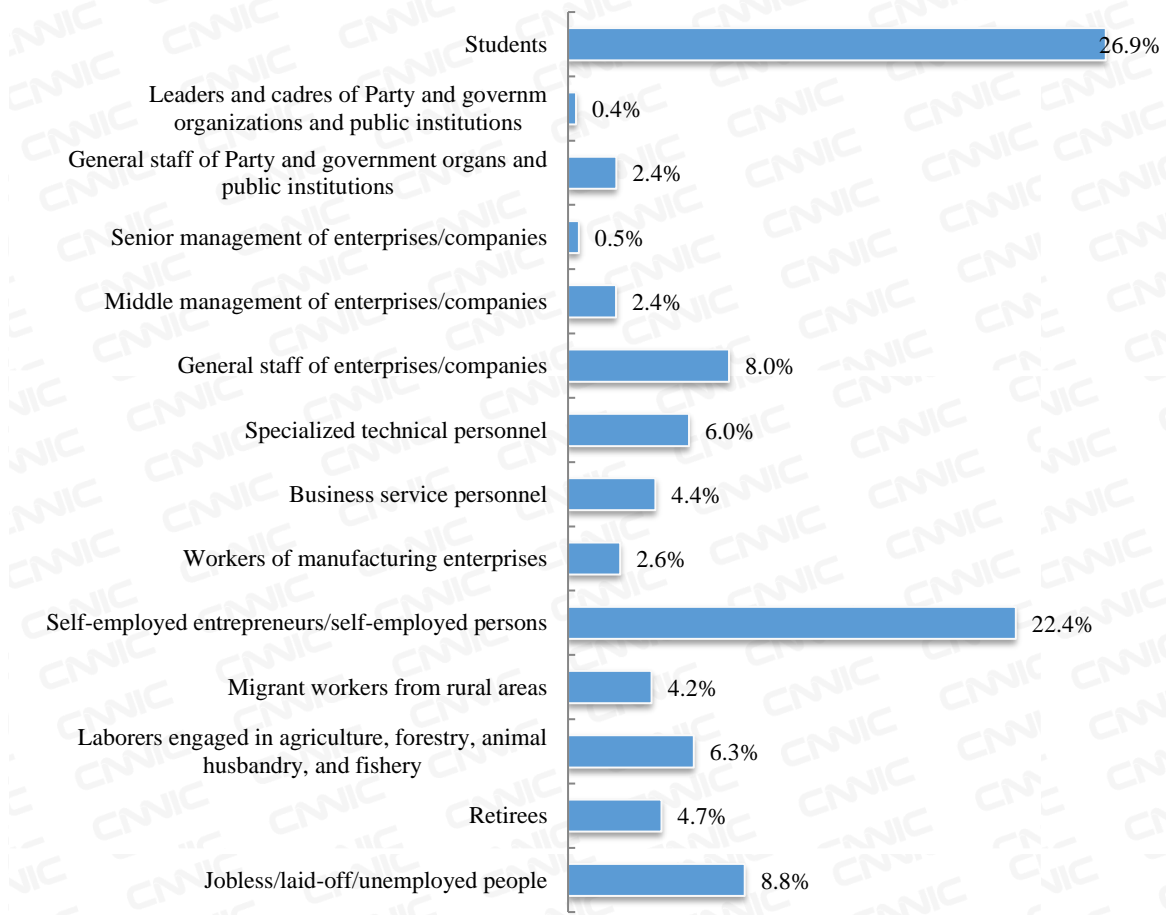


Figure 29 Education Structure of Internet Users

(IV) Occupational Structure

Up to March 2020, of Chinese Internet users, 26.9% were students, 22.4% were self-employed businessmen/freelancers, and 10.9% were managers and ordinary staff members in enterprises/companies.

Occupational Structure of Internet Users



Source: CNIC Statistical Survey on Internet Development in China Mar.2020

Figure 30 Occupational Structure of Internet Users

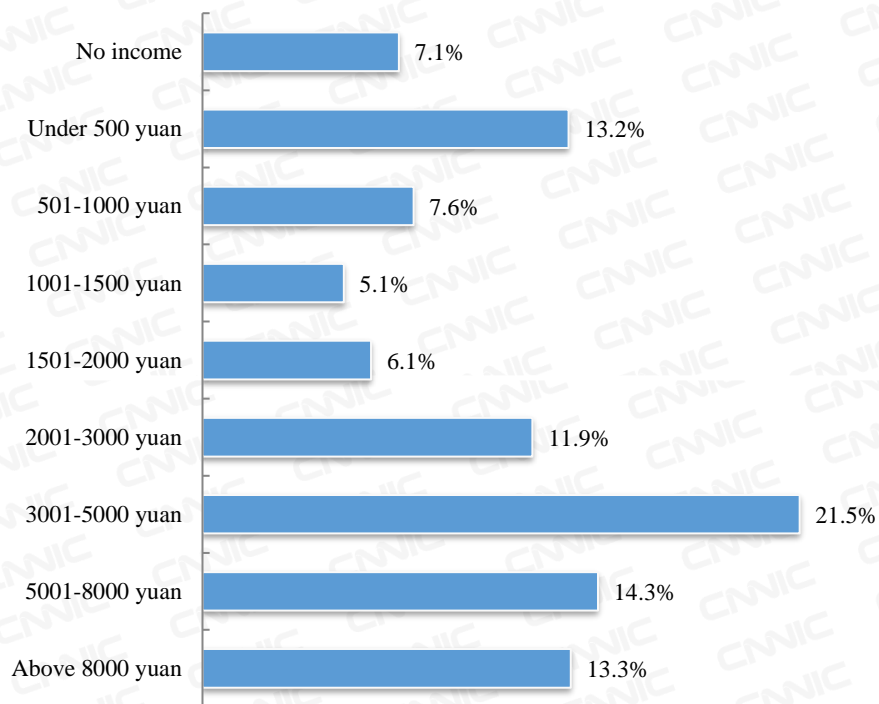
(V) Income Structure

As of March 2020, the number of Internet users with a monthly income²⁸ ranging from 2001 to 5000 yuan made up 33.4%. The proportion of Internet users earning more than 5,000 yuan per month was 27.6%. The proportion of Internet users earning less than 1,000 yuan a month (excluding those earning nothing) was 20.8%.

²⁸ Monthly income: the income of students includes living allowances provided by families, salary earned from work-study programs, scholarships and others. The income of workers engaged in agriculture, forestry, animal husbandry and fishery includes the living allowances provided by children, income of agricultural production, and government subsidy. The income of those who are jobless, laid off or unemployed includes the living allowances provided by children, government relief and subsidy, pension, and subsistence allowances. The income of retirees includes the living allowances provided by children and pension.



Structure of Monthly Personal Income of Internet Users



Source: CNNIC Statistical Survey on Internet Development in China Mar.2020

Figure 31 Structure of Monthly Personal Income of Internet Users

Chapter III The Development of Internet Applications

I. Overview of Internet Applications

Since 2019, China's personal Internet applications have continued to develop steadily. Due to the impact of the COVID-19 outbreak in early 2020, the opening of all schools nationwide was postponed, and teaching activities were carried out online, promoting the size of online education users to increase by 110.2% from the end of 2018. Driven by live e-commerce streaming, the number of live streaming users increased by 41.1% from the end of 2018. The size of online payment users reached 768 million, up 27.9% from the end of 2018, and the growth rate of mobile payment users was 31.1%.

Table 6 User Size and Utilization Rate of Internet Applications of Internet Users from Dec. 2018 to Mar. 2020

Applications	Mar. 2020		Dec. 2018		Growth rate
	Number of Internet users (10,000)	The percentage of Internet users using the application	Number of Internet users (10,000)	The percentage of Internet users using the application	
Instant messaging	89613	99.2%	79172	95.6%	13.2%
Search engine	75015	83.0%	68132	82.2%	10.1%
Online news	73072	80.9%	67473	81.4%	8.3%
Online payment	76798	85.0%	60040	72.5%	27.9%
Online shopping	71027	78.6%	61011	73.6%	16.4%
Online meal ordering	39780	44.0%	40601	49.0%	-2.0%
Online travel	37296	41.3%	41001	49.5%	-9.0%

	Mar. 2020		Dec. 2018		
Applications	Number of Internet users (10,000)	The percentage of Internet users using the application	Number of Internet users (10,000)	The percentage of Internet users using the application	Growth rate
booking ²⁹					
Online car-hailing services	36230	40.1%	38947	47.0%	-7.0%
Online education	42296	46.8%	20123	24.3%	110.2%
Online music	63513	70.3%	57560	69.5%	10.3%
Online literature	45538	50.4%	43201	52.1%	5.4%
Online games	53182	58.9%	48384	58.4%	9.9%
Online video (including short video)	85044	94.1%	72486	87.5%	17.3%
Short video	77325	85.6%	64798	78.2%	19.3%
Live streaming ³⁰	55982	62.0%	39676	47.9%	41.1%
Internet wealth management	16356	18.1%	15138	18.3%	8.1%

Table 7 User Size and Utilization Rate of Mobile Internet Applications of Mobile Internet Users from Dec. 2018 to Mar. 2020

	Mar. 2020		Dec. 2018		
Applications	Number of Internet users (10,000)	Utilization ratio of mobile Internet users	Number of Internet users (10,000)	Utilization ratio of mobile Internet users	Growth rate
Mobile instant messaging	89012	99.2%	78029	95.5%	14.1%

²⁹ Travel booking covers the booking of air tickets, hotels, train tickets, and travel & vacation products via the Internet.

³⁰ Live streaming includes live e-commerce streaming, live sport broadcasting, host live show, live game streaming, and live concert streaming.

Applications	Mar. 2020		Dec. 2018		Growth rate
	Number of Internet users (10,000)	Utilization ratio of mobile Internet users	Number of Internet users (10,000)	Utilization ratio of mobile Internet users	
Mobile search	74535	83.1%	65396	80.0%	14.0%
Mobile news	72642	81.0%	65286	79.9%	11.3%
Mobile payment	76508	85.3%	58339	71.4%	31.1%
Mobile shopping	70749	78.9%	59191	72.5%	19.5%
Mobile meal ordering	39653	44.2%	39708	48.6%	-0.1%
Mobile learning courses	42023	46.9%	19416	23.8%	116.4%
Mobile music	63274	70.5%	55296	67.7%	14.4%
Cell phone literature	45255	50.5%	41017	50.2%	10.3%
Mobile game	52893	59.0%	45879	56.2%	15.3%

In December 2019, the per capita number of mobile phone Apps³¹ among mobile Internet users aged 15-19 was the largest, reaching 84. In the second place, mobile Internet users aged 20-29 had 65 mobile phone Apps on average. Mobile Internet users aged 60 years old or above installed 37 mobile phone Apps on average. Compared with December 2018, the per capita number of mobile phone Apps among mobile Internet users aged 10 or above increased.

³¹ Per capita number of mobile phone Apps refers to that of Apps installed on mobile phones of mobile Internet users on average.

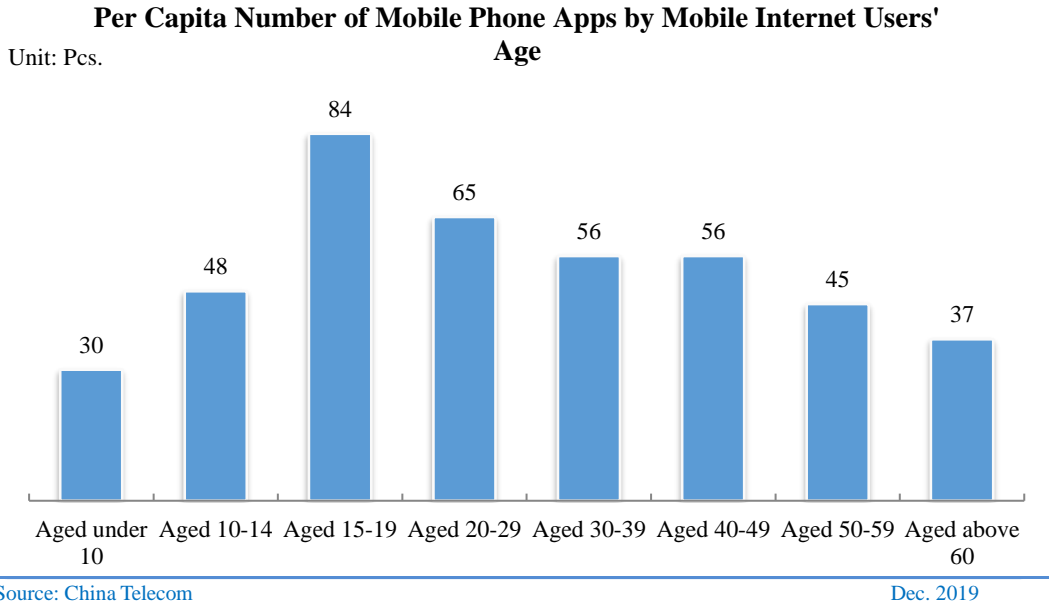


Figure 32 Per Capita Number of Mobile Phone Apps by Mobile Internet Users' Age

II. Basic Apps

(I) Instant Messaging

Up to March 2020, the user size of instant messaging was 896 million or 99.2% of China's total netizen population, up 104 million over the end of 2018; the number of mobile instant messaging users had reached 890 million, up 110 million from the end of 2018, accounting for 99.2% of mobile Internet users.

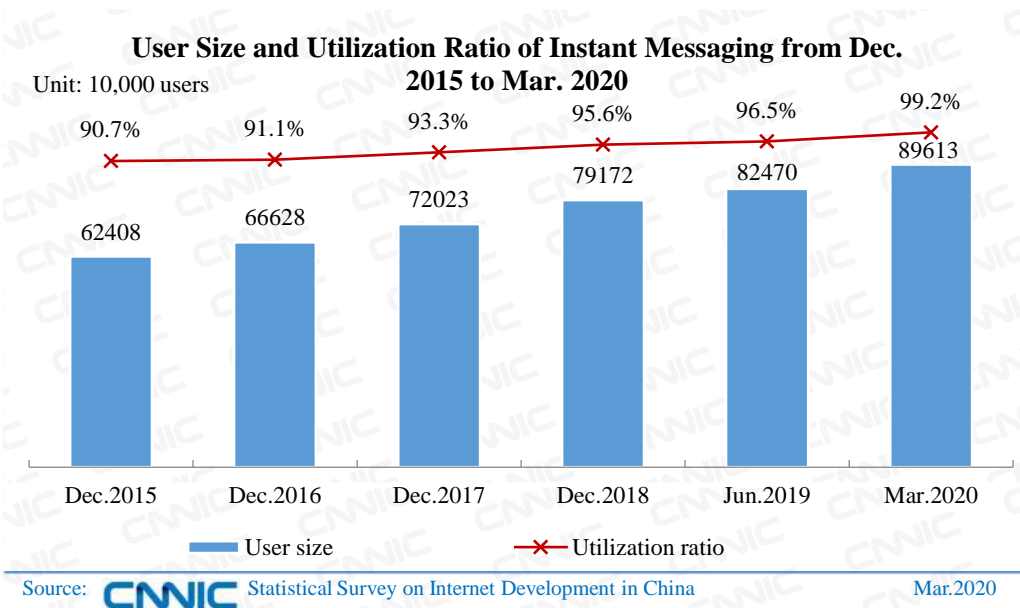


Figure 33 User Size and Utilization Ratio of Instant Messaging from Dec. 2015 to Mar. 2020

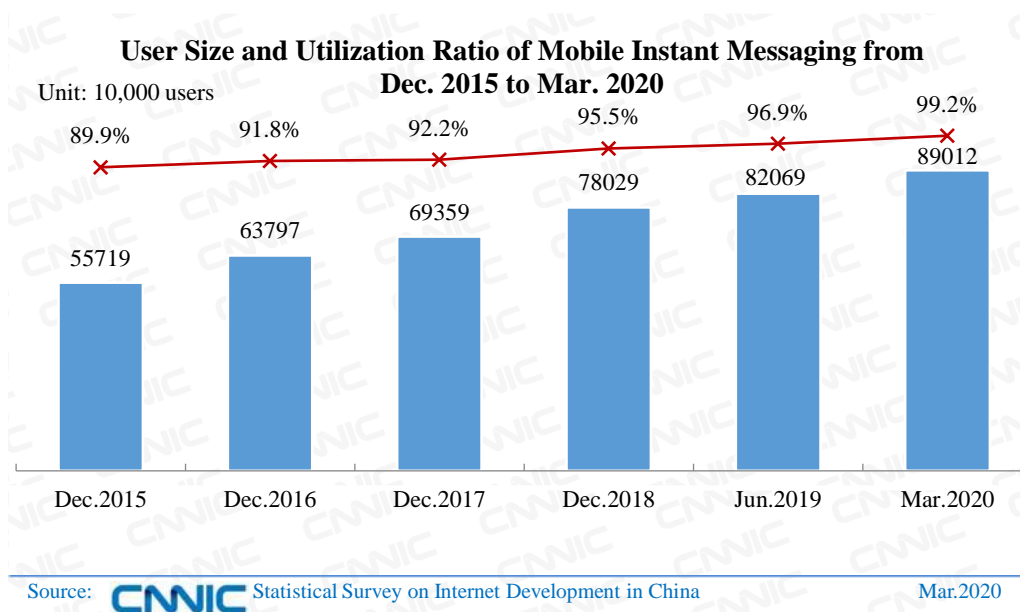


Figure 34 User Size and Utilization Ratio of Mobile Instant Messaging from Dec. 2015 to Mar. 2020

Since 2019, the instant messaging industry has developed well, with the user size and penetration further increasing. Instant messaging products have gradually expanded from communication platforms to service platforms, which are mainly reflected in the digitization of individual users and the informatization of enterprise users.

In terms of individual users, instant messaging has become the basic platform for users' digital lives. First, on the development side, an instant messaging platform provides rich and complete cloud development tools for small program developers. Developers may directly use application program interfaces (APIs) for core business development without building servers, databases, and storage space, so as to achieve the rapid launch and iteration of various services. Second, on the application side, more and more online and offline services are incorporated into the instant messaging ecosystem, promoting instant messaging to become the core link of personal digital life. According to the data, the two Internet Apps most commonly used by Internet users are instant messaging Apps³². Third, on the client, an instant messaging platform lowers the use and feedback threshold for users in the service ecosystem by launching functions such as small programs search and scoring, and promotes the further increase of the size and activity of small program users. According to the data³³, in 2019, the number of daily active users of small programs exceeded 300 million, and the per capita visit to and the per capita use of small programs increased by 45% and 98%, respectively.

In terms of enterprise users, instant messaging Apps have begun to become powerful assistants in the information technology-oriented transformation of enterprises. By relying on

³² Source: CNNIC's 45th Statistical Survey on Internet Development in China

³³ Source: 2020 WeChat Open Class of Tencent.

cloud computing, artificial intelligence and other technologies, the role of instant messaging in the daily operation and management of enterprises, data and information exchange and sharing, and remote collaborative team work has become increasingly prominent, thereby helping enterprises improve operational quality and efficiency, and empowering traditional industries to transform and upgrade. First, in terms of the daily operation and management of enterprises, instant messaging provides offline retail industry with functions such as store personnel deployment, customer and member management, and inventory information reminders, helping enterprises realize information technology-based and intelligent operation of offline retail outlets. Second, in terms of data and information exchange and sharing, enterprise instant messaging develops an information flow and communication platform for medical industry institutions to realize information exchange between departments and hospitals, and activates the connection among doctors, patients and equipment in the medical process, thereby promoting the full flow of medical information and data and improving the treatment efficiency and cure rate of patients. Third, in terms of remote collaborative team work, instant messaging provides enterprises with functions such as cloud-based multi-person audio and video conferences, shared document editing, and collaborative management of remote projects, helping enterprises achieve real-time collaboration and ensuring efficient and stable operation of the organizations. Especially during the COVID-19 outbreak in early 2020, the remote working function of enterprise instant messaging effectively reduced interpersonal contact in the office environment, providing strong support for preventing the spread of the epidemic and promoting the resumption of work and production.

(II) Search Engine

Up to March 2020, the user size of search engine was 750 million or 83.0% of China's total netizen population, up 68.83 million over the end of 2018; the number of mobile search engine users had reached 745 million, up 91.4 million from the end of 2018, accounting for 83.1% of mobile Internet users.

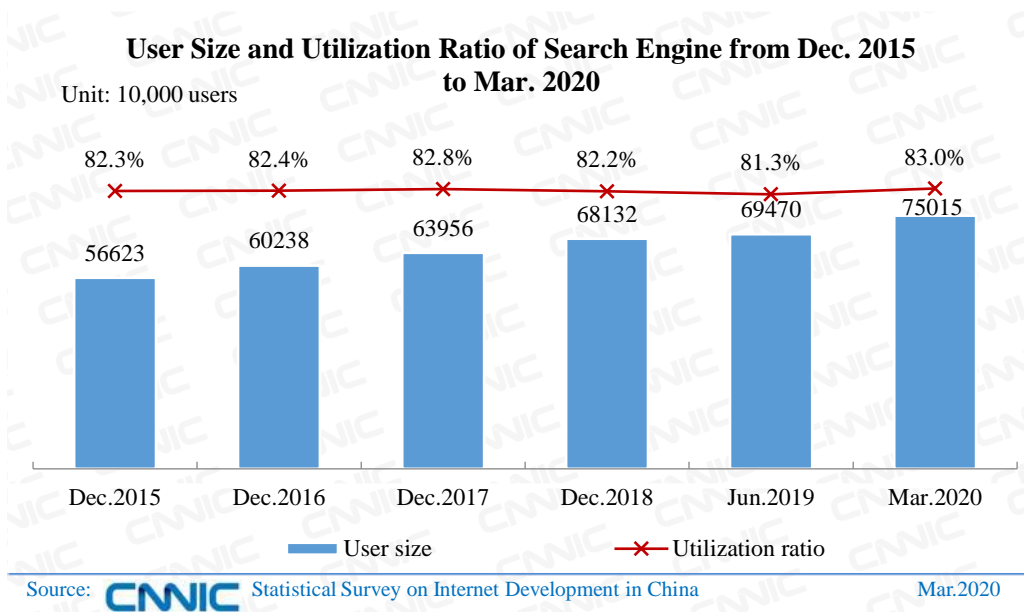


Figure 35 User Size and Utilization Ratio of Search Engine from Dec. 2015 to Mar. 2020

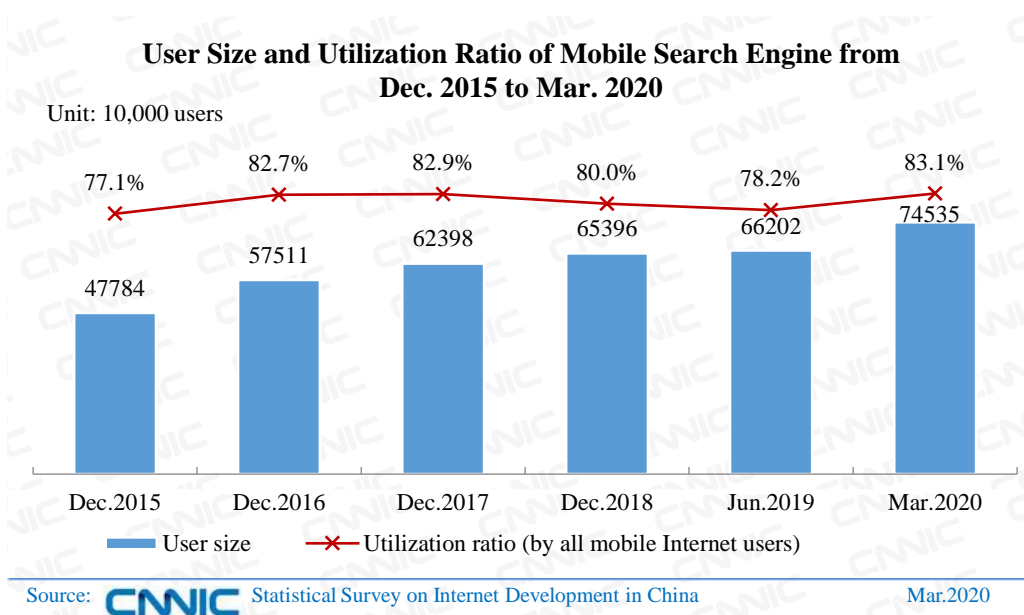


Figure 36 User Size and Utilization Ratio of Mobile Search Engine from Dec. 2015 to Mar. 2020

In 2019, competition in the search engine industry was fierce; products and services were constantly enriched; and the industrial development was more healthy and orderly.

