
Statistical Report on Internet Development in China

(August 2019)

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 43 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.

Currently, major breakthroughs have been made in the new-generation network information technology, developing a more digital and intelligent network. The digital transformation of the world economy has become the prevailing trend. Since the 19th National Congress of the Communist Party of China, all regions and departments, under the strong leadership of the Party Central Committee with Comrade Xi Jinping at its core, have implemented the spirit of the National Conference on Cyberspace Security and Information Technology. As the strategy for building a country with strong cyber technology is being advanced and cybersecurity keeps improving steadily, the Internet has played a more important role in China's economic and social development. 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 five aspects of basic Internet development, the size and structure of Internet users, the development of Internet applications, the development of e-government applications, and Internet security. It strives to comprehensively demonstrate the development of China's Internet in the first half of 2019 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, 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)

August 2019



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Summary

- ◇ As of June 2019, China had 854 million netizens, up by 25.98 million from the end of 2018, and its Internet penetration had reached 61.2%, up 1.6 percentage points over the end of 2018.
- ◇ Up to June 2019, the number of mobile Internet users in China had reached 847 million, up 29.84 million over the end of 2018. The proportion of Internet users accessing the Internet through mobile phones in China had amounted to 99.1%, up 0.5 percentage point over the end of 2018.
- ◇ As of June 2019, the size of rural Internet users was 225 million¹ or 26.3% of China's total netizen population, up 3.05 million over the end of 2018, while that of urban Internet users had reached 630 million or 73.7% of China's total netizen population, up 22.93 million from the end of 2018.
- ◇ Up to June 2019, the proportions of Chinese netizens accessing the Internet through mobile phones, desktop computers, laptops computers, TVs and tablet computers were 99.1%, 46.2%, 36.1%, 33.1%, and 28.3%, respectively.
- ◇ Up to June 2019, the number of IPv6 addresses in China had reached 50,286 blocks/32, up 14.3% over the end of 2018.
- ◇ As of June 2019, China had a total of 48 million domain names, of which 21.85 million or 45.5% were ended with ".CN", up by 2.9% from the end of 2018.
- ◇ As of June 2019, the user size of instant messaging was 825 million or 96.5% of China's total netizen population, up 32.98 million over the end of 2018; the number of mobile instant messaging users had reached 821 million, up 40.4 million from the end of 2018, accounting for 96.9% of mobile Internet users.
- ◇ Up to June 2019, the user size of online news was 686 million or 80.3% of China's total netizen population, up 11.14 million over the end of 2018; the number of mobile news users had reached 660 million, up 7.34 million from the end of 2018, making up 78.0% of mobile Internet users.

¹The number of rural Internet users was 224.55 million or 225 million as a round-off number.

- ◇ As of June 2019, the user size of online shopping was 639 million or 74.8% of China's total netizen population, up 28.71 million over the end of 2018; the number of mobile shopping users had reached 622 million, up 29.89 million from the end of 2018, taking up 73.4% of mobile Internet users.
- ◇ Up to June 2019, the user size of online meal ordering was 421 million or 49.3% of China's total netizen population, up 15.16 million over the end of 2018; the number of mobile meal ordering users had reached 417 million, up 20.37 million from the end of 2018, representing 49.3% of mobile Internet users.
- ◇ As of June 2019, the user size of online payment was 633 million or 74.1% of China's total netizen population, up 32.65 million over the end of 2018; the number of mobile payment users had reached 621 million, up 37.88 million from the end of 2018, accounting for 73.4% of mobile Internet users.
- ◇ Up to June 2019, the user² size of online video was 759 million or 88.8% of China's total netizen population, up 33.91 million over the end of 2018; among them, 648 million were short video users making up 75.8% of China's Internet users.
- ◇ As of June 2019, the user size of online car-hailing services was 337 million or 39.4% of China's total netizen population, up 6.70 million over the end of 2018; the number of online premier and fast ride had reached 339 million, up 6.33 million from the end of 2018, representing 39.7% of China's Internet users.
- ◇ Up to June 2019, 509 million Internet users or 59.6% of all netizens had received e-government services in China.

² Online video users refer to the combination of long video and short video users, similarly hereinafter. Long video users refer to those who had watched TV plays, variety shows and movies via the Internet in the past six months, while short video users refer to those who had watched short video programs.



Chapter I Basic Internet Development

I. Basic Internet Resources

(I) An Overview of Basic Internet Resources

Up to June 2019, China had 385.98 million IPv4 addresses and 50,286 blocks/32 of IPv6 addresses.

China had a total of 48 million domain names, of which 21.85 million or 45.5% were ended with “.CN”.

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

	Dec. 2018	Jun. 2019	Semi-annual increment	Semi-annual growth rate
IPv4 ³	385,843,968	385,979,136	135,168	0.04%
IPv6 ⁴ (block/32)	43,985	50,286	6,301	14.3%
Domain name	37,927,527 ⁵	48,001,471 ⁶	--	--
Wherein, .CN Domain name	21,243,478	21,851,990	608,512	2.9%

(II) IP Address

Up to June 2019, the number of IPv6 addresses in China had reached 50,286 blocks/32, up 14.3% over the end of 2018.

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

⁴ Data for December 2018 and June 2019 cover Hong Kong, Macau and Taiwan.

⁵ The statistics in December 2018 do not include the number of new generic Top-Level Domains (New gTLD).

⁶ The statistics in June 2019 include the number of new generic Top-Level Domains (New gTLD).

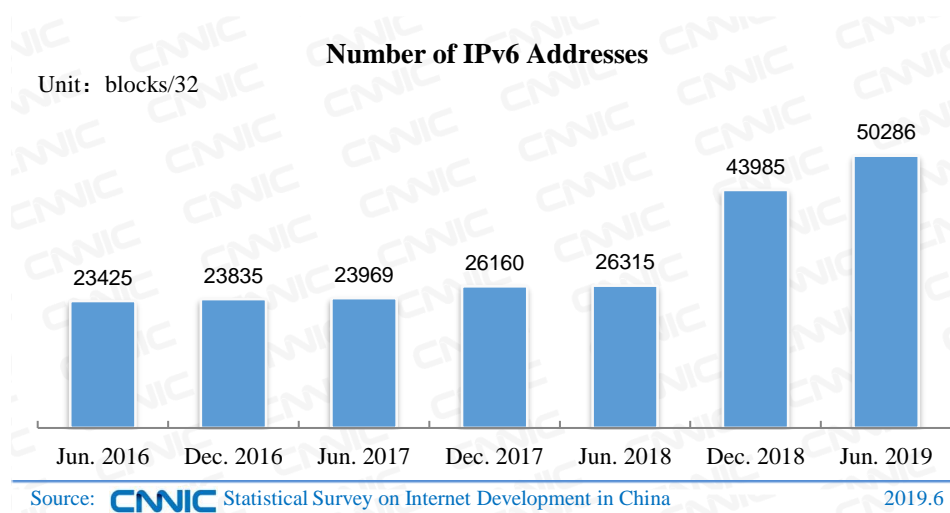


Figure 1 Number of IPv6 Addresses⁷

As of June 2019, the number of IPv4 addresses in China was 385.98 million.

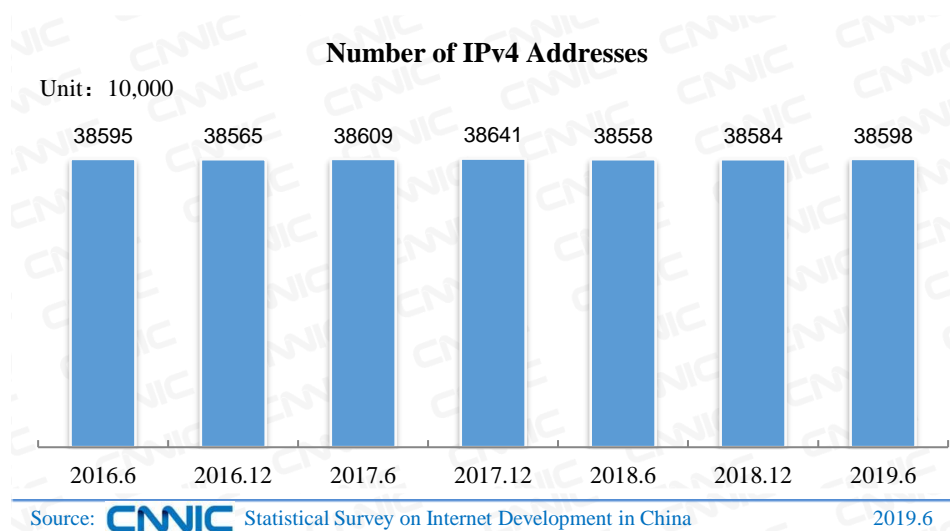


Figure 2 Number of IPv4 Addresses⁸

(III) Domain Name

As of June 2019, China had 48 million domain names. Among them, the number of “.CN” domain names was 21.85 million or 45.5% of the national total, up 2.9% from the end of 2018; the number of “.COM” domain names was 14.56 million or 30.3% of the national total; the number of “.中国” domain names was 1.71 million or 3.6% of the national total; the number of new generic

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

⁸ The data in Figure 2 cover Hong Kong, Macau and Taiwan.



Top-Level Domains (New gTLD) was 8.06 million, or 16.8% of the national total.

Table 2 Number of Domain Names by Category⁹

	Number	Proportion in total domain names
.CN	21,851,990	45.5%
.COM	14,558,469	30.3%
.中国	1,705,861	3.6%
.NET	1,126,268	2.3%
.BIZ	357,174	0.7%
.ORG	185,822	0.4%
.INFO	62,506	0.1%
New gTLD	8,057,424	16.8%
Others	95,957	0.2%
Total	48,001,471	100.0%

Table3 Number of “.CN” Domain Names by Category

	Number	Proportion in total “.CN” domain names
.CN	19,075,505	87.3%
.COM.CN	2,228,998	10.2%
.NET.CN	265,698	1.2%
.ORG.CN	158,474	0.7%
.ADM.CN	81,674	0.4%
.GOV.CN	24,733	0.1%
.AC.CN	10,543	0.0%
.EDU.CN	6,264	0.0%
Others	101	0.0%
Total	21,851,990	100.0%

II. Application of Internet Resources

(I) Websites

As of June 2019, there were 5.18 million websites¹⁰ in China, down 1.1% from the end of 2018.

⁹ Generic Top-Level Domains (gTLD) and new generic Top-Level Domains (New gTLD) are provided by China's domain name registration units.

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

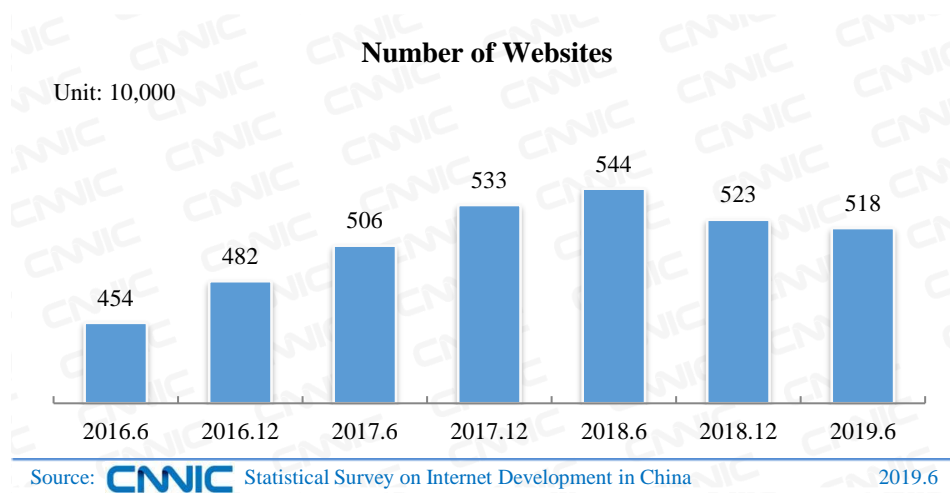


Figure 3 Number of Websites¹¹

Up to June 2019, China had 3.37 million websites with the domain name of “.CN”, up 3.5% from the end of 2018.

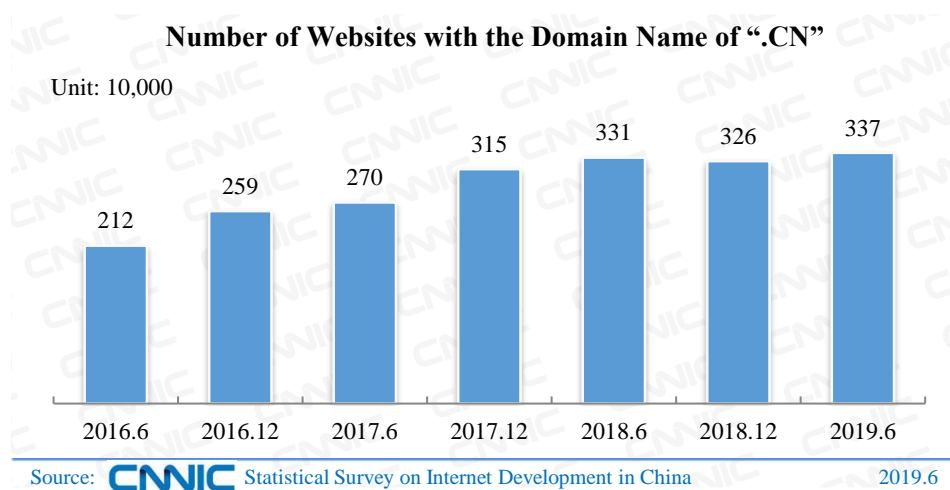


Figure 4 Number of Websites with the Domain Name of “.CN”¹²

(II) Mobile Internet Access Traffic

From January to June 2019, the cumulative mobile Internet traffic totaled 55.39 billion GB, up 107.3% over the same period of last year.

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”.
The 44th Statistical Report on Internet Development in China



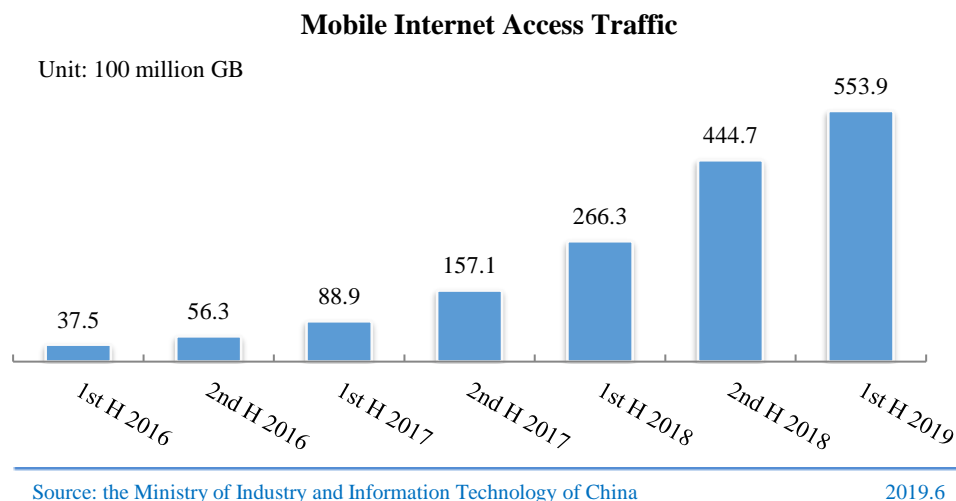


Figure 5 Mobile Internet Access Traffic¹³

III. Internet Access Environment

(I) Internet Access Devices

As of June 2019, the proportion of Chinese netizens accessing the Internet through mobile phones, desktop computers, laptops computers, TVs and tablet computers was 99.1%, 46.2%, 36.1%, 33.1%, and 28.3%, respectively. The proportion of Internet users surfing the Internet through mobile phones and TVs increased respectively by 0.5 percentage point and 2.0 percentage points from the end of 2018.

¹³ Source: Data for 2016 are from the *Annual Report on China's Communications Statistics*. Data for 2017-1st H 2019 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.

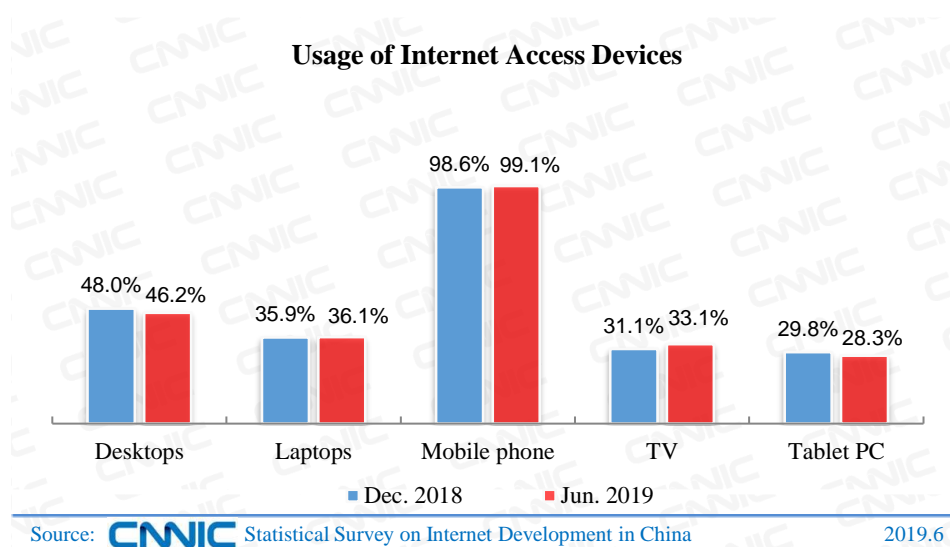


Figure 6 Usage of Internet Access Devices

(II) Online Duration

1. Weekly Per Capita Online Duration of Internet Users

In the first half of 2019, the average online duration per netizen in China was 27.9 hours in a week, an increase of 0.3 hour from the end of 2018.

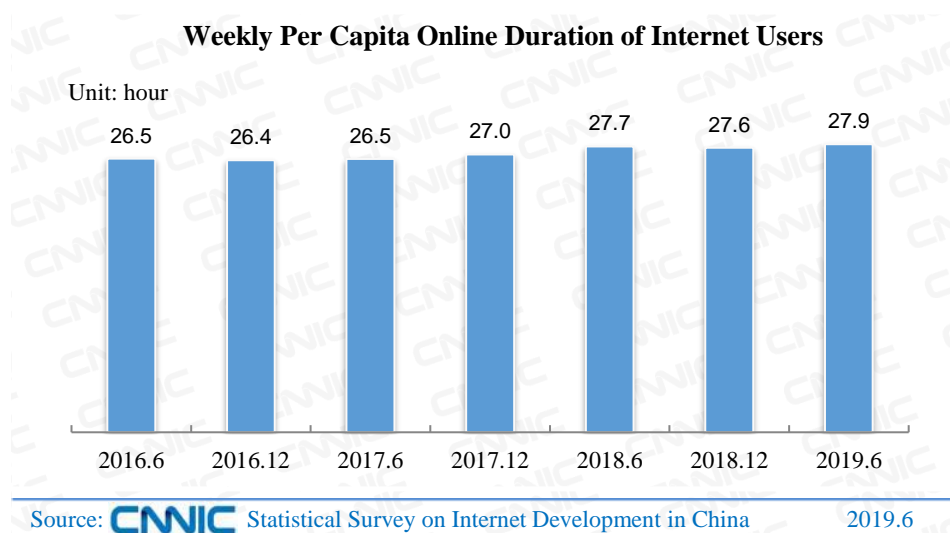
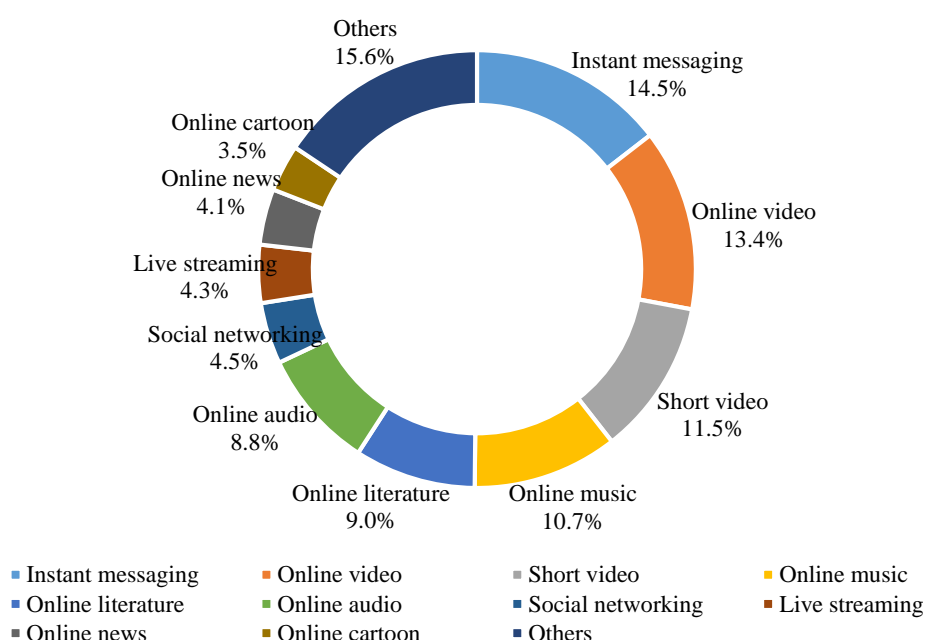


Figure 7 Weekly Per Capita Online Duration of Internet Users

2. The Proportion of Usage Duration by Type of Application

In the first half of 2019, of all Apps (Application, Mobile Internet Application) frequently used by mobile Internet users, instant messaging Apps were used for the longest duration, accounting for 14.5%; by usage duration, the proportions of online video, short video, online music, online literature, and online audio¹⁴ Apps were 13.4%, 11.5%, 10.7%, 9.0% and 8.8%, respectively.

Proportion of Usage Duration by Type of Application



Source: China Telecom

2019.6

Figure 8 Proportion of Usage Duration by Type of Application¹⁵

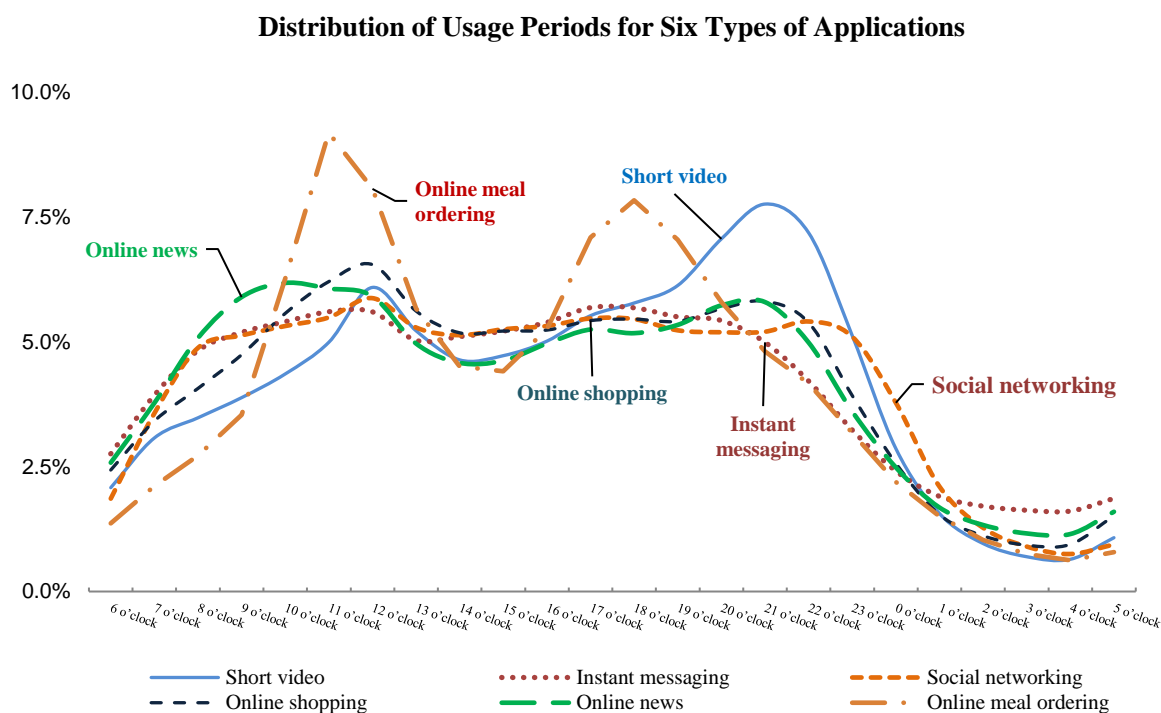
3. Distribution of Usage Periods by Type of Application

In the first half of 2019, of the six types of Apps used by mobile phone users more frequently, the usage period of instant messaging and social networking Apps was evenly distributed between 9 o'clock and 20 o'clock, accounting for more than 5% respectively. Short video Apps had two small peaks at 12 o'clock and 21 o'clock respectively, which conformed to the law of leisure and

¹⁴ Online audio refers to the type of mobile Internet applications that can provide audio programs such as network radio stations.