The ecological content layout of search services has evolved rapidly. The information flow service is an interest-based active pushing service, which can effectively supplement the demand-based active search service, help search engines improve the ecological content layout, alleviate the traffic acquisition problem caused by data barriers between Apps, and obtain more users and benefits. By relying on search engine portals, Baidu continuously optimizes algorithms, provides rich media content such as text and short videos, and continuously improves information flow products. ByteDance released mobile search products, covering the content of products such as its

information flow³⁴, short videos, and Q&A, and at the same time grabbed resources throughout the network, to provide users with comprehensive search services.

Artificial intelligence technology promotes the innovation in search products and the improvement in their service quality. First, artificial intelligence technology promotes innovation in products, and new products that use knowledge systems as search results have emerged. Magi, an artificial intelligence knowledge search engine based on machine learning, was launched. By extracting structured data from natural language information through machine learning, it can provide users with search results of knowledge systems other than webpage links, and build and improve knowledge graphs for the industries. **Second, artificial intelligence technology has improved service quality.** Search engines open the artificial intelligence technology interface and integrate with the small search programs to promote developers to provide users with more intelligent services, covering many fields such as videos, life services, shopping, and tourism. The number of active users of Baidu smart small programs in November 2019 exceeded 300 million, accounting for more than 30% of search traffic³⁵, and the number of active users of the 360 search PC small programs in December exceeded 50 million³⁶.

The industrial development environment has continuously improved. First, regulatory authorities strengthen the supervision of commercial information. In view of the fact that search advertisements in the education field disrupt normal network order and harm the interests of users, the Ministry of Education, in concert with the Ministry of Public Security, requires search engines to make improvement, perfect recommendation rules, and highlight advertising tips, and regulates commercial recommendation behaviors to prevent security risks. **Second, enterprises attach importance to the construction and maintenance of the search environment for the youth.** China Search launched a search engine App “Huayang Search” tailored specifically for teenagers, using artificial intelligence technology to block bad information harmful to the physical and mental health of teenagers.

(III) Online News

As of March 2020, the user size of online news was 731 million or 80.9% of China’s total netizen population, up 55.98 million over the end of 2018; the number of mobile news users had reached 726 million, up 73.56 million from the end of 2018, making up 81.0% of mobile Internet users.

³⁴ Information stream products refer to products that are displayed in the form of user updates, images, news, videos and so on in a waterfall layout in social media, news, video/audio and other Internet applications.

³⁵ Source: <https://tech.qq.com/a/20200109/066359.htm>, January 9, 2020.

³⁶ Source: Qihoo 360's report on Commercialization *Analysis of Small Program Platforms*, December 2019.

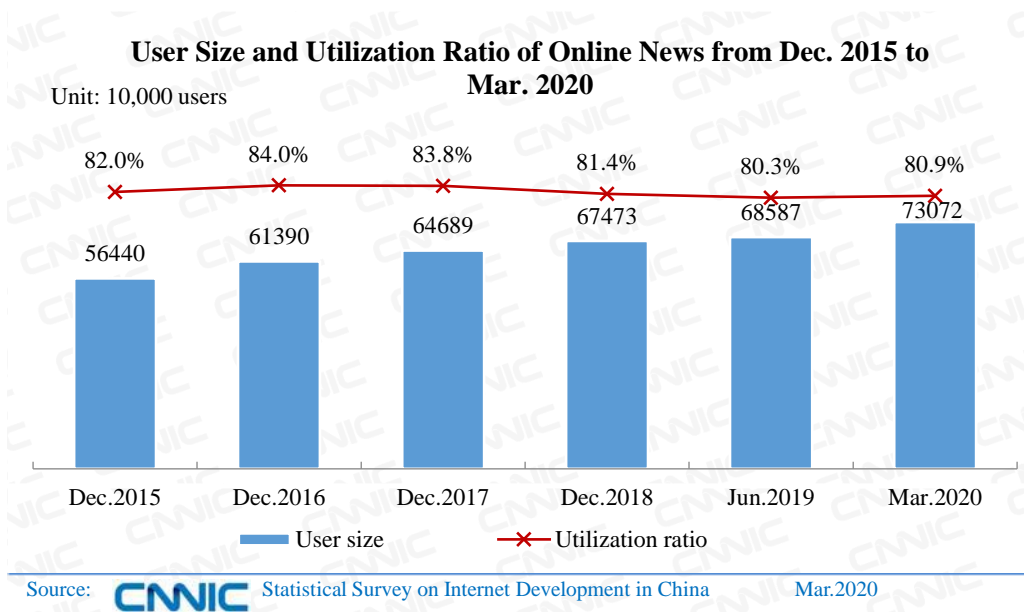


Figure 37 User Size and Utilization Ratio of Online News from Dec. 2015 to Mar. 2020

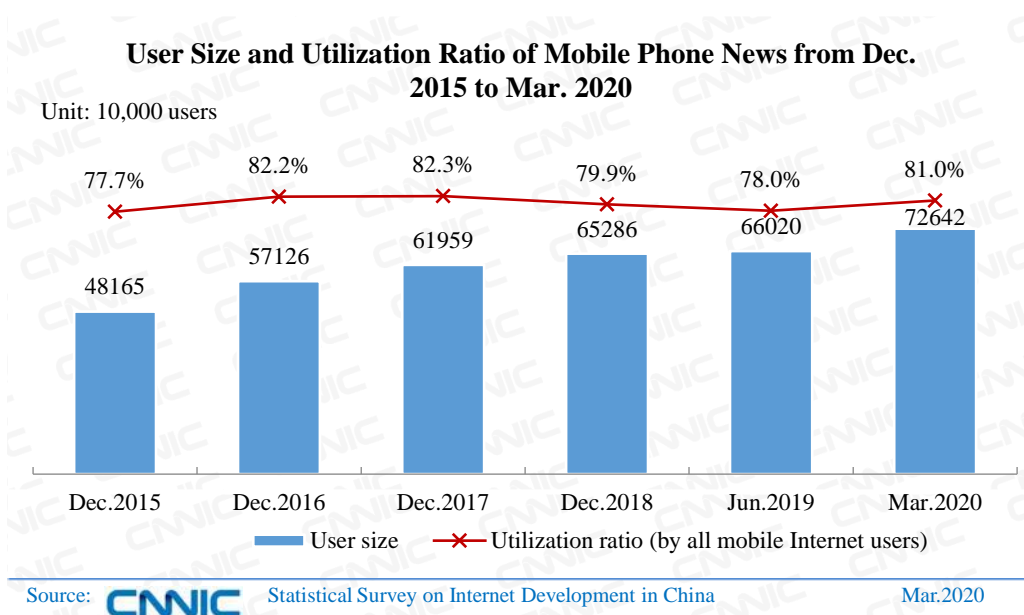


Figure 38 User Size and Utilization Ratio of Mobile Phone News from Dec. 2015 to Mar. 2020

In 2019, the online news industry kept up with current events, constantly created attractive content products, and worked together to build a high-quality content ecosystem.

The news media insist on "content is king", and information platforms explore integrated development. First, traditional media strengthen cooperation with enterprises on the platforms. In 2019, traditional media paid more attention to news dissemination channels, actively strengthened cooperation with information aggregation and entertainment content platforms, and accelerated their integration into the online content ecosystem. For example, in August 2019, Xinwen Lianbo officially opened accounts on short video platforms such as Douyin and Kuaishou, attracting tens of millions of followers on the day when such accounts were opened. **Second, news**

information aggregation platforms pay more attention to the integration of high-quality resources. In 2019, news information platforms constantly expanded the boundaries of cooperation with news content, so that the content could flow across platforms. For example, by relying on two social networking platforms, namely QQ and WeChat, and by taking its copyright advantages in video, variety shows, games, and sports fields, Tencent Kandan realize the combination of social networking and content; App Top News continues to expand content distribution channels through the layout of search business to better serve users.

The news media remain technologically sensitive and promote the continuous evolution of the media ecology. With the popularization of the mobile Internet and the continuous evolution of emerging information technologies such as 5G and AI (Artificial Intelligence), profound changes have taken place in the media landscape and the ecology of public opinions; traditional media and emerging media promote the continuous evolution of the media ecology by relying on the in-depth integration of new technologies. For example, China Media Group, by actively applying the new technologies of “5G+4K³⁷+AI”, cooperated with three telecommunication operators and Huawei to build China’s first national-level “5G new media platform”. The whole-process and all-element production and broadcasting based on “5G+4K” and “5G+VR (Virtual Reality)” were achieved for the reporting of the 2019 Spring Festival Gala, Two Sessions, the "Belt and Road" Summit Forum and the Beijing International Horticultural Expo. In the future, such technologies are expected to be widely applied in the media field. In the fight against the COVID-19 epidemic, Sina News integrated the content of authoritative media such as People’s Daily and Xinhua News Agency for content aggregation and distribution by using AI technology, helping users understand the real-time epidemic situation in a timely manner, and at the same time pre-judged users’ potential needs such as epidemic prevention knowledge popularization and rumors screening to show users knowledge popularization and rumor refuting information.

(IV) Social Networking APPs

As of March 2020, the utilization rates of WeChat Moments and microblogs were 85.1% and 42.5%, respectively, up 1.7 and 0.2 percentage points from the end of 2018; the utilization rate of Qzone was 47.6%.

³⁷ 4K refers to 4K ultra-high-definition resolution. At this resolution, viewers will be able to watch every detail and close-up in the picture.

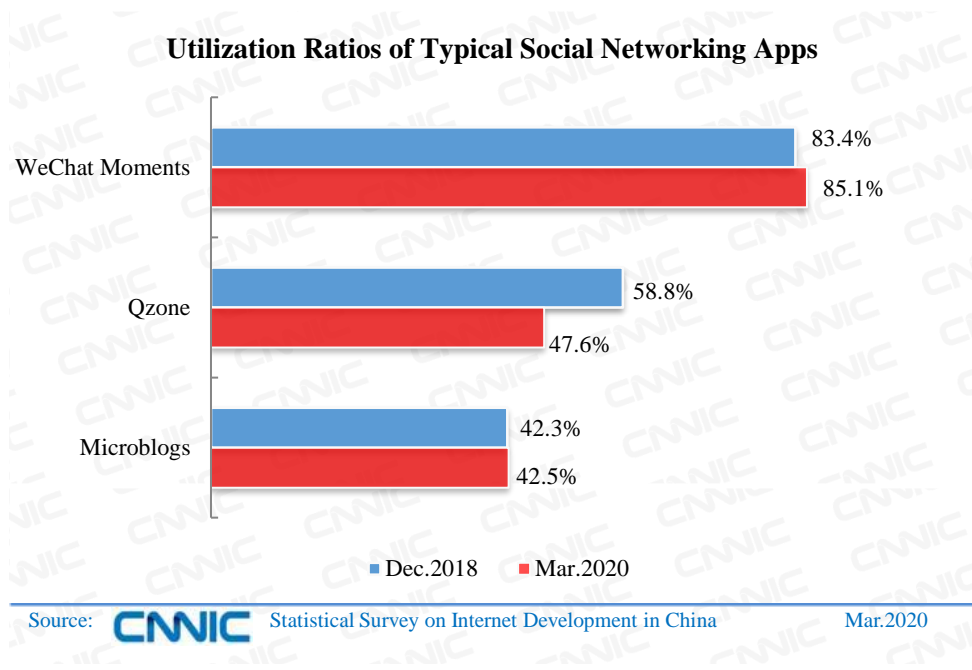


Figure 39 Utilization Ratios of Typical Social Networking Apps

In 2019, social networking products being constantly innovated, social networking elements promoting the realization of traffic³⁸, and social networking platforms assisting public welfare, made a better social networking ecology.

With rich innovations, social networking products meet the diverse needs of users. First, the integration of social networking and videos increases the usage duration and stickiness of users, and new forms of social networking products or functions such as audio, short video, and live streaming have emerged. For example, Duoshan based on short videos, Zhiya and Yinyu based on sound, and Zhihu have opened live streaming function. Second, enterprises are digging into the market segments of social relationships. According to the closeness of the relationship, products with different social networking degrees such as Moshengguanxi and Dianzanzhijiao have emerged. For example, Tencent and Momo have successively launched a number of anonymous social networking Apps; Sohu and Weibo have successively launched shallow interactive social networking products such as Huyou and Lvzhou.

Social networking elements help monetize traffic and broaden platforms' income channels. First, social networking elements promote the production of high-quality content, thereby increasing income. For example, App Top News provides social group services, and creators can establish paid social groups to obtain creative income. Second, social networking e-commerce continues to expand digital consumption channels. Social networking platforms have established rich connection channels for multiple types of users, such as brand accounts, we media accounts, celebrity and KOL³⁹ accounts, and individual accounts, to promote the maintenance of rapid

³⁸ Traffic monetization refers to the process of converting website traffic into cash income through commercial means.

³⁹ KOL stands for Key Opinion Leader.

growth of social networking e-commerce.

Social networking platforms have exerted more public welfare effects, and their social value has continued to expand. Social networking platforms have played a huge role in promoting the spread of charity activities and have become an important source of charity donations. In the first half of 2019, the donations obtained on the 20 Internet public fundraising information platforms designated by the Ministry of Civil Affairs totaled more than 1.8 billion yuan. Specifically, Tencent Charity and WeChat Charity used social networking platforms to assist charity donations. In the fight against the COVID-19 epidemic, hundreds of millions of users followed the latest information of the epidemic, obtained prevention and treatment services, and participated in public donations via Weibo. As of February 4, 2020, the epidemic-related topics on the Weibo hot search list accounted for more than 60%⁴⁰.

(V) Online Payment

As of March 2020, the user size of online payment was 768 million or 85.0% of China’s total netizen population, up 168 million over the end of 2018; the number of mobile payment users had reached 765 million, up 182 million from the end of 2018, accounting for 85.3% of mobile Internet users.

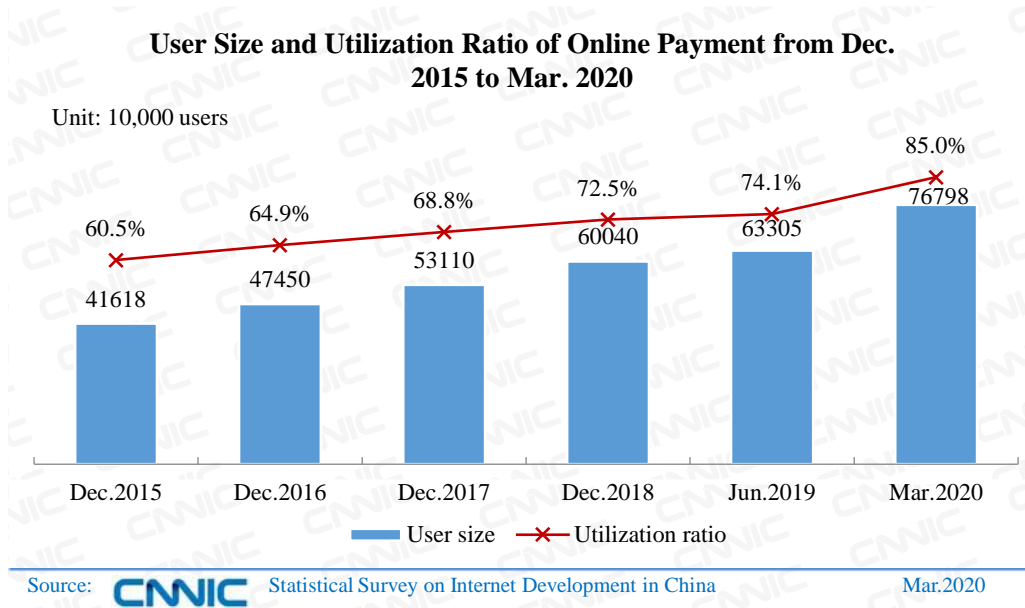


Figure 40 User Size and Utilization Ratio of Online Payment from Dec. 2015 to Mar. 2020

⁴⁰ Source: Weibo.

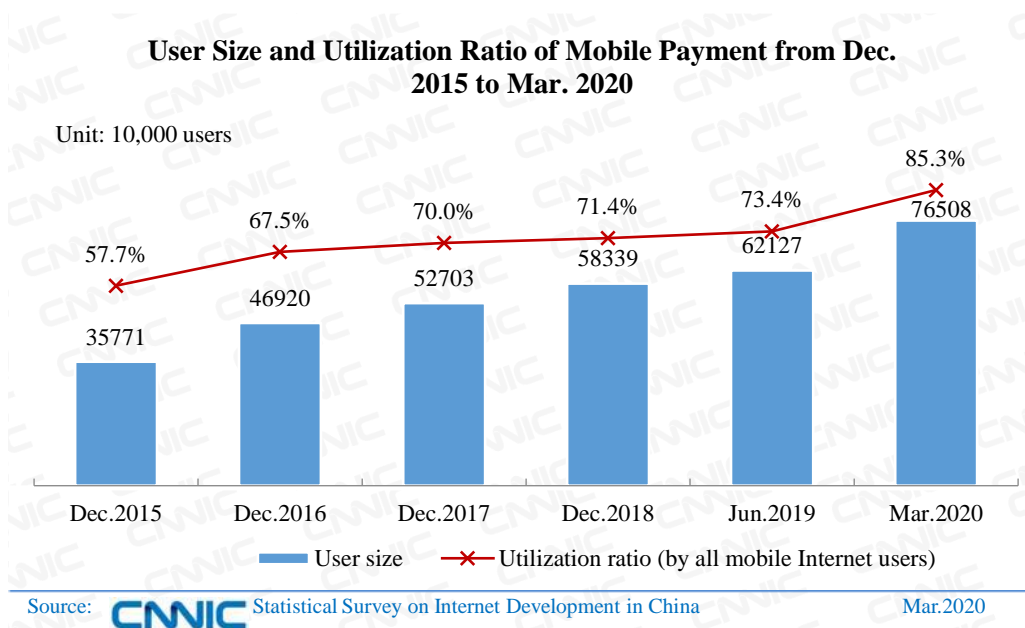


Figure 41 User Size and Utilization Ratio of Mobile Payment from Dec. 2015 to Mar. 2020

In 2019, more and more fields were covered by online payment, and penetration of online payment into vertical application scenarios was accelerated, as to promote the integrated development of the digital economy and the real economy.

The online payment business has grown steadily, which strongly promotes the upgrade of consumption. First, the online payment business continues to maintain a rapid growth rate. According to the data⁴¹, in 2019, non-banking payment institutions processed 719.998 billion online payment transactions, involving an amount of 249.88 trillion yuan, achieving a rapid growth of 35.7% and 20.1% respectively year-on-year. **Second, mobile payment strongly stimulates the growth of consumption.** The increasingly close connection between non-cash payment tools and the daily life of the general public has not only reshaped the individual consumption behaviors of residents and changed the business model of enterprises, but also promoted the consumption growth of residents in various regions to a large extent. **Third, mobile payment optimizes the consumption structure of households.** According to research⁴², mobile payment could promote a 16.0% increase in household consumption in China, reduce the Engel coefficient (the proportion of food consumption) by 1.7%, and at the same time drive substantial growth in developmental consumption such as education, culture, and entertainment, which was significantly higher than that in food, clothing, housing and other subsistence consumption needs.

Online payment is becoming an active area for domestic enterprises to go abroad and for foreign companies to enter the domestic market. First, online payment business promotes

⁴¹ Source: *Overall Operation of the Payment System in 2019* of the People's Bank of China.

⁴² Source: Open Research Initiative of Digital Finance jointly issued by Institute of Digital Finance, Peking University, China Academy of Financial Research, Shanghai Jiaotong University, Academy of Internet Finance, Zhejiang University, Chinese Academy of Financial Inclusion at Renmin University of China, and Ant Financial Group Research Institute.

domestic enterprises going abroad and overseas business developing rapidly. In recent years, with the increasing demand for national outbound tourism, countries along the “Belt and Road” have increasingly strong demand for digital development, and more and more online payment enterprises are vigorously expanding cross-border business. For example, in February 2019, after Alipay's wholly-owned acquisition of the British cross-border payment company WorldFirst, the number of financial institution partners around the world exceeded 250; in May, NetEase Pay was launched on the cross-border receipt platform for carrying out the foreign exchange receipt and settlement business, aiming to help domestic sellers realize the collection of cash payments and settlement of foreign exchange, and to support its own e-commerce business in going overseas.

Second, the payment industry has gradually become a pioneer in the further opening up of the financial market. After China liberalized the access restrictions for foreign-funded payment institutions, in September 2019, the People's Bank of China approved PayPal's acquisition of 70% of Guofubao's equity, marking the first foreign-funded third-party payment institution entering the domestic market. In November, under the guidance of the People's Bank of China, five major international card issuers such as Visa and MasterCard cooperated with Tencent to enable international credit cards opened overseas to be bound to WeChat Payment. Currently, payments can be made through such cards under domestic consumption scenarios such as e-commerce shopping and online travel booking.

The integration of online payment and technology has been continuously deepened, to promote the improvement in industrial efficiency. The penetration of new technologies such as the Internet of Things and near-field communication in vertical fields has been accelerated, constantly catalyzing and transforming related payment methods and forms. For example, in the field of transportation, ETC (Electronic Toll Collection) based on induction recognition, data networking and exchange and other technologies have developed rapidly. As of December 10, 2019, the total number of ETC customers nationwide reached 185 million, up 105 million during the whole year of 2019. The average utilization rate of ETC for passenger cars at the entrance and exit of expressways nationwide reached 70.0%⁴³. In addition, as the integration of technology and payment deepens, the focus of competition among payment enterprises is gradually shifting to technology. Human-computer interaction technologies represented by face recognition and fingerprint recognition and risk control technologies represented by anti-attack and anti-fraud technologies have been increasingly used in the field of online payment.

III. Business Transaction Applications

(I) Online Shopping

Up to March 2020, the user size of online shopping was 710 million or 78.6% of China's total

⁴³ Source: Press Conference of the Ministry of Transport on Cancelling Expressway Toll Stations at Provincial Boundaries, http://www.gov.cn/xinwen/2019-12/12/content_5460622.htm, December 12, 2019.

netizen population, up 100 million over the end of 2018; the number of mobile shopping users had reached 707 million, up 116 million from the end of 2018, taking up 78.9% of mobile Internet users.

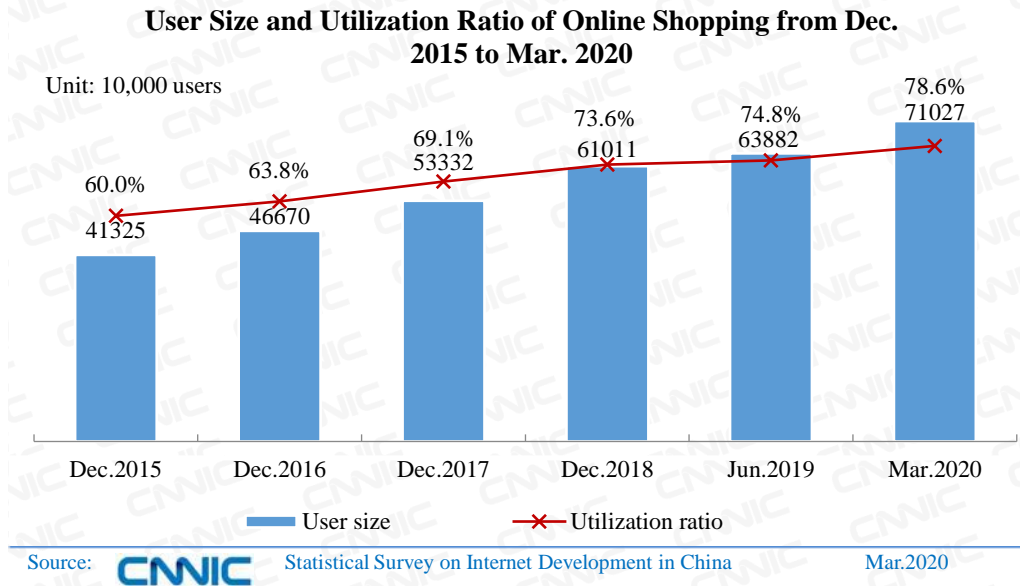


Figure 42 User Size and Utilization Ratio of Online Shopping from Dec. 2015 to Mar. 2020

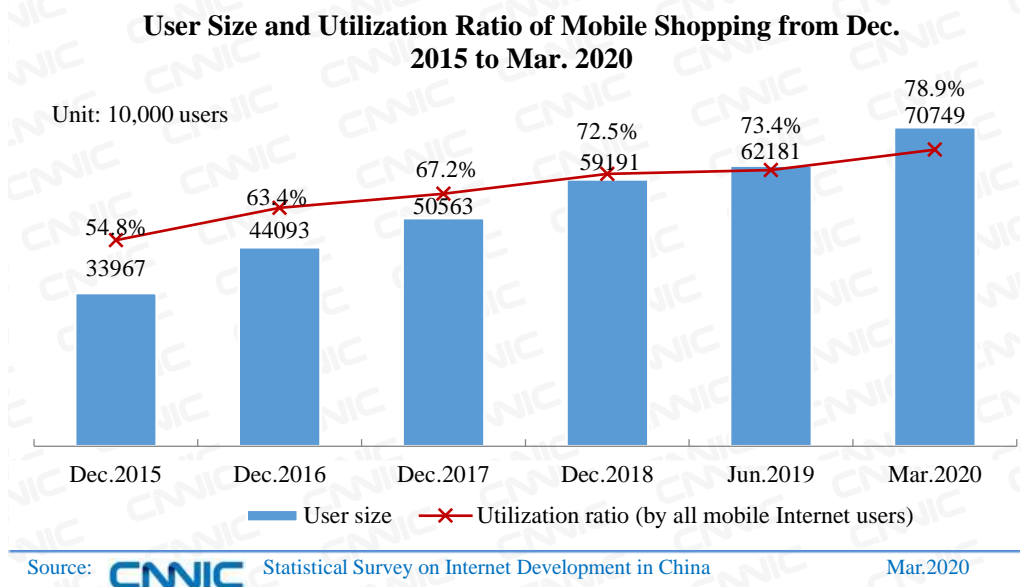


Figure 43 User Size and Utilization Ratio of Mobile Shopping from Dec. 2015 to Mar. 2020

In 2019, online retailing continued to develop steadily, becoming an important driving force for China's consumption growth. According to the data⁴⁴, in 2019, the national online retail sales reached 10.63 trillion yuan, of which the online retail sales of physical goods reached 8.52 trillion yuan, accounting for 20.7% of the total retail sales of consumer goods. Online consumption has continuously released momentum through model innovation, channel sinking, and cross-border e-commerce, forming a number of bright spots in consumption growth.

⁴⁴ Source: National Bureau of Statistics.

Social networking e-commerce and live e-commerce streaming have become new drivers of online consumption growth. As an innovation in online consumption models, social networking e-commerce and live e-commerce streaming have effectively met the diverse needs of consumers and become an important support for online consumption. **First, social networking e-commerce has grown rapidly and become a new force in online consumption.** According to data estimates⁴⁵, the amounts of social networking e-commerce transactions in 2019 increased by more than 60% year-on-year, which was much higher than the overall growth rate of national online retail sales. Social networking e-commerce has realized iterative innovation in traditional e-commerce models through sharing, content production, and distribution via social media or interactive network media. **Second, live e-commerce streaming constantly expands the space of online consumption.** As of March 2020, the user size of live e-commerce streaming reached 265 million, accounting for 37.2% of online shopping users and 47.3% of live streaming users. Live e-commerce streaming activates users' perceptual consumption through "product seeding"⁴⁶ and real-time interaction to improve purchase conversion rate and user experience.

A sinking market⁴⁷ has become an important incremental market for online consumption. **First, the number of online shopping users on the sinking market has maintained a rapid growth, providing a user base for online consumption.** As of March 2020, the proportion of online shopping users on the third-tier or below markets to the number of Internet users in the region increased by 3.9 percentage points from the end of 2018; the number of rural online shopping users reached 171 million, accounting for 24.1% of online shopping users. **Second, the online shopping environment on the sinking market has becoming more and more perfect, providing an important guarantee for the release of consumption potential.** With the accelerated sinking of e-commerce platform channels and logistics services, the online shopping infrastructure and commodity supply in third-tier and below cities and rural areas have been continuously improved, and the sinking market has become the core driving force for the growth of online shopping consumption. According to data⁴⁸, during the 2019 Tmall "618" event, the growth rate of online consumption in third-tier and below cities was 1.14 times that of first- and second-tier cities, contributing 62% to the year-on-year growth of online consumption.

Cross-border e-commerce has become an important force to promote consumption and stabilize foreign trade. **First, the role of cross-border e-commerce in promoting consumption continues to be prominent.** In 2019, under the promotion of a number of favorable policies such as clarifying the nature of cross-border e-commerce, that is, "products are supervised as per entry

⁴⁵ Source: *2019 China Social E-Commerce Industry Development Report* of the Internet Society of China.

⁴⁶ Product seeding refers to sharing and recommending a certain product through content introduction, display, etc., to stimulate others' desire to buy the product.

⁴⁷ A sinking market refers to small and medium-sized third-tier cities or below as well as townships, towns and rural areas in China.

⁴⁸ Source: gmw.cn, http://economy.gmw.cn/xinxi/2019-06/28/content_32957924.htm, June 28, 2019.

and exit items for personal use⁴⁹”, reducing the rate of tax on luggage and postal items⁵⁰, and expanding comprehensive pilot areas for cross-border e-commerce, cross-border e-commerce maintained a rapid growth. The total amount of retail imports and exports through the customs cross-border e-commerce management platform through 2019 reached 186.21 billion yuan, up 38.3%⁵¹. **Second, cross-border e-commerce helps brands go overseas and promotes foreign trade to “improve its quality while growing stably”.** In 2019, the State Council issued the “No Invoice and Tax Exemption” Policy⁵² and income tax assessment and collection methods that were more convenient for enterprises, further assisting exports through cross-border e-commerce. The increasingly mature cross-border e-commerce industry and the domestic manufacturing system provide a powerful boost for brands going overseas. Many traditional manufacturers and e-commerce brands have entered the global market, further enhancing the international image of Chinese brands while promoting the transformation and upgrading of foreign trade. According to the data⁵³, among the 2019 BrandZ Top 50 Chinese Global Brand Builders, 9 were cross-border e-commerce brands, and some brands’ influence even exceeded that of traditional well-known brands, reflecting the positive effect of e-commerce on the transformation and upgrading of manufacturing and brand building.

(II) Online Meal Ordering

Up to March 2020, the user size of online meal ordering was 398 million or 44.0% of China’s total netizen population; the user size of mobile meal ordering was 397 million or 44.2% of mobile Internet users.

⁴⁹ Products being supervised as per entry and exit items for personal use means the luggage that individuals carry to and out of China, and the items that are mailed to and out of China, are for personal use and in reasonable quantities.

⁵⁰ Tax on luggage and postal items refers to the import tax including the tariff, import value-added tax, and consumption tax on items personally carried and postal items collected by the customs.

⁵¹ Source: General Administration of Customs, <http://www.scio.gov.cn/xwfbh/xwfbh/wqfbh/42311/42414/index.htm>, January 14, 2020.

⁵² “No Invoice and Tax Exemption” Policy means the trial implementation of exemption policies for value-added tax and consumption tax for goods exported by export enterprises that have not obtained valid purchase certificates but met certain conditions in cross-border e-commerce comprehensive pilot zones.

⁵³ Source: The report *2019 BrandZ Top 50 Chinese Global Brand Builders* jointly released by Google and the world’s largest communications group WPP.

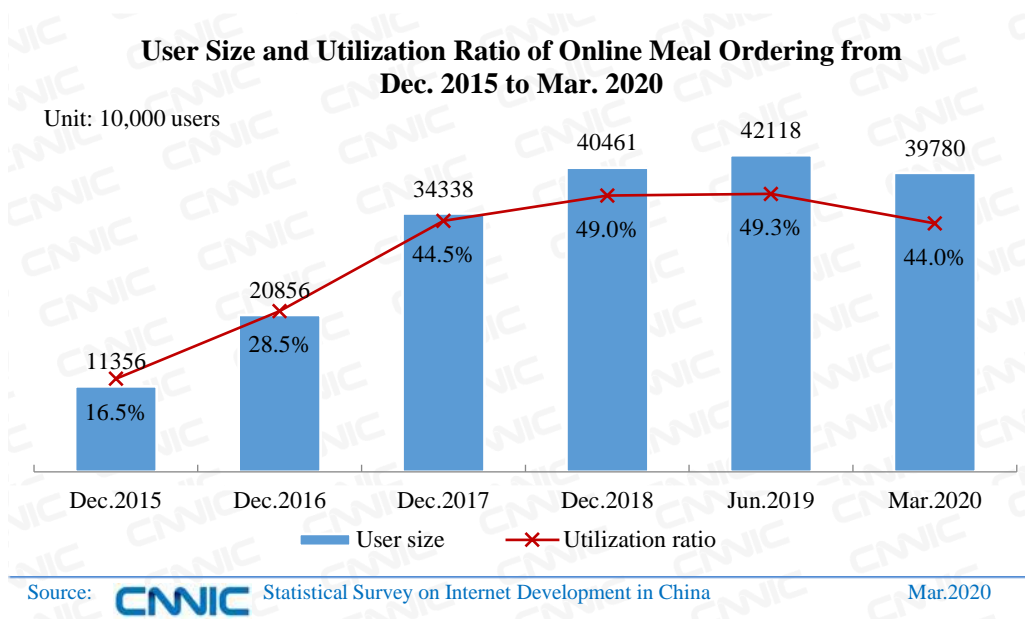


Figure 44 User Size and Utilization Ratio of Online Meal Ordering from Dec. 2015 to Mar. 2020

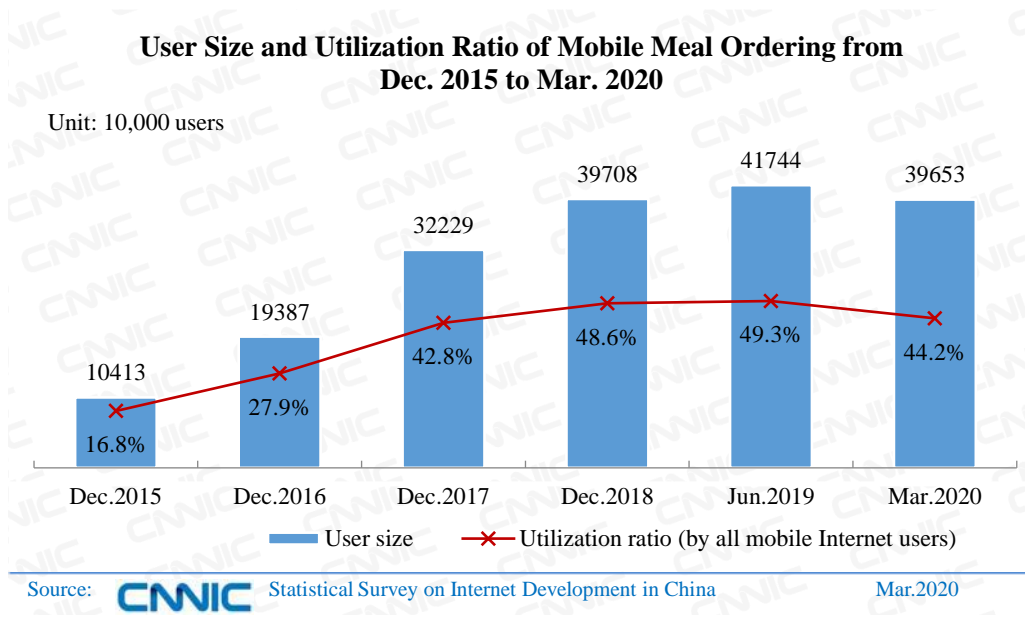


Figure 45 User Size and Utilization Ratio of Mobile Meal Ordering from Dec. 2015 to Mar. 2020

In 2019, the online meal ordering industry developed profoundly from both ends of supply and demand, and had entered a stage of quality improvement.

From the perspective of the supply side, the online meal ordering platforms' support for upstream services constantly increases and gradually spreads to the supply in the traditional catering industry. First, the digital upgrade of the supply side of the online meal ordering industry has been accelerated. In 2019, the online meal ordering platforms increased their service support for merchants and improved the operational efficiency of merchants by providing smart terminals, smart ordering systems, and cashier systems. Meanwhile, such platforms strengthened the merchants' supply chain level through digital support such as order management, centralized procurement, and peak forecasting. While the efficiency of the supply side was improved, the digital upgrade of the catering industry was further promoted. **Second, continuous improvement**

in the quality of takeaway products and services is promoted. The online meal ordering platforms continue to optimize the service process, and promote unmanned delivery and other technologies to continuously strengthen the fulfillment and delivery capabilities, so that the safety and delivery efficiency of takeaway food are constantly improved. Meanwhile, the trend of brand building and chain operation of online meal providers has been further highlighted, and the quality has been further upgraded.

From the demand side, online meal ordering platforms constantly expand their service boundaries, and gradually form new growth drivers on sinking markets and segment scenarios. Although the COVID-19 outbreak has caused a great impact on the demand of online meal ordering users, as user habits have formed, with the ease of the epidemic and the gradual resumption of production and production in the catering industry, the demand for online meal ordering will further recover. **First, the downward market sinking has been accelerated.** In 2019, online meal ordering platforms accelerated their penetration into third-tier and below markets. As of March 2020, online meal ordering users on third-tier and below markets accounted for 39.8% of Internet users in the region. The sinking market is becoming an incremental market for the demand side of online meals. **Second, the demand for online meals is showing a diversified development trend, and the segment scenarios have spawned new consumption growth points.** Driven by online meal ordering services, dining demand extends vertically from dinner to desserts, drinks, afternoon tea, night-time snack and other segment scenarios, and a "night economy"⁵⁴ consumption represented by online night-time snack ordering has been formed gradually. Meanwhile, online meal ordering services have accelerated horizontal expansion to meet the demand for instant delivery services for fresh vegetables and medicine, accelerated the development of new retail models represented by fresh food in communities and group purchase of food, and further enriched online and offline retail formats. For example, during the COVID-19 outbreak, online meal ordering platforms launched delivery services for food and drug purchases and quick purchases. While more online consumption habits were cultivated, and traditional retail business such as supermarkets was supplemented, the further construction of platform ecology was also accelerated.

(III) Online Travel Booking

As of March 2020, the number of online travel booking users in China had reached 373 million, down 37.05 million from the end of 2018, accounting for 41.3% of all Internet users. Affected by the COVID-19 outbreak, in the short term, the online travel booking industry has been greatly impacted, with the number of users falling sharply; in the medium and long term, with the gradually improvement in the epidemic till the end, the online travel booking industry is expected to enter a rebound period.

⁵⁴ Night economy refers to the business activities in the service industries from 6 PM to 6 AM the next day, including evening shopping, catering, tourism, entertainment, learning, film and television watching, and leisure.

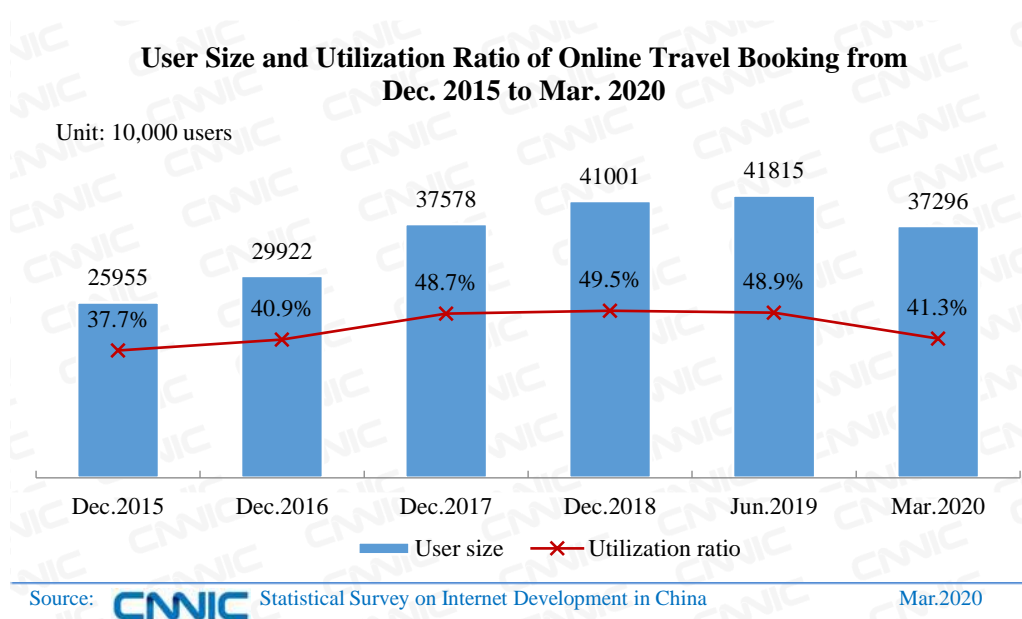


Figure 46 User Size and Utilization Ratio of Online Travel Booking from Dec. 2015 to Mar. 2020

In 2019, China's online travel booking industry developed steadily. By expanding the market space, new growth points for business were boosted. Emerging technologies were used to empower new digital momentum. Economic growth in poverty-stricken areas was stimulated via rural tourism.

In terms of market operations, overseas business and sinking markets have become new business growth points for online travel agencies. First, the overseas market expansion of online travel booking platforms has achieved remarkable results. Take Ctrip Group as an example. In 2019, it reached a strategic cooperation with TripAdvisor to share inventory of travel categories. At present, Ctrip Group has more than 100 million overseas users, and its product presence covers more than 200 countries and regions around the world. Income from international business accounts for more than 35.0% of the group's total income⁵⁵. **Second, online travel booking platforms digging the potential of users in third-tier and below cities accelerates the rise of consumption on sinking markets.** Taking Tongcheng-Elong as an example, it has achieved business growth by sharing the sinking market traffic on WeChat platform. In the third quarter of 2019, registered users from non-first-tier cities accounted for approximately 85.5%, and 63.3% of new paid WeChat users came from third-tier and below cities, increasing from 58.8% in the same period of 2018⁵⁶. The compound annual growth rate of outbound tourists in third-tier and below cities was the highest, reaching 160%⁵⁷. The rapid growth of outbound tourists continued to promote market development.

In terms of technology empowerment, digital Apps have become a new driving force for the development of the online travel booking industry. First, the online trend of travel

⁵⁵ Source: Ctrip quarterly financial reports 2019.

⁵⁶ Source: Tongcheng-Elong Q3 Financial Report 2019.

⁵⁷ Source: Ctrip and MasterCard's 2019 China Cross-Border Travel Consumption Report.

behaviors reshapes users' travel booking decision-making habits. 60.8% of users had travel experience sharing behaviors in the past year⁵⁸. By sharing photos and short videos taken at scenic spots, more user traffic could be imported to the online travel booking platforms. **Second, “cloud tourism” is driven by digital virtual scenic areas.** Digital technologies such as VR (Virtual Reality)/AR (Augmented Reality), AI, and 5G penetrate into scenarios of online travel booking Apps to realize virtual scenic tours and to enhance consumer experience. Taking the Baidu Baike Digital Museum as an example, a total of 300 museums have been launched, having attracted a total of 117 million visitors⁵⁹. The vigorous development of digital Apps stimulates the growth potential of the travel industry and constantly shapes the future travel booking models.

In terms of tourism-based poverty alleviation, rural tourism has become one of the important ways for the poor in China to get rid of poverty. According to data from the National Rural Tourism Monitoring Center, 101 poverty alleviation monitoring points (documented poverty villages) were established in 25 provinces (autonomous regions and municipalities directly under the central government) nationwide. 4,796 people were alleviated from poverty through the rural tourism economy, accounting for 30.4% of all people alleviated from poverty. Through rural tourism, the per capita income of the poor at the monitoring points increased by 1,123 yuan. In this process, tourism-based poverty alleviation was promoted through short videos, which further stimulated the potential of rural tourism consumption and enabled more people to participate in poverty alleviation activities. Videos related to tourism scenery in poverty-stricken counties on the Douyin platform have been shared 36.63 million times⁶⁰.

(IV) Online Car-hailing Services

As of March 2020, the user size of online car-hailing services was 362 million or 40.1% of China's total netizen population. Affected by the COVID-19 outbreak, some cities suspended online car-hailing services. In the affected cities, public transportation was suspended, and many online car-hailing service platforms organized drivers to provide transportation support for doctors and patients and special service guarantees. In the medium and long term, the user size of online car-hailing services will resume growth.

⁵⁸ Source: Tongcheng-Elong and Mafengwo's *New Tourism Consumption Trend Report 2019*.

⁵⁹ Source: Baidu Baike--Museum Program.

⁶⁰ Source: Douyin's *2019 Douyin Data Report*.

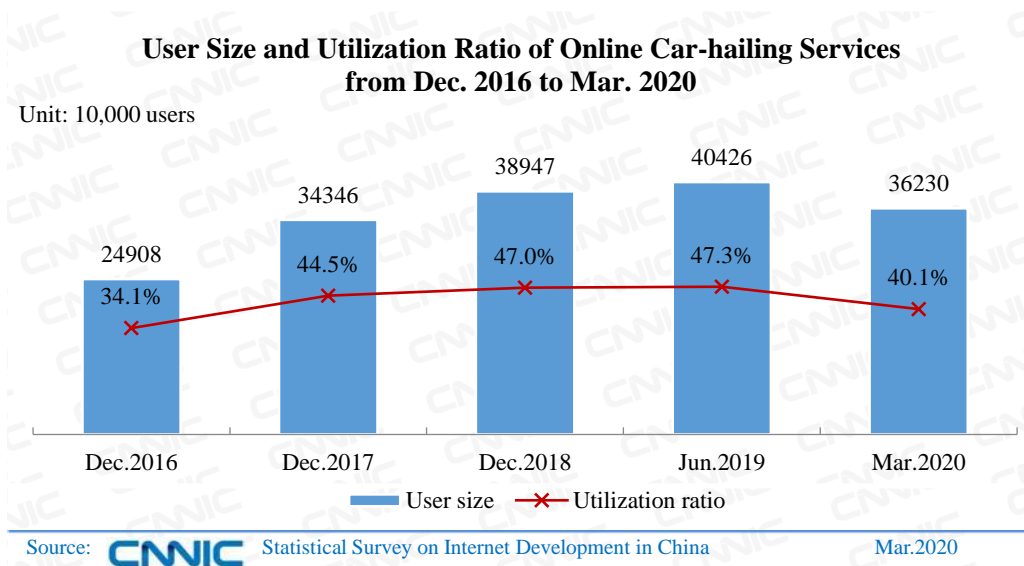


Figure 47 User Size and Utilization Ratio of Online Car-hailing Services from Dec. 2016 to Mar. 2020

In 2019, the compliance process of the online car-hailing industry was accelerated, and the intensified competition gave birth to new cooperation models.