¹⁵ Source: The usage duration data of all types of applications are derived from 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 June, and the daily average total duration of each type of application is calculated by building a data model.

entertainment time for most netizens. The distribution of usage period of online shopping and online news Apps was relatively close, with the total usage duration between 8 o'clock and 22 o'clock making up more than 80%. The obvious distribution peak value of usage period of online meal ordering Apps had a high correlation with internet users' mealtime, with usage peaks occurring at 11 o'clock and 18 o'clock.



Source: China Telecom

2019.6

Figure 9 Distribution of Usage Periods¹⁶ for Six Types Applications

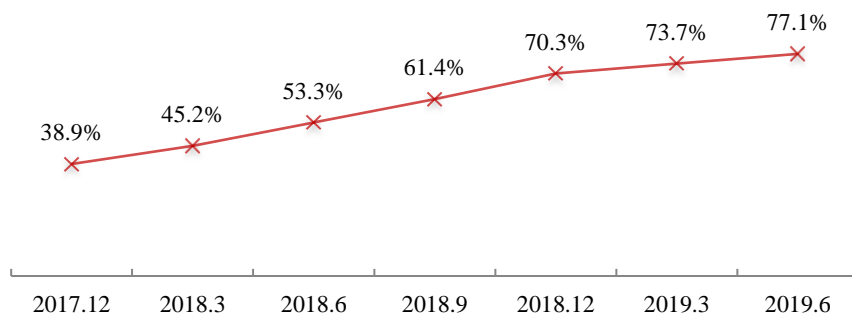
(III) Proportion of Subscribers of Broadband at the Speed of 100 Mbps or above

As of June 2019, the number of subscribers of broadband at the speed of 100 Mbps or above had accounted for 77.1% of all broadband subscribers.

¹⁶ 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 $0.25/4$.

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



Source: the Ministry of Industry and Information Technology of China

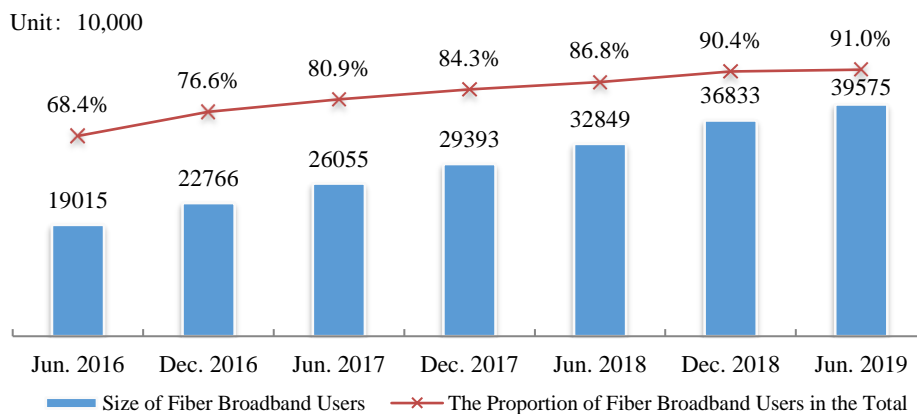
2019.6

Figure 10 Proportion of Subscribers of Broadband at the Speed of 100 Mbps or above

(IV) Scale and Proportion of Fiber Broadband Users

As of June 2019, the number of FTTH/O¹⁷ users had reached 395.75 million, accounting for 91.0% of all Internet broadband access users, up 0.6 percentage point from the end of 2018.

Scale and Proportion of Fiber Broadband Users



Source: the Ministry of Industry and Information Technology of China

2019.6

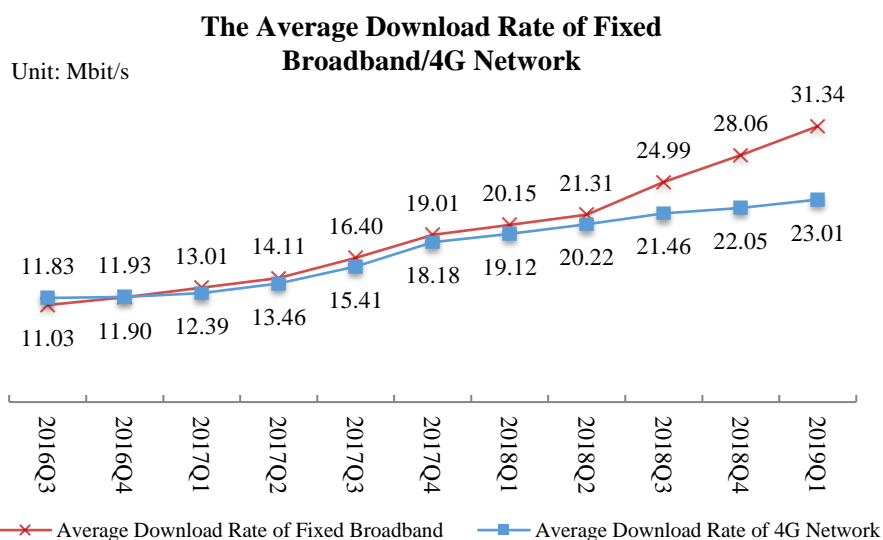
Figure 11 Scale and Proportion of Fiber Broadband Users¹⁸

¹⁷ FTTH/O refers to FTTH and FTTO. FTTH means Fiber to the home. FTTO stands for Fiber to the office.

¹⁸ Source: Data for 2016 are from the *Annual Report on China's Communications Statistics*. Data for 2017-June 2019 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.

(V)Download Rate of Broadband

As of the first quarter of 2019, the average download rate of China's fixed broadband was 31.34 Mbit/s, up 55.5% 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 23.01 Mbit/s, up 20.4% year on year.



Source: Broadband Development Alliance

2019.3

Figure 12 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 June 2019, China had 854.49 million netizens, up by 25.98 million from the end of 2018, and its Internet penetration had reached 61.2%, up 1.6 percentage point over the end of 2018.

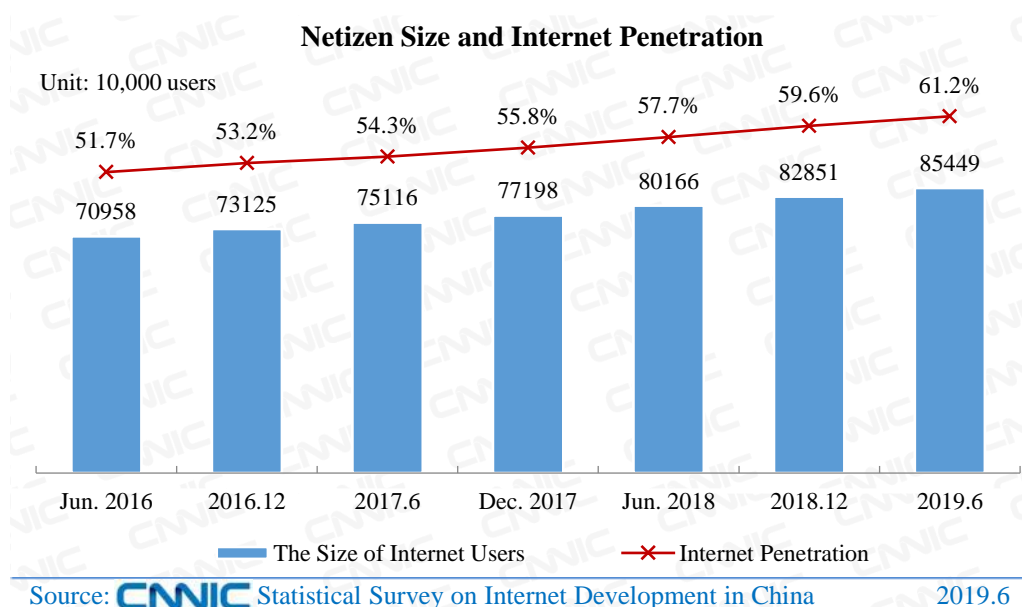


Figure 13 Netizen Size and Internet Penetration

As of June 2019, China had 846.81 million mobile Internet users, up 29.83 million over the end of 2018. Among all the Internet users, the proportion of those accessing the Internet through mobile phones increased from 98.6% at the end of 2018 to 99.1%.

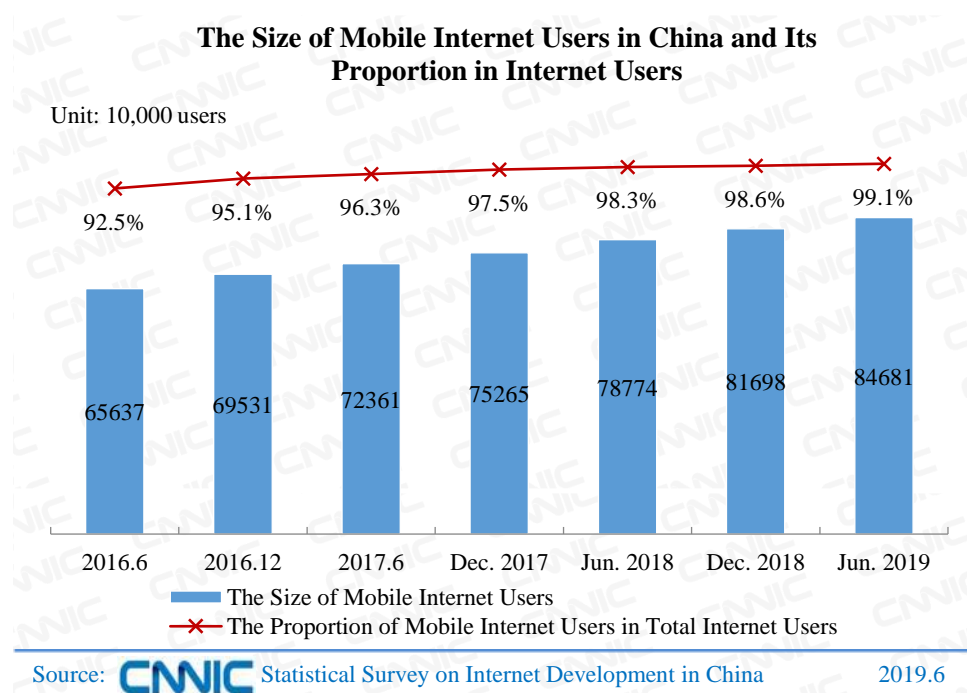


Figure 14 The Size of Mobile Internet Users and Its Proportion in Internet Users

China has kept providing more access to the Internet by increasing the network speed and reducing access charges, achieving remarkable results. The 2019 Government Work Report proposed to continue to speed up broadband and lower Internet rates, launch demo projects to extend 1,000M broadband connectivity to urban homes, upgrade networks for distance education and telemedicine, and increase the capacity of and upgrade mobile networks, so as to provide faster and more reliable broadband connections for Internet users. The Report also presented that average rates for mobile Internet services would be further cut by more than 20%. According to the *Notice on Launching the Special Action to Further Speed Up Broadband and Lower Internet Rates to Support High-quality Economic Development 2019* issued by the Ministry of Industry and Information Technology and the State-owned Assets Supervision and Administration Commission under the State Council in May 2019, it is necessary to further enhance the capacity of broadband networks, shore up weaknesses in development, optimize the development environment, boost the development of information consumption and the “Internet plus” action in a bid to build up China’s strength in cyberspace. The ratio of optical fiber users to all broadband subscribers, fixed broadband household penetration, broadband coverage rate in poor villages and other indicators reached their goals set in the *13th Five-Year National Planning for IT Application* ahead of schedule.

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

As of June 2019, the size of rural Internet users was 225 million or 26.3% of China's total netizen population, up 3.05 million over the end of 2018, while that of urban Internet users had reached 630 million or 73.7% of China's total netizen population, up 22.93 million from the end of 2018.

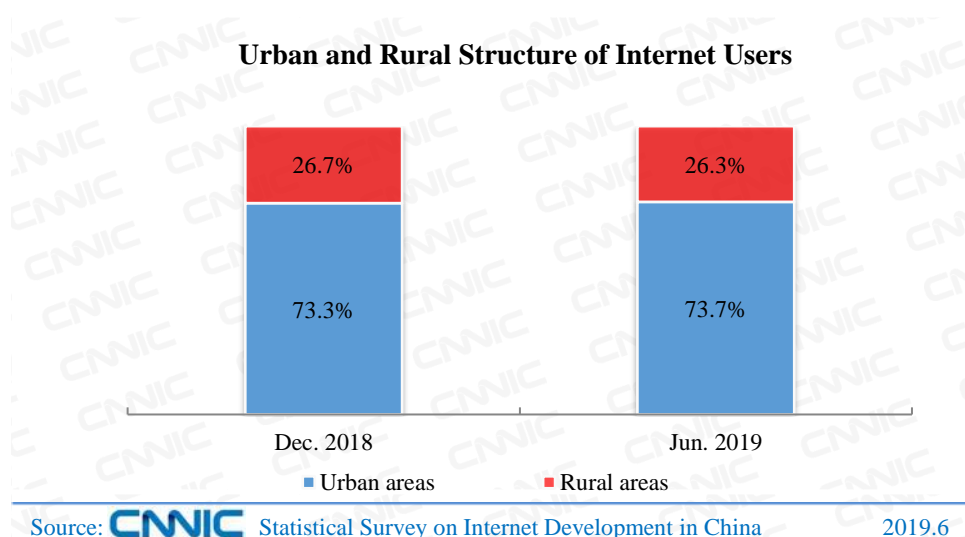


Figure 15 Urban and Rural Structure of Internet Users

(III) The Size of Non-netizen

As of June 2019, of 541 million non-netizens in China, these in urban areas accounted for 37.2%, while those in rural areas took up 62.8%. The majority of non-netizens were still in rural areas.

Shortage of Internet skills and limited literacy level were major factors preventing non-netizens from accessing the Internet. According to the survey, 44.6% and 36.8% of non-netizens did not access the Internet because they did not master computer/network skill or Pinyin, respectively. The proportion of non-netizens who did not surf the Internet because they did not have computers or other Internet devices was 15.3%. As age was another reason why non-netizens did not access the Internet, 14.2% of non-netizens were too old or too young to surf the Internet. The proportion of non-netizens who had no demand for or were not interested in surfing the Internet was 10.6%. The proportion of non-netizens who did not access the Internet due to lack of time and inability to connect to the Internet was less than 10%.

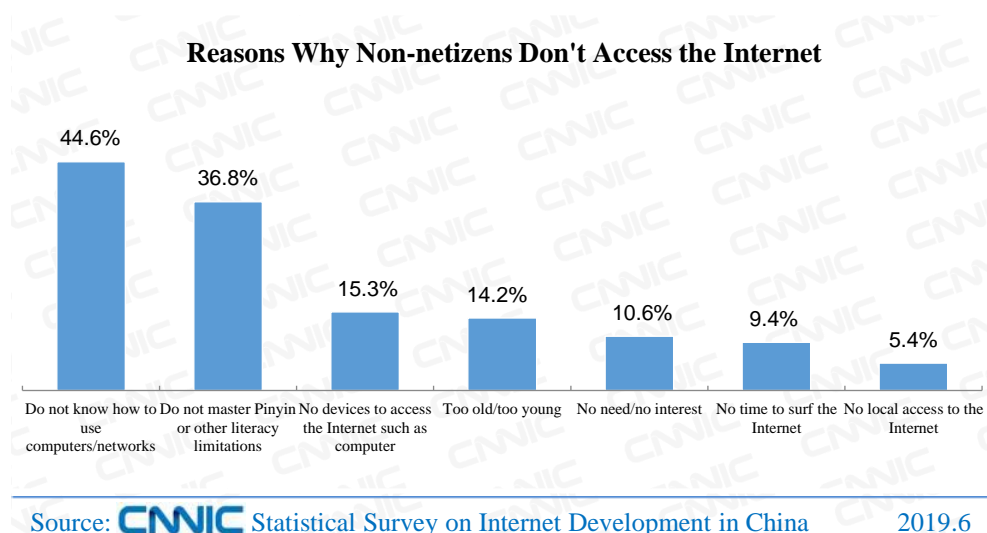


Figure 16 Reasons Why Non-netizens Don't Access the Internet

According to the survey, the primary factor of non-netizens accessing the Internet was to facilitate communication with their families and relatives, accounting for 18.1%. The second factor was to provide free training on Internet surfing, making up 16.7%. The third was to provide accessible Internet devices, taking up 15.7%.

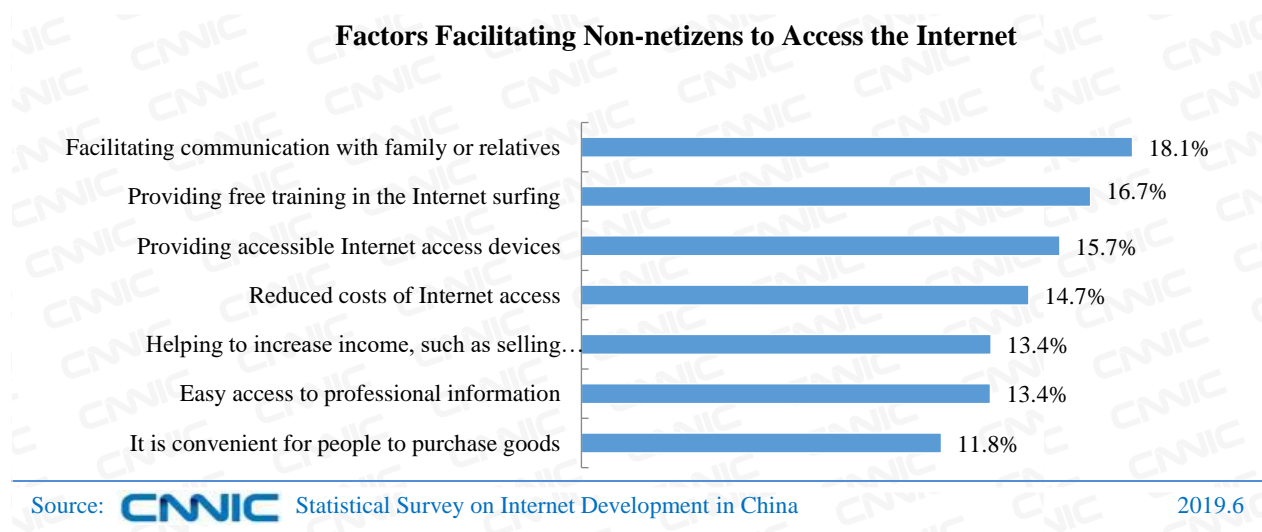


Figure 17 Factors Facilitating Non-netizens to Access the Internet

II. The Attribute Structure of Internet Users

(I) Gender Structure

As of June 2019, the gender ratio of China's Internet users was 52.4:47.6, basically the same as that at the end of 2018.

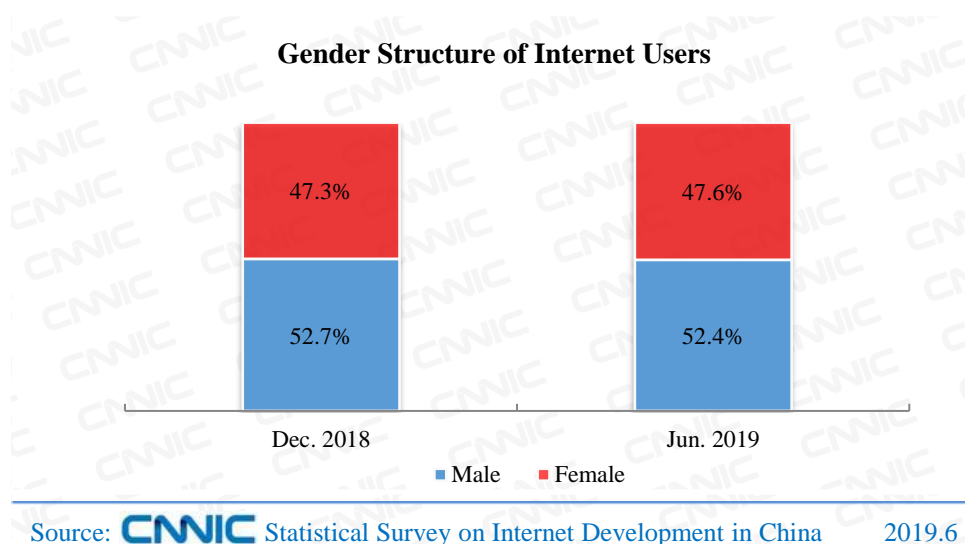


Figure 18 Gender Structure of Netizens

(II) Age Structure

As of June 2019, of the Internet users aged 10-39 accounting for 65.1% of the total, the Internet users aged 20-29 had made up 24.6%, representing the largest user group. The proportion of Internet users aged 40-49 had increased to 17.3% from 15.6% at the end of 2018. The proportion of Internet users aged 50 and above had risen to 13.6% from 12.5% at the end of 2018. The Internet continued to expand its presence among the middle-aged and elderly.

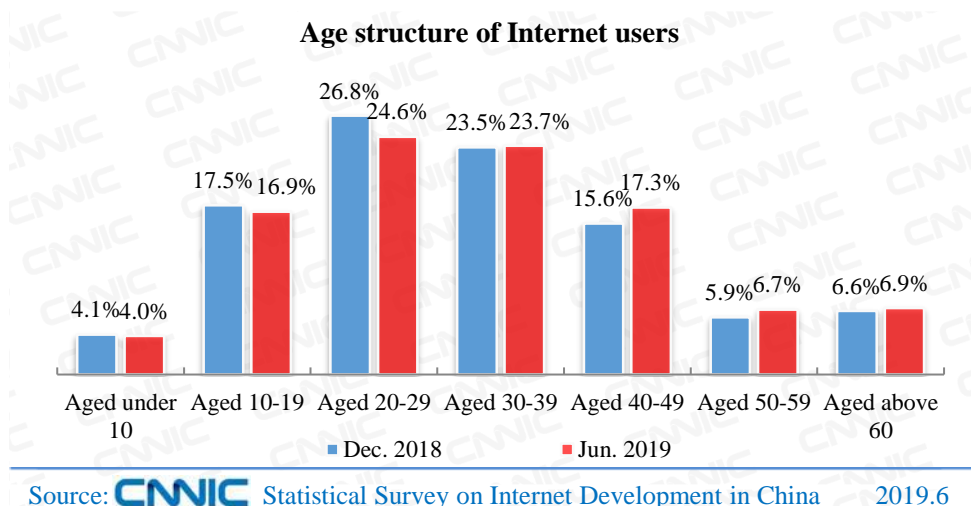


Figure 19 Age Structure of Netizens

(III) Educational Background

As of June 2019, the proportions of netizens graduating from junior middle schools as well as senior middle schools, vocational schools or technical schools were 38.1% and 23.8%, respectively. The proportions of Internet users holding a diploma from colleges and universities or above were 10.5% and 9.7%, respectively.

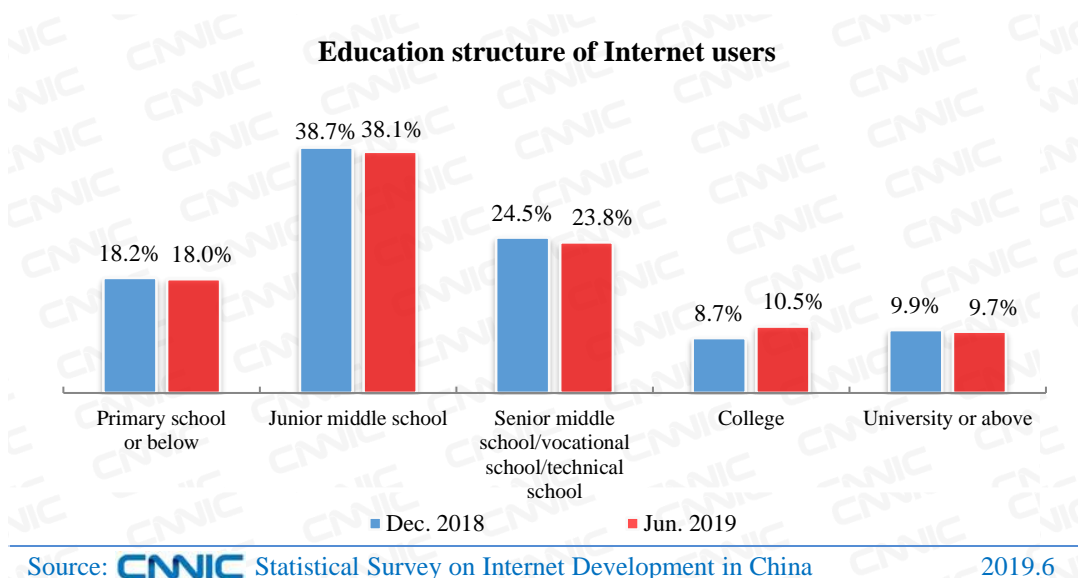
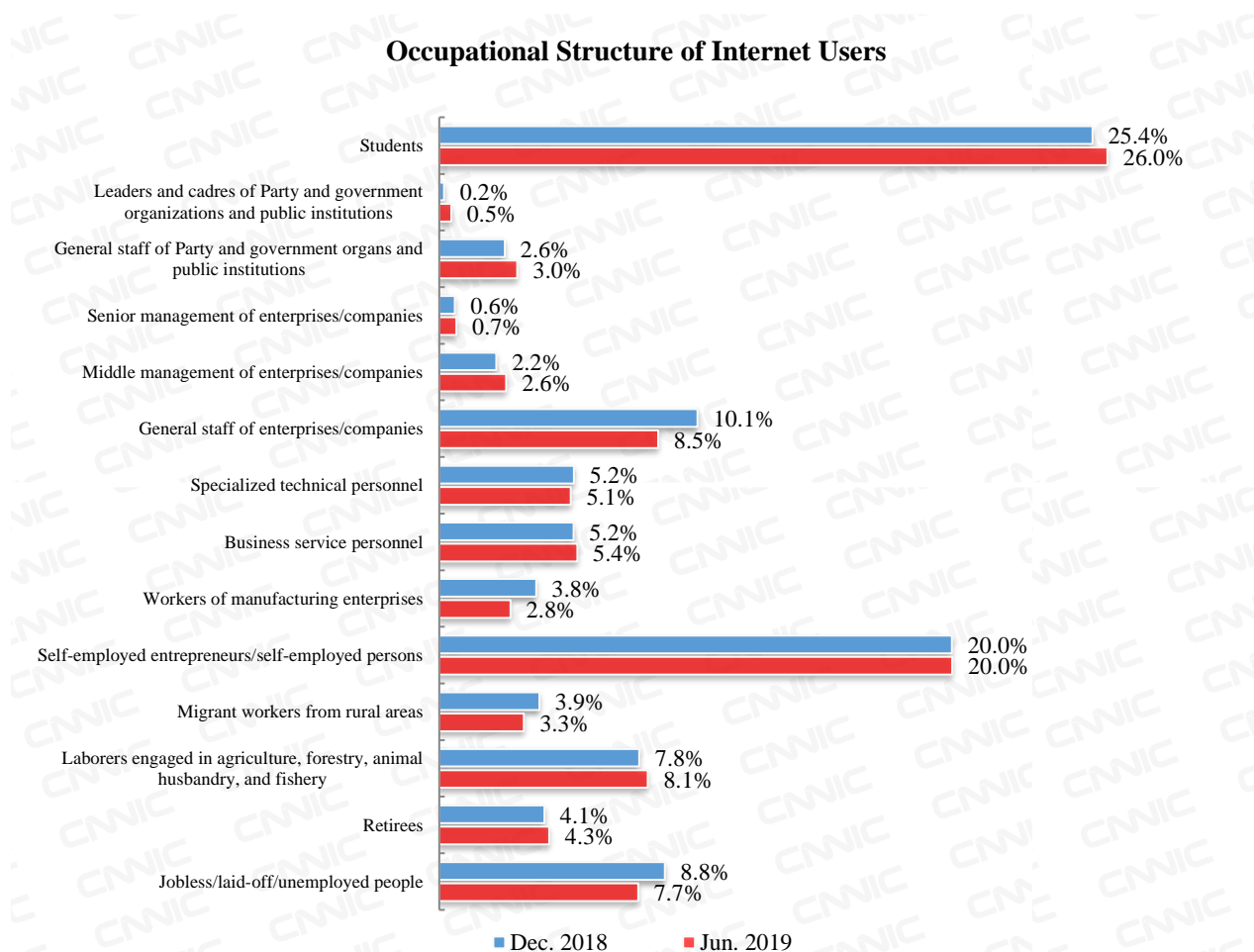


Figure 20 Educational Background of Netizens

(IV) Occupational Structure

Up to June 2019, of Chinese Internet users, 26.0% were students, 20.0% were self-employed businessmen/freelancers, and 11.8% were managers and ordinary staff members in enterprises/companies.



Source: CNNIC Statistical Survey on Internet Development in China

2019.6

Figure 21 Occupational Structure of Internet Users

(V) Income Structure

As of June 2019, the proportion of netizens with no income and a monthly income¹⁹ below

¹⁹ 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.

500 yuan was 19.9%. The number of netizens with a monthly income ranging from 2001 to 5000 yuan made up 33.4%. The proportion of netizens earning more than 5,000 yuan per month was 27.2%.

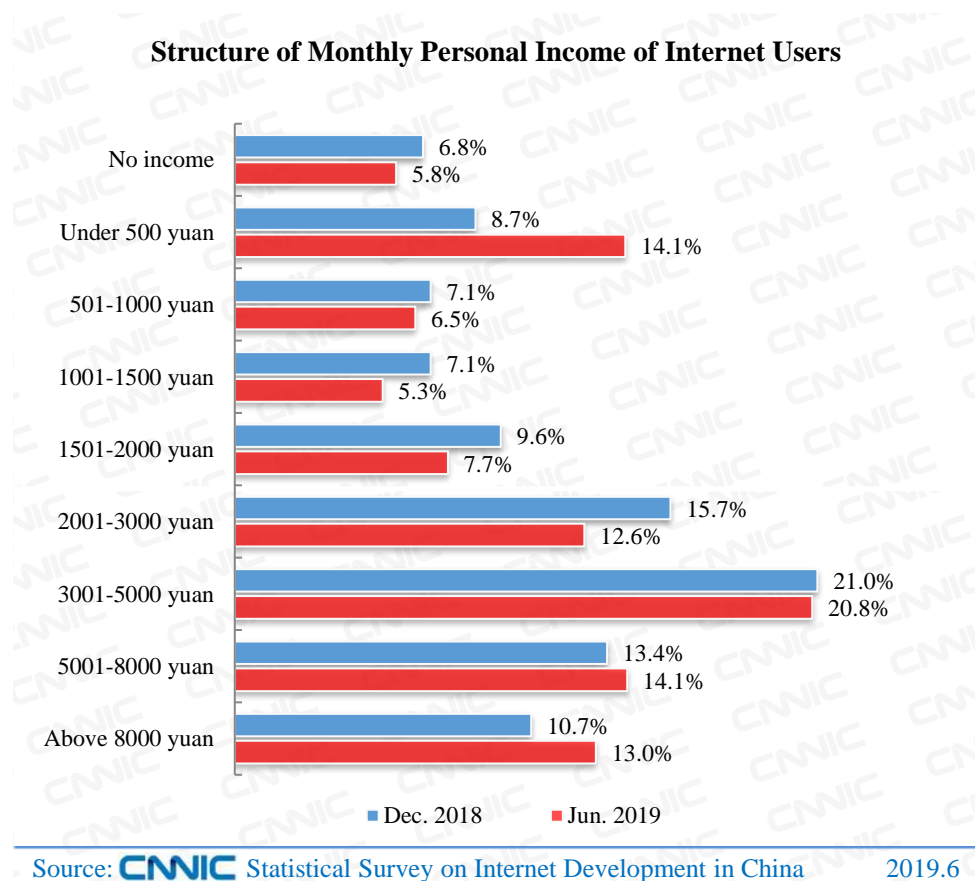


Figure 22 Structure of Monthly Personal Income of Internet Users

Chapter III The Development of Internet Applications

I. Overview of Internet Applications

In the first half of 2019, China's personal Internet applications developed steadily. Of all personal Internet applications, online education users grew fastest, with a half-year growth rate of 15.5%. The second was Internet wealth management, with a semi-annual growth rate of 12.1%. Regarding the development of mobile Internet applications, the user sizes of online payment, online literature, online music, instant messaging, online shopping, and online meal ordering grew at a rate of over 5% in the first half of 2019.

Table 4 User Size and Utilization Rate of Internet Applications of Internet Users from Dec. 2018 to Jun. 2019

Applications	Jun. 2019		Dec. 2018		Semi-annual 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	82470	96.5%	79172	95.6%	4.2%
Search engine	69470	81.3%	68132	82.2%	2.0%
Online news	68587	80.3%	67473	81.4%	1.7%
Online video (including short video)	75877	88.8%	72486	87.5%	4.7%
Online shopping	63882	74.8%	61011	73.6%	4.7%
Online payment	63305	74.1%	60040	72.5%	5.4%
Online music	60789	71.1%	57560	69.5%	5.6%
Online games	49356	57.8%	48384	58.4%	2.0%
Online literature	45454	53.2%	43201	52.1%	5.2%

	Jun. 2019		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	Semi-annual growth rate
Online travel booking ²⁰	41815	48.9%	41001	49.5%	2.0%
Online meal ordering	42118	49.3%	40601	49.0%	3.7%
Live streaming ²¹	43322	50.7%	39676	47.9%	9.2%
Online premier and fast ride	33915	39.7%	33282	40.2%	1.9%
Online car-hailing services	33658	39.4%	32988	39.8%	2.0%
Online education	23246	27.2%	20123	24.3%	15.5%
Internet wealth management	16972	19.9%	15138	18.3%	12.1%
Short video	64764	75.8%	64798	78.2%	-0.1%

Table 5 User Size and Utilization Rate of Mobile Internet Applications of Mobile Internet Users
from Dec. 2018 to Jun. 2019

	Jun. 2019		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	Semi-annual growth rate
Mobile instant messaging	82069	96.9%	78029	95.5%	5.2%
Mobile search	66202	78.2%	65396	80.0%	1.2%
Mobile news	66020	78.0%	65286	79.9%	1.1%
Mobile shopping	62181	73.4%	59191	72.5%	5.1%
Mobile payment	62127	73.4%	58339	71.4%	6.5%
Mobile music	58497	69.1%	55296	67.7%	5.8%

²⁰ Travel booking covers the booking of air tickets, hotels, train tickets, and travel & vacation products via the Internet.

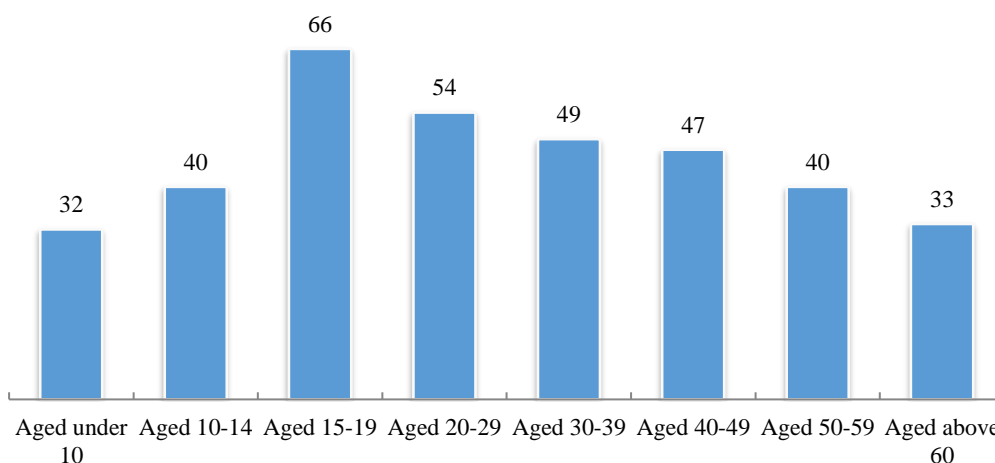
²¹ Live streaming includes live sport broadcasting, host live show, live game streaming, and live concert streaming.
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	Jun. 2019		Dec. 2018		
Applications	Number of Internet users (10,000)	Utilization ratio of Mobile Internet users	Number of Internet users (10,000)	Utilization ratio of Mobile Internet users	Semi-annual growth rate
Mobile game	46756	55.2%	45879	56.2%	1.9%
Cell phone literature	43544	51.4%	41017	50.2%	6.2%
Mobile meal ordering	41744	49.3%	39708	48.6%	5.1%
Mobile learning courses	19946	23.6%	19416	23.8%	2.7%

In the first half of 2019, the per capita number of mobile phone Apps²² among netizens aged 15-19 was the largest, reaching 66. In the second place, Internet users aged 20-29 had 54 mobile phone Apps on average. The per capita number of mobile phone Apps of netizens above 15 years old gradually decreased with the increase of age. Netizens aged 60 years old or above installed 33 mobile phone Apps on average.

Per Capita Number of Mobile Phone Apps by Netizens' Age



Source: China Telecom

2019.6

Figure 23 Per Capita Number of Mobile Phone Apps by Netizens' Age

²² Per capita number of mobile phone Apps refers to that of Apps installed on mobile phones of netizens on average.

II. Basic Apps

(I) Instant Messaging

Up to June 2019, the user size of instant messaging was 824.7 million or 96.5% of China's total netizen population, up 32.98 million over the end of 2018; the number of mobile instant messaging users had reached 820.69 million, up 40.4 million from the end of 2018, accounting for 96.9% of mobile Internet users.

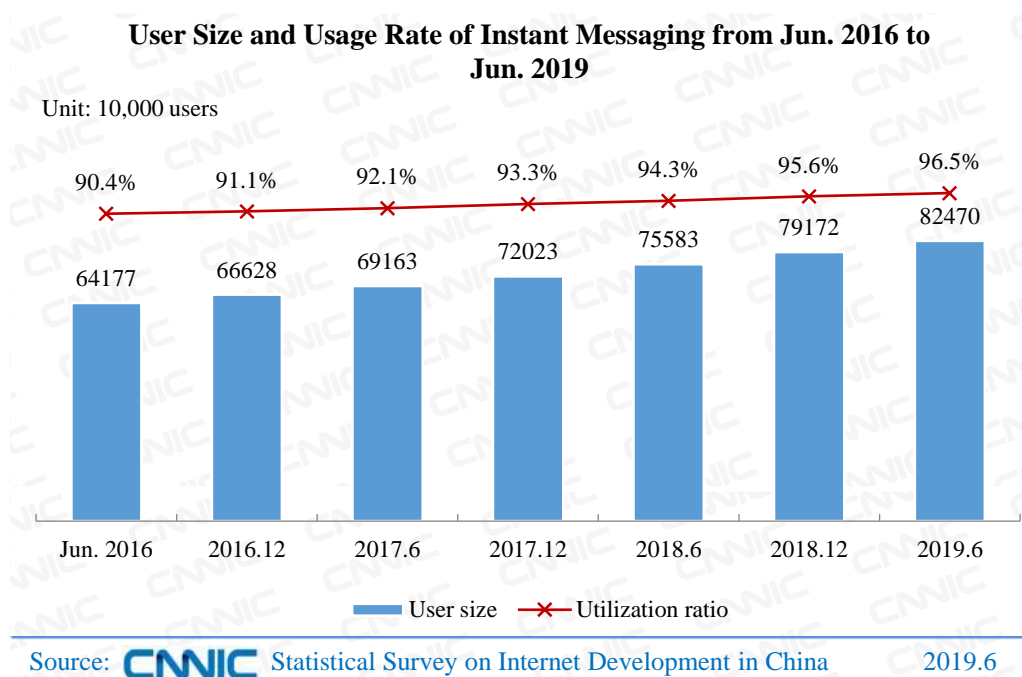
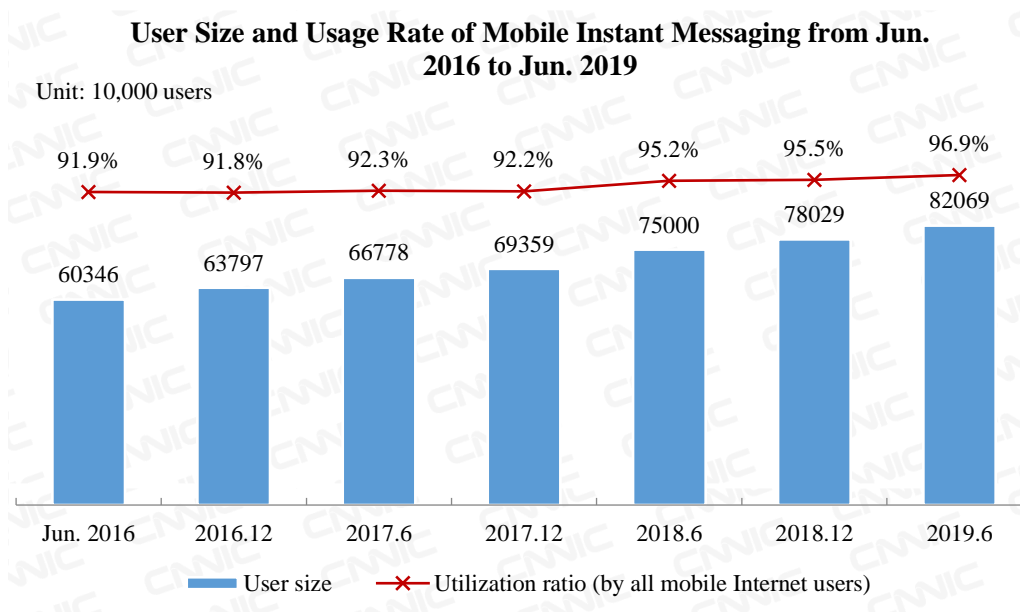


Figure 24 User Size and Usage Rate of Instant Messaging Jun. 2016 — Jun. 2019



Source: CNNIC Statistical Survey on Internet Development in China 2019.6

Figure 25 User Size and Usage Rate of Mobile Instant Messaging Jun. 2016 — Jun. 2019

In the first half of 2019, China's instant messaging industry maintained a sound momentum of growth, which was mainly reflected in the exploration of new products and new functions and the further growth of business revenue.

In terms of products, traditional instant messaging manufacturers and new entrants launched a number of new products in the first half of the year. The focus of market competition gradually shifted from mass-market services to vertical fields. The specific manifestations were as follows. First, traditional instant messaging manufacturers continued to look for special usage scenarios or market segment opportunities in specific industries. Tencent launched an ecological IoV (Internet of Vehicles) solution for the application of instant messaging in a driving scenario, helping users to conduct voice interaction and press the button on the steering wheel to awaken WeChat and other functions. NetEase integrated internal resources such as Yunxin to set up NetEase's Intelligent Enterprise Department that has been dedicated to applying enterprise instant messaging tools in the e-commerce field. Second, new entrants emerged to challenge traditional instant messaging providers. For instance, in the first half of 2019, ByteDance successively launched two instant messaging products, Duoshan and Flipchat, to explore market opportunities for segmented groups through social networking regarding video and interest.

In regard to revenue, instant messaging companies further increased sources of profits, with advertising, live streaming and financial services becoming the core drivers of revenue growth.

First, the advertising business kept growing. The advertising value of applet traffic was highly valued by enterprises. It was expected that this business would hold a more important position in its overall revenue in the future. According to Tencent's financial report, its online advertising revenue accounted for 17.1%²³ of the overall revenue in the first half of 2019, a further increase from the same period in 2017 (16.0%) and 2018 (16.8%). Applets were one of the important sources of its advertising revenue growth. Second, live streaming increased the revenue. The instant messaging products represented by Momo increased their revenue through the development of live streaming services. The financial report of Momo in the first quarter showed that the quarterly revenue of live streaming increased 14% year on year, accounting for 72% of the total revenue. Third, financial services developed rapidly. Through the diversion of financial services under Tencent, Tencent's revenue from fintech and services for enterprises grew 37% year-on-year in the second quarter, representing the highest year-on-year growth among major services.

(II) Search Engine

Up to June 2019, the user size of search engine was 694.7 million or 81.3% of China's total netizen population, up 13.38 million over the end of 2018; the number of mobile search engine users had reached 662.02 million, up 8.06 million from the end of 2018, accounting for 78.2% of mobile Internet users.

²³ The figure is obtained by calculating relevant data from Tencent's financial reports in the first and second quarters of 2019.

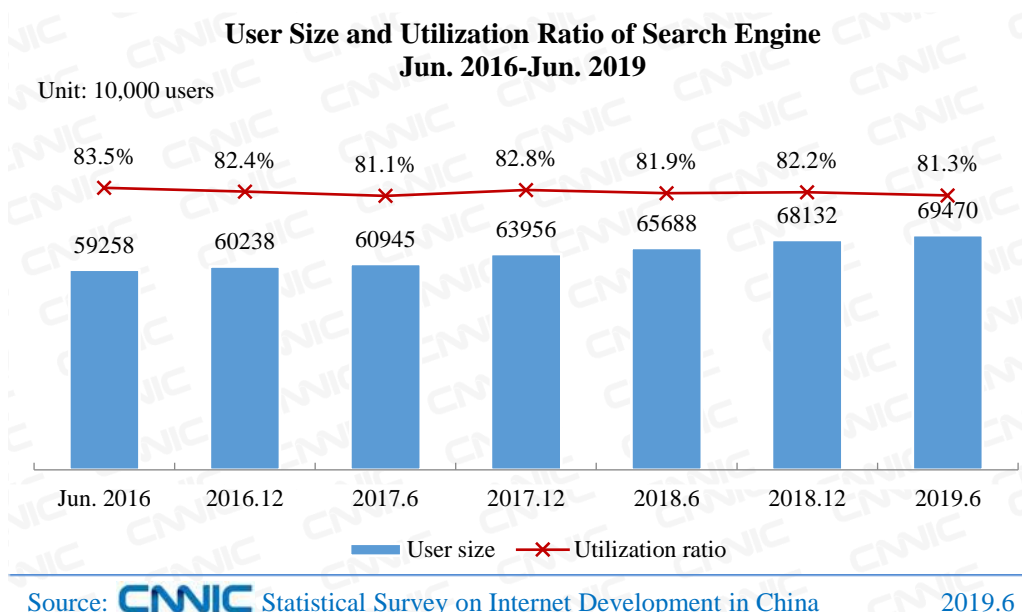


Figure 26 User Size and Utilization Ratio of Search Engine Jun. 2016-Jun. 2019

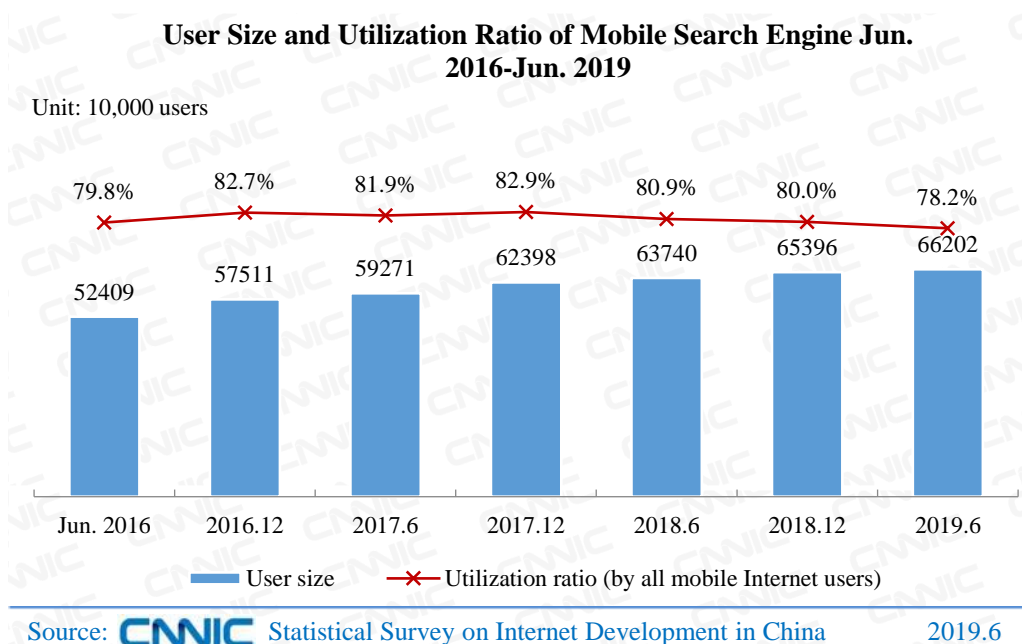


Figure 27 User Size and Utilization Ratio of Mobile Search Engine Jun. 2016-Jun. 2019

In the first half of 2019, the revenue of search engine advertising maintained growth, but the growth rate continued to decline. According to corporate financial reports, Baidu's online marketing revenue continued to decline from 25% to 3% year-on-year from the second quarter of 2018 to the first quarter of 2019, while Sogou's search and search-related revenue continued to drop from 45% to 6% year-on-year. After years of development, search advertising entered a short period of

bottleneck. Therefore, enterprises must seek more ways of traffic monetization²⁴ to break the ceiling of revenue growth.