In terms of industry standards, the speed-up of compliance of online car-hailing services has contributed to the safe development of the industry. Government departments adopt an inclusive and prudent supervision attitude towards online car-hailing services: adhering to the bottom line of safety, reasonably relaxing restrictions, and clearly proposing in the regulatory opinions to optimize and improve access conditions, approval procedures and services, establishing and improving identity authentication, and accelerating the compliance process of platform economy participants⁶¹. Local governments and enterprises actively implement compliance requirements. **First, the access conditions for online car-hailing services are continuously optimized.** For example, Ningbo and Guiyang consolidate licenses for online car-hailing services and taxis; Shenzhen and Kunming promote the use of new-energy online car-hailing services. **Second, a “blacklist” early warning mechanism is established.** For example, the Shanghai online car-hailing supervision platform built a “dual certificate” query and comparison system, and completed the connection construction with four online car-hailing enterprises⁶² and the setup of the first phase of the “blacklist” early warning function. **Third, law enforcement is accurately carried out by relying on a new generation of information technology.** For example, the Nanjing transportation administrative department tried to conduct law enforcement inspections via 5G equipment⁶³, and instantly verified the illegally operated cars for online car-hailing services. At

⁶¹ Source: *Guiding Opinions of the General Office of the State Council on Promoting the Regulated and Healthy Development of the Platform Economy*, Guo Ban Fa [2019] No.38.

⁶² Four online car-hailing enterprises refer to Meituan Taxi, Shouqi Taxi, Sunshine Travel and Didi Travel.

⁶³ Law enforcement inspections via 5G equipment refer to installing 5G equipment terminals in the trunks of law enforcement vehicles, connecting high-definition cameras and drones to the 5G network, returning the license plate information of operating vehicles captured on the road at any time, and comparing it with the database to screen problematic vehicles.

present, more than 140 online car-hailing platforms in China have obtained an operating permit⁶⁴; there are more than 1.5 million lawful online car-hailing drivers nationwide; more than 20 million online car-hailing orders are completed on average per day⁶⁵.

In terms of market competition, auto enterprises reconstruct the competitive landscape of the car-hailing industry, and the aggregation model⁶⁶ helps platforms expand the market. First, automakers operate online car-hailing business. Digital transformation is reshaping the value chain of the automotive industry. Automakers are racing to lay out the field of travel services, segment the market with a “manufacturing + travel” model, grab user traffic and data resources, and consolidate the foundation for future smart travel services. In 2019, nearly ten auto enterprises including GAC Group and FAW Group launched online car-hailing services, and most large state-owned auto enterprises entered the online car-hailing market. **Second, online car-hailing platforms aggregate resources to expand development space.** Car-hailing platforms expand their business nationwide in the "aggregation model", and local car-hailing enterprises, as the underlying force in the market, provide basic supply resources for the "aggregation model". For example, Meituan Dianping has many online car-hailing service providers connected to the platform, aggregates traffic entrances to improve car-hailing efficiency, and expands travel services to 42 cities across the country⁶⁷.

(V) Online Education

As of March 2020, the user size of online education was 423 million or 46.8% of China’s total netizen population, up 222 million over the end of 2018; the number of mobile learning users had reached 420 million, up 226 million from the end of 2018, accounting for 46.9% of mobile Internet users. Affected by the COVID-19 epidemic, the opening of all schools nationwide was postponed, and teaching activities were carried out online, promoting the rapid growth of the size of online education users.

⁶⁴ Source: Ministry of Transport.

⁶⁵ Source: Information Interactive Platform for the Supervision of Car-hailing Service.

⁶⁶ Aggregation model refers to the model in which a platform expands supply-side resources, has multiple online car-hailing service providers accessed, and aggregates traffic entrances to improve car-hailing efficiency. For example, users can call cars on Shouqi Taxi, Caocao Travel, Shenzhou Special Car and other different platforms by one click on the App Meituan.

⁶⁷ Source: Meituan Dianping Q2 Financial Report 2019.

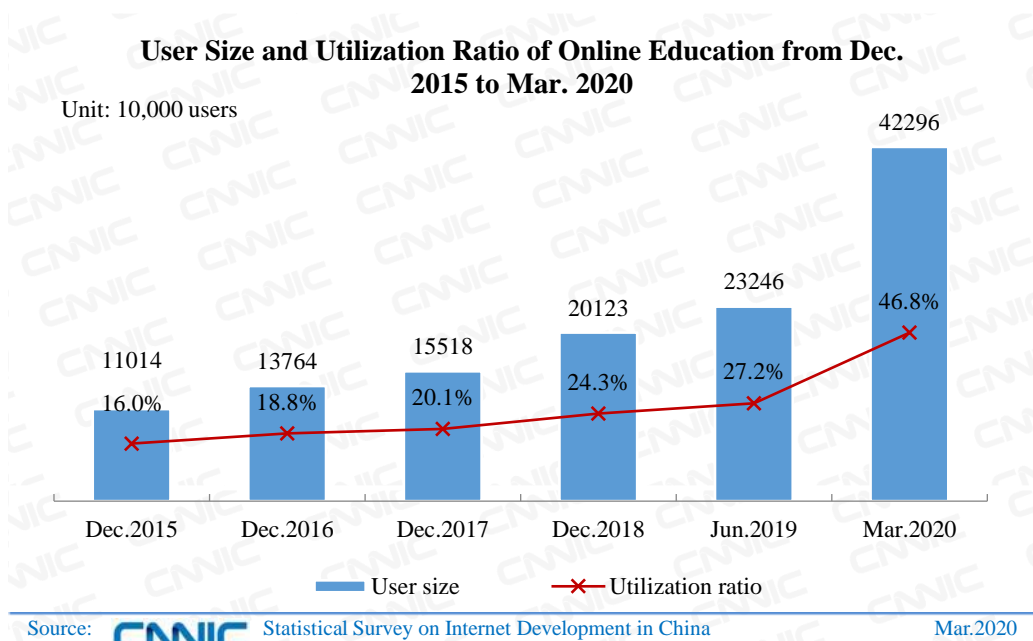


Figure 48 User Size and Utilization Ratio of Online Education from Dec. 2015 to Mar. 2020

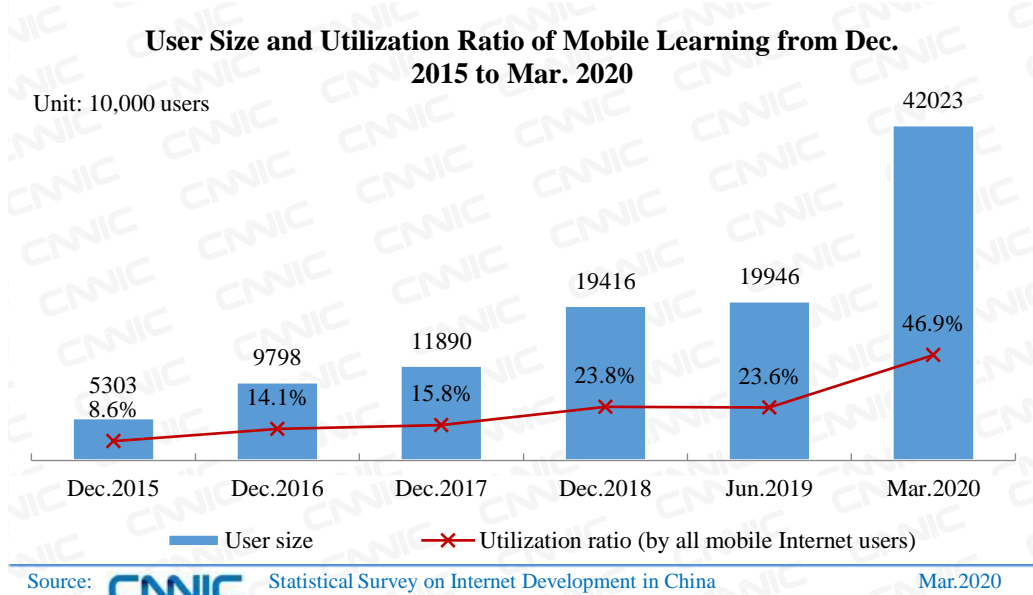


Figure 49 User Size and Utilization Ratio of Mobile Learning from Dec. 2015 to Mar. 2020

The Fourth Plenary Session of the 19th Central Committee of the Communist Party of China proposed to “take the advantages of online education and artificial intelligence to innovate education and learning methods”, which injected new vitality into the development of online education and pointed out a new direction. In 2019, education departments issued a number of policies to regulate the online education market; online education companies promoted customer acquisition and revenue growth in a variety of ways.

Education departments have intensively introduced a number of policies to promote the further standardization of the online education industry. Education departments have strengthened cooperation with cybersecurity and informatization, public security and other departments, and strengthened the supervision of the online education industry and online education

Apps. The Opinions on Guiding and Regulating the Orderly and Healthy Development of Education Mobile Internet Applications, the Implementing Opinions on Regulating After-school Online Training and other guiding opinions jointly issued by the Ministry of Education, the Office of the Central Cyberspace Affairs Commission, the Ministry of Public Security and other departments as well as the policy documents including the Administrative Measures for the Record-filing of Mobile Internet Education Applications and the Special Governance Action Plan for Mobile Internet Education Applications on Higher Educational Management Services, set forth clear requirements for the orderly and healthy development of mobile education Apps and off-campus online training, and promote the online education industry to become more standardized and systematic.

Online education companies promote customer acquisition and revenue growth via a variety of methods. In 2019, the online education market entered a more stable period of development. According to the data⁶⁸, in 2019, a total of 148 financings were initiated for online education in China, a year-on-year increase of 38.3%, and the total amount financed reached 11.56 billion yuan. **First, the in-depth application of new technologies in online classrooms is promoted.** Currently, emerging technologies such as artificial intelligence and big data have been widely used in the field of online education. Through big data, teachers are screened, and curriculum standardization and customer satisfaction are improved. Through artificial intelligence, academic classroom performance is identified, collected, and sorted out, striving to teach students according to students' different conditions, achieve personalized classrooms, and enhance user stickiness. With the commercialization of 5G in China, the interactive live teaching method will be used more and more in online education. The current pain points such as unsmooth images and delayed content will also be further improved. **Second, cross-border cooperation with short videos is strengthened.** Through this method that is more in line with the information acquisition habits of young users, online education companies achieve the goal of attracting more customers and reducing customer acquisition costs. In 2019, the cumulative production volume of educational short videos on the Kuaishou platform alone reached 200 million⁶⁹.

At the beginning of 2020, the opening of all schools in China was postponed, and 265 million students generally turned to take online courses, fully release the user demand. Facing the huge demand for online learning, various enterprises actively responded, and the industry showed an explosive growth trend. According to the data, during the epidemic, the number of daily active users of multiple online education Apps reached more than 10 million. **First, various schools are actively exploring online education.** The Ministry of Education organized the launch of 22 online course platforms which offered 24,000 online courses, providing a strong guarantee for the continued teaching and learning of ordinary colleges and universities during the epidemic period⁷⁰.

⁶⁸ Source: *2019 Online Education Financing Data List* of www.100ec.cn.

⁶⁹ Source: Kuaishou Big Data Research Institute, *2019 Kuaishou Education Ecological Report*.

⁷⁰ Source: Press Conference of the Joint Prevention and Control Mechanism of the State Council, <http://www.gov.cn/xinwen/gwylflkjz10/>, February 12, 2020.

Second, multiple office Apps offer online education. Office Apps such as DingTalk and Tencent Meeting have become online education platforms and been widely adopted by teachers and students nationwide. **Third, communication and e-commerce platforms have joined the market competition.** Huawei and JD.com have launched online education classrooms or teaching systems to join the competition in the online education industry.

IV. Online Entertainment Applications

(I) Online Music

As of March 2020, the user size of online music was 635 million or 70.3% of China’s total netizen population, up 59.54 million over the end of 2018; the number of mobile music users had reached 633 million, up 79.78 million from the end of 2018, accounting for 70.5% of mobile Internet users.

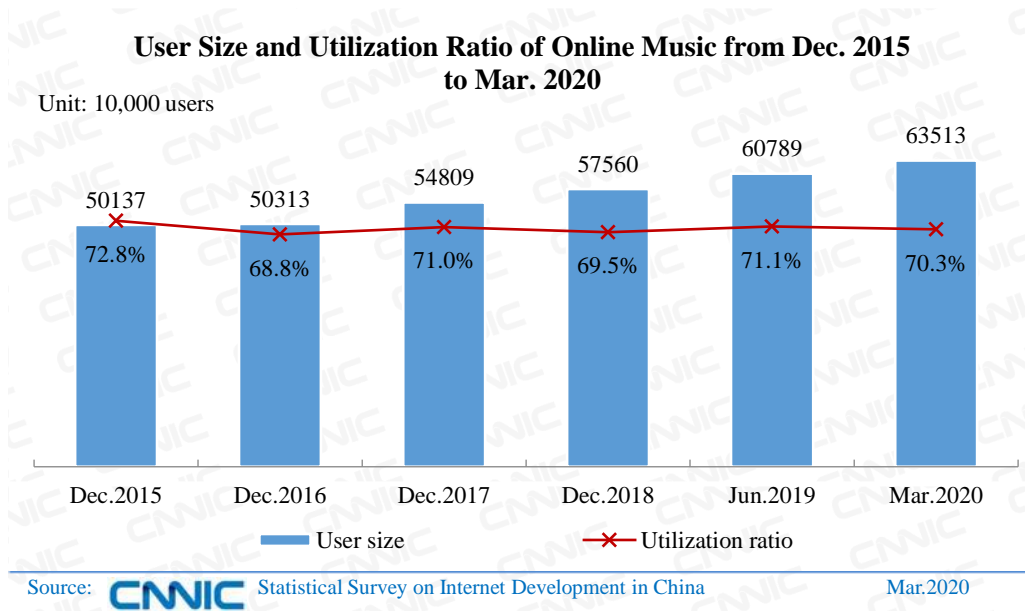


Figure 50 User Size and Utilization Ratio of Online Music from Dec. 2015 to Mar. 2020

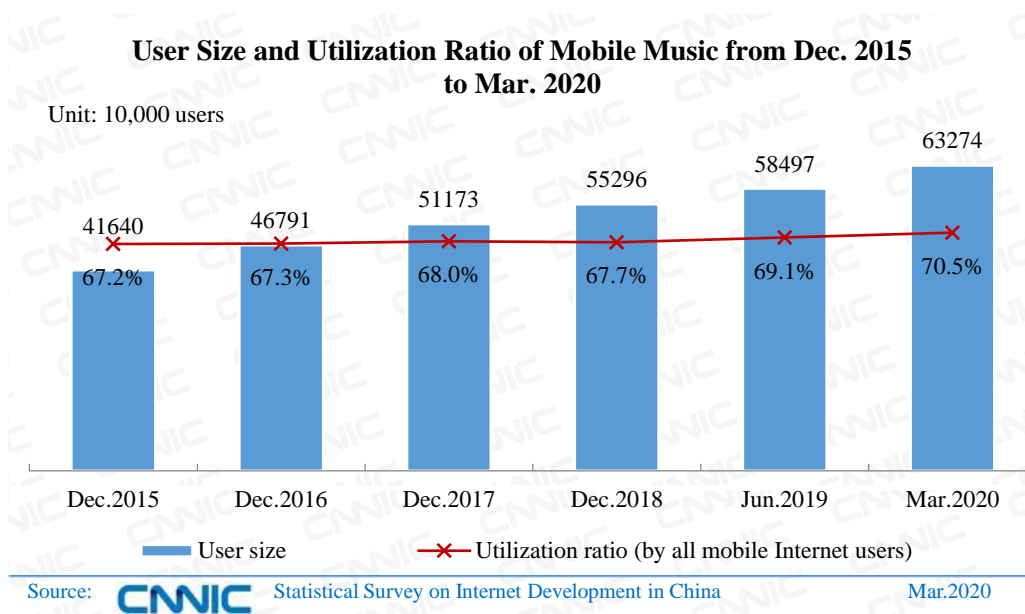


Figure 51 User Size and Utilization Ratio of Mobile Music from Dec. 2015 to Mar. 2020

In 2019, with increasingly improved quality and increasingly perfected business model, online music works became an important part of the people's online spiritual and cultural life.

In terms of industrial ecology, the online music industry pays more attention to building an upstream creative ecology. In the context of more intense competition for music copyright resources, the strategic focus of large-scale online music platforms has shifted from downstream user resources to upstream creative resources. The original music communities represented by “5sing” under Kugou Music and “Yuncun” under NetEase Cloud Music have become the cradles of high-quality music works. Major platforms use funds and traffic to encourage community users to create and upload various styles of music works. This model not only provides a channel for professional musicians to release and promote new works, but also attracts ordinary users to actively record songs through online karaoke and share them with other community users. The vigorous development of the original music communities not only forms a closed loop of the industry chain integrating artist mining, works release, and fan interaction, but also helps form a music cultural life atmosphere where all people create music works and participate in the exchange.

In terms of business development, diversified business models in the online music industry have gradually taken shape. Online music platforms are gradually transforming from works distributors⁷¹ to music content providers⁷², which drives steady growth in industrial revenue. Live streaming is a key business model for large-scale online music platforms in 2019. The singer live streaming segment was launched on the online music platforms under Tencent and NetEase, and

⁷¹ Music works distributors refer to online music platforms that adopt a single business model in which they simply purchase online music copyrights and sell them to users.

⁷² Music content providers refers to online music platforms that include multiple business models such as music sales, live streaming with gifts, works authorization, music peripherals, and offline performances.

has gradually become an important force driving revenue growth. According to data⁷³, in the first three quarters of 2019, the revenue of social networking and entertainment services centered on live streaming services accounted for 72.4% of the total revenue of TME. In the future, based on paid membership, the diversified business collaborating with live streaming with gifts⁷⁴, digital albums, works authorization, paid radio stations, music peripherals⁷⁵, and offline performances will further promote the healthy development of the online music industry.

On overseas markets, the globalization of large-scale online music platforms has achieved initial results. Chinese Internet music platforms have further increased their foreign investment, which not only broadens the industry's revenue growth channels, but also lays the foundation for domestic and foreign music cultural exchanges. At present, the global layout of large-scale online music platforms in China has formed a certain scale. First, in the European and North American markets, Tencent has invested in overseas online music companies such as Spotify and Smule. Spotify is the world's largest online music platform. Second, in the Asian market, ByteDance has launched the music App Resso in India and Indonesia, trying to compete with the Indian music platform Gaana invested by Tencent. Third, in the African market, Boomplay, an African music platform invested by NetEase Cloud Music, quickly penetrates among African users through mobile phone pre-installation channels, thus opening the door to the African online music market.

(II) Online Literature

As of March 2020, the user size of online literature was 455 million or 50.4% of China's total netizen population, up 23.37 million over the end of 2018; the number of cell phone literature users had reached 453 million, up 42.38 million from the end of 2018, accounting for 50.5% of mobile Internet users.

⁷³ Source: TME Q3 Financial Report 2019.

⁷⁴ Live streaming with gifts refers to users giving gifts to anchors in the form of virtual gift when watching the online live streaming service on online music platforms.

⁷⁵ Musical peripherals refer to peripheral products such as clothing or accessories that are launched around musicians or musical works.

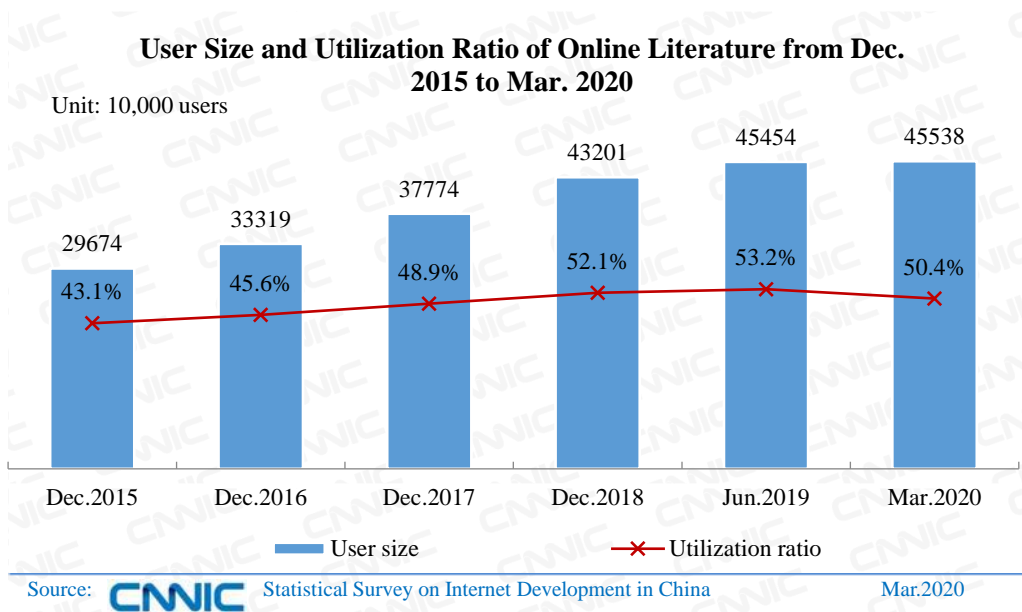


Figure 52 User Size and Utilization Ratio of Online Literature from Dec. 2015 to Mar. 2020

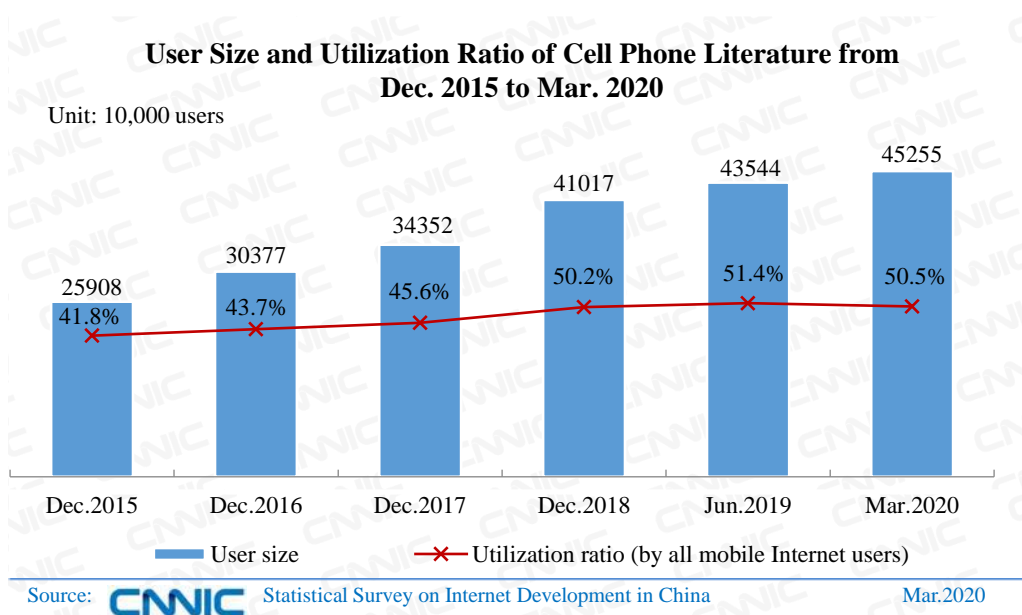


Figure 53 User Size and Utilization Ratio of Cell Phone Literature from Dec. 2015 to Mar. 2020

The online literature industry has continued a long-term stable development trend, and its changes are mainly reflected in three aspects: market competition, quality of works and business models.

In terms of market competition, internal and external competition in the online literature industry has become more intense. First, within the industrial chain, online literature platforms are facing challenges from upstream and downstream companies. Companies such as iQIYI and Motie continue to penetrate the online literature business with their own advantages and have formed a certain scale. **Second, outside the industrial chain, the cross-border competition of information distribution platforms has brought new competitive pressures to**

the online literature industry. Information distribution platforms such as ByteDance and Qutoutiao strengthened their online literature business layout in 2019. Specifically, ByteDance launched a free reading App that relies on membership fee and advertising service revenue, and Qutoutiao promoted an online literature company under it to complete a new round of financing.