Facing the bottleneck of development, search engine enterprises continued to enrich product functions, expand application scenarios, and create more original content. The specific manifestations are as follows. First, search engine enterprises continued to enrich product forms and service functions. Taking the search engine as an interface, enterprises boosted the development of information stream products²⁵ to rapidly expand their business to areas such as online news and short videos by optimizing recommendation algorithms and enriching information display forms. In the first quarter of 2019, the total usage time duration of Baidu App and short video information stream users increased 83% year on year. Second, search engine enterprises rely on App to develop applets, providing users with convenient applications in purchasing goods and living services, broadening application scenarios and increasing user stickiness²⁶. As of June 2019, Baidu had more than 150,000 smart applets and 250 million monthly active users. Third, search engine companies were increasingly paying attention to the construction of content ecosystem, attracting individuals, media, institutions, enterprises, and other content accounts through open-content platforms, and focusing on the construction of original content. In March 2019, Baidu Baijiahao content creators reached 2.1 million. Sogou search and Shenma search also began to develop content public account business. The above measures will help search engine enterprises to increase the number of active users and the duration of usage, so as to reduce the cost of traffic acquisition and expand revenue channels.

(III) Online News

Up to June 2019, the user size of online news was 685.87 million or 80.3% of China's total netizen population, up 11.14 million over the end of 2018; the number of mobile news users had reached 660.2 million, up 7.34 million from the end of 2018, accounting for 78.0% of mobile Internet users.

²⁴ Traffic monetization refers to the process of converting website traffic into cash income through commercial means.

²⁵ Information stream product refers to the Internet product that uses manual or algorithmic recommendation to push massive information to users in real time.

²⁶ User stickiness stands for the degree of users' dependence and re-consumption expectation formed by the combination of loyalty, trust and good experience for brands or products.

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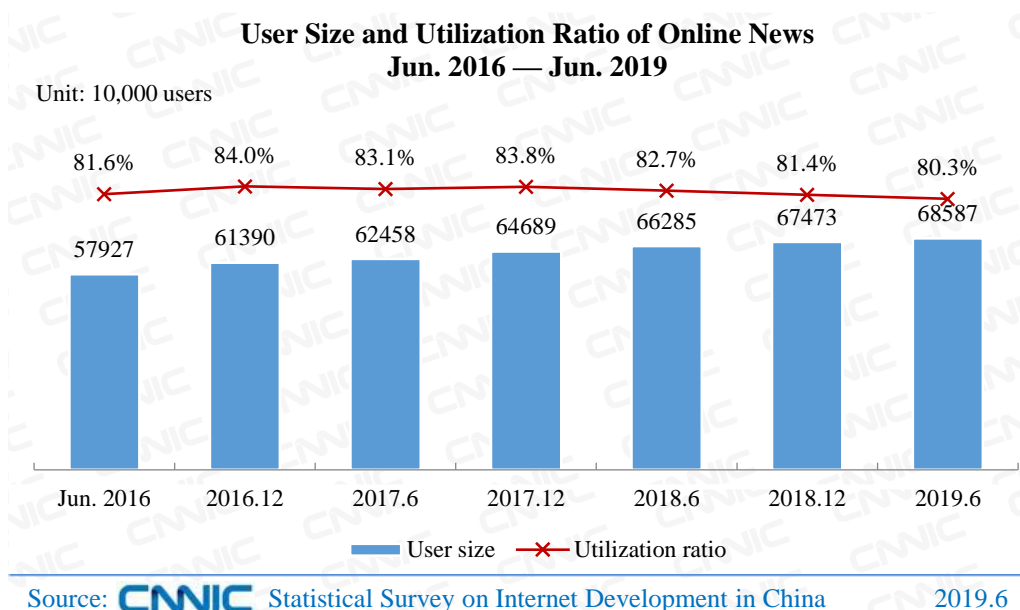


Figure 28 User Size and Utilization Ratio of Online News Jun. 2016 — Jun. 2019

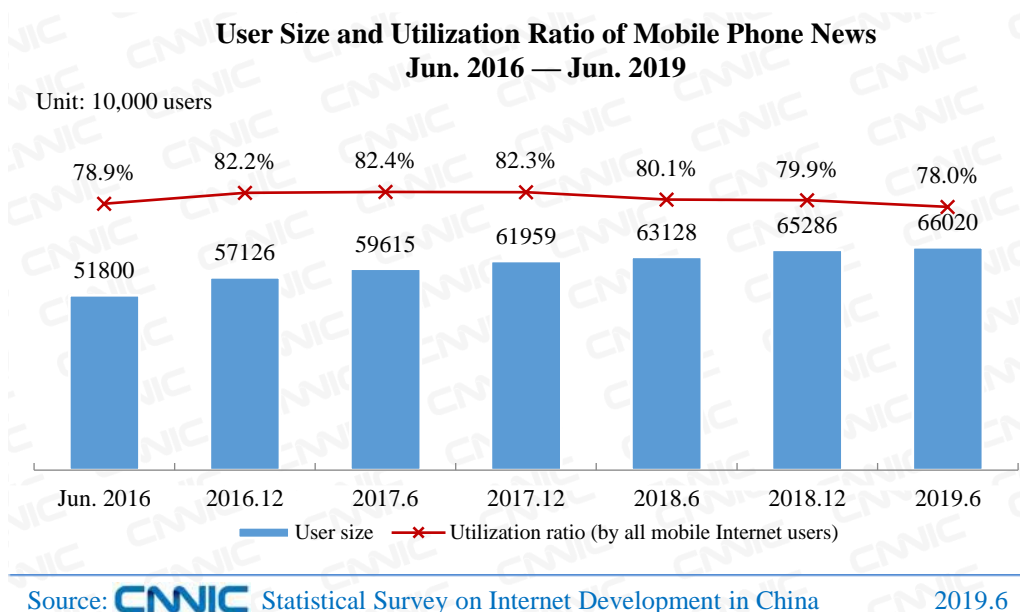


Figure 29 User Size and Utilization Ratio of Mobile Phone News Jun. 2016 — Jun. 2019

In recent years, the management effect of the online news industry has been gradually demonstrated, the content production efficiency has been significantly improved, and the dissemination forms have been further enriched. All these efforts have boosted the development of media integration.

Regarding industry management, the number of units and items approved for Internet news and information services was increasing. As of June 30, 2019, 910 Internet news and information service units were approved by cyberspace administration departments at all levels, representing an

increase of 149 over the end of 2018. The number of service items totaled 4,560, an increase of 21.1% over the end of 2018, covering 896 websites, 675 Apps, 135 forums, 25 blogs, 3 microblogs, 2,793 public accounts, 1 instant messaging tool, 14 live streaming platforms, and other 18 items²⁷.

In terms of content supply, news production efficiency has been significantly improved. In recent years, the news production process and digital technology have been integrated more closely, laying a solid foundation for improving content production efficiency and quality. For example, the People's Daily launched its "People's Daily Creative Brain" platform together with a number of enterprises using data collection, big data analysis, and natural language processing to support news creators in content error correction, data analysis, and information collation. AI anchor created by Xinhua News Agency and Sogou Company, has the same broadcasting ability as real ones. As of February 2019, more than 3,400 articles had been broadcast, totaling more than 10,000 minutes.

In regard to content dissemination, new models of dissemination were emerging one after another, empowering news to achieve better spreading effects in the omnimedia era. In recent years, online news reports have fully combined pictures, text, audio and video, animation with other elements to launch a range of new forms of news dissemination such as Vlog (Video Blog) and live VR (Virtual Reality). For instance, during this year's "Two Sessions", 5G (the fifth-generation mobile communication technology) network covered the conference venue for the first time, empowering multiple media to transmit high-definition materials and conduct panoramic VR live broadcast. The virtual AI anchor also appeared in the "Two Sessions" and became a new force in broadcasting news. During the "Two Sessions", a range of Vlog reports over life emerged, conveying a culture of "Two Sessions" full of rich flavor of life to the public and achieving a good dissemination effect.

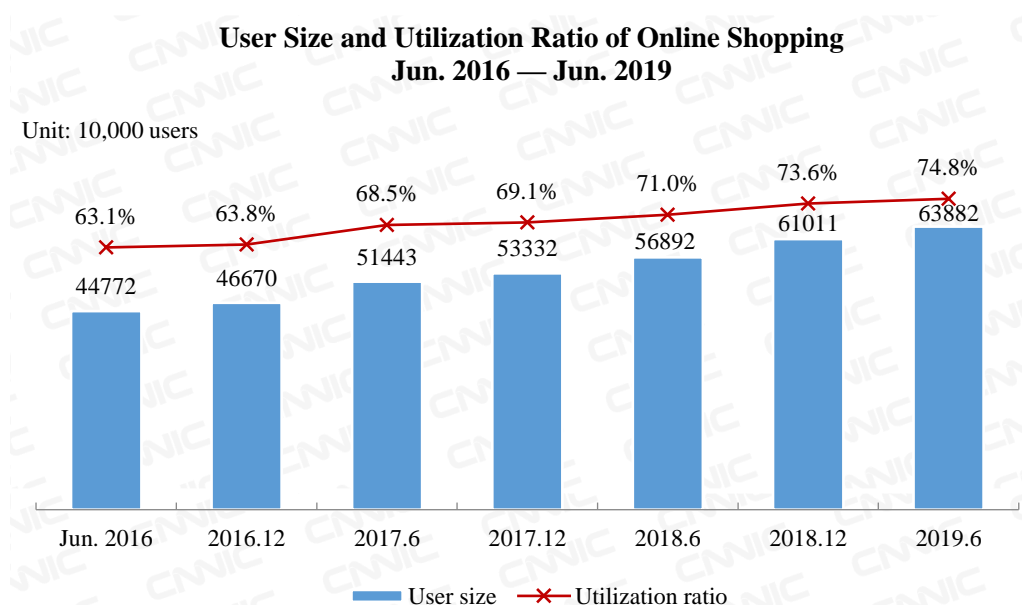
²⁷ Source: information about units approved for Internet News and Information Services, http://www.cac.gov.cn/2019-04/23/c_1124405702.htm, July 9, 2019.



III. Business Transaction Applications

(I) Online Shopping

Up to June 2019, the user size of online shopping was 638.82 million or 74.8% of China's total netizen population, up 28.71 million over the end of 2018; the number of mobile shopping users had reached 621.81 million, up 29.89 million from the end of 2018, accounting for 73.4% of mobile Internet users.



Source: CNNIC Statistical Survey on Internet Development in China 2019.6

Figure 30 User Size and Utilization Ratio of Online Shopping Jun. 2016 — Jun. 2019

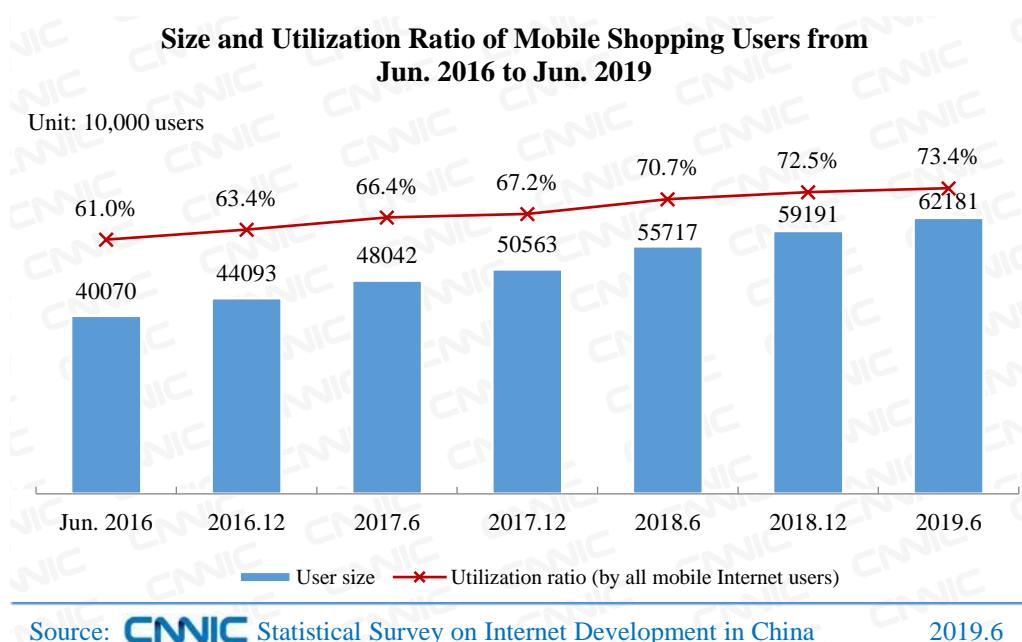


Figure 31 Size and Utilization Ratio of Mobile Shopping Users from Jun. 2016 to Jun. 2019

In the first half of 2019, the online shopping market maintained rapid development, while the sinking market²⁸, cross-border e-commerce, and model innovation provided new growth momentum for the online shopping market.

Regionally, the sinking market represented by small and medium-sized cities and rural areas expanded the growth room of online consumption. Meanwhile, e-commerce platforms accelerated the penetration of channels. First, the sinking market gradually overtook the first-tier and second-tier cities in the growth rate of online turnover. For instance, during the “June 18” activities, the growth rate of turnover of major e-commerce platforms such as cosmetics and digital products in the sinking market exceeded that in the first-tier and second-tier cities. Second, there was still much room for growth in the user size in the sinking market. By the end of March 2019, 77% of 104 million new monthly active mobile users of Taobao and Tmall came from third-tier cities and below²⁹.

In the formats of business, cross-border e-commerce retail imports continued to grow, and favorable policies further boosted the development of the industry. In the first half of 2019, the value of cross-border e-commerce retail imports in China was 45.65 billion yuan, up 24.3% year

²⁸ A sinking market refers to small and medium-sized third-tier cities or below as well as townships, towns and rural areas in China.

²⁹ Source: Alibaba Financial Report 2019.

on year.³⁰ Meanwhile, the favorable policies for cross-border e-commerce continued to be released, boosting the sustained and healthy development of the industry. In July, the State Council announced that it would add a number of pilot cities to the existing 35 cross-border e-commerce comprehensive pilot zones. Meanwhile, it proposed the implementation of the “No Invoice and Tax Exemption” Policy³¹ and the introduction of a more convenient method for the verification and collection of corporate income tax.

In terms of models, new models such as live selling³², factory-based e-commerce³³, and community-based retail were booming, representing new highlights in the growth of online consumption. First, marketing innovations emerged one after another. E-commerce was deeply integrated with live streaming and short video. For instance, Taobao launched its independent live streaming platform, Pinduoduo and Kuaishou conducted live streaming for promotion, JD’s shopping cart could access Douyin, and NetEase Kaola launched its shopping recommendation channel of short video. Second, the industry chain continued to be consolidated. Major e-commerce platforms focused on promoting the OEM model. For example, NetEase Kaola opened its offline global factory stores, Pinduoduo mapped out its new brand plan, and Suning Pingou signed agreements with hundreds of factories. Third, the industry ecosystem was being improved. E-commerce platforms such as Alibaba, JD, and Suning accelerated their entry into the community-based retail sector through self-management and investment, boosting the development of new models such as community-based group booking and community-based shopping.

(II) Online Meal Ordering

Up to June 2019, the user size of online meal ordering was 421.18 million or 49.3% of China’s total netizen population, up 15.17 million over the end of 2018; the number of mobile meal ordering had reached 417.44 million, up 20.36 million from the end of 2018, accounting for 49.3% of mobile Internet users.

³⁰ Source: Tax Administration Bureau of General Administration of Customs.

³¹ “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.

³² Live selling means that the host conducts live streaming program on the Internet platform to attract users to purchase goods.

³³ Factory-based e-commerce refers to a mode of online sales, where goods are produced in a factory but bear the brand of the e-commerce platform.

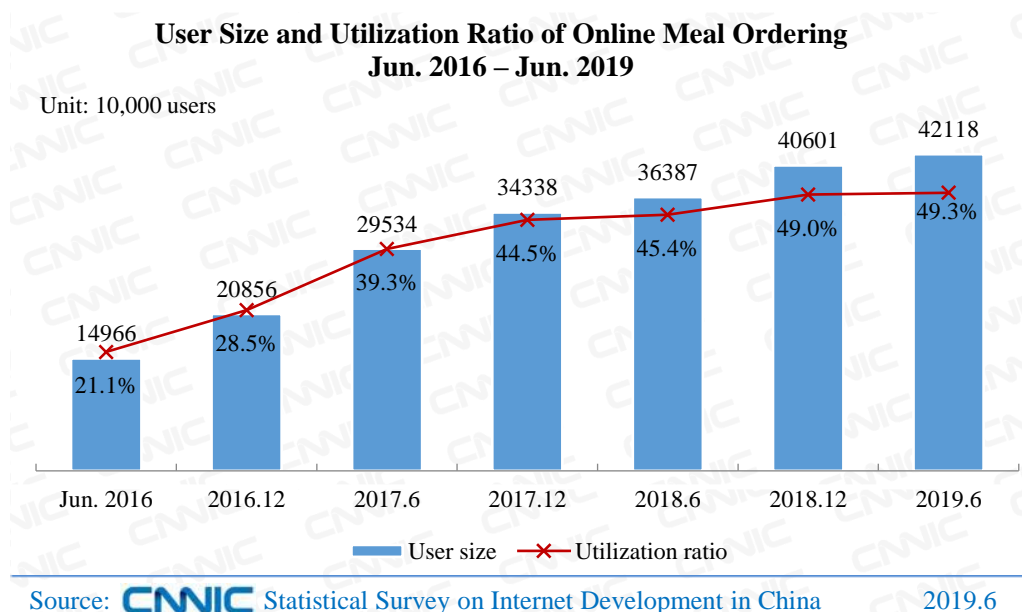


Figure 32 User Size and Utilization Ratio of Online Meal Ordering Jun. 2016 – Jun. 2019

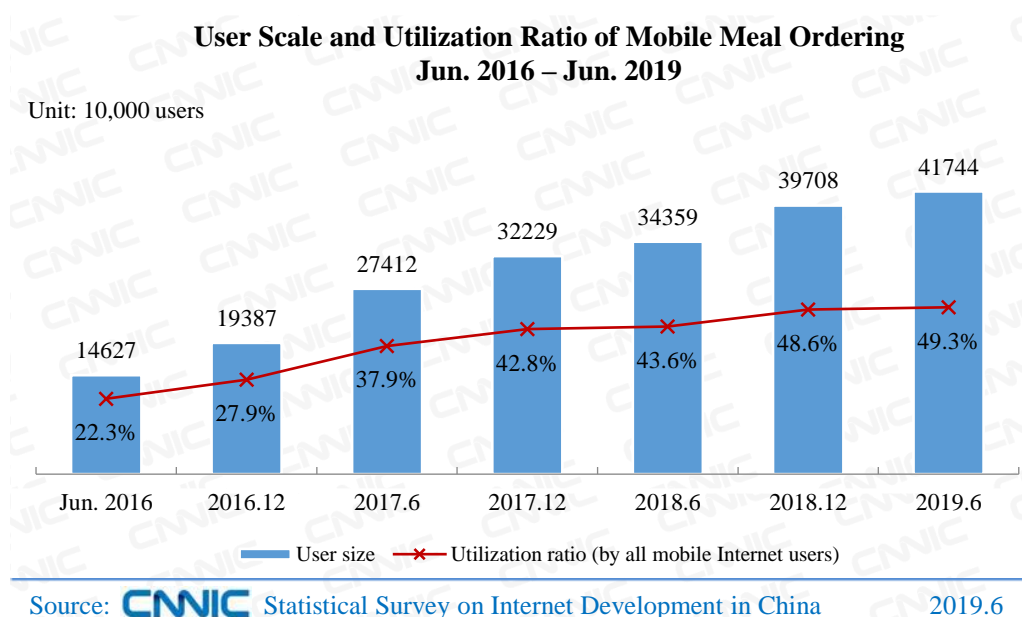


Figure 33 User Scale and Utilization Ratio of Mobile Meal Ordering Jun. 2016 – Jun. 2019

Currently, the market structure of the online meal ordering industry is relatively stable. The major platforms for online meal ordering already have a huge user size, business base, and delivery system, focusing on improving profitability and building a service ecosystem.

First, these platforms improved the service capability to merchants and thus the profitability. In the first half of 2019, Meituan Takeout increased the proportion of service commissions of merchants on the platform. Koubai.com also started to charge merchants service fees. First, the

platforms increased service commissions to help themselves strengthen their service capabilities to maintain the stickiness of merchants. For example, Meituan Takeout and ele.me announced in the first half of the year that they would invest a huge sum of money to assist merchants with digital upgrading, thus improving the operational efficiency of the industry. Second, in order to cope with the increased commissions, merchants improved their efficiency and maintained a reasonable profit level by optimizing the structure of online meal ordering, takeaway and restaurant meals and strengthening refine management. In this process, poorly-run small and medium-sized merchants would be eliminated rapidly, with the advantages of brand merchants highlighted.

Second, the platforms expanded the types of services for users, building a local ecosystem for life services. Against the background of slowing down user growth, online meal ordering platforms proactively expanded services and built a service ecosystem to increase revenue sources. In the first half of 2019, Meituan Takeout and ele.me accelerated their plans in the community-based fresh food sector. Meituan Takeout launched Meituan Maicai; ele.me set up a brand-new open fresh food platform and joined hands with Dingdong Maicai to explore the community-based fresh food sector. The platforms expanded from online meal ordering business to instant delivery of all kinds of commodities such as flowers, medicines, and articles of daily use and to community-based fresh-food services, continuously widening the scope of services. This expansion reflected that the competition in the online meal ordering market was no longer limited to a single field, but presented more diversified characteristics. It also embodied that the online meal ordering business, as the foundation of the life service system, was deeply integrating itself with new retail and other related business, connecting more life service scenarios, and boosting the coordinated development of the ecosystem.

(III) Online Travel Booking

As of June 2019, the number of online travel booking users in China had reached 418.15 million, up 8.14 million from the end of 2018, accounting for 48.9% of all Internet users.

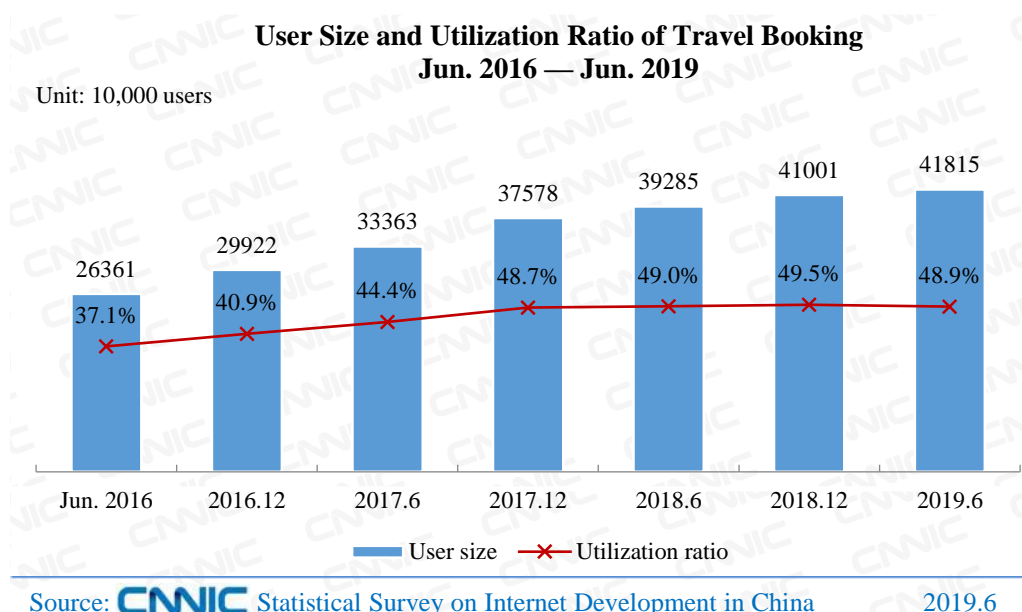


Figure 34 User Size and Utilization Ratio of Travel Booking Jun. 2016 — Jun. 2019

Regarding online ticket booking, airlines enhanced their direct selling capability through in-depth cooperation. OTA (Online Travel Agency) platforms improved sales of auxiliary products³⁴ through pre-judged travel scenarios. On the one hand, airlines integrated high-quality resources, enriched members' choices and enhanced their ability to attract customers through ticket sales for each other and code sharing³⁵. On the other hand, OTA enterprises analyzed travel search data, predicted customer behaviors, and implemented precision marketing to meet different travel needs and adapt to application scenarios, thus improving the booking volume of air ticket auxiliary products such as visa processing, shuttle services, and foreign currency exchange.