In terms of the quality of works, the content quality of online literature has been further improved. In 2019, the online literature industry continued the development of high-quality works, showing a new look with more diverse themes, more novel creations, and richer content. The competition mechanism among authors and the rapid reader feedback mechanism jointly promote the iteration and innovation of the content of online literature. At present, there are nearly 20 main categories of online literature, and more than 200 sub-categories. Among them, positive energy themes in the fields of Party building, reform and opening up, anti-corruption and integrity, innovation and entrepreneurship are popular among readers. With the continuous improvement in the content quality of online literature, more and more excellent works are going overseas, becoming a representative symbol of China's export of cultural influence to the world. As of 2019, Yuewen Group alone authorized more than 700 works overseas, and the number of daily comments in online community of Webnovel exceeded 40,000⁷⁶.

In terms of business models, the monetization methods of online literature industry have become increasingly rich. A diversified business portfolio represented by film and television production, game adaptation, and advertising revenue has gradually become a regular monetization method for large-scale online literature platforms, and its contribution to corporate revenue has increased significantly, laying a solid foundation for the healthy development of the industry. The business model of attracting users to monetize advertisements through free works is particularly valued. Yuewen Group, iQIYI (Literature) and other platforms successively launched genuine free works in 2019, and enhanced their profitability by forming a composite business model collaborating on membership, advertising, copyright and other business. According to the data⁷⁷, revenue from non-online reading business⁷⁸ of Yuewen Group in 2019 accounted for 55.6%, an increase of 31.5 percentage points year-on-year.

(III) Online Games

As of March 2020, the user size of online games was 532 million or 58.9% of China's total netizen population, up 47.98 million over the end of 2018; the number of mobile game users reached 529 million, up 70.14 million from the end of 2018, accounting for 59.0% of mobile Internet users.

⁷⁶ Source: Chinese Academy of Social Sciences' *Report on Online Literature Development 2019*.

⁷⁷ Source: Yuewen Group Financial Report 2019.

⁷⁸ Non-online reading business specifically refers to copyright operation and other business.

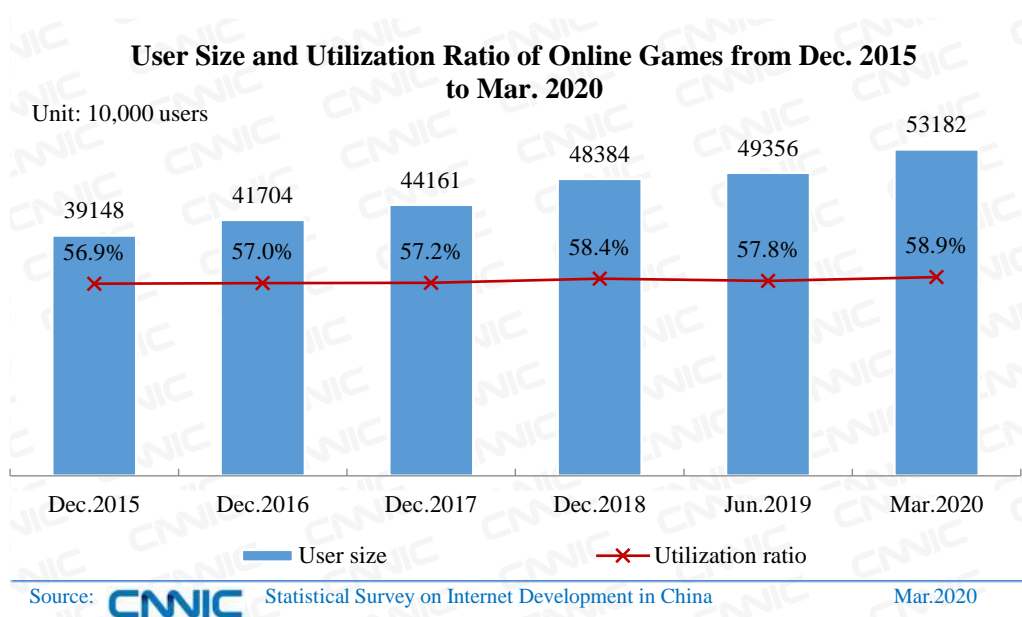


Figure 54 User Size and Utilization Ratio of Online Games from Dec. 2015 to Mar. 2020

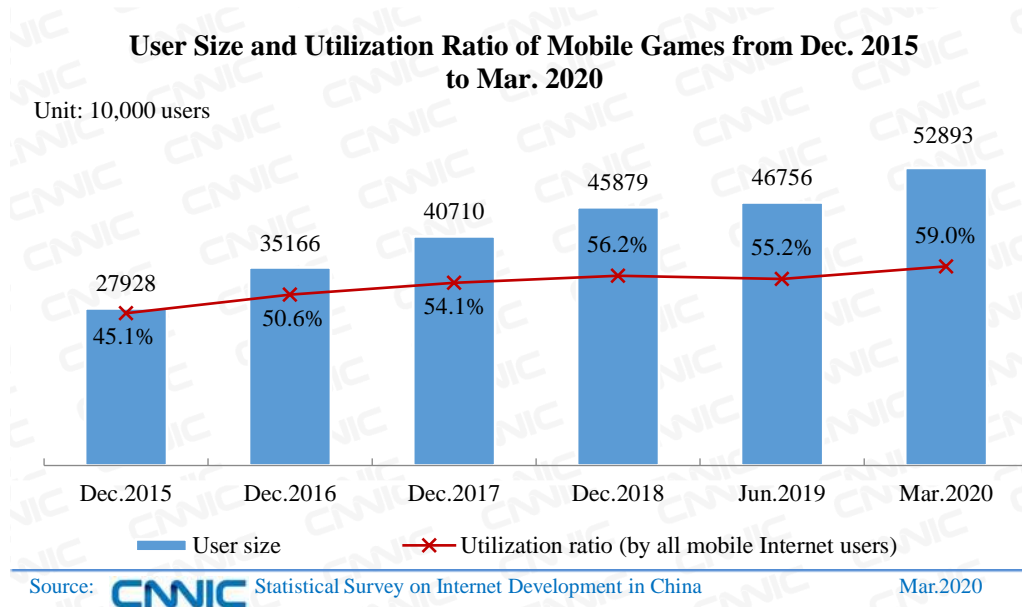


Figure 55 User Size and Utilization Ratio of Mobile Games from Dec. 2015 to Mar. 2020

The development of the online games industry in 2019 rebounded significantly from 2018. A total of 1,570 games passed the review and went live in the whole year⁷⁹. Chinese online games companies have tried overseas distribution of games to broaden their income channels, and more internationally renowned online games companies have begun to operate in China. Under the guidance of technological progress, “cloud games” have gradually shifted from concepts to implementation.

Highlights of the online game industry in “going out” frequently appear. As the domestic games market becomes increasingly saturated, overseas development has become a pragmatic

⁷⁹ Source: <http://www.gamelook.com.cn/2020/01/378576>, January 3, 2020.

choice for many domestic online games manufacturers. Many domestically developed mobile games rank among the top in the world in terms of global monthly active users, downloads, and user expenditures. According to the data⁸⁰, among the top ten online games in terms of global user spending in 2019, *Glory of the King*, *Fantasy Westward Journey* and *PUBG MOBILE* from China ranked second, seventh and ninth respectively. Among the top ten online games in terms of monthly active users in the world, four were also domestic games. The outstanding performance of domestic games overseas has created good conditions for online games manufacturers to broaden their income channels and enhance their ability to resist risks.

The introduction of overseas online games has fruitful results. For a long time, the domestic games market has been favored by many overseas companies. In 2019, Nintendo Switch and Steam were introduced into China and started to provide services for Chinese users. The introduction of internationally renowned games platforms has created conditions for Chinese online games users to obtain better gaming experience and more games choices. It also provides an opportunity for Chinese online games practitioners to learn advanced foreign production concepts and thus enter the international market.

The concept of "cloud gaming" is gradually implemented. With the further development of science and technology and the commercialization of 5G in China, "cloud gaming" has taken a solid step from a concept to implementation. "Cloud gaming" aims to reduce the hardware requirements for customers of games through centralized computing in the cloud, so that more users can enjoy high-quality gaming experience. Online games companies such as Tencent, Perfect World, and NetEase have successively launched multiple cloud gaming platforms, and have strengthened R&D cooperation with communications companies such as China Unicom and Huawei in related fields, with the intention of taking the lead in the field of "cloud gaming".

At the beginning of 2020, affected by the COVID-19 outbreak, people inclined to engage in entertainment activities through the Internet. The downloads, simultaneous online volume, user traffic, and in-game consumption of mobile games, computer games, console games and other games all reached new highs. The online games industry ushered in rapid growth in revenue.

(IV) Online Video

As of March 2020, the user size of online video (including short video) in China had reached 850 million, up 126 million from the end of 2018, accounting for 94.1% of all Internet users. Of them, the user size of short video was 773 million or 85.6% of all Internet users, up 125 million from the end of 2018. At the beginning of 2020, affected by the COVID-19 epidemic, both the user size and the usage duration of online video Apps increased significantly.

⁸⁰ Source: *Mobile Market Report 2020* of the mobile market data supplier App Annie.

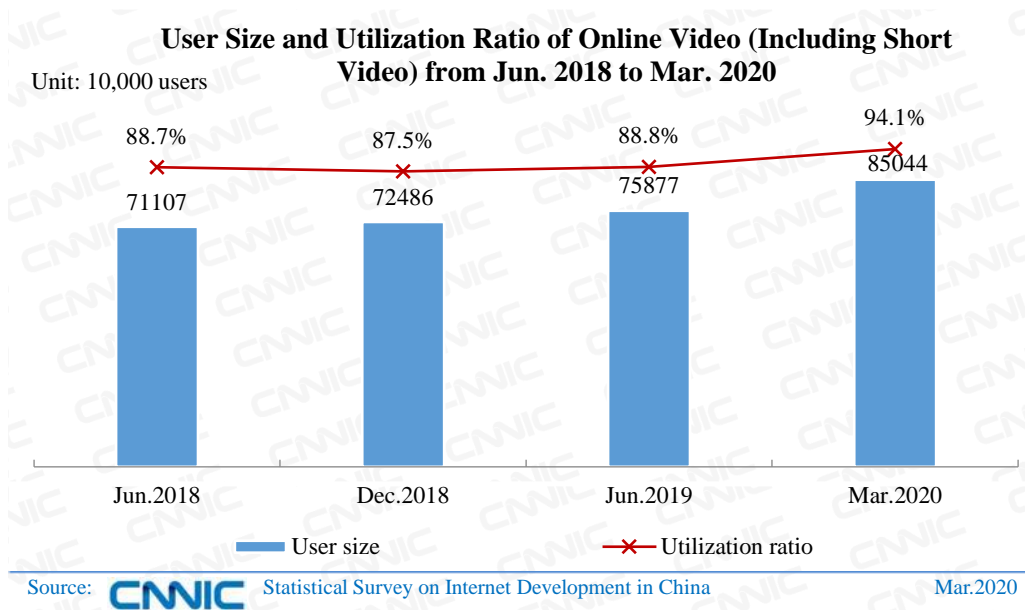


Figure 56 User Size and Utilization Ratio of Online Video (Including Short Video) from Jun. 2018 to Mar. 2020

In 2019, the development of the online video industry was further standardized; interactive video⁸¹ became a hot spot in the industry; platforms' cooperation across fields created a new ecosystem of membership services.

The government strengthens supervision to facilitate the healthy and orderly development of the industry. In March 2019, the Cyberspace Administration of China guided and organized major short video platforms to pilot the launch of Addiction Prevention System for the Youth, instructing Internet companies to actively perform their social responsibilities and further enhancing the protection of the youth online. As of October, 53⁸² online video and live streaming platforms launched the "Youth Mode", which regulates the usage duration, periods, functions and content for young users, and instructs young users to use the Internet reasonably. In November, the Cyberspace Administration of China and other relevant administrative departments jointly issued the *Administrative Provisions on Online Audio-visual Information Services*, promptly responding to the current problems facing the development of online audio and video information services and related technologies, and comprehensively stipulating the administrative requirements that relevant parties engaged in online audio and video information services shall observe, and providing important guidance for promoting the healthy and orderly development of the industry.

The pace of interactive video exploration has accelerated and quickly become the focus of the industry. First, platforms promote the development of interactive videos. Many platforms

⁸¹ Interactive video refers to a video format corresponding to traditional video, which puts the trend of the plot in the hands of the audience. The audience actively participates in the trend of the plot through interaction with options and determines the development and ending of characters.

⁸² Source: Cyberspace Administration of China, http://www.cac.gov.cn/2019-10/14/c_1572583648355661.htm, October 14, 2019.

such as iQIYI, Tencent Video, Bilibili and Youku have begun to experiment with interactive videos, and have achieved multiple blossoms in the fields of interactive TV series, interactive variety shows, and interactive movies. Meanwhile, they have established creation funds to encourage excellent content creation and promote the availability of more interactive content. **Second, technologies promote the development of interactive videos.** One-stop interactive video creation platforms have been introduced successively to help creators upload and publish works by using common templates, to lower the creation threshold, and to promote the landing of interactive video content. In addition, the commercial use of 5G technology also provides a new opportunity for the development of interactive videos. However, due to the limitation of production costs, the current business model and technical form of interactive videos are still in the exploratory stage.

Online video platforms strengthen cross-field cooperation to promote the growth of the number of paid members and revenue. In 2019, focusing on high-quality content services, major video platforms further expanded service boundaries around user needs, cooperated with leading companies in life services, technology and other fields such as Ctrip, JD.com, and Huawei, and through measures such as account interoperability, operational collaboration, and content sharing, expanded membership rights and interests, stimulated users' willingness to pay, and acquired paid user resources in different fields. In June and November 2019, iQIYI and Tencent Video respectively announced that the number of their paid members exceeded 100 million⁸³. In 2019, iQIYI's revenue from membership services increased by 36% year-on-year, accounting for nearly 50% of total revenue, far exceeding revenue from online advertising services⁸⁴. With the continuous growth of paid users, how to balance platforms' business revenue and user experience in the future is a problem facing the online video industry.

⁸³ Source of iQIYI data: official Weibo of iQIYI, <https://m.weibo.cn/status/4385852639307944>, June 22, 2019; source of Tencent Video data: Tencent Q3 Financial Report 2019, <https://tech.sina.com.cn/i/2019-11-13/doc-iihnzahi0645660.shtml>, November 13, 2019.

⁸⁴ Source: iQIYI Financial Report 2019, <https://tech.sina.com.cn/i/2020-02-28/doc-iimxyqvz6376372.shtml>, February 28, 2020.

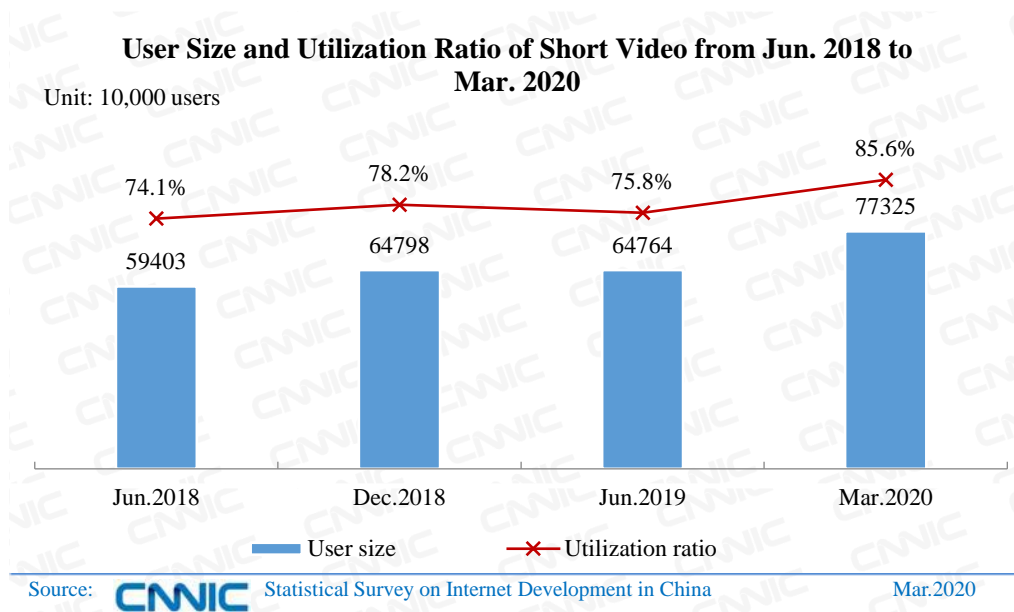


Figure 57 User Size and Utilization Ratio of Short Video from Jun. 2018 to Mar. 2020

Since 2019, the size of short video users has grown rapidly; content development has become more benign; the industry has gradually entered a new stage of healthy development. While short video platforms are striving to expand overseas markets and export culture, the trend of integration with other industries is becoming more and more obvious, especially in driving economic development in poverty-stricken areas.

While expanding overseas markets, short video has also become an important platform for cultural output. First, major short video platforms continue to expand their external communication domains. TikTok, the overseas version of Douyin, and Kwai, the overseas version of Kuaishou, rapidly expand their presence in overseas markets, based on the "East Asian Cultural Circle" and assisted by the European and American regions. The overseas version of short video products supports sharing videos to international platforms such as YouTube, Facebook, and Twitter, and connects the main social networking software commonly used by overseas users, and thus the utilization rate rises rapidly. According to the data⁸⁵, TikTok has been downloaded more than 1.5 billion times overseas, and Kwai has repeatedly topped the list of Brazilian Apps. **Second, excellent short video works take on the important mission of cultural output.** Vivid, intuitive, novel and easy-to-understand short video works break through the limitations of language and are easier to be communicated in different cultural domains. Take Li Ziqi, a well-known blogger, for example. Her short videos focus on traditional Chinese culture as well as the food, clothing, housing, and transportation of Chinese farmers, attract foreign netizens to watch, and become a window for them to understand Chinese culture. As of December 2019, Li Ziqi had nearly 8 million followers on YouTube, and most of the over 100 short videos have 5 million views or above⁸⁶.

⁸⁵ Source: Sensor Tower, a mobile application data analysis company.

⁸⁶ Source: people.cn, <http://media.people.com.cn/n1/2020/0101/c40606-31530960.html>, January 1, 2020.

Short videos promote the economic development of poverty-stricken areas by driving rural tourism and promoting the sales of agricultural products. The 2019 Key Tasks for Network Poverty Alleviation emphasize that it is necessary to fully explore the potential of the Internet and informatization in poverty alleviation, and firmly promote the in-depth development of network poverty alleviation actions. With the improvement of rural Internet infrastructure and the popularization of smart terminals, simple and easy-to-use short videos have become farmers' entertainment and production tools. People in poverty-stricken areas attract tourists, promote rural tourism, and promote local economic development through short videos of the natural scenery and customs of their hometowns. Meanwhile, more and more farmers have turned into video bloggers, and solved the problem of selling rural specialty products with the help of short videos. As of September 2019, more than 19 million people earned income on the Kuaishou platform, of which more than 5 million people were from national-level poverty-stricken counties, and 1.15 million people achieved annual sales of 19.3 billion yuan through sales of goods on the Kuaishou platform⁸⁷. The Xianya Village in Liangshan Yi Autonomous Prefecture of Sichuan has achieved poverty alleviation through short videos. The short video township entrepreneurship and poverty alleviation activities in Yangling, Shaanxi and Tai'an, Shandong have all achieved good results.

(V) Live Streaming

As of March 2020, the user size of live streaming in China had reached 560 million, up 163 million from the end of 2018, accounting for 62.0% of all Internet users. Among them, the user size of live game streaming was 260 million, up 22.04 million from the end of 2018, accounting for 28.7% of all netizens. The user size of host live show was 207 million, up 43.74 million from the end of 2018, making up 22.9% of the total. The user size of live concert streaming was 150 million, up 41.37 million from the end of 2018, taking up 16.6% of all netizens. The user size of live sports broadcasting was 213 million, up 36.77 million from the end of 2018, accounting for 23.5% of the total. The user size of live e-commerce streaming that emerged and achieved rapid development in 2019 was 265 million, accounting for 29.3% of all netizens.

⁸⁷ Source: Innovation Development Report on Short Video Supporting and Boosting Agriculture on people.cn, <http://capital.people.com.cn/n1/2019/1122/c405954-31469951.html>, November 19, 2019.

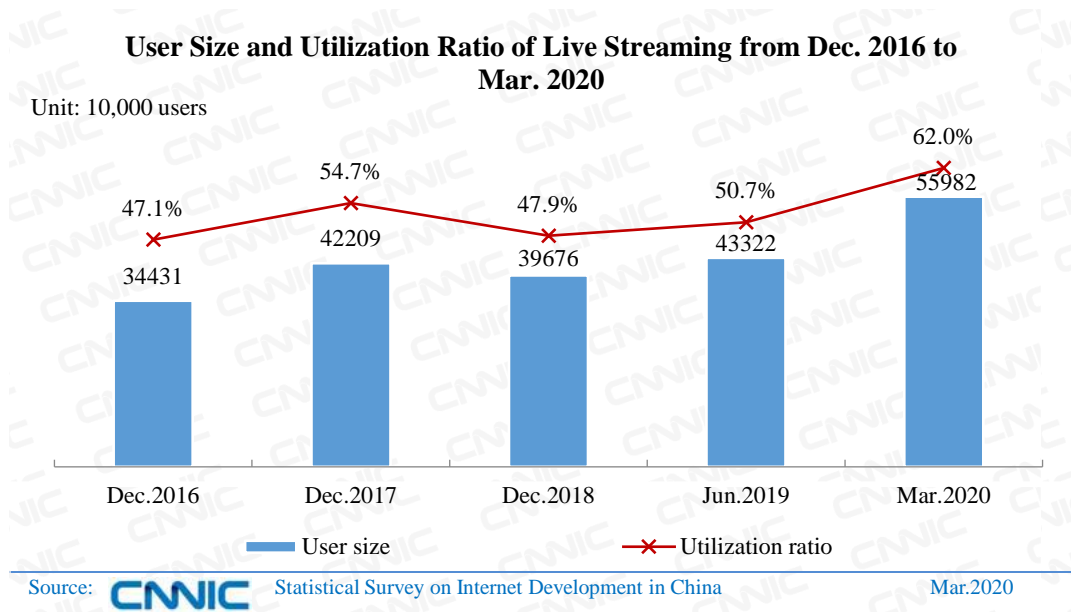


Figure 58 User Size and Utilization Ratio of Live Streaming from Dec. 2016 to Mar. 2020

The live streaming industry continued its innovative development trend in 2019, and industrial changes were mainly reflected in the following three aspects:

In terms of content categories, live e-commerce streaming are booming. Although the user size of traditional live streaming such as host live show and live game streaming has slowed down, the rise of live e-commerce streaming has injected new vitality into the growth of overall user size of the industry and enriched the content and monetization methods of the live streaming industry. E-commerce platforms such as Alibaba, JD.com, and Pinduoduo have stepped into this field successively, integrating physical commodity transactions and interactive live streaming to improve user consumption experience and stickiness. In addition, live e-commerce streaming has boosted the sales of agricultural products and provided strong support for poverty-stricken areas to get rid of poverty. In July 2019, Zhejiang Province and Alibaba Group organized the Zhejiang E-commerce Poverty Alleviation activity. The cadres from 12 key corresponding counties including Dangshan County, Pingwu County, and Xianfeng County and public welfare stars and anchors jointly promoted characteristic agricultural products, with sales exceeding 10 million yuan within three hours⁸⁸.

In terms of market development, live streaming has returned to a rational development track. In 2019, as the capital market's investment in the live streaming industry gradually decreased, the trend of the survival of the fittest among traditional live streaming platforms became more and more obvious. According to data from relevant enterprises' financial reports, the revenue of large-scale live streaming platforms launched on the market such as YY, Momo, Douyu, and Huya maintained a growth trend in the first three quarters of 2019. Specifically, growth rate of revenue of the live online games platforms represented by Douyu and Huya Revenue reached 109.3% and

⁸⁸ Source: Department of Commerce of Zhejiang Province.

87.0% respectively, and some small and medium-sized platforms withdrew from the market due to financing difficulties.

In terms of industrial supervision, related administrative mechanisms have been further improved. First, in terms of account supervision, anchor's dressing, user's reporting and other issues during the live streaming process, local trade associations and live streaming platforms have jointly issued the *Good Practice for Live Streaming* and the *Good Practice for Live Streaming Anchors*, which have become the first batch of group standards issued and implemented by the live streaming industry in China. Second, in terms of product quality and exaggerated publicity issues during live e-commerce streaming, the State Administration for Market Regulation and other departments issued in October a special action plan to specifically rectify food safety issues during live e-commerce streaming.

Chapter IV The Development of E-government

I. The Development of E-government Services

As of March 2020, 694 million Internet users or 76.8% of all netizens had received e-government services in China, up 76.3% over the end of 2018.

In 2019, different regions and departments in China earnestly implemented the decisions and deployments of the Party Central Committee and the State Council, and vigorously promoted the construction of government service platforms at all levels. The national integrated online government service platform (hereinafter referred to as the “platform”) with the national government service platform as the main hub was initially established, promoting the interconnection, data sharing and business collaboration of the government service platforms of different regions and departments, and providing strong support for the comprehensive promotion of the “one-for-all website” of government services. At the beginning of 2020, Internet government services provided strong support in the prevention and control of the COVID-19 epidemic, with the user size increasing significantly, the application of the integrated government platform becoming more effective, social awareness becoming higher and higher, and the public’s sense of recognition becoming stronger, and have become a new channel for innovating government’s administration and optimizing government services.

II. The Development of Government Websites

(I) General Situation of Government Websites and Provincial Websites

As of December 2019, there were 14,474 government websites⁸⁹ in China, mainly including government portals⁹⁰ and departmental websites⁹¹. Among them, departments under the State Council and their internal and vertical administrative institutions had 912 government websites.

⁸⁹ Government websites refer to those run by people's governments at all levels and their departments, agencies and institutions with administrative functions on the Internet. They have the functions of information release, interpretation and response, service, and interactive exchange.

⁹⁰ Government portals refer to government portal websites set up by people's governments at or above the county level and departments under the State Council. In principle, villages, towns and communities do not set up government portals, and special needs are addressed in other ways.

⁹¹ Departmental website: provincial and municipal government departments, as well as institutions above the county level where the system-wide vertical management department is located, can set up their own websites. In principle, county-level government departments do not set up government websites, and there are special treatments for special needs.

13,562 government websites for administrative units at the provincial level or below were distributed in 31 provinces (autonomous regions and municipalities directly under the central government) and Xinjiang Production and Construction Corps.

Number of Government Websites in 2016-2019

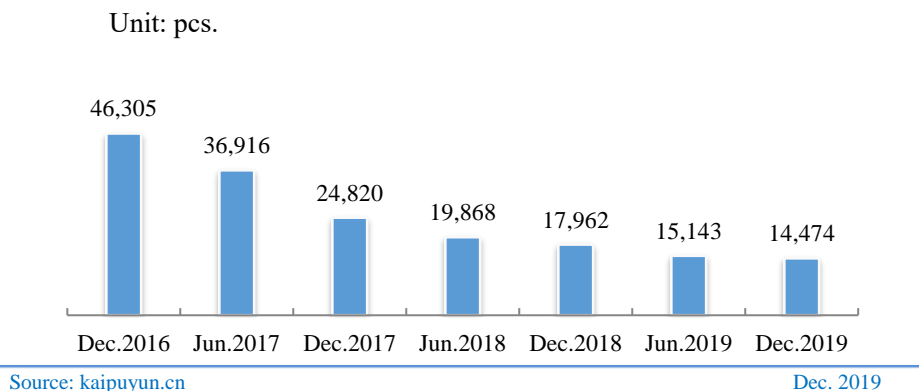


Figure 59 Number of Government Websites in 2016-2019

Table 8 Number of Government Websites by Province from Dec. 2018 to Dec. 2019 ⁹²

Province	Dec. 2019	Dec. 2018	Reduction
Beijing	72	80	10.0%
Tianjin	105	133	21.1%
Hebei	499	573	12.9%
Shanxi	398	422	5.7%
Inner Mongolia	537	618	13.1%
Liaoning	543	666	18.5%
Jilin	302	373	19.0%
Heilongjiang	207	449	53.9%
Shanghai	63	88	28.4%
Jiangsu	645	800	19.4%
Zhejiang	558	689	19.0%
Anhui	810	909	10.9%
Fujian	433	495	12.5%
Jiangxi	533	625	14.7%
Shandong	864	1120	22.9%
Henan	841	1054	20.2%
Hubei	707	852	17.0%
Hunan	576	746	22.8%
Guangdong	617	867	28.8%
Guangxi	573	758	24.4%
Hainan	108	127	15.0%
Chongqing	113	342	67.0%
Sichuan	909	1066	14.7%
Guizhou	413	450	8.2%
Yunnan	302	394	23.4%
Tibet	215	165	-30.3%
Shaanxi	627	752	16.6%
Gansu	520	616	15.6%
Qinghai	134	181	26.0%
Ningxia	126	158	20.3%
Xinjiang	161	167	3.6%
Xinjiang	51	147	65.3%

⁹² The data in Table 8 do not include the number of websites of ministries and commissions.

Province	Dec. 2019	Dec. 2018	Reduction
Production and Construction Corps			
Total	13562	16882	19.7%

Source: kaipuyun.cn

(II) Number of Government Websites by Administrative Level

As of December 2019, departments under the State Council and their internal and vertical administrative institutions had 912 government websites, accounting for 6.3% of the total. There were 11,890 government websites for administrative units at the municipal level or below, accounting for 82.1%. The number of government websites at all administrative levels had decreased from the end of 2018.

Number of Government Websites by Administrative Level

Unit: pcs.

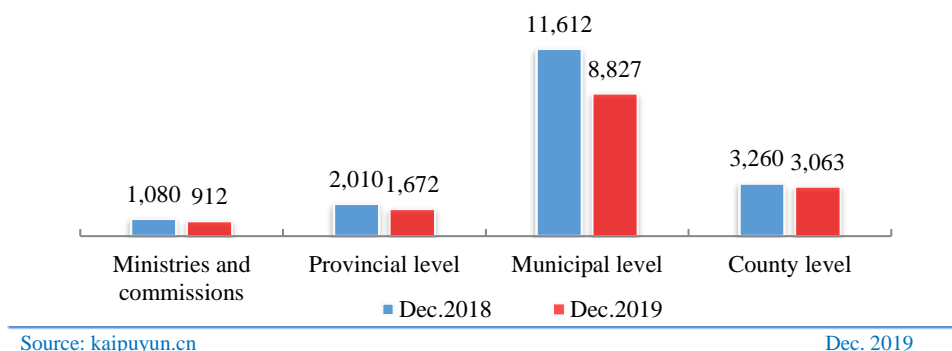


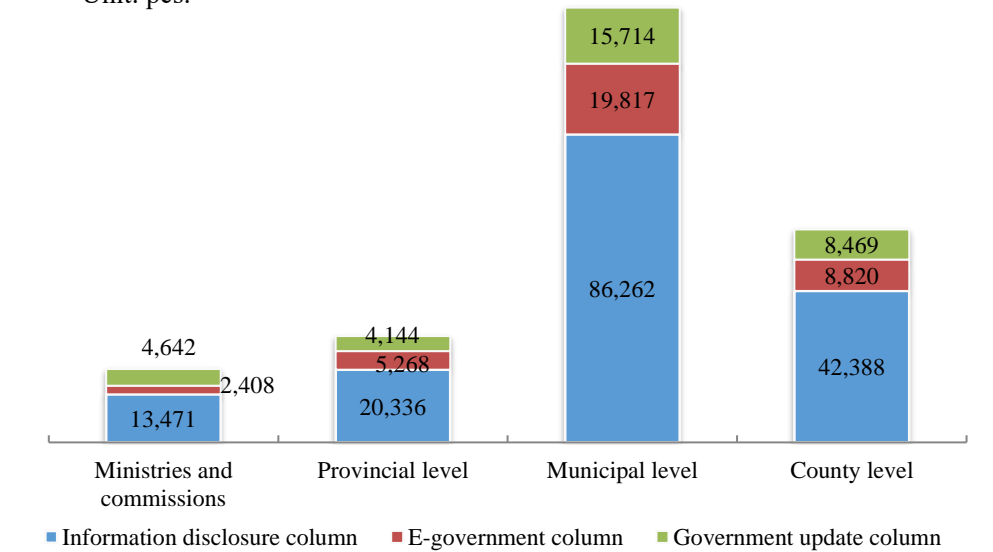
Figure 60 Number of Government Websites by Administrative Level

(III) Number of Columns on Government Websites by Administrative Level

As of December 2019, a total of 245,000 columns were opened on government websites at all administrative levels, mainly covering information disclosure, online services, and government affairs. Among the government websites at all administrative levels, municipal websites set the largest number of columns, reaching 129,000, or 52.9% of the total. Among all columns of government websites, the number of columns of information disclosure was 162,000, ranking first and accounting for 66.4%; online service columns took up 14.8%; and government affairs columns made up 13.5%.

Number of Columns on Government Websites by Administrative Level

Unit: pcs.



Source: kaipuyun.cn

Dec. 2019

Figure 61 Number of Columns on Government Websites by Administrative Level ⁹³

(IV) Number of Articles Updated on the Homepages of Government Websites

In 2019, the number of articles updated on the homepages⁹⁴ of China's government websites at all administrative levels increased by 34.6% over the end of 2018. Among them, the government websites of ministries and commissions soared by 63.7%.

⁹³ The number distribution of columns on government websites at all administrative levels only includes the three categories shown in the Figure, excluding other small columns.

⁹⁴ The number of articles updated on the homepage refers to that of updated homepage articles on government websites.

Number of Articles Updated on the Homepages of Government Websites at All Administrative Levels

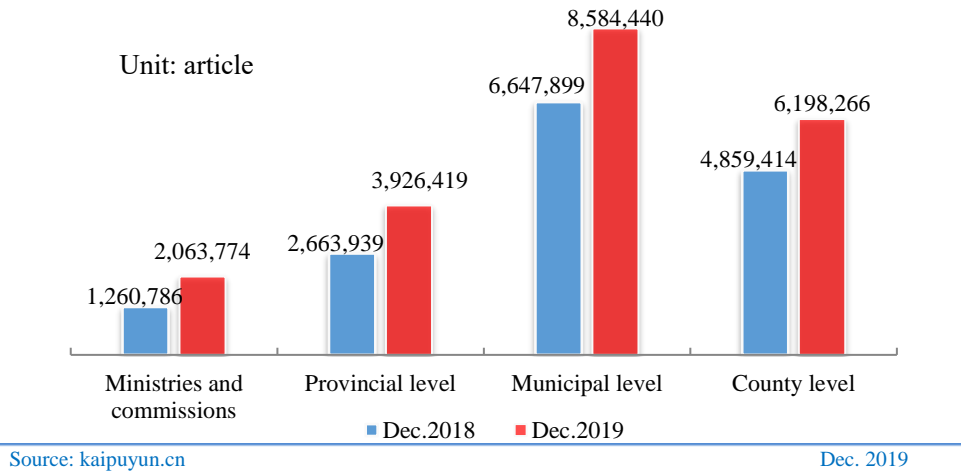


Figure 62 Number of Articles Updated on the Homepages of Government Websites at All Administrative Levels

III. The Development of New Government Media

(I) The Development of Government Service Search

1. Overall Status of Government Service Search

In 2019, the search volume of government services via Baidu App was 20.197 billion times.

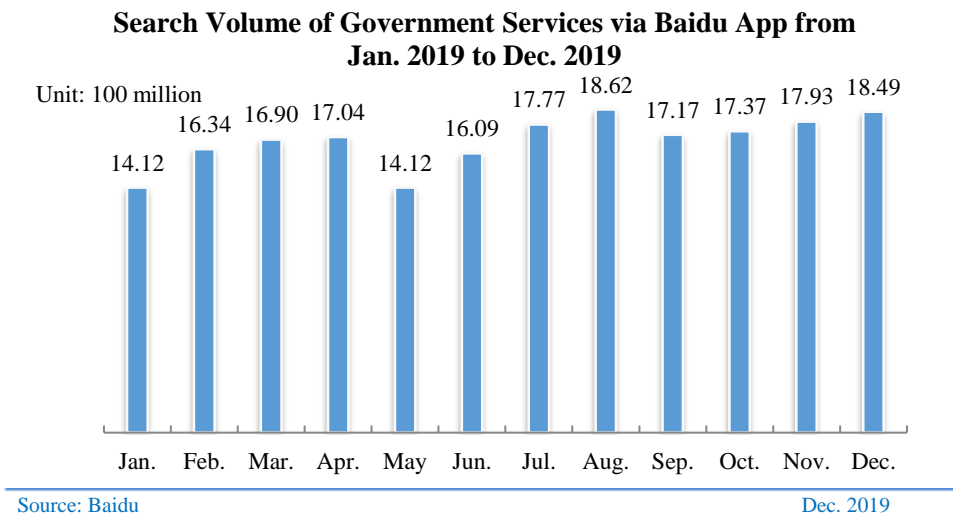


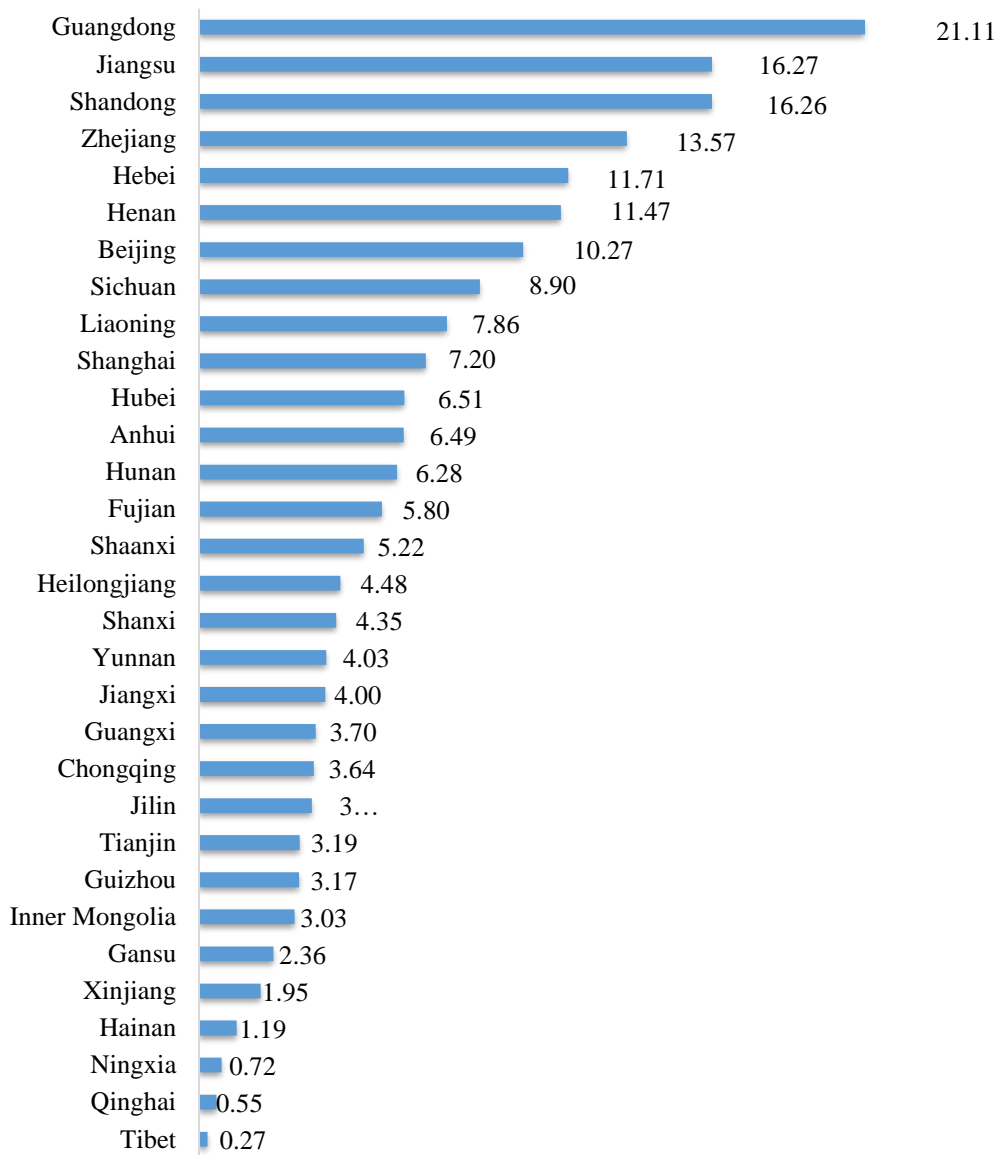
Figure 63 Search Volume of Government Services via Baidu App from Jan. 2019 to Dec. 2019

2. Search of Government Services by Province

In 2019, the number of Guangdong netizens searching government services via Baidu App was 2.111 billion times, ranking the first nationwide.

Search Volume of Government Services via Baidu App by Province

Unit: 100 million



Source: Baidu

Dec. 2019

Figure 64 Search Volume of Government Services via Baidu App by Province

(II) The Development of Government Microblogs

1. The Overview of Government Microblogs

Up to December 2019, 139,000 government microblogs had been verified by Sina.

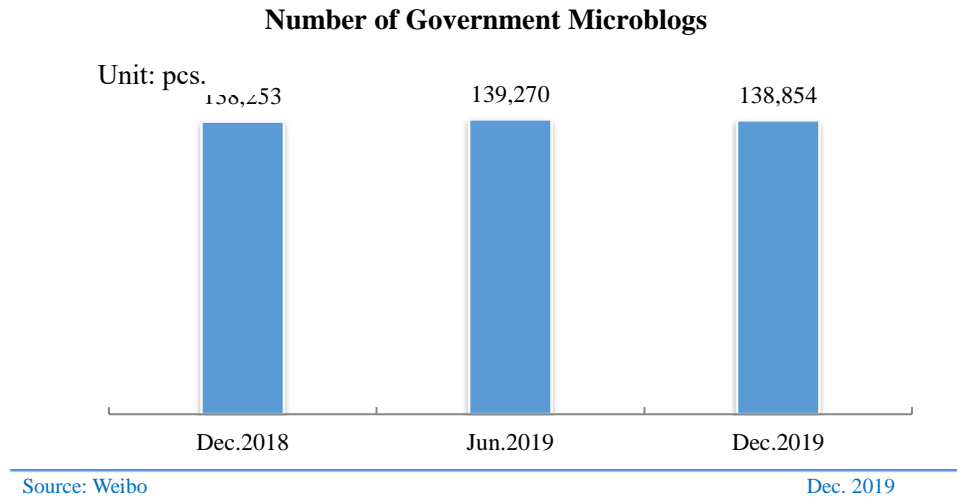


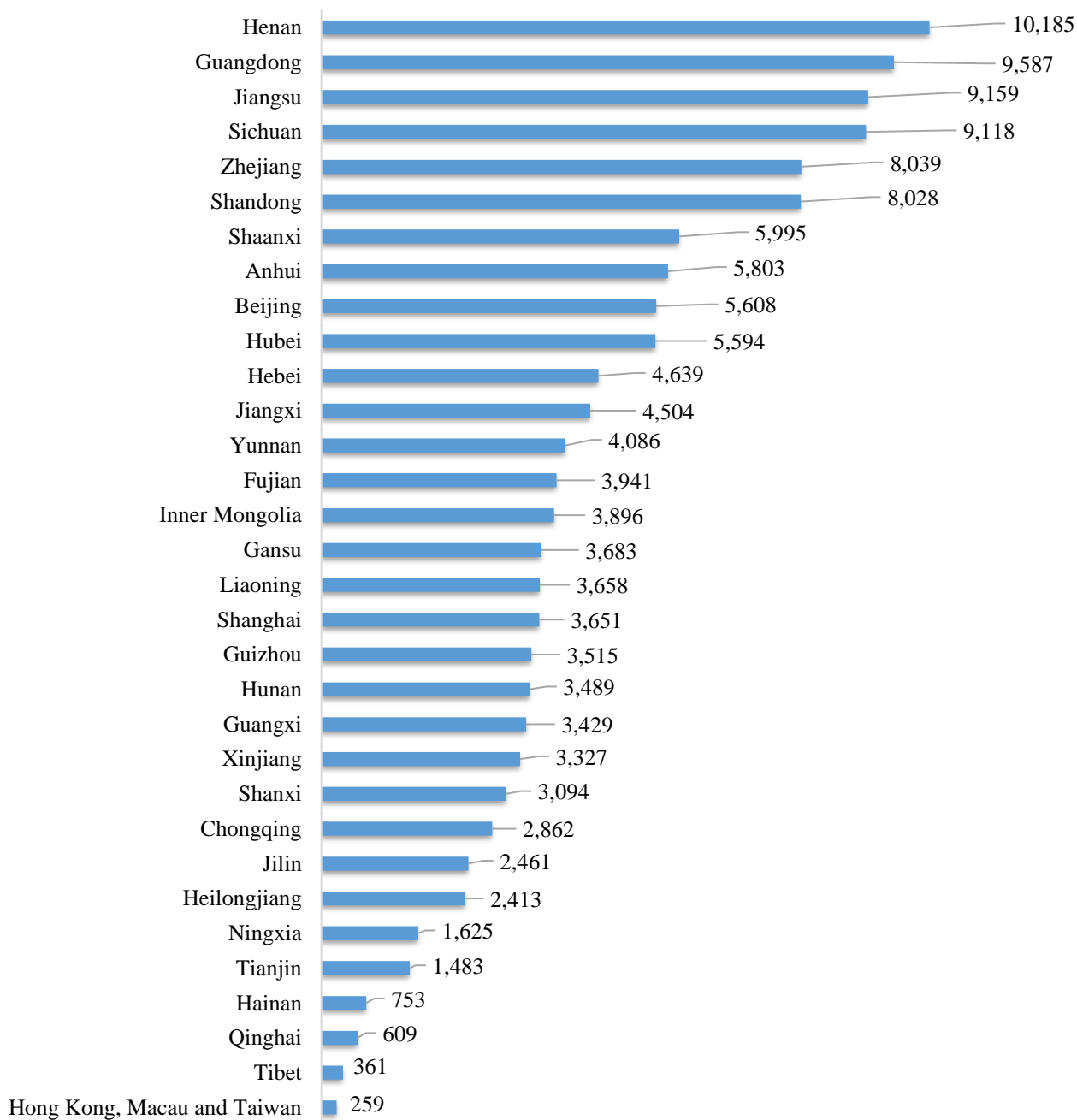
Figure 65 Number of Government Microblogs

2. The Overview of Government Microblogs by Province

As of December 2019, 31 provinces, autonomous regions and municipalities directly under the central government in Mainland China had launched government microblogs. Specifically, Henan province had opened 10,185 government microblogs, ranking first in the country, followed by Guangdong province launching 9,587 government microblogs.

Number of Government Microblogs by Province

Unit: pcs.



Source: Weibo

Dec. 2019

Figure 66 Number of Government Microblogs by Province

(III) The Development of Government Toutiao and Douyin Accounts

1. The Overview of Government Toutiao Accounts

As of December 2019, the number of government Toutiao accounts⁹⁵ launched by governments at all levels had reached 82,937, an increase of 4,757 from the end of 2018.