With respect to the online hotel reservation, OTA platforms and hotel groups increased the reservation volume by bringing together independent hotels³⁶, while international hotels expanded their market by sinking channels. For one thing, OTA platforms and hotel groups attracted independent hotels, expanded the "Long Tail Market"³⁷, brought into play the scale effect to gather users, and supported the supply chain by technical means, thus increasing the online booking

³⁴ Auxiliary products refer to the non-recurring and concurrently-operated products of the enterprise.

³⁵ Code sharing means that the ticket of airline A is purchased by a passenger who is actually carried by airline B, so the relevant flight is called code sharing flight.

³⁶ Independent hotel refers to the hotel that does not belong to any hotel group and has not joined the alliance in any form. Its characteristic is that it operates separately and dispersedly in cities and regions in the form of traditional hotels and independently conducts marketing and management.

³⁷ Long Tail Market refers to the market composed of products with weak demand or poor sales. In this Report, it refers to the independent hotel market. Independent hotels make up about 80% of the market scale and lack the ability to draw customers in scattered regions.



volume of independent hotels. For another, international hotel groups opened up second- and third-tier city markets by sinking channels. InterContinental Hotel, Hilton, Marriott, and other international hotel groups opened up their mid-end brands to expand the market through the franchise.

In the online booking of tourism and vacation products, OTA platforms and travel agencies utilized new product services and potential channels to attract users. In terms of products and services, OTA platforms and travel agencies produced different product combinations according to users' subdivided needs, including family tour products suitable for children and the elderly and customized services for users' personalized needs. To expand channels, OTA platforms laid out offline outlets to complement online channels. The platforms integrated offline demands to conduct intelligent marketing through big data technology so as to tap into potential user markets.

IV. Internet Finance Applications

(I) Internet Wealth Management

As of June 2019, the user size of Internet wealth management in China had reached 169.72 million, up 18.34 million from the end of 2018, accounting for 19.9% of all Internet users.

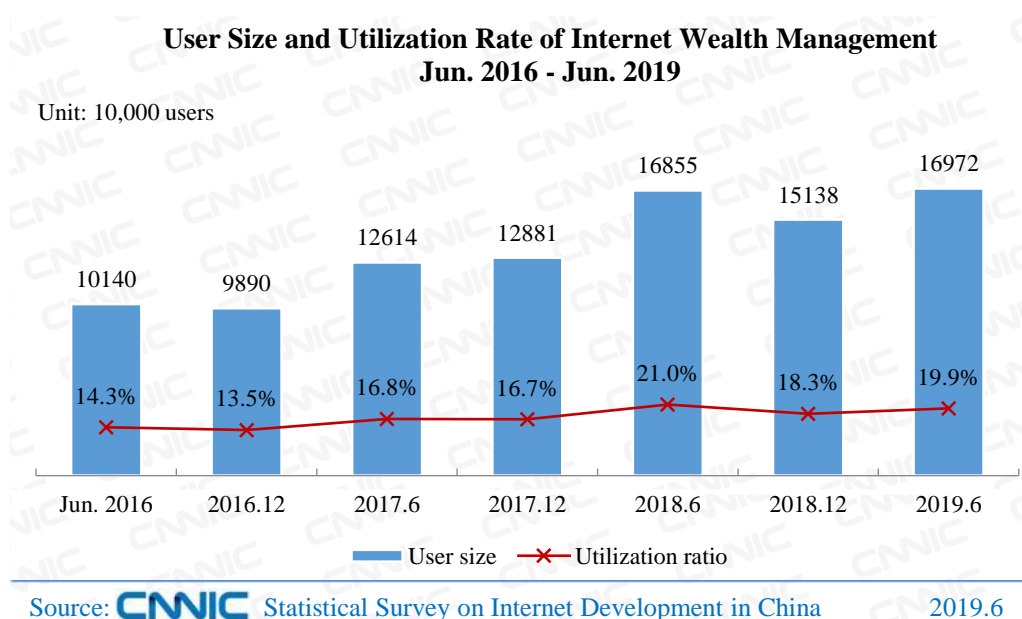


Figure 35 User Size and Utilization Rate of Internet Wealth Management Jun. 2016 - Jun. 2019

After the new asset management regulations³⁸ and related detailed rules were put in place in 2018, the supervision system for asset management market had been gradually improved, boosting the standardized development of the Internet wealth management market. In the first half of 2019, the Internet wealth management market showed the following development trends.

First, the positioning of the main body of the Internet wealth management market was increasingly clear. The *Measures for the Administration of Wealth Management Subsidiaries of Commercial Banks* was issued by the China Banking and Insurance Regulatory Commission at the end of 2018, with the arrangement of wealth management services accelerated gradually. In the first half of the year, more than 30 banks announced the establishment of wealth management subsidiaries³⁹. In February 2019, the *Measures for the Supervision and Administration of Sales Organizations for Public Offering of Securities Investment Funds (Draft for Comments)* issued by China Securities Regulatory Commission defined the boundaries of fund sales and the responsibilities of Internet information technology service institutions, prohibiting any disguised involvement in fund sales such as the introduction of Internet traffic and system nesting. The further clarification of the position of market entities would accelerate the formation of a healthy and standardized ecosystem for the Internet wealth management industry, which would not only help reduce the risks in the financial market but also facilitate the cooperation between financial institutions and Internet technology enterprises in related fields. They would give full play to their respective advantages in products, customers, channels and technologies to build a win-win industry ecosystem.

Second, the Internet wealth management market entered a new stage of development from rapid expansion to upgrading. Under the new regulatory policy, the Internet wealth management market shifted from expansion to product upgrading. In the first half of 2019, the expansion of Internet money funds⁴⁰ slowed down. The net asset value of Yu'e Bao under Tianhong Asset Management Co., Ltd. saw a decline of 8.8%⁴¹ from the end of 2018. The endogenous power of

³⁸The new asset management regulations refer to the *Guidance on Regulating Asset Management of Financial Institutions* jointly issued by the People's Bank of China, China Banking and Insurance Regulatory Commission, China Securities Regulatory Commission, and the State Administration of Foreign Exchange in 2018.

³⁹Source: the website of Securities Times, <http://finance.stcn.com/2019/0621/15198738.shtml>, June 21, 2019.

⁴⁰ Internet money fund refers to money fund products sold through Internet-based channels.

⁴¹ Source: *Reports of Tianhong Yu'e Bao Money Market Fund* respectively released in 2018 and the second quarter of 2019.

asset management institutions was further unleashed. By focusing on product innovation and risk management, asset management institutions continuously enlarged the wealth management scope of cash management and fixed income products. For example, the intelligent consulting and research for investment⁴² were introduced to continuously enrich the product categories in the market.

(II) Online Payment

As of June 2019, the user size of online payment was 633.05 million or 74.1% of China's total netizen population, up 32.65 million over the end of 2018; the number of mobile payment users had reached 621.27 million, up 37.88 million from the end of 2018, accounting for 73.4% of mobile Internet users.

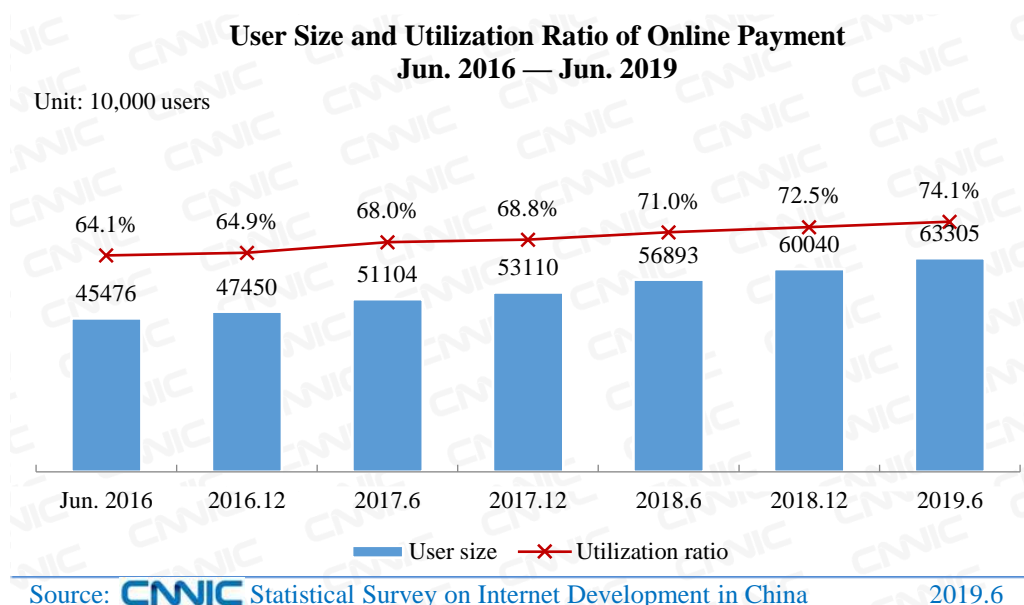


Figure 36 User Size and Utilization Ratio of Online Payment Jun. 2016 — Jun. 2019

⁴² The intelligent consulting and research for investment is intended to provide intelligent financial products and wealth management services through AI and other technologies based on user data and financial needs.

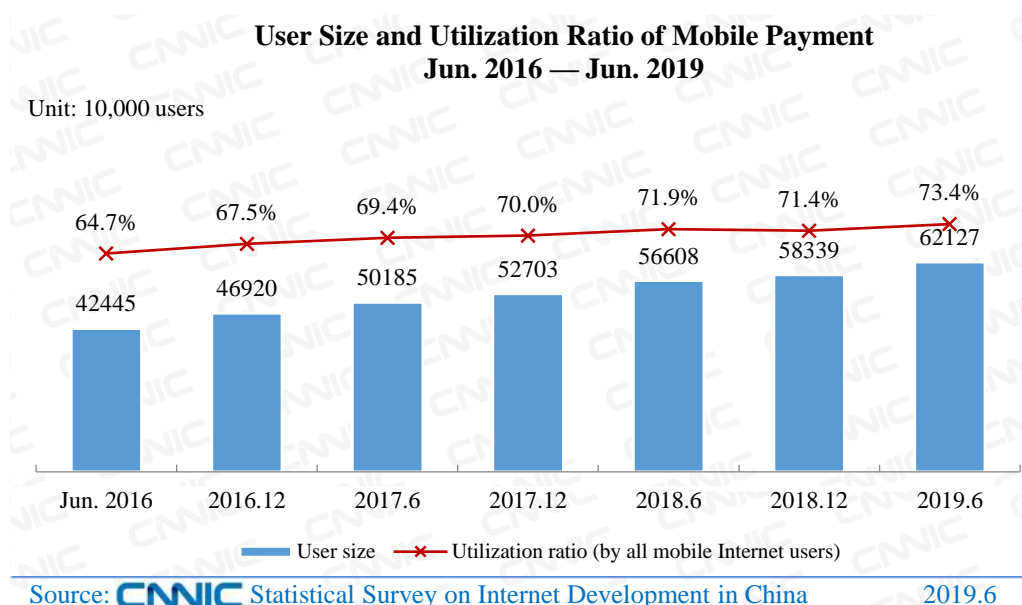


Figure 37 User Size and Utilization Ratio of Mobile Payment Jun. 2016 — Jun. 2019

In recent years, the online payment industry has taken the initiative to seek changes and continuously adopt a new approach to unleash new momentum for development.

For one thing, online payment agencies took the initiative to make business adjustments. In January 2019, the deadline for the cancellation of the excess reserve account was met. As a result, the third-party institutions paid the excess reserve more completely. Affected by this case, payment companies tightened their preferential policies and actively transformed themselves towards fintech services with the payment system as the core. For example, large payment institutions integrated payment and financial business lines and optimized their own payment solutions to become effective distribution channels for financial services such as wealth management and small loans. Small and medium-sized payment institutions constantly attempted to cooperate with cross-border e-commerce platforms, deepen enterprise-side payment services, and expand sources of overseas users to transform and develop themselves.

For another, online payment was full of innovation power, increasing more application scenarios. Following the popularity of QR-code scanning payment, the deep integration of biometrics, ETC (Electronic Toll Collection) and online payment services resulted in new payment schemes that no longer rely on mobile phones. Such schemes were commercialized and promoted. Among them, face recognition payment based on face recognition technology developed rapidly. Its convenience, accuracy and payment efficiency were improved compared with QR-code

scanning payment. For instance, Alipay introduced a face-recognition payment product Dragonfly that integrates software and hardware. WeChat payment also launched a face-recognition payment product Frog that can be connected to a POS (Point of Sale) device. Both products were put in place rapidly. In addition, the Ministry of Transport proposed to boost the development and application of ETC on expressways. Under this background, major banks launched various preferential activities, and service outlets extended from offline to online services, such as mobile banking and WeChat applets. Alipay and WeChat payment used their advantages of online payment to simultaneously open their online ETC services, so as to perfect the layout of their offline payment scenarios. As of July 18, 2019, the user size of ETC nationwide reached 91.51 million, with a daily average ETC circulation of about 420,000, 7 times that in 2018⁴³.

V. Online Entertainment Applications

(I) Online Music

As of June 2019, the user size of online music was 607.89 million or 71.1% of China's total netizen population, up 32.29 million over the end of 2018; the number of mobile music users had reached 584.97 million, up 32.01 million from the end of 2018, accounting for 69.1% of mobile Internet users.

⁴³ Source: Regular Press Conference held by the Ministry of Transport of the P.R.C. in July 2019.

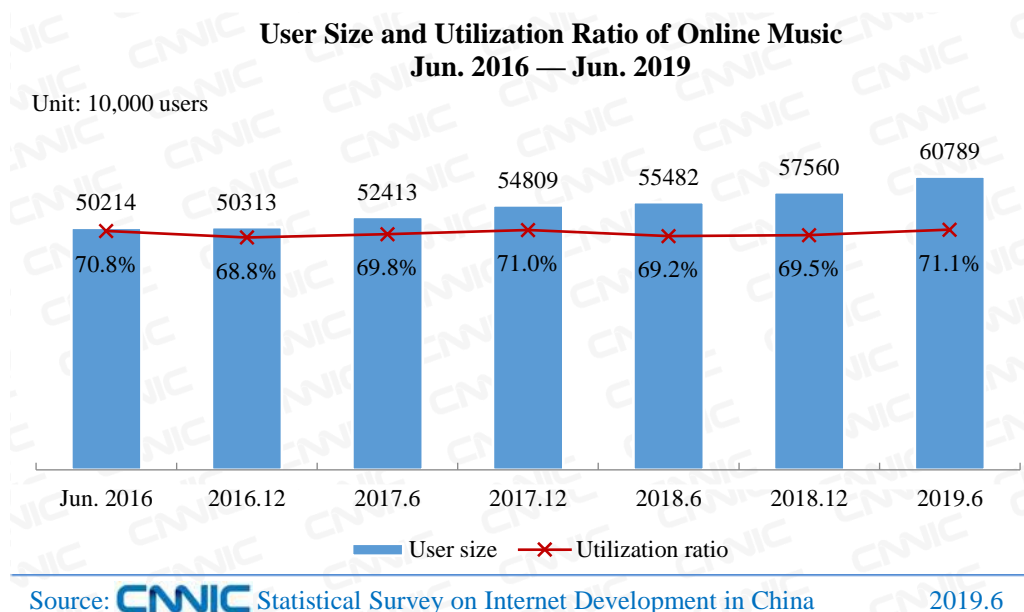


Figure 38 User Size and Utilization Ratio of Online Music Jun. 2016 — Jun. 2019

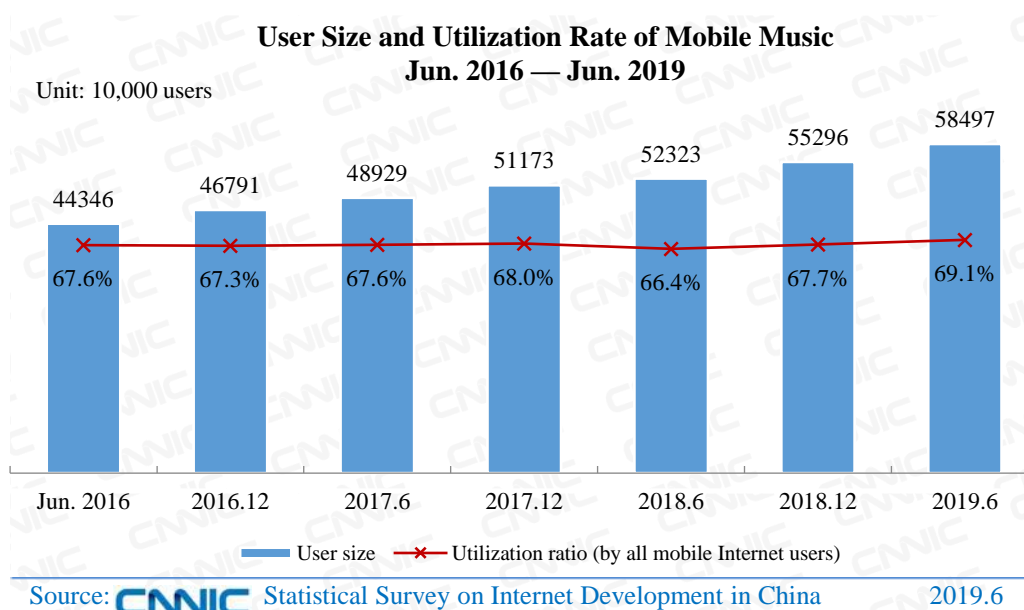


Figure 39 User Size and Utilization Rate of Mobile Music Jun. 2016 — Jun. 2019

In the first half of 2019, the business model of online music became sounder and more mature. Its changes were mainly reflected in three aspects: construction of content ecosystem, exploration of product functions, and the sustainable development of business.

In terms of content ecosystem, online music platforms stepped up efforts to support more creative content. Now, the behavior of bidding for exclusive music copyright at a high price is gradually decreasing, with an industry-wide atmosphere of sharing copyright formed. Against this

background, major platforms all lay more emphasis on the traffic effect of original music resources and intensify efforts to lay out the ecosystem of music creation in a bid to create differentiated competitive advantages. Specifically, in the first half of the year, major platforms successively launched the incentive mechanism for original music authors, encouraging the creation of exquisite content through sharing of advertising revenue, cash incentives of short video, and sales of digital albums.

In regard to product innovation, online music suppliers continued to explore new functions and services. First, large music companies focused on exploring personalized and social products. For example, Tencent Music Entertainment Group (TME) introduced a new application Moo Music to provide users with new experience featured by the visual interaction and the song-list recommendation mechanism with a niche style. NetEase Cloud Music was added with a new function, “Making Friends through Music”, aiming to take music as an opportunity for exploring its development prospects in the social networking field. Second, small and medium-sized music companies still attempted to explore the competitive edge of their products and make up for their disadvantages in the user size and song copyright by constantly iterating their products.

In terms of business development, users were more willing to accept the online music payment model, facilitating the revenue of platforms to keep growing. This can be summarized in the following two points. First, in the core services, the revenue of online music services showcased a stable development trend thanks to the growth of subscribers and the improvement of the online music copyright environment. Second, regarding other services, social entertainment services represented by live streaming began to demonstrate a stronger growth capacity than core services. According to its financial report, TME’s online music revenue increased by 20.2% year-on-year in the second quarter and the number of paid users grew by 33.0% year-on-year. Revenue from social entertainment and other services rose by 35.3% year-on-year, much faster than online music.

(II) Online Literature

As of June 2019, the user size of online literature was 454.54 million or 53.2% of China’s total netizen population, up 22.53 million over the end of 2018; the number of cell phone literature users had reached 435.44 million, up 25.27 million from the end of 2018, accounting for 51.4% of mobile

Internet users.

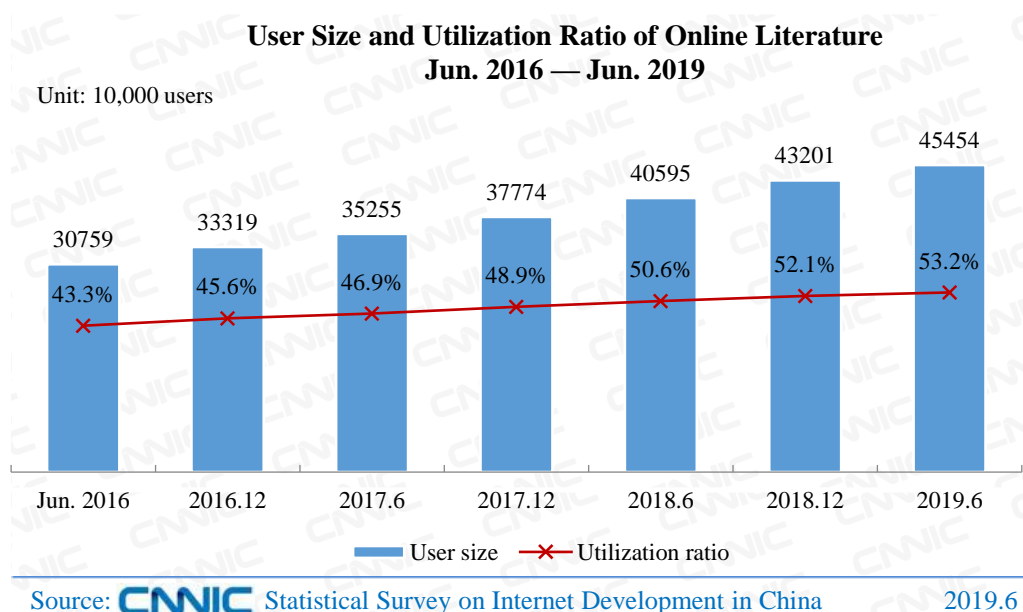


Figure 40 User Size and Utilization Ratio of Online Literature Jun. 2016 — Jun. 2019

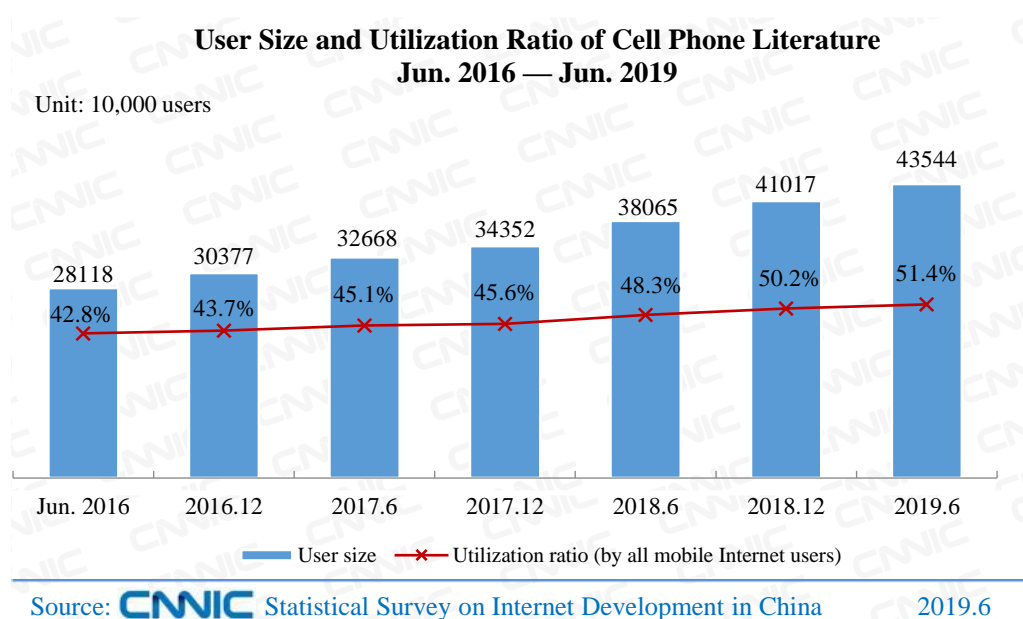


Figure 41 User Size and Utilization Ratio of Cell Phone Literature Jun. 2016 — Jun. 2019

With the continuous advancement of the industry standardization, China's online literature business model was more diversified, laying a solid foundation for the sustainable development of the business. In the upstream of the industry chain, young writers injected new vitality into the industry, and greatly diversified the themes of works. In the downstream of the industry chain, the overseas influence of China's online literature platforms continued to expand, providing new room

for the growth of the industry's revenue.

In terms of content creation, the diversification and young authorship were the main characteristics. First, the choice of subjects for online literature became wider. The themes of popular works were no longer limited to fantasy and romance but covered by diversified vertical categories such as science fiction, history, and military. Second, more and more post-90s and post-95s young writers emerged on the online literature platform, injecting new vitality into the creation of literary content. According to related statistics⁴⁴, of writers newly recruited by China Literature Limited in 2018, post-90s writers accounted for over 70% and post-95s writers for nearly 50%.

In regard to market expansion, the overseas business of China's online literature platforms had been booming. First, regarding the business model, online literature companies began to use overseas platforms to support the content creation and operation of local authors. The overseas business was no longer subject to publishing authorization, work output and IP (Intellectual Property) adaptation of China's literature. According to relevant data, Webnovel, an overseas online literature portal, had been home to more than 12,000 overseas writers since it was launched one year ago. Second, in terms of regional expansion, China's online literature platforms not only entered the markets of developed countries in North America and Europe but also started to penetrate emerging markets in Africa and Southeast Asia through channels such as China's mobile phone manufacturers and overseas telecommunication carriers.

(III) Online Games

As of June 2019, the user size of online games was 493.56 million or 57.8% of China's total netizen population, up 9.72 million over the end of 2018; the number of mobile game users reached 467.56 million, up 8.77 million from the end of 2018, accounting for 55.2% of mobile Internet users.

⁴⁴ Source: Yuewen Group's *Report on Online Literature Development 2018*.

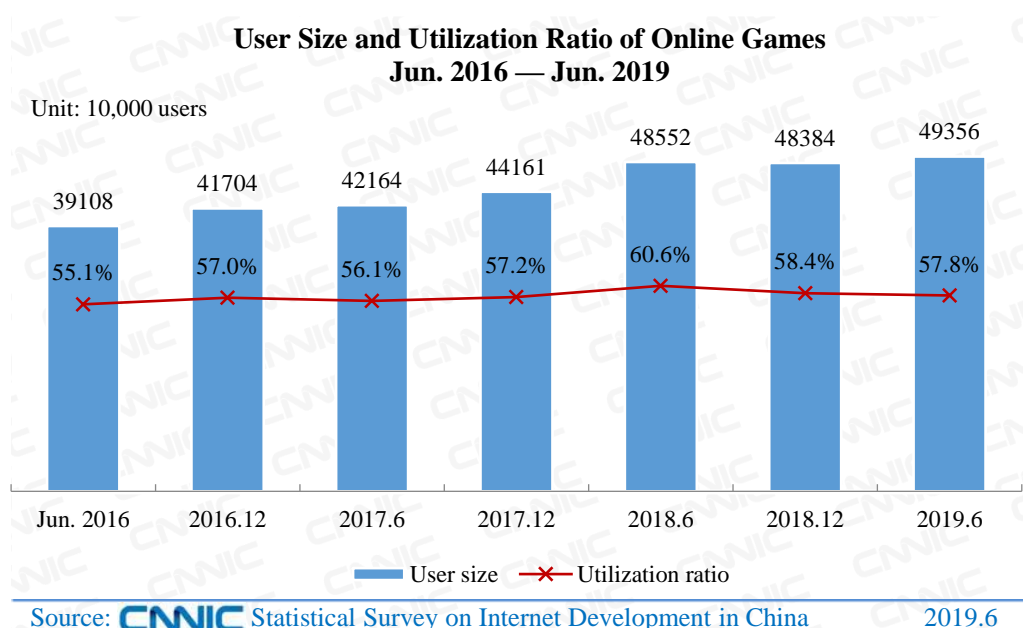


Figure 42 User Size and Utilization Ratio of Online Games Jun. 2016 — Jun. 2019

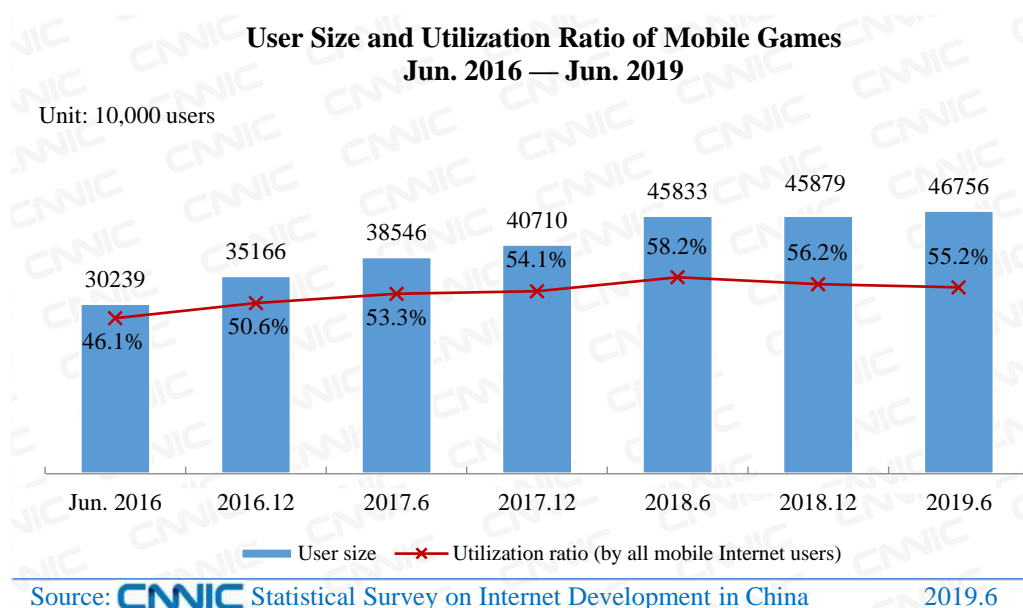


Figure 43 User Size and Utilization Ratio of Mobile Games Jun. 2016 — Jun. 2019

In the first half of 2019, the online game industry still maintained a good development trend. Its development features were mainly reflected on product innovation, market expansion, and social impact.

In regard to product innovation, cloud services had an increasing impact on the online game industry and were expected to reshape the R&D, operation, and user experience of online games. First, regarding R&D and operation, cloud services were widely used in game operations, payment,



data storage, back-stage management, and other links, which not only provided special tools for game development and operation but also enabled enterprises to rapidly expand or reduce the number of servers according to the needs of players. Second, in terms of user experience, games based on cloud platforms not only did not need to be downloaded by users but also significantly reduced the requirements for graphics cards, CPU (Central Processing Unit), and other devices. Tencent and Google launched cloud gaming platforms CMatrix and Stadia respectively in the first half of the year to attempt to provide users with new cloud gaming experience.

In terms of market expansion, Chinese game companies continued to provide capital and products to overseas markets. First, in regard to capital supply, many large game companies in China continued to make investments in overseas game developers, integrate China's mature operation capability with overseas advanced R&D capability, and enhance their competitive edge in the global market. Second, with respect to product output, China's game enterprises further intensified their efforts to export products to overseas markets. The games expanded its presence from the field of mobile games to the areas of client games and PC games. With the advancement of an overseas business, it was expected that overseas market revenue would make up a higher share of the overall revenue of China's gaming enterprises.

With respect to social impact, the government and enterprises attached great importance to the negative impact of online games on the minors and took relevant actions to continuously improve the gaming environment of the minors. First, in the regulatory policies, the *Regulations on the Administration of Programs for Minors* and other relevant documents had been issued, requiring enterprises not to publicize or introduce online games that are not conducive to the physical and mental health of minors. Second, in terms of industry self-discipline, the people.cn and ten large game companies launched the *Game Age Prompt Initiative* to attempt to establish industry standards on game content and operation for different age groups. Third, regarding enterprise operation, many game companies strengthened parents and teachers' monitoring of students' game behaviors by upgrading health systems, growth guard platforms, and other functions. In addition, carriers also began to set foot in this field, helping parents to manage and protect minors' gaming behaviors by designing customized mobile phone cards.

(IV) Online Video

As of June 2019, the user⁴⁵ size of online video in China had reached 758.77 million, up 33.91 million from the end of 2018, accounting for 88.8% of all Internet users. Of them, the user size of long video was 639 million or 74.7% of all Internet users; the user size of short video was 648 million or 75.8% of all netizens.

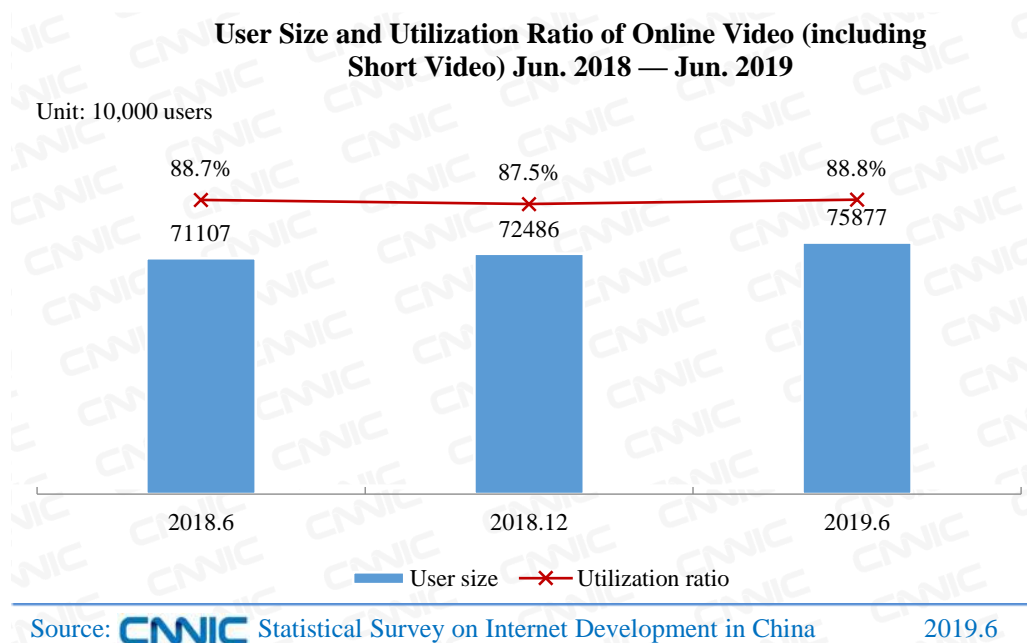


Figure 44 User Size and Utilization Ratio of Online Video (including Short Video) Jun. 2018 — Jun. 2019

In the first half of 2019, major video platforms further subdivided the types of content products and carried out professional production and operation. The entertainment content ecosystem of the industry gradually took shape.

In the era of user segmentation, major video platforms continued to explore new categories of markets and lay more emphases on the specialized and professionalized content. In the online video content, major video platforms were constantly expanding new categories such as games, electronic sports, and music based on core categories including TV plays, movies, variety shows and animation in a bid to cater to diverse user preferences. In addition, major video platforms used

⁴⁵ Online video users refer to the combination of long video and short video users, similarly hereinafter. Long video users refer to those who had watched TV plays, variety shows and movies via the Internet in the first half of the year, while short video users refer to those who had watched short video programs in the same period.

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technologies such as big data and AI to quickly identify user needs and accurately push content. Meanwhile, the major platforms conducted in-depth analysis of relevant data on user content consumption and commodity consumption to restore users' real needs and help produce high-quality content. For example, Youku's Fish Brain System⁴⁶ had been fully applied in the design and production of network dramas and variety shows.

The entertainment content ecosystem for the online video industry gradually took shape, producing the win-win value for all parties. The ecosystem centered on IP to integrate and link together resources inside and outside the platform, ranging from novels, comics, network dramas, variety shows, animation, movies, to authorized games, commodities and services. It achieved the coordinated development of video content with that of music, literature, games, and e-commerce, forming an eco-chain closed loop. For example, iQIYI, based on online video, expanded itself into multiple entertainment fields such as literature, games, comics, and ticketing. It strengthened the profitability of the platform through the correlation and coordination of various fields. While integrating resources within the platform, Tencent Video cooperated with QQ Music, Tencent Literature, Tencent Games and other platforms to achieve win-win results.

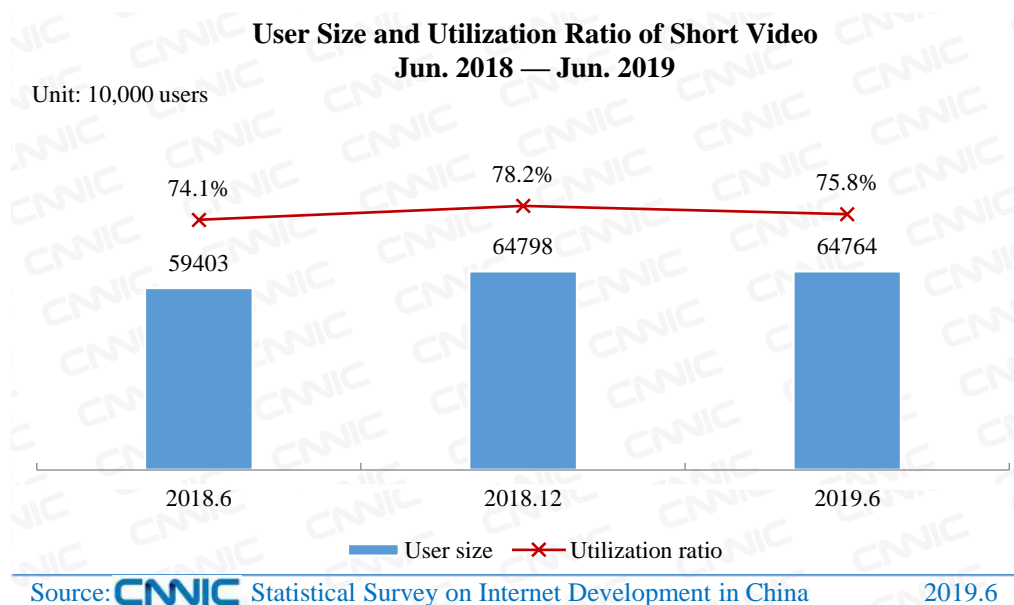


Figure 45 User Size and Utilization Ratio of Short Video Clips Jun. 2018 — Jun. 2019

In the first half of 2019, under the guidance of relevant departments, the industry of short video

⁴⁶ Fish Brain System refers to the intelligent prediction platform of pan-content big data, which mainly provides data reference and support to content planning, creation, marketing, and commercialization.

clips was further standardized while speeding up its integration with other fields and exploring new business models.

The Youth Internet-Addiction Prevention System (YIAPS) was launched to create good cyberspace for the healthy growth of young people. To prevent teenagers from indulging in short videos clips, Douyin Short Video, Kuaishou and Huoshan, under the guidance of Cyberspace Administration of China launched the piloted YIAPS in March 2019. In May, the coverage of the YIAPS was expanded on the basis of summarizing the previous pilot work experience. Currently, 21 major online video platforms launched the YIAPS, with limitations on the duration, what time to use, functions, and content of youth users. In the future, relevant platforms will continue to step up R&D efforts to improve the accurate identification of young users. Meanwhile, they will also pool all social forces to expand the coverage of the YIAPS to further strengthen the protection of young people.

Short video clips platforms sped up integration with e-commerce and tourism to explore new business models. Major e-commerce platforms introduced short video clips in the form of independent channels or applications to help users quickly understand commodities, shorten consumption decision-making time and attract users to purchase by making use of their real and intuitive features. In addition, the short video clips platform linked user accounts to cooperated e-commerce platforms, allowing users to purchase goods directly within the app, so as to form a closed trading loop. In the field of tourism, short video clip platforms strengthened their cooperation with major scenic spots or cities to package and promote tourism resources, hold themed-video challenge activities, and help build Internet-famous scenic spots and cities. While boosting the growth of local tourism revenue, they also promoted the diversification of their content and business models. For example, “light-rail trains passing through the building at Liziba Station” and “Hongyadong” and other Internet-famous tourist attractions in Chongqing were driving the local tourism economy. During the May Day or Labor Day holiday in 2019, the tourist number and tourism income in Chongqing increased by 10.6% and 33.5% respectively year-on-year⁴⁷.

⁴⁷ Source: Chongqing Culture and Tourism Development Committee, <http://whlyw.cq.gov.cn/content-2568-20848-1.html>, May 4, 2019.



(V)Live Streaming

As of June 2019, the user size of live streaming in China had reached 433.22 million, up 36.46 million from the end of 2018, accounting for 50.7% of all Internet users. Among them, the user size of host live show and live sports broadcasting were 205 million and 194 million respectively, accounting for 24.0% and 22.7% of all netizens, up 4.3 and 1.5 percentage points respectively from the end of 2018. The user size of live game streaming and live concert streaming was 243 million and 116 million respectively, making up 28.4% and 13.6% of the total respectively, which remained stable compared with the end of 2018.

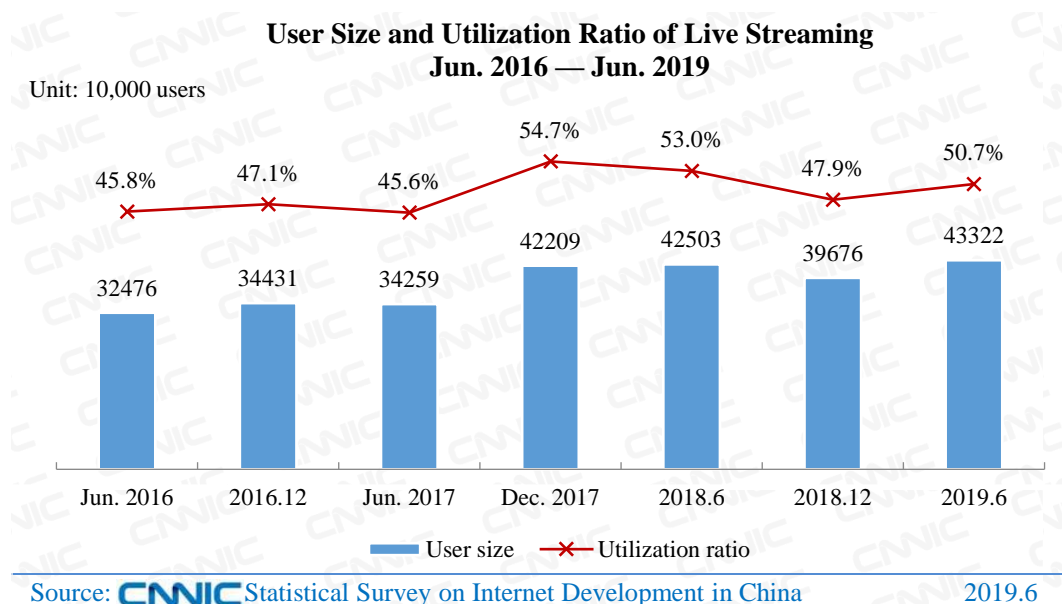


Figure 46 User Size and Utilization Ratio of Live Streaming Jun. 2016 — Jun. 2019

In the first half of 2019, major live streaming platforms explored the “live streaming plus” model and laid out the content ecosystem. E-commerce and short video platforms also took advantage of live streaming to drive their business development.

Major live streaming platforms increased revenue by expanding the content ecosystem. In the first half of the year, they promoted the “live streaming plus” layout by integrating with industries such as electronic sports, variety show, culture, tourism, and education. The platforms strove to build a more diversified, differentiated and high-quality live streaming ecosystem and became the main driving force for the development of the industry. For instance, YY live streaming platform

developed content categories such as two-dimensional⁴⁸, emotion, outdoor, gourmet, and tourism, tried various types of home-made programs, and enriched its content system by introducing PGC (Professional Generated Content) institutions, combining online and offline models, and conducting interdimensional cooperation⁴⁹. Huya live streaming platform further deepened the layout of the electronic sports industry chain by signing professional teams, seizing the copyright of contests and making its own IP. In the second quarter of 2019, the revenues of YY and Huya live streaming platforms were 5.923 billion yuan and 1.922 billion yuan respectively, with the year-on-year growth rates of 66.4% and 93.7% respectively.⁵⁰

Platforms of e-commerce, short video clips and others attached great importance to the potential profit of live streaming by setting foot in live streaming fields in a manner of mutually integrated development. The e-commerce platform lowered the threshold to attract anchors and fans and establish emotional connections between the platform and consumers, thus accelerating the growth of the market. From April 2018 to March 2019, Mogujie live streaming business grew, with the total live streaming-related transactions up 138.1% year-on-year and the number of monthly active mobile users using live streaming services up 42.1% year-on-year⁵¹. During the “June 18” period in 2019, Taobao’s live streaming platform drove sales of 13 billion yuan, with the number of merchants that broadcast live streaming increasing by nearly 120% year-on-year and that of broadcasts growing by 150% year-on-year.⁵² Meanwhile, fragmented and refined short video content was integrated with a live streaming model of instant interaction to share user traffic and complement each other. For example, Kuaishou launched an independent live game streaming App. Douyin Short Video lifted the control over users’ live streaming rights. Such efforts continuously explored the operating system of “short video plus live streaming”.

⁴⁸ Two-dimensional means the virtual world corresponding to the real world. It is often used to refer to the virtual world in animation, comics and games.

⁴⁹ Interdimensional cooperation refers to the cooperation between reality and two-dimensional.

⁵⁰ Sources: the financial reports of YY and Huya live streaming platforms in the second quarter of 2019.

⁵¹ Source: Mogujie Financial Report for the Fourth Quarter of Fiscal Year 2019.

⁵² Source: Data released by Taobangdan and Taobao Live Streaming, <https://tbd.wshang.com/navi/article?Id=577>, June 21, 2019.



VI. Public Service Applications

(I) Online Car-hailing Services

As of June 2019, the user size of online car-hailing services was 336.58 million or 39.4% of China's total netizen population, up 6.70 million over the end of 2018; the number of online premier and fast ride had reached 339.15 million, up 6.33 million from the end of 2018, accounting for 39.7% of China's Internet users.