Number of Government Toutiao Accounts in 2017-2019

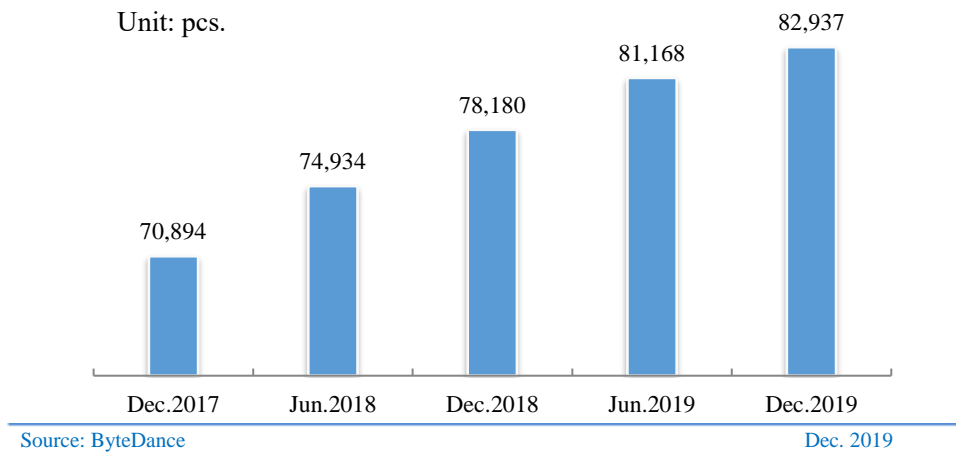
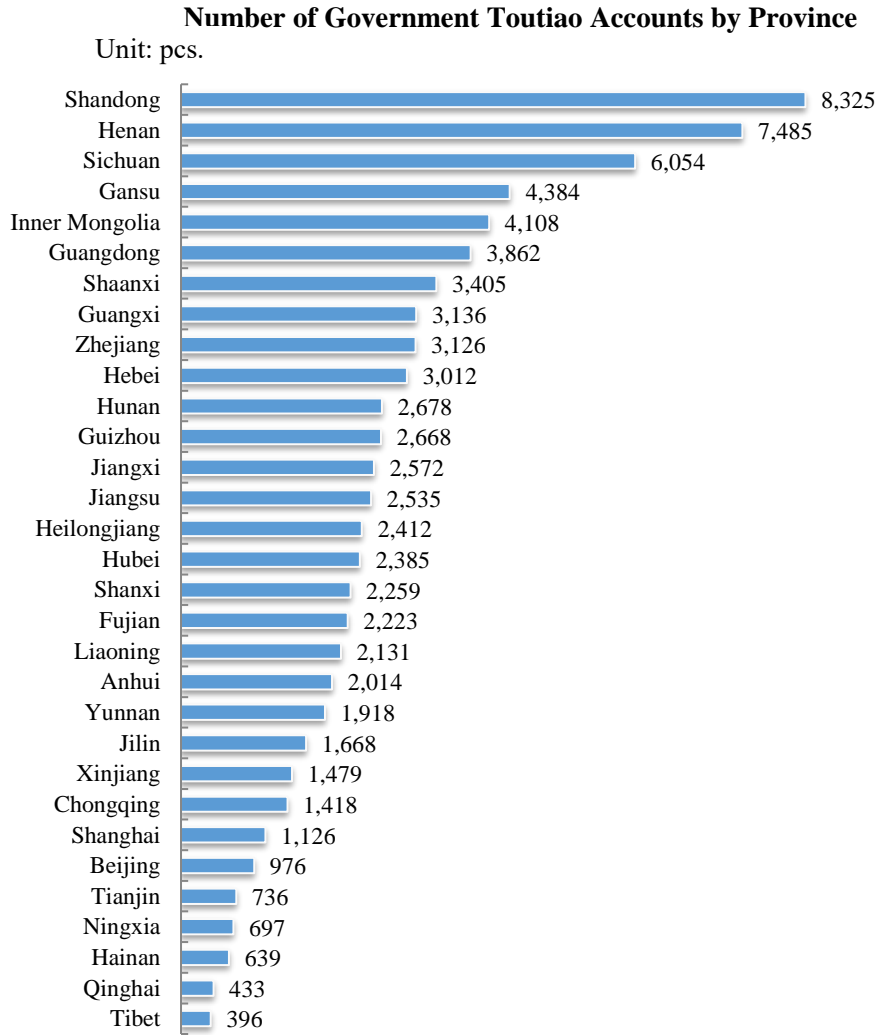


Figure 67 Number of Government Toutiao Accounts in 2017-2019

2. The Overview of Government Toutiao Accounts by Province

As of December 2019, 31 provinces, autonomous regions and municipalities directly under the central government in Mainland China had launched government Toutiao accounts. Among them, Shandong was the province boasting the largest number of 8,325 government Toutiao accounts. 10 provinces opened more than 3,000 government Toutiao accounts.

⁹⁵ Government Toutiao accounts refer to public information publishing platforms for governmental departments, which are based on the App Top News.



Source: ByteDance

Dec. 2019

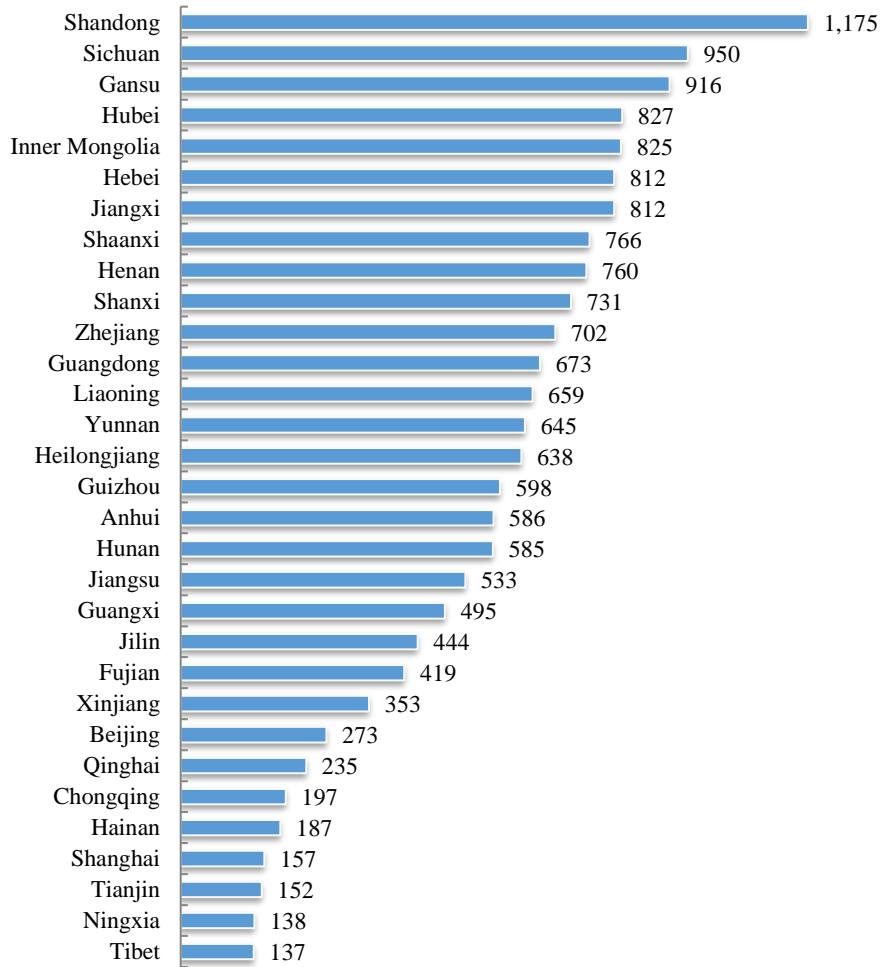
Figure 68 Number of Government Toutiao Accounts by Province

3. The Overall Status of Government Douyin Accounts and the Status by Province

As of December 2019, the number of government Douyin accounts launched by governments at all levels had reached 17,380. 31 provinces, autonomous regions and municipalities directly under the central government in Mainland China had launched government Douyin accounts. Among them, Shandong was the province boasting the largest number of 1,175 government Douyin accounts.

Number of Government Douyin Accounts by Province

Unit: pcs.



Source: ByteDance

Dec. 2019

Figure 69 Number of Government Douyin Accounts by Province

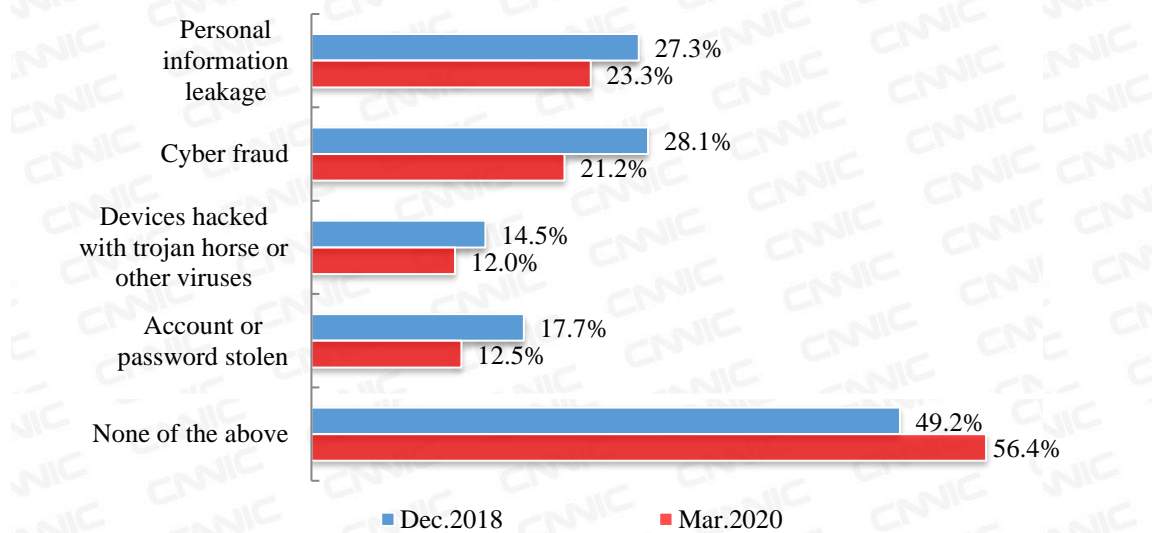
Chapter V Internet Security

I. Cyber Incidents

(I) Proportion of Types of Network Security Problems

The proportion of China's netizens who had not encountered any cyber incidents increased. As of March 2020, 56.4% of netizens said they had not encountered any network security problem in the past six months, up 7.2 percentage points from the end of 2018. Through the analysis of the network security problems encountered by netizens, it was found that the proportion of netizens suffering from online fraud had dropped by 6.9 percentage points from the end of 2018. The proportion of netizens encountering account or password being stolen had decreased by 5.2 percentage points from the end of 2018. The proportion of netizens encountering other network security problems also had declined from the end of 2018.

Proportion of Types of Network Security Problems



Source: CNIC Statistical Survey on Internet Development in China

Mar. 2020

Figure 70 Proportion of Types of Network Security Problems

(II) Proportion of Types of Internet Fraud

Through further investigation of netizens who suffered from online fraud, it was found that bonus-winning fraud was still the most common type of online fraud, accounting for 52.6%, down 8.7 percentage points from the end of 2018. The proportion of fake friend fraud was 41.2%, down 8.1 percentage points over the end of 2018. The proportion of online part-time fraud was 33.5%, down 7.8 percentage points from the end of 2018.

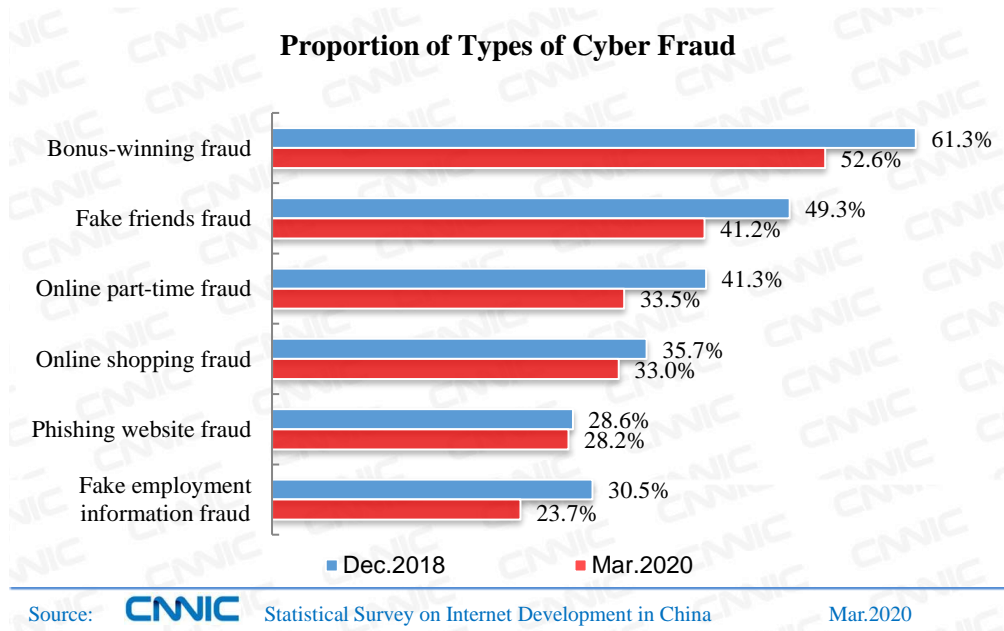


Figure 71 Proportion of Types of Cyber Fraud

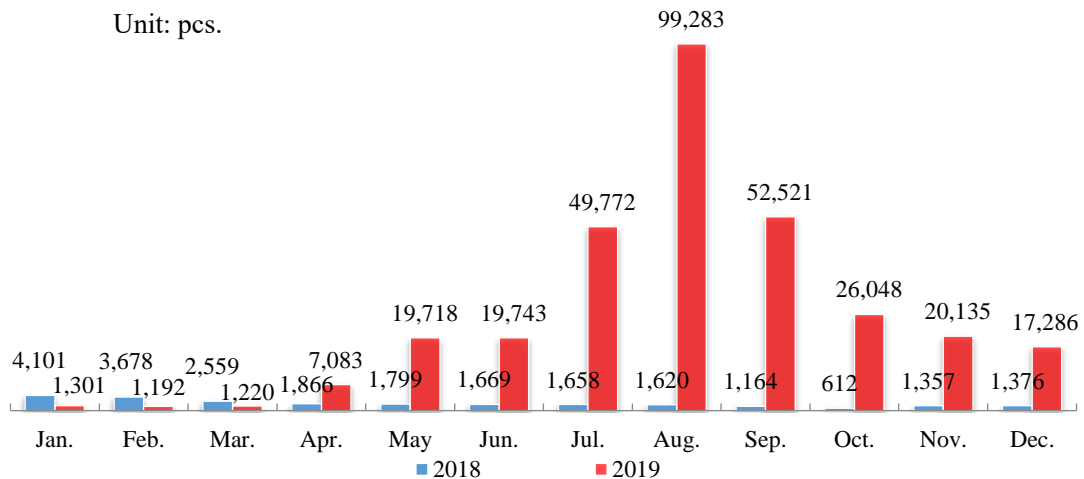
II. Website Security and Vulnerabilities

(I) Number of Websites Tampered with by Hackers in China

As of December 2019, China National Computer Network Emergency Response Technical Team (known as CNCERT) found the number of tampered websites⁹⁶ in China was 185,573⁹⁷, a large increase from the end of 2018 (7,049)⁹⁸.

Number of Websites Tampered with by Hackers in China

Unit: pcs.



⁹⁶ Tampered website means that malicious destruction or change of webpage content leads to the fact that a website is unable to work properly or inserted with abnormal webpage content by hackers.

⁹⁷ The data are deduplicated, the same below.

⁹⁸ Since April 2019, CNCERT has expanded the scope of monitoring, so the data have increased significantly.

Figure 72 Number of Websites Tampered with by Hackers in China

As of December 2019, CNCERT found 515 government websites⁹⁹ were tampered with in China, up 138.4% from the end of 2018 (216).

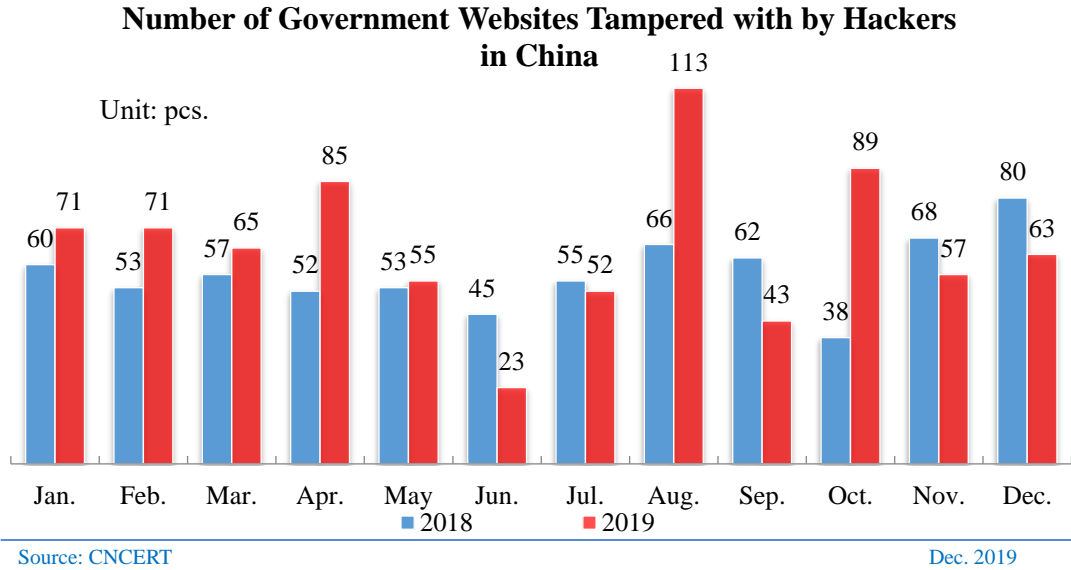


Figure 73 Number of Government Websites Tampered with by Hackers in China

(II) Number of Websites Implanted with Backdoor Malware in China

As of December 2019, CNCERT found that hackers had 84,850 websites implanted with backdoor malware in China, up 259.4% from the end of 2018 (23,608).

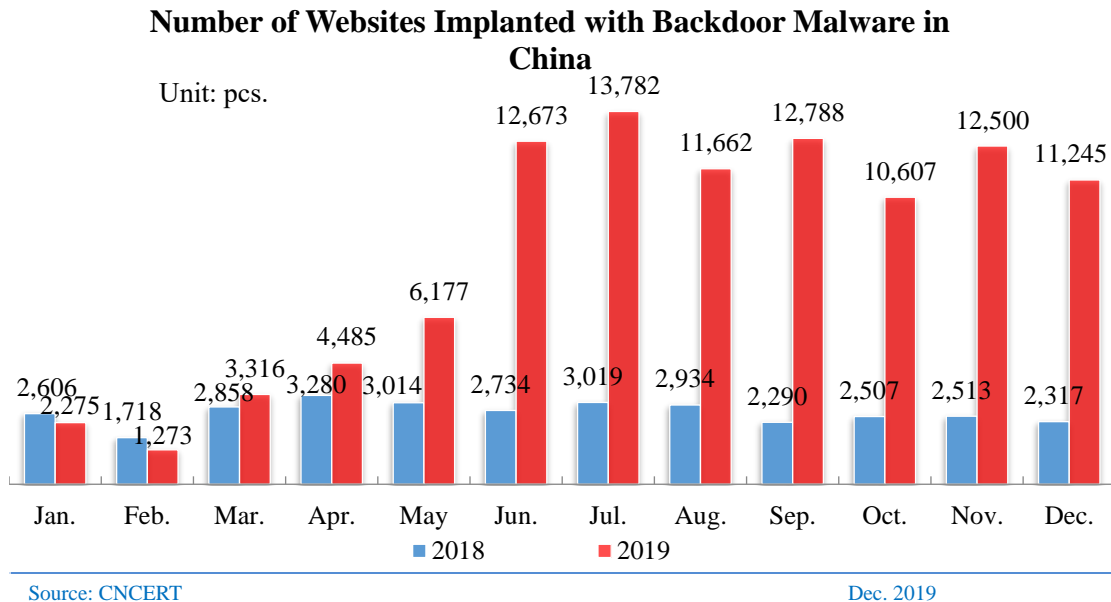


Figure 74 Number of Websites Implanted with Backdoor Malware in China ¹⁰⁰

⁹⁹ Government websites refer to the websites ended with “GOV.CN”.

¹⁰⁰ Since April 2019, CNCERT has expanded the scope of monitoring, so the data have increased greatly.

As of December 2019, CNCERT found that hackers had 717 government websites implanted with backdoor malware in China, up 6.4% from the end of 2018 (674).

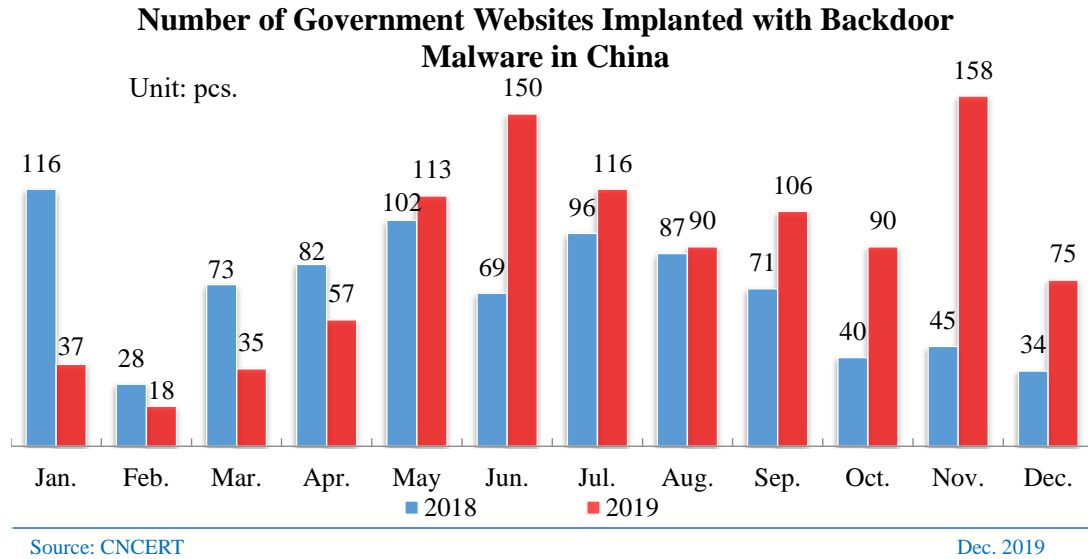


Figure 75 Number of Government Websites Implanted with Backdoor Malware in China

(III) Number of Information System Vulnerabilities

As of December 2019, China National Vulnerability Database (CNVD) ¹⁰¹ collected and sorted 16,193 information system vulnerabilities, an increase of 14.0% from 2018 (14,201).

Number of Information System Vulnerabilities Collected and Sorted by the CNVD

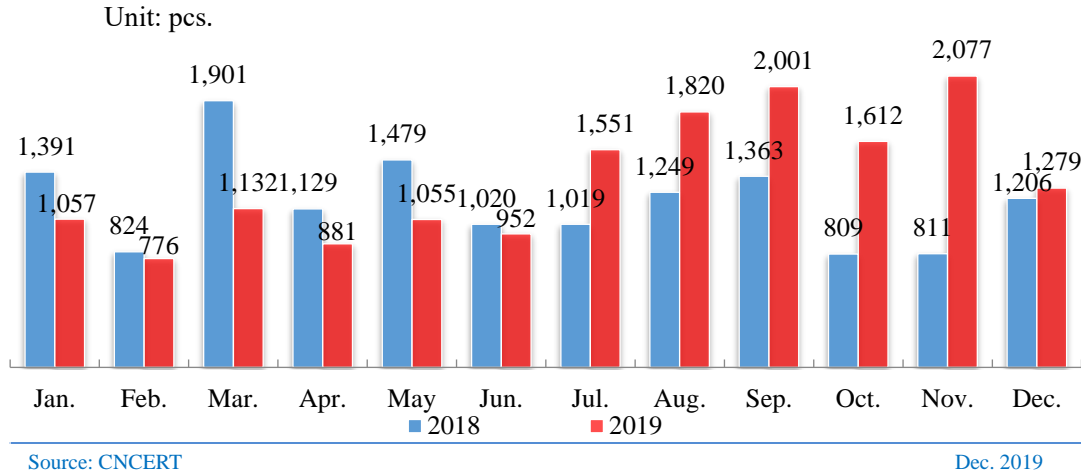


Figure 76 Number of Information System Vulnerabilities Collected and Sorted by the CNVD

Among them, 4,877 were high-risk vulnerabilities, down 0.4% from the end of 2018 (4,898).