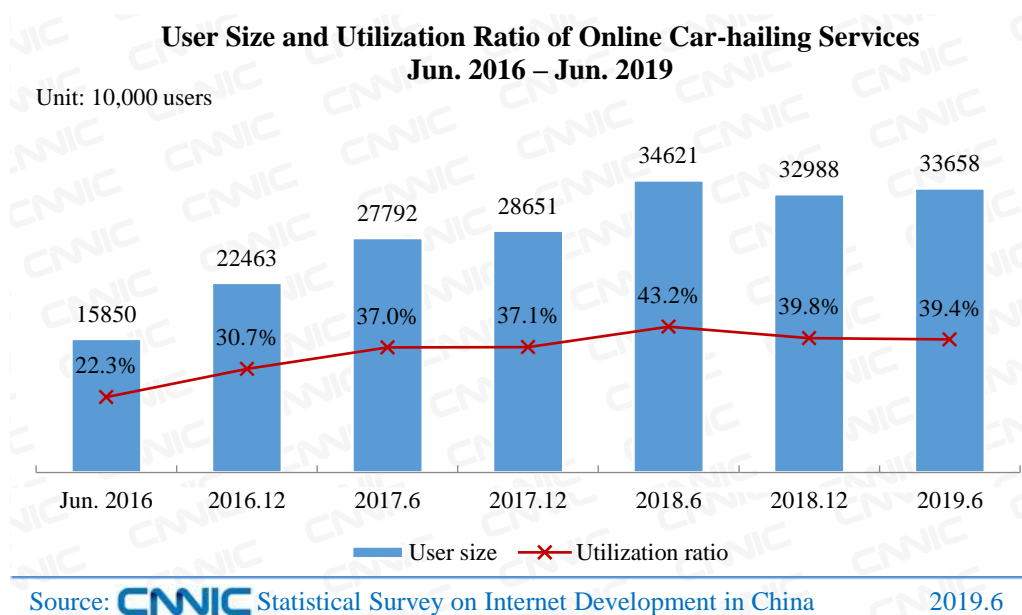


Figure 47 User Size and Utilization Ratio of Online Car-hailing Services Jun. 2016 – Jun. 2019

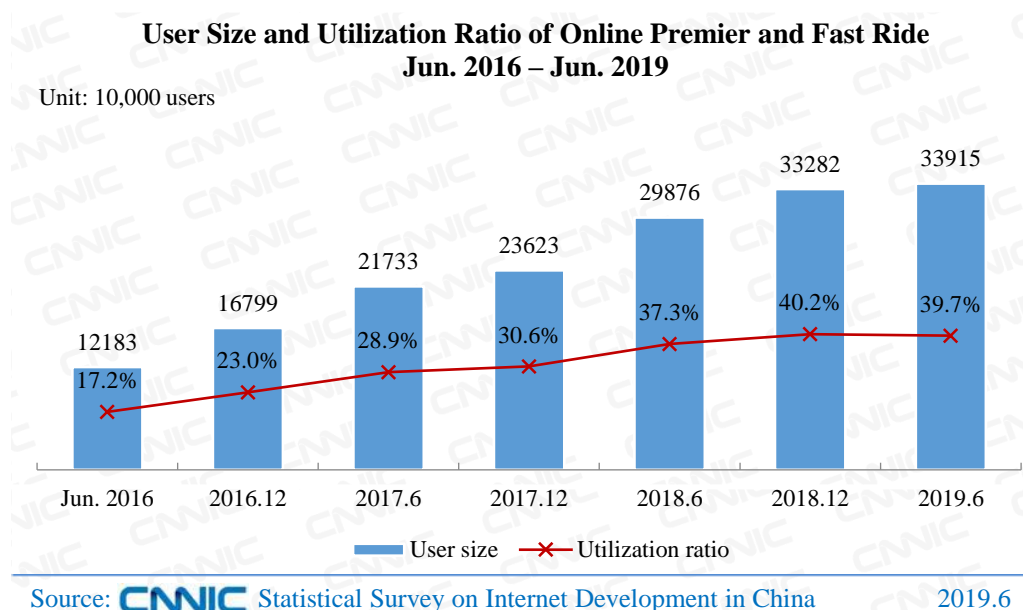


Figure 48 User Size and Utilization Ratio of Online Premier and Fast Ride Jun. 2016 – Jun. 2019

Regarding policy supervision, the compliance of the online car-hailing industry achieved initial results and standardized operation laid a solid foundation for development. The Online Car-hailing Business Certificate, Online Car-hailing Driver Certificate, and Online Car-hailing Transportation Certificate were the current market access conditions for online car-hailing services in China. As of February 2019, 247 cities across the country had issued specific suggestions and measures to standardize the development of online car-hailing services. More than 110 online car-hailing companies had obtained business licenses. 680,000 driver licenses and 450,000 vehicle transportation licenses⁵³ were issued. The steady progress in the compliance of the online car-hailing industry has resulted in an increasingly standardized operation and a fairer and more orderly competitive environment.

In terms of operational services, online car-hailing companies adjusted their development strategies and continuously optimized their business layout. First, enterprises accelerated the integration of resources. Meituan, Gaode, and other enterprises were connected to a number of travel service providers on their platforms. As a result of the size effect, they aggregated user resources to seize the entrances of Apps and enhance the user loyalty through differentiated operations. Second, regarding the diversified model, online car-hailing companies explored a

⁵³ Source: Press Conference on Deepening Reform and Promoting High-Quality Development of Transportation convened by the State Council Information Office.



variety of business models to enhance their operational capabilities. Shouqi Limousine & Chauffeur, Shenzhou, and other self-operation companies adjusted themselves to the parallel model of self-operation and franchise. Didi Chuxing, Yidao Yongche, and other platforms adopting the franchise model extended their self-operation business by recruiting their drivers and customizing new energy vehicles. Third, advanced enterprises gave priority to the development by striving to operate basic travel business, so as to control their operating costs, consolidate the safety service foundation, and improve the operating efficiency and service quality.

In regard to users, the online car-hailing service users were widely distributed and most of them were young users. As of June 2019, the user group of online car-hailing services covered 31 provinces (autonomous regions and municipalities directly under the central government) in China, seen from the geographical distribution, with the utilization rate in most areas of the country exceeding 30%. Among them, the utilization ratio of Internet users was 54.0% in the eastern region, 43.4% in the central region, 44.8% in the western region and 34.6% in the northeastern region⁵⁴. Judged from the age structure, the usage ratio of online car-hailing services was 74.0% and 57.0% among the netizens aged 20-29 and 30-39 respectively, higher than other age groups.

(II) Online Education

As of June 2019, the user size of online education was 232.46 million or 27.2% of China's total netizen population, up 31.22 million over the end of 2018; the number of mobile learning users had reached 199.46 million, up 5.30 million from the end of 2018, accounting for 23.6% of mobile Internet users.

⁵⁴ The division of the eastern, central, western and northeastern regions shall refer to the division standard published by the National Bureau of Statistics of China.

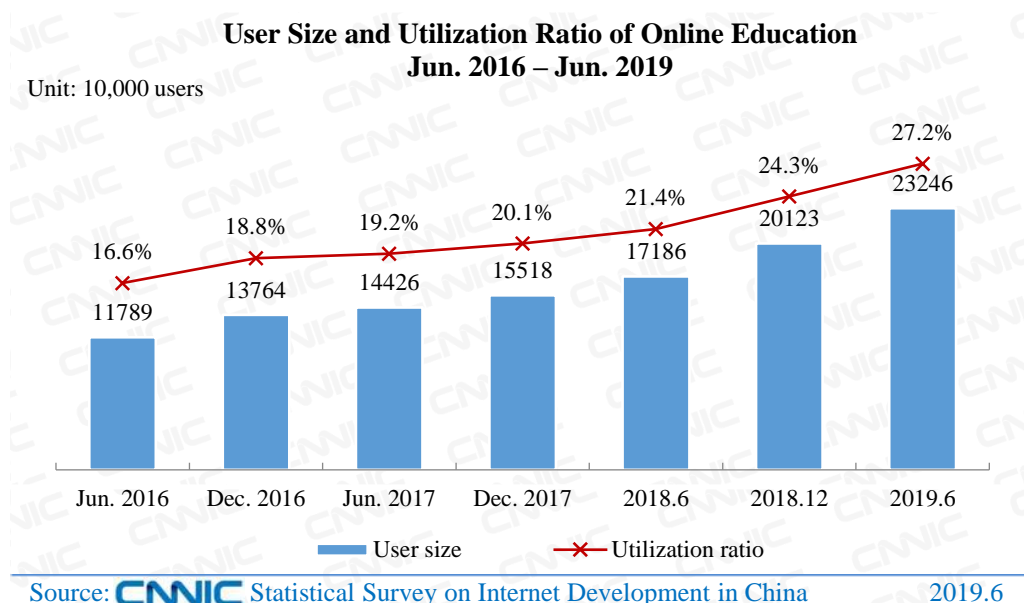


Figure 49 User Size and Utilization Ratio of Online Education Jun. 2016 – Jun. 2019

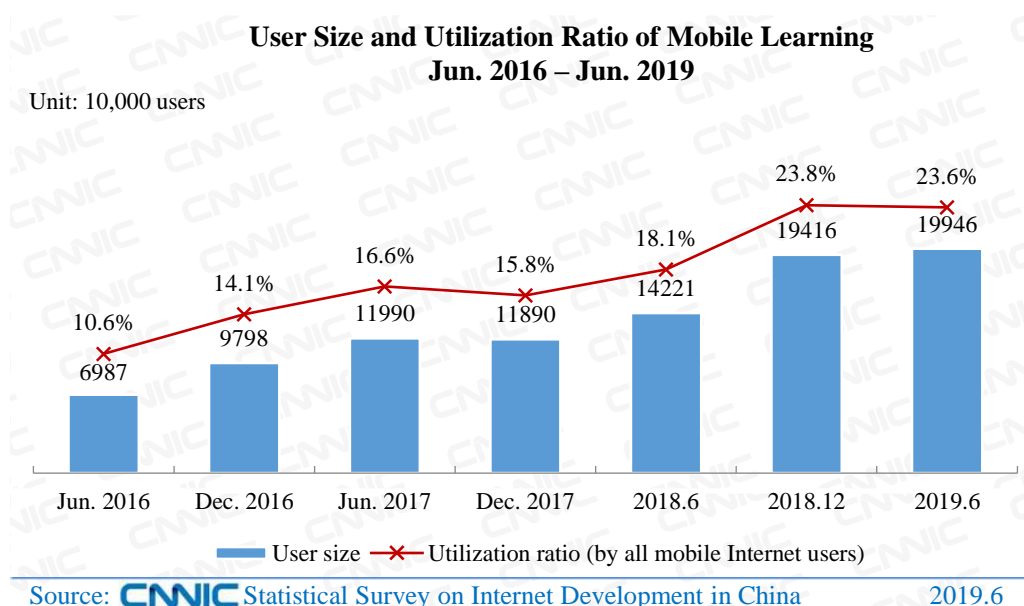


Figure 50 User Size and Utilization Ratio of Mobile Learning Jun. 2016 – Jun. 2019

The 2019 *Government Work Report* proposed to develop the “Internet plus education” initiative to facilitate the sharing of high-quality resources. Under the guidance of relevant policies, online education gradually extended to rural and remote areas. Personalized AI-driven teaching will become an important development direction of online education in the future.

The online class in rural areas had been gradually promoted to make up for the shortage of rural education. With the continuous improvement of hardware facilities such as video conference

rooms, live video rooms and multimedia classrooms in some rural areas, famous teachers from well-known schools were able to teach rural students in the countryside and parents attended such classes, which provides new solutions for the development of rural education. In the first half of the year, some underdeveloped regions introduced a teaching model of “online famous teacher teaching plus offline real-time tutoring”, regularly arranged front-line teaching experts to train local teachers through online courses, shared high-quality teaching resources, and strengthened the capabilities of local teachers. Up to June 2019, the utilization ratio of online education of China’s rural Internet users had reached 17.6%, up 2.1 percentage points over the end of 2018.

Personalized AI-driven teaching will become an important development direction of online education in the future. In the first half of the year, major online education platforms launched more full-fledged products in the field of “AI plus education”. Related products were based on AI and big data technologies. For one thing, they increased classroom interest and improved learning efficiency through voice assessment and interaction with AI teachers. For another, with advanced algorithms as the core, the classroom behaviors and learning effects of students were analyzed through big data to create their portraits in a targeted way and provide the best personalized learning solution.

Chapter IV The Development of E-government Applications

I. The Development of E-government Services

Up to June 2019, 509 million Internet users or 59.6% of all netizens had received e-government services in China.

In the first half of 2019, China's e-government services continued to improve. Governments at all levels implemented relevant policies such as the *Key Points of Making Government Affairs public 2019*, put them in place, strove to improve the quality of open government affairs, and deepened information disclosure in key areas. In the first half of the year, government departments started from the integrated management of new media, integrated construction of platforms, and application of new technologies to further improve the governance and enhance the people's satisfaction and sense of fulfillment.

In the integration and management of new government media, a number of policies had been issued to guide the integration and development of new government media platforms. According to relevant data⁵⁵, 297 prefecture-level governments in China opened new media channels such as "two micros and one end"⁵⁶, with an overall coverage rate of 88.9%. However, about 57% of prefecture-level city government still did not meet the standard of service integration of Apps and WeChat official accounts. Mobile service supply was scattered and the integration capability of new government media platforms needed to be improved. In response to this phenomenon, the General Office of the State Council formulated the *Inspection Index for Government Websites and New Government Media* and the *Annual Assessment Index for the Supervision of Government Websites and New Government Media* to gradually solve the prominent problems existing in some new government media, such as imprecise information release, nonstandard construction and operation,

⁵⁵ Source: *The Report on Internet Service Capabilities of China's Local Governments (2019)*, University of Electronic Science and Technology of China.

⁵⁶ Two micros and one end refer to government microblog, WeChat official account of government, and client-side government App.



and inadequate supervision and management. Governments at all levels were also required to coordinate the development of new government media in strict accordance with the intensive principle, avoid the phenomenon of “one App for one service item, one unit for one App”, continuously optimize government services, improve the efficiency of social governance, and make new government media an important platform and effective tool for serving, uniting and maintaining close ties with the people.

Regarding the development of an integrated e-government service platform, governments at all levels sped up the integration of online and offline services and promoted more services included in “one-for-all website”. Against the backdrop of comprehensively deepening the reform, the construction of an integrated e-government service platform had become an important move for governments at all levels to transform their functions. Since China's national e-government service platform was put into trial operation in May 2019, the platform has witnessed about 222 million visits, 10.496 million users registering with real names, 33.85 million real-name identity verification services for local departments, and 2.86 million calling and sharing services of electronic licenses and certificates. In addition, 31 provinces (autonomous regions and municipalities), Xinjiang Production and Construction Corps and 40-plus departments under the State Council opened their e-government service platforms. The public entrance, public channel and public support of China's national e-government services began to play a pivotal role.

In the application of new technologies, governments at all levels established new service models with open data and applications of new technologies. In the first half of the year, ministries and commissions accelerated data development and explored data applications. According to the data⁵⁷, about 25% of the websites of ministries and commissions set up “data” columns to focus on opening government data to the public, while about 20% of the websites used visual methods such as graphs and diagrams to interpret the data. The websites of the National Development and Reform Commission, the Ministry of Commerce, the Forestry and Grassland Bureau provided intelligent consulting services through natural language processing and other related technologies to automatically answer user inquiries. The Ministry of Water Resources, the Ministry of Transport and other ministries and commissions optimized the search technology on their websites, improved

⁵⁷ Source: the *17th Performance Evaluation Report of Government Websites of Ministries and Commissions* released by China Software Evaluation Center.

the search effect, and initially realized the functions of automatic correction of misspelled words, keyword recommendation, and popular language search, so as to integrate government information resources.

II. The Development of Government Websites

(I) General Situation of Government Websites and Provincial Websites

As of June 2019, there were 15,143 government websites⁵⁸ in China, mainly including government portals⁵⁹ and departmental websites⁶⁰. Among them, departments under the State Council and their internal and vertical administrative agencies had 1,001 government websites. 14,142 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 Jun. 2016 - Jun. 2019

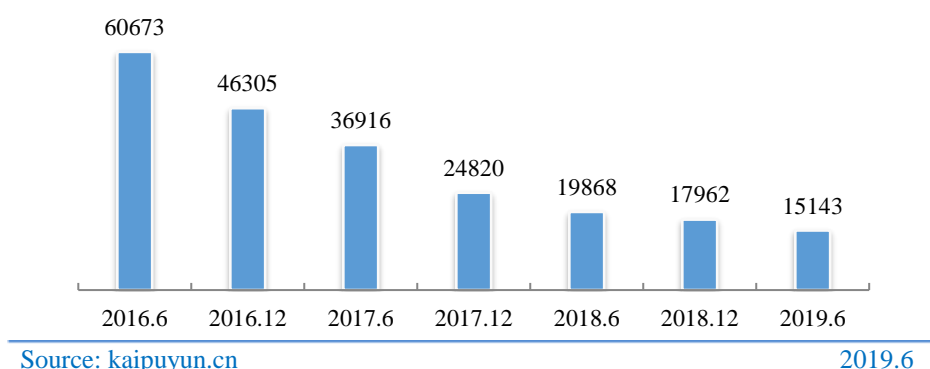


Figure 51 Number of Government Websites Jun. 2016 - Jun. 2019

⁵⁸ 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.

⁵⁹ 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.

⁶⁰ 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.

Table 6 Number⁶¹ of Government Websites by Province Dec. 2018 - Jun. 2019

Province	Jun. 2019	Dec. 2018	Reduction
Beijing	77	80	3.8%
Tianjin	109	133	18.0%
Hebei	504	573	12.0%
Shanxi	398	422	5.7%
Inner Mongolia	580	618	6.1%
Liaoning	555	666	16.7%
Jilin	320	373	14.2%
Heilongjiang	260	449	42.1%
Shanghai	68	88	22.7%
Jiangsu	647	800	19.1%
Zhejiang	604	689	12.3%
Anhui	799	909	12.1%
Fujian	443	495	10.5%
Jiangxi	546	625	12.6%
Shandong	858	1120	23.4%
Henan	898	1054	14.8%
Hubei	727	852	14.7%
Hunan	631	746	15.4%
Guangdong	653	867	24.7%
Guangxi	658	758	13.2%
Hainan	106	127	16.5%
Chongqing	131	342	61.7%
Sichuan	912	1066	14.4%
Guizhou	412	450	8.4%
Yunnan	342	394	13.2%
Tibet	176	165	-6.7%
Shaanxi	654	752	13.0%
Gansu	523	616	15.1%
Qinghai	137	181	24.3%
Ningxia	130	158	17.7%
Xinjiang	159	167	4.8%

⁶¹ The data in Table 7 do not include the number of websites of ministries and commissions.

Province	Jun. 2019	Dec. 2018	Reduction
Xinjiang Production and Construction Corps	125	147	15.0%
Total	14142	16882	16.2%

Source: Kaipuyun

(II) Number of Government Websites by Administrative Level

As of June 2019, departments under the State Council and their internal and vertical institutions had 1,001 government websites, accounting for 6.6% of the total. There were 12,422 government websites for administrative units at the municipal level or below, accounting for 82.0%. The number of government websites at all administrative levels had decreased from the end of 2018.

Number of Government Websites by Administrative Level

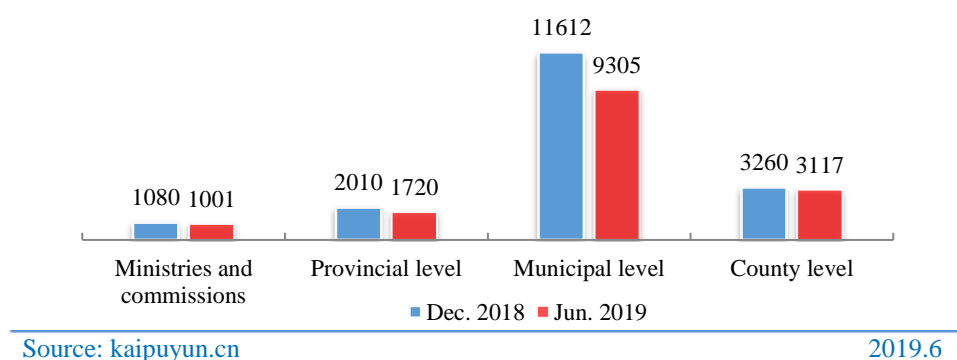


Figure 52 Number of Government Websites by Administrative Level

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

As of June 2019, a total of 255,000 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 138,000, or 54.3% of the total. Among all columns of

government websites, the number of columns of information disclosure was 173,000, ranking first and accounting for 67.7%; online service columns took up 15.3%; and government affairs columns made up 13.5%.

Number of Columns on Government Websites by Administrative Level

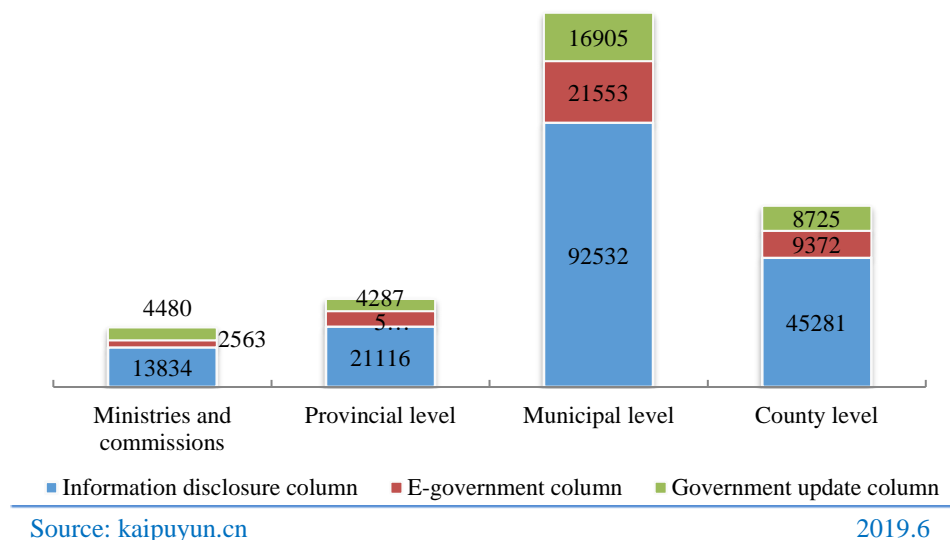


Figure 53 Number of Columns on Government Websites by Administrative Level⁶²

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

In the first half of 2019, the number⁶³ of articles updated on the homepages of China's government websites at all administrative levels increased by 20.5% over the end of 2018. Among them, the government websites of ministries and commissions soared by 53.1% from the end of 2018.

⁶² 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.

⁶³ 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

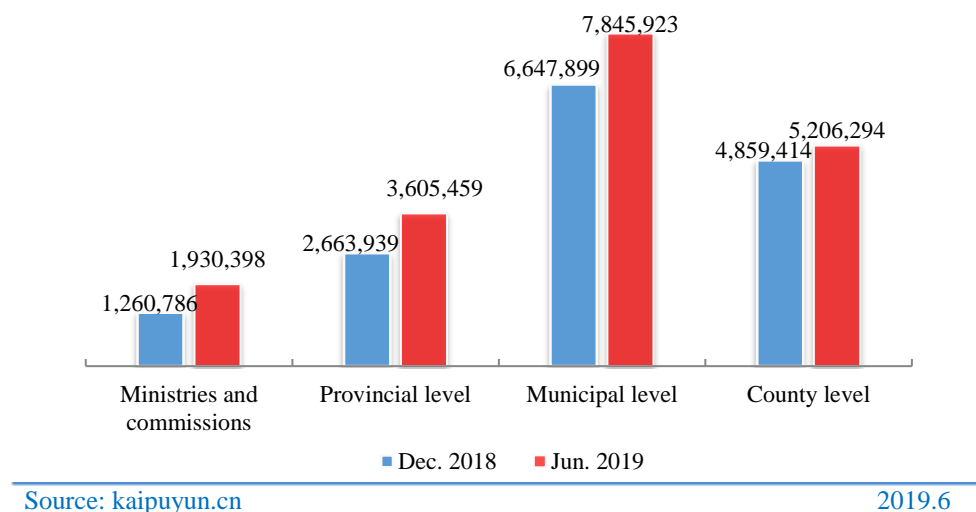


Figure 54 Number of Articles Updated on the Homepages of Government Websites at All Administrative Levels

III. The Development of New Government Media

(I) The Development of WeChat Civic Services

1. Overall Usage of WeChat Civic Services

Up to June 2019, the cumulative number of WeChat civic service users in China reached 620 million.

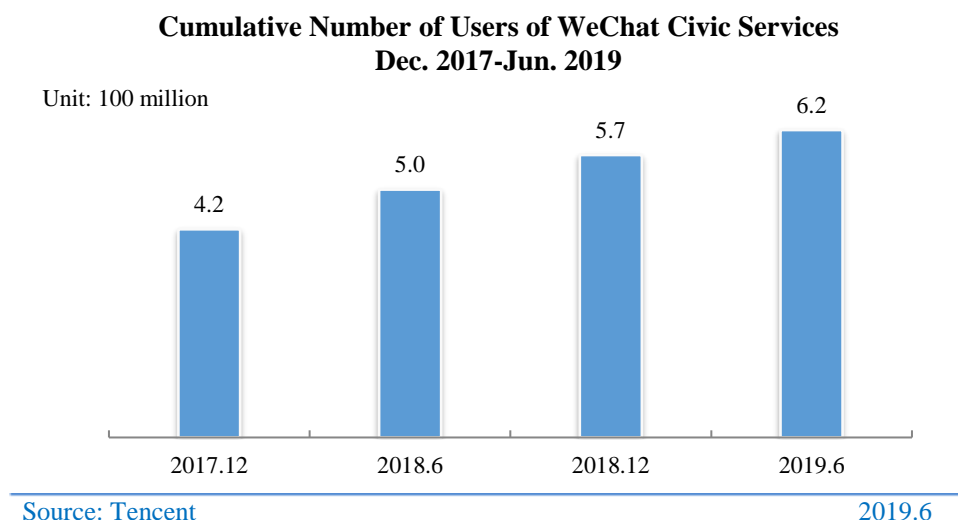


Figure 55 Cumulative Number of Users of WeChat Civic Services Dec. 2017-Jun. 2019

2. Usage of WeChat Civic Services by Province

As of June 2019, 31 provinces, autonomous regions and municipalities directly under the central government in Mainland China had launched WeChat Civic Services. Specifically, Guangdong Province had a total of 189 million users, ranking first in the country.