Number of High-risk Information System Vulnerabilities Collected and Sorted by the CNVD

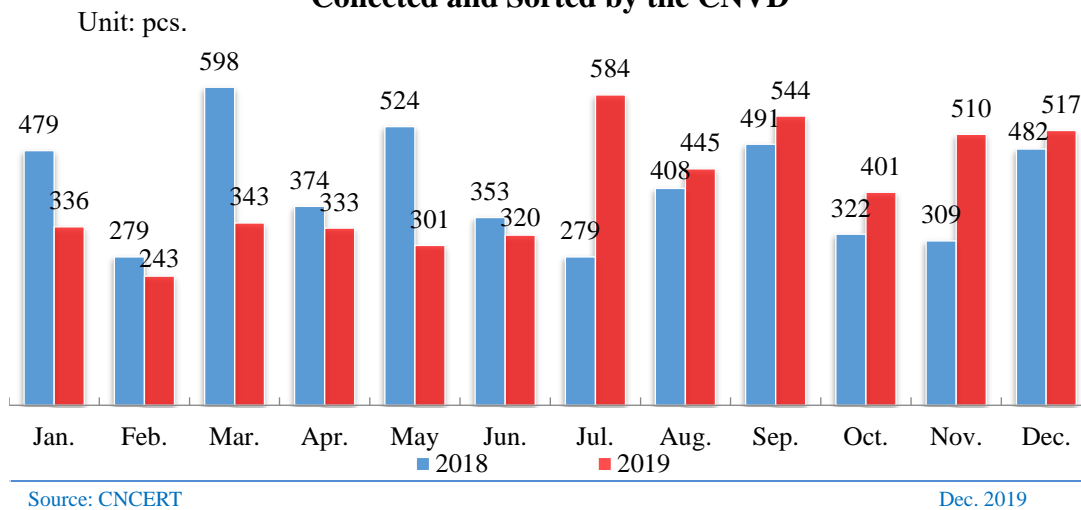


Figure 77 Number of High-risk Information System Vulnerabilities Collected and Sorted by the CNVD

¹⁰¹ China National Vulnerability Database (CNVD) is an information sharing database about information security vulnerabilities, established by CNCERT coupled with China's important information system units, basic telecommunication carriers, network security vendors, software vendors, and Internet companies.

I. The Reporting and Handling of Internet Incidents

(I) Number of Cyber Incident Reports Received by CNCERT

Up to December 2019, CNCERT had received 107,801 cyber incident reports, up 1.0% from the end of 2018 (106,700).

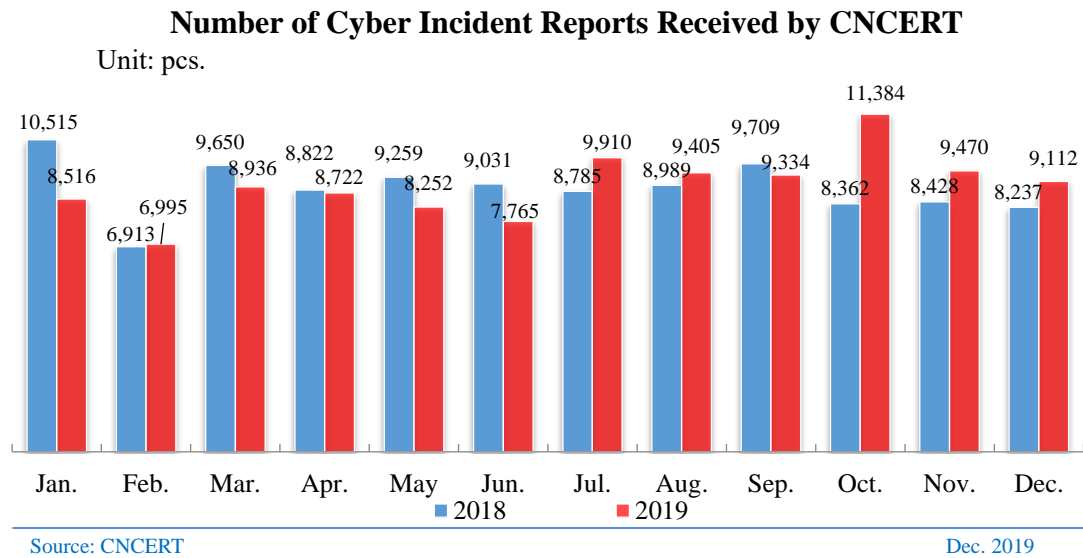


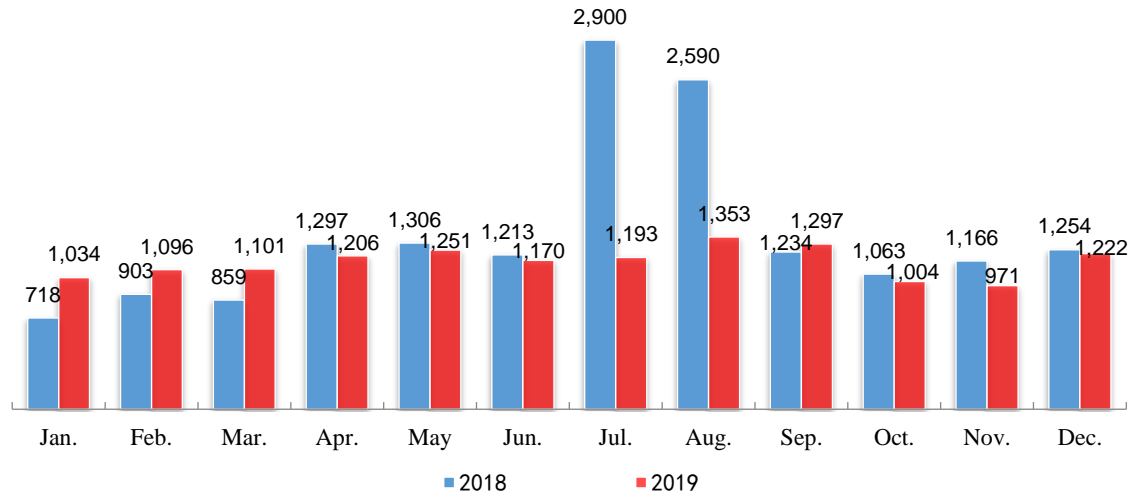
Figure 78 Number of Cyber Incident Reports Received by CNCERT

(II) Number of Reports Received by China's Network Reporting Departments

As of December 2019, network reporting departments at all levels received 138.99 million reports nationwide, down 15.8% from 165.02 million in the end of 2018.

Number of Reports Received by Network Reporting Departments at All Levels Nationwide

Unit: 10,000



Source: China Internet Illegal and Bad Information Reporting Center under the Office of Central Cyberspace Affairs Commission (Cyberspace Administration of China) Dec. 2019

Figure 79 Number of Reports Received by Network Reporting Departments at All Levels Nationwide

Appendix 1 Survey Methodology

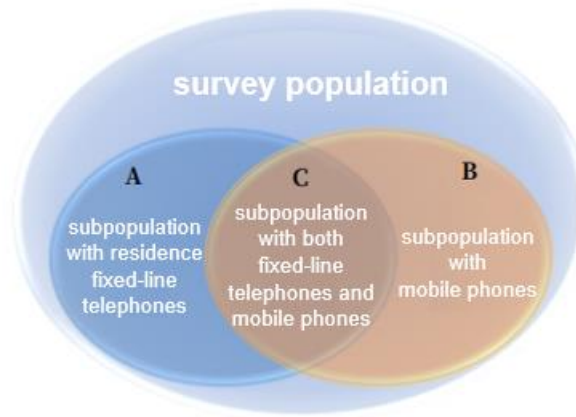
I. Survey Methodology

(I) Survey on Individual Internet Users

1.1 Survey Population

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

- ◇ 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, PHS users, 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 the 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 residence fixed-line telephones are taken with almost the same probability in each district, city or prefecture, that is, the local bureau number with more residence fixed-line telephones will more likely be taken, and to make the phone visit more feasible, the residence fixed-line 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, 0.8 percentage points 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 Data Report

Automatic online search is used to conduct technical statistics about the quantity of domain names and websites, and their geographical distribution. Statistical data for reporting mainly includes the number of IP addresses and international Internet gateway bandwidth.

2.1 Total 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 require 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 Total Number of Websites

It is worked out by CNNIC according to the lists of domain names. The lists of domain names with .CN and .中国 come from the CNNIC database, while the lists of gTLDs come from relevant international domain name registries.

2.3 Total Number of Domain Names

The numbers of domain name under “.CN” and “.中国” come from the database of China Internet Network Information Center (CNNIC). The numbers of generic top-level domain (gTLD) and new generic top-level domain (New gTLD) are provided by domestic domain name registration companies.

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, but not limited to those surfing the Internet via mobile phones only.

◇ **Computer Internet Users:** Internet users who have used computers to access and surf the Internet in the past 6 months, but not limited to those surfing the Internet via computers only.

◇ **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 Chinese ccTLD, such as .cn and .中国, and gTLD, and registrants of the domain names are within the territory of P.R.C. For example: for the domain name of “cnnic.cn”,

it has only one website and the corresponding web address is “cnnic.cn” or “www.cnnic.cn”. Other web addresses with such domain name as the suffix, like “whois.cnnic.cn” and “mail.cnnic.cn”, are regarded as different channels of the website.

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

◇ **Deadline of Survey Data:** The deadline of the statistical survey data is Mar.15, 2020.

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
Mainland China	339,092,992	20A+58B+43C
Taiwan	35,695,872	2A+41B+223C
Hong Kong SAR	12,382,720	166B+104C
Macau SAR	336,640	5B+33C

Table 2 The Allocation of IPv4 Addresses among Organizations in Mainland China

Organization Name	Number of Addresses	Total Number of IPv4 Addresses
China Telecom	12,576,3328	7A+126B+255C
China Unicom	69,866,752 ^{Note 1}	4A+42B+21C
IP Address Allocation Alliance of CNNIC	61,979,904 ^{Note 2}	3A+177B+189C
China Mobile	35,294,208	2A+26B+140C
China Education and Research Network	16,649,728	254B+14C
China Tietong Telecom	15,796,224 ^{Note 3}	241B+8C
Others	13,742,848	209B+179C
Total	339,092,992	20A+58B+43C

Data sources: Asia-Pacific Network Information Center (APNIC) and China Internet Network Information Center (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 84.97 million, equivalent to 5.1A. The IPv4 addresses of the members of IP Address Assignment Alliance listed in the above table do not include those IPv4 addresses already assigned to former China Unicom and Tietong.

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

Note 4: The deadline for the above statistical data is Dec.31, 2019.

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

Region	Number of Addresses
Mainland China	47,885
Taiwan	2,538
Hong Kong SAR	447
Macau SAR	7

Table 4 The Allocation of IPv6 Addresses in Mainland China

Organization Name	Number of IPv6 Addresses (/32)
China Telecom	16,387
IP Address Allocation Alliance of CNNIC	14,328 ^{note2}
China Education and Research Network	6,162
China Unicom	4,097
China Mobile	4,097
China Tietong Telecom	2,049 ^{note3}
China Science and Technology Network	17 ^{note4}
Others	748
Total	47,885

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 16409/32. 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 Tietong Telecom and China Science and Technology Network (CSTNET).

Note 3: The IPv6 addresses of China Tietong Telecom 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, 2019.

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

Province	Proportion
Beijing	25.49%
Guangdong	9.54%
Zhejiang	6.47%
Shandong	4.89%
Jiangsu	4.76%
Shanghai	4.51%
Liaoning	3.33%
Hebei	2.85%
Sichuan	2.77%
Henan	2.63%
Hubei	2.40%
Hunan	2.36%
Fujian	1.94%
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, 2019.

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

Province	Domain names		Among them: .CN domain names		.中国 domain names	
			Number	Proportion in .CN domain names	Number	Proportion in .中国 domain names
	Number	Proportion in total domain names	Number	Proportion in .CN domain names	Number	Proportion in .中国 domain names
Fujian	6951243	13.6%	4227657	18.9%	1505477	88.4%
Guangdong	6118385	12.0%	2037735	9.1%	21389	1.3%
Beijing	5049877	9.9%	1965633	8.8%	28740	1.7%
Henan	3135248	6.2%	1058690	4.7%	4658	0.3%
Hunan	2501484	4.9%	907915	4.0%	2753	0.2%
Jiangsu	2425387	4.8%	1098288	4.9%	11242	0.7%
Sichuan	2170482	4.3%	849678	3.8%	11035	0.6%
Hubei	2063296	4.1%	885753	3.9%	5340	0.3%
Zhejiang	1840148	3.6%	615742	2.7%	8895	0.5%
Shandong	1773097	3.5%	774486	3.5%	24143	1.4%
Jiangxi	1566758	3.1%	746128	3.3%	5795	0.3%
Anhui	1513616	3.0%	652114	2.9%	2734	0.2%
Shanghai	1388849	2.7%	719673	3.2%	9575	0.6%
Hubei	1383850	2.7%	750388	3.3%	5489	0.3%
Guangxi	1252634	2.5%	582665	2.6%	2230	0.1%
Guizhou	1199342	2.4%	414203	1.8%	3249	0.2%
Shaanxi	1074086	2.1%	471840	2.1%	5292	0.3%
Yunnan	990032	1.9%	413092	1.8%	5518	0.3%
Liaoning	961913	1.9%	583668	2.6%	6775	0.4%
Shanxi	820642	1.6%	477209	2.1%	1903	0.1%
Chongqing	811992	1.6%	301415	1.3%	5404	0.3%
Hainan	641935	1.3%	324006	1.4%	441	0.0%
Jilin	626679	1.2%	234719	1.0%	1572	0.1%
Heilongjiang	560257	1.1%	256080	1.1%	3280	0.2%
Gansu	343054	0.7%	174505	0.8%	919	0.1%
Tianjin	334146	0.7%	145469	0.6%	1697	0.1%
Inner Mongolia	279128	0.5%	142158	0.6%	1304	0.1%
Xinjiang	158680	0.3%	66247	0.3%	918	0.1%
Ningxia	81511	0.2%	43354	0.2%	440	0.0%
Qinghai	38997	0.1%	20639	0.1%	181	0.0%
Tibet	20058	0.0%	13793	0.1%	457	0.0%
Others	865489	1.7%	471958	2.1%	14611	0.9%
Total	50942295	100.0%	22426900	100.0%	1703456	100.0%

Table 7 Web Pages Categorized by Suffix

Web page suffix	Proportion
html	46.08%
htm	4.02%
/	14.93%
shtml	2.93%
asp	0.94%
php	5.99%
jsp	0.27%
aspx	1.58%
Other suffixes	23.26%
Total	100.00%

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

Table 8 The Number of Web Pages by Province

	Total web pages after duplication removed	Static	Dynamic	Proportion of Static to Dynamic
Beijing	112,491,651,009	77,342,016,903	35,149,634,106	2.20
Guangdong	40,580,470,043	29,748,748,331	10,831,721,712	2.75
Zhejiang	35,523,633,334	23,631,891,744	11,891,741,590	1.99
Shanghai	21,170,500,933	14,300,570,128	6,869,930,805	2.08
Henan	14,789,152,264	9,976,529,229	4,812,623,035	2.07
Jiangsu	14,384,291,053	9,607,980,457	4,776,310,596	2.01
Hebei	11,161,383,615	7,503,258,278	3,658,125,337	2.05
Fujian	7,092,222,905	5,400,446,405	1,691,776,500	3.19
Shandong	5,844,398,886	4,307,931,973	1,536,466,913	2.80
Tianjin	4,377,725,523	3,038,028,826	1,339,696,697	2.27
Sichuan	4,268,267,276	3,366,241,581	902,025,695	3.73
Shanxi	3,831,038,657	2,534,070,871	1,296,967,786	1.95
Anhui	3,512,065,237	2,604,914,559	907,150,678	2.87
Liaoning	2,198,633,421	1,492,239,032	706,394,389	2.11
Jiangxi	2,161,699,656	1,460,205,872	701,493,784	2.08
Jilin	2,052,845,780	1,402,714,088	650,131,692	2.16
Hubei	1,990,192,685	1,411,521,169	578,671,516	2.44
Heilongjiang	1,844,942,262	1,398,261,838	446,680,424	3.13
Guangxi	1,832,653,391	1,339,607,180	493,046,211	2.72
Yunnan	1,733,805,207	985,537,723	748,267,484	1.32
Hunan	1,405,631,922	1,010,646,291	394,985,631	2.56
Shaanxi	1,231,035,945	792,047,131	438,988,814	1.80
Hainan	1,114,258,097	825,081,057	289,177,040	2.85
Chongqing	564,347,920	325,629,097	238,718,823	1.36
Guizhou	250,343,770	163,481,223	86,862,547	1.88
Inner Mongolia	184,534,517	102,660,381	81,874,136	1.25
Gansu	125,306,189	91,319,683	33,986,506	2.69
Xinjiang	67,219,451	57,610,753	9,608,698	6.00
Qinghai	25,652,178	18,892,545	6,759,633	2.79
Ningxia	16,183,704	11,810,633	4,373,071	2.70
Tibet	3,827,681	3,417,364	410,317	8.33
The whole country	297,829,914,511	206,255,312,345	91,574,602,166	2.25

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

Table 9 The Number of Web Page Bytes by Province

	Total Page Size	Average Page Size (KB)
Beijing	9,349,712,147,880	83
Guangdong	2,722,564,025,419	67
Zhejiang	2,221,857,618,145	63
Shanghai	1,648,299,212,791	78
Hebei	906,223,987,575	81
Henan	824,930,039,794	56
Jiangsu	686,503,236,366	48
Fujian	415,362,417,431	59
Shanxi	401,630,768,645	105
Shandong	339,951,150,001	58
Tianjin	255,307,201,411	58
Sichuan	217,571,936,607	51
Liaoning	118,259,434,858	54
Anhui	98,808,794,584	28
Heilongjiang	97,846,328,385	53
Yunnan	86,878,724,976	50
Jiangxi	85,017,269,600	39
Jilin	84,479,735,961	41
Hubei	82,122,912,915	41
Guangxi	77,969,322,193	43
Hunan	58,805,314,272	42
Hainan	56,951,737,002	51
Shaanxi	48,803,927,625	40
Chongqing	36,677,422,799	65
Guizhou	13,567,030,133	54
Inner Mongolia	6,019,885,013	33
Gansu	6,005,173,801	48
Xinjiang	2,530,200,633	38
Qinghai	1,010,039,117	39
Ningxia	554,646,285	34
Tibet	142,248,491	37
The whole country	20,952,363,890,708	70

Data source: 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 on basic resources. (Not listed in any particular order)

Ministry of Industry and Information Technology	Hangzhou 22.cn Co., Ltd.
China Telecom Cloud Company	Hangzhou E-commerce Interconnection Technology Co., Ltd.
China Organizational Name Administration Center	Hangzhou Marksmile.com Co., Ltd.
Alibaba Communication Technology (Beijing) Co., Ltd.	Hangzhou Yunji Communication Technology Co., Ltd.
Alibaba Cloud Computing Co., Ltd.	Henan Weichuang Network Technology Co., Ltd.
Beijing Oriental Wangjing Information Technology Co., Ltd.	Heilongjiang E-link Network Co., Ltd.
Beijing XDNS.cn Co., Ltd.	Internet Domain Name System Beijing Engineering Research Center
Beijing HuaRui Wireless Technology Co., Ltd.	Jiangsu Bangning Technology Co., Ltd.
Beijing Jinluoshen E-commerce Co., Ltd.	Kunming Lewang Digital Technology Co., Ltd.
Beijing Blue Ocean Great Undertaking Co., Ltd.	Maoming City Qunying Network Co., Ltd.
Beijing Wanweitonggang Technology Co., Ltd.	Ningxia Hengsheng Friends Network Technology Co., Ltd.
Beijing Xinwanghulian Technology Co., Ltd.	Xiamen Nawang Technology Co., Ltd.
Beijing Xinet Digital Information Technology Co., Ltd.	Xiamen 35.com Technology Co., Ltd.
Beijing ZW Network Technology Co., Ltd.	Xiamen Shangzhong Online Technology Co., Ltd.
Beijing Zhongyuzhike International Network Technology Co., Ltd.	Xiamen ZZY Network Service Co., Ltd.
Beijing Zhuoyueshengming Technology Co., Ltd.	Xiamen eName Technology Co., Ltd.
Beijing Zihai Technology Co., Ltd.	Shanghai Oray.com Co., Ltd.
Chengdu Feishu Technology Co., Ltd.	Shanghai Chinafu.com Co., Ltd.
Chengdu Shijidongfang Network Communication Co., Ltd.	Shanghai Meicheng Technology Information Development Co., Ltd.
Chengdu West Dimension Digital Technology Co., Ltd.	Shanghai Yovole Network Co., Ltd.
Dalian Zhongyi Interconnection Technology Co., Ltd.	Shenzhen Idcipc.com Co., Ltd.
Daqing Zhuochuang Multi-media Production Co., Ltd.	Shenzhen Internet Works Online Technology Co., Ltd.
Panasia Info&Tech JiangSu Co., Ltd.	Shenzhen Web Information Technology Co., Ltd.
Foshan Yidong Network Co., Ltd.	Shenzhen Yingmaisi Culture Technology Co., Ltd.
Fujian Litian Network Technology Co., Ltd.	Sichuan Yuqu Network Technology Co., Ltd.
Guangdong Huyi Network Intellectual Property Co., Ltd.	Tianjin Zhuiqi Technology Development Co., Ltd.
Guangdong Jinwanbang Technology Investment Co., Ltd.	Wangju Brands Management Co., Ltd.
Guangdong Nicenic.net Inc.	Wenzhou Zhongwang Computer Technology Service Co., Ltd.
Guangdong Shidai Hulian Technology Co., Ltd.	Yantai DNSpod Network Technology Co., Ltd.
Guangxi Beibu Gulf Online Investment Co., Ltd.	Ejee Group Beijing Co., Ltd.
Guangzhou Mingyang Information Technology Co., Ltd.	Yunnan Landui Cloud Computing Co., Ltd.
Guangzhou Yiyou Information Technology Co., Ltd.	Zhejiang 22net Inc.
Vip Internet Co., Ltd.	Zhengzhou Shanglv Technology Co., Ltd.
Guizhou Eric Network Co., Ltd.	Zhengzhou Shijichuanglian Electronic Technology Development Co., Ltd.

Zhengzhou Yifang Technology & Trade Co., Ltd.
China Education and Research Network
Grow Force Technology Co., Ltd.

ChinaNet (Suzhou) Co., Ltd.
Knetreg (Tianjin) Technology Co., Ltd.
Chongqing Zhijia Information Technology Co. Ltd.

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

E-government Research Center, Party School of the Central Committee of C.P.C
(National Academy of Governance)

Beijing Ucap Information Technology Co., Ltd.

Baidu Online Network Technology (Beijing) Co., Ltd.

Beijing Micro Dream Network Technology Co., Ltd. (Micro-blog)

Beijing Bytedance Technology Co., Ltd. (Toutiao)

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

National Internet Emergency Center (CNCERT)

China Reporting Center for Illegal and Inappropriate Internet Information, CAC (12377)

We also extend our sincere thanks to other organizations that have helped us in the course of compiling and revising the Report.

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