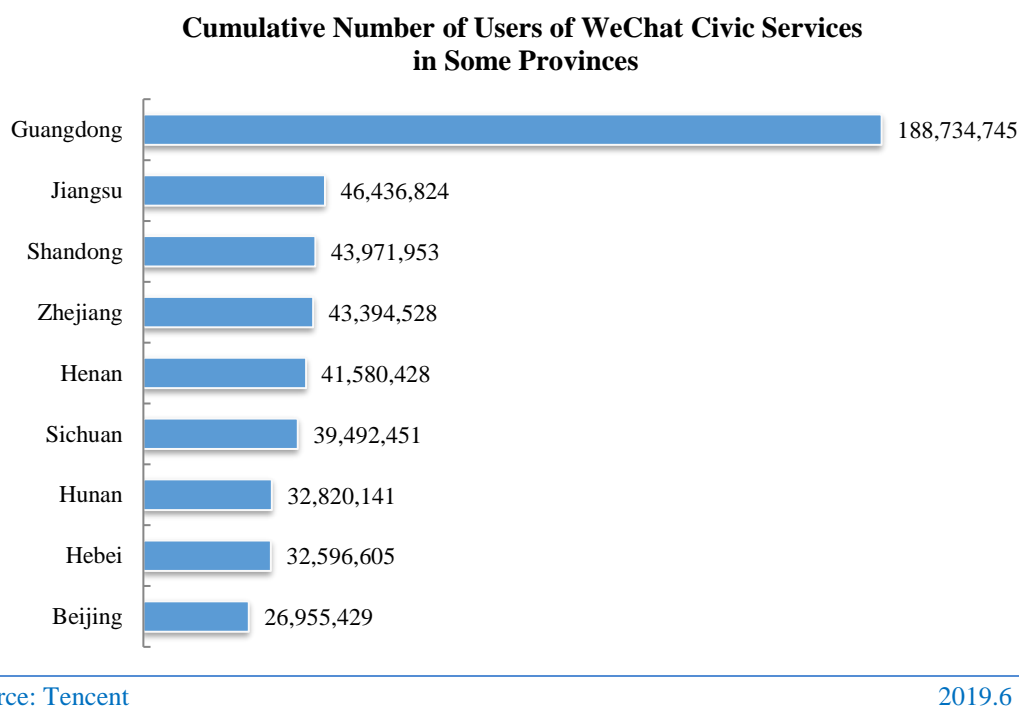


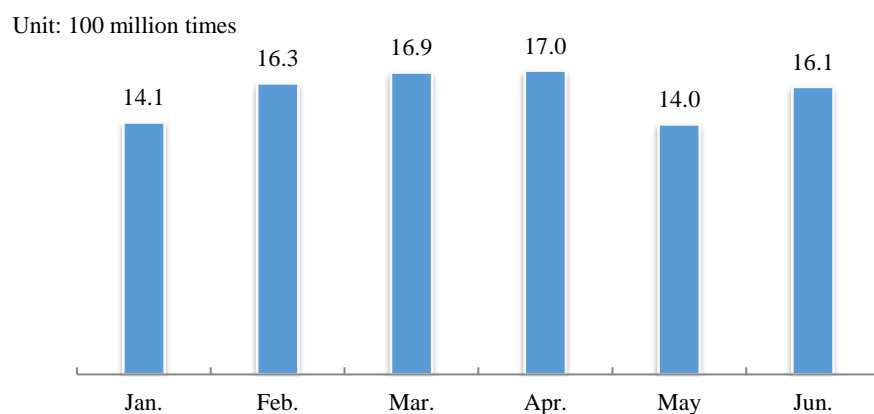
Figure 56 Cumulative Number of Users of WeChat Civic Services in Some Provinces

(II) The Development of Government Service Search

1. Overall Status of Government Service Search

In the first half of 2019, the search volume of government services via Baidu App was 9.44 billion times.

**Search Volume of Government Services via Baidu App
Jan. 2019-Jun. 2019**



Source: Baidu

2019.6

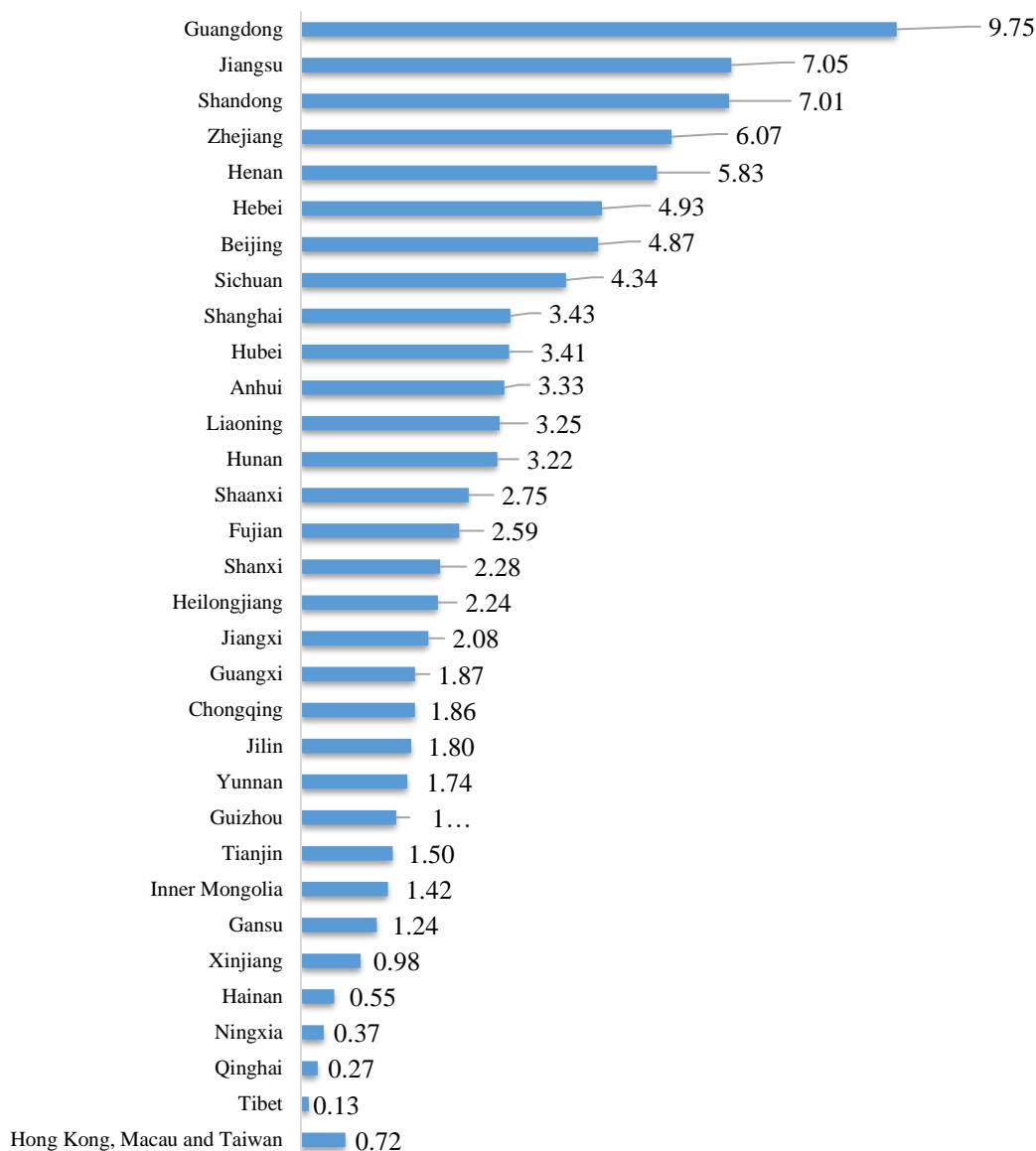
Figure 57 Search Volume of Government Services via Baidu App Jan. 2019-Jun. 2019

2. Search of Government Services by Province

In the first half of 2019, the number of Guangdong netizens searching government services via Baidu App was 975 million times or 10.3% of the total search volume, ranking the first nationwide.

Search Volume of Government Services via Baidu App by Province

Unit: 100 million times



Source: Baidu

2019.6

Figure 58 Search Volume of Government Services via Baidu App by Province

(III) The Development of Government Microblogs

1. The Overview of Government Microblogs

Up to June 2019, 139,270 government microblogs had been verified by Sina.

Number of Government Microblogs

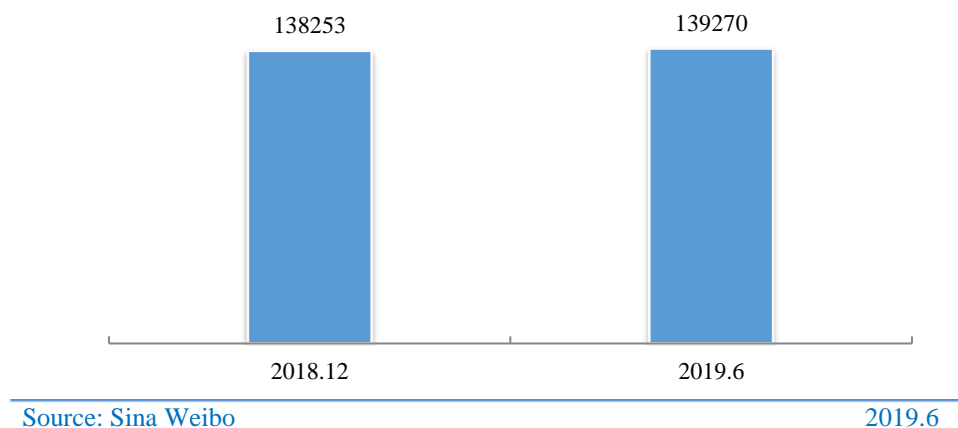
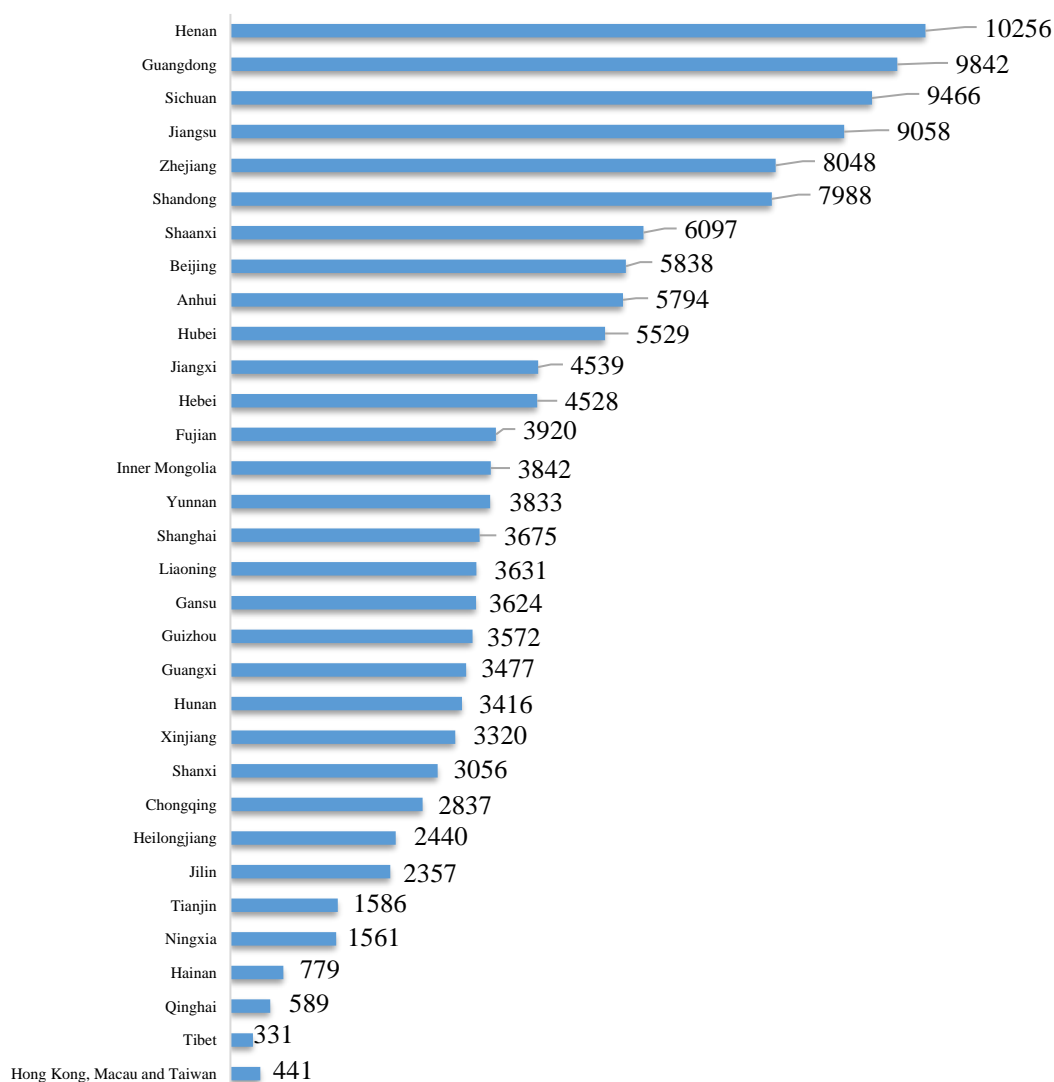


Figure 59 Number of Government Microblogs

2. The Overview of Government Microblogs by Province

As of June 2019, 31 provinces, autonomous regions and municipalities directly under the central government in Mainland China had launched government microblogs. Specifically, Henan province had opened 10,256 government microblogs, ranking first in the country, followed by Guangdong province launching 9,842 government microblogs.

Number of Government Microblogs by Province



Source: Sina Weibo

2019.6

Figure 60 Number of Government Microblogs by Province

(IV) The Development of Zhengwutoutiao

1. The Overview of Zhengwutoutiao

As of June 2019, the number of Zhengwutoutiao⁶⁴ launched by governments at all levels had reached 81,168, an increase of 2,988 from the end of 2018.

⁶⁴ Zhengwutoutiao refers to a public information publishing platform for governmental departments, which is based on the App Top News.

Number of Zhengwutoutiao Dec. 2017-Jun. 2019

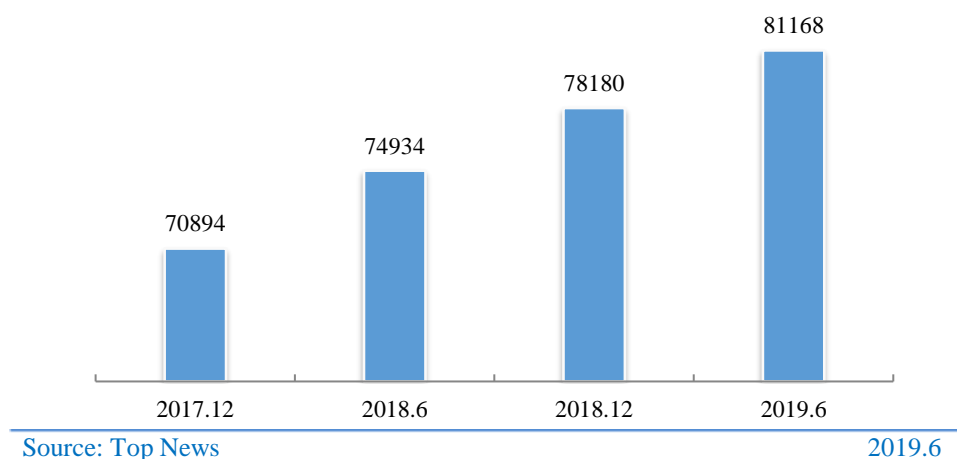
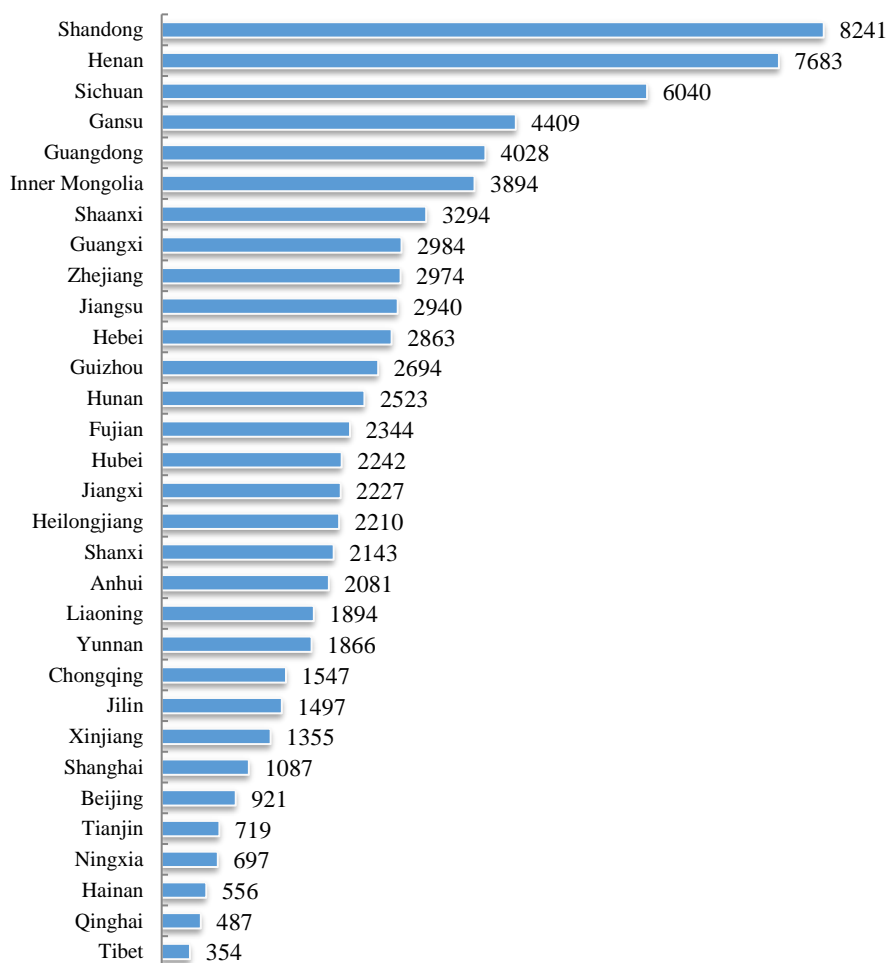


Figure 61 Number of Zhengwutoutiao Dec. 2017-Jun. 2019

2. The Overview of Zhengwutoutiao by Province

As of June 2019, 31 provinces, autonomous regions and municipalities directly under the central government in Mainland China had launched government microblogs. Among them, Shandong was the province boasting the largest number of 8,241 Zhengwutoutiao accounts. 7 provinces opened more than 3,000 Zhengwutoutiao accounts.

Number of Zhengwutoutiao by Province



Source: Top News

2019.6

Figure 62 Number of Zhengwutoutiao by Province⁶⁵

⁶⁵ The number of Zhengwutoutiao by province does not include that of Zhengwutoutiao opened by ministries and commissions.

Chapter V Internet Security

I. Cyber Incidents

(I) Proportion of Types of Network Security Problems

In the first half of 2019, the proportion of China's netizens who had not encountered any cyber incidents increased. According to statistics, 55.6% of netizens said they had not encountered any network security problem in the past six months, up 6.4 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 6.6 percentage points from the end of 2018. The proportion of netizens encountering network security problems such as account or password stolen and personal information leakage also decreased.

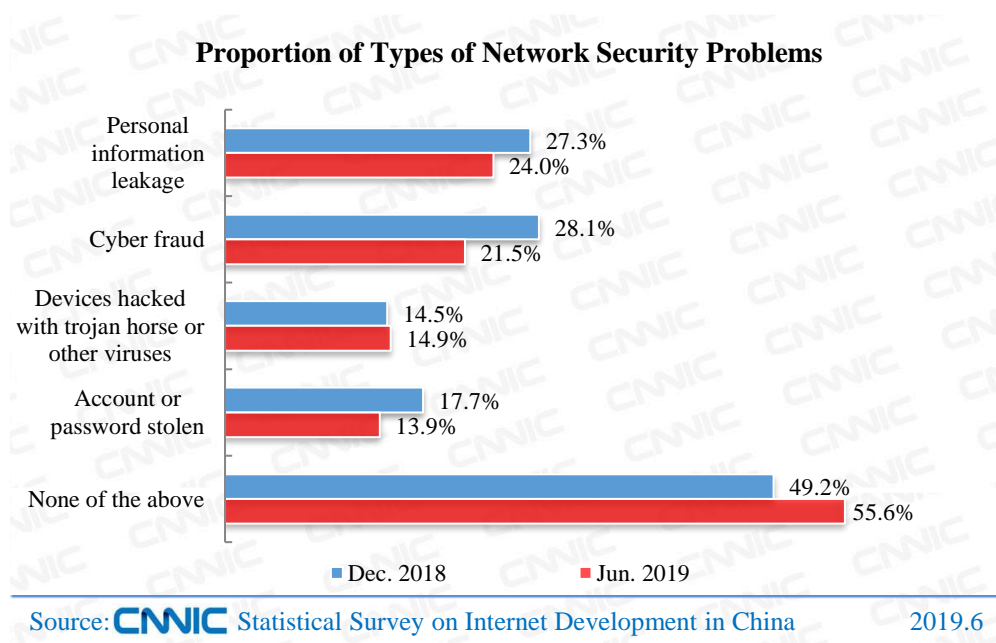


Figure 63 Proportion of Types of Network Security Problems

(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 58.1%, down

3.2 percentage points from the end of 2018. The proportion of fake friend fraud was 41.9%, down 7.4 percentage points over the end of 2018.

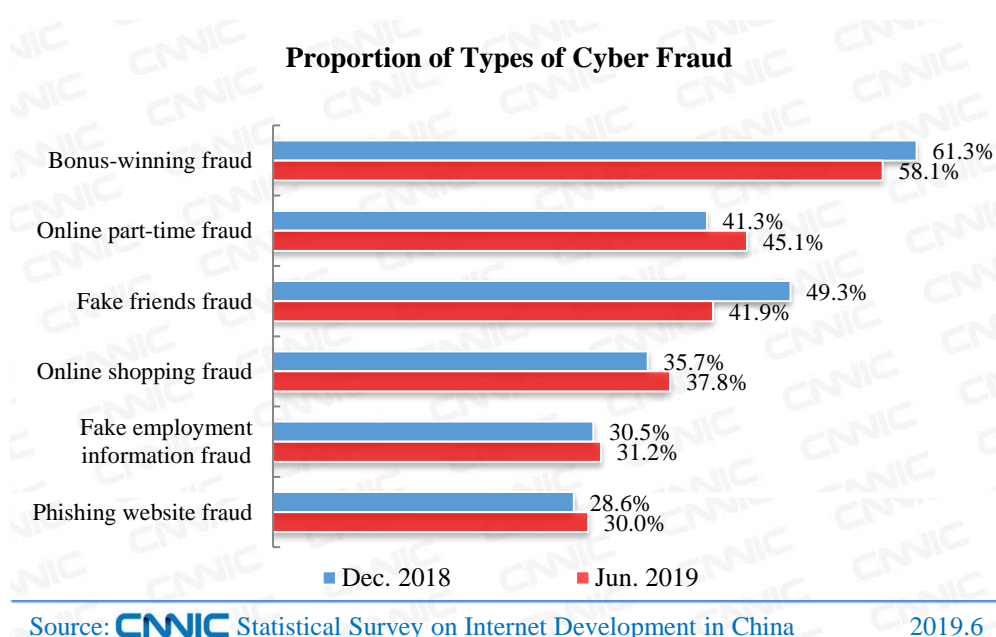


Figure 64 Proportion of Types of Cyber Fraud

II. Website Security and Vulnerabilities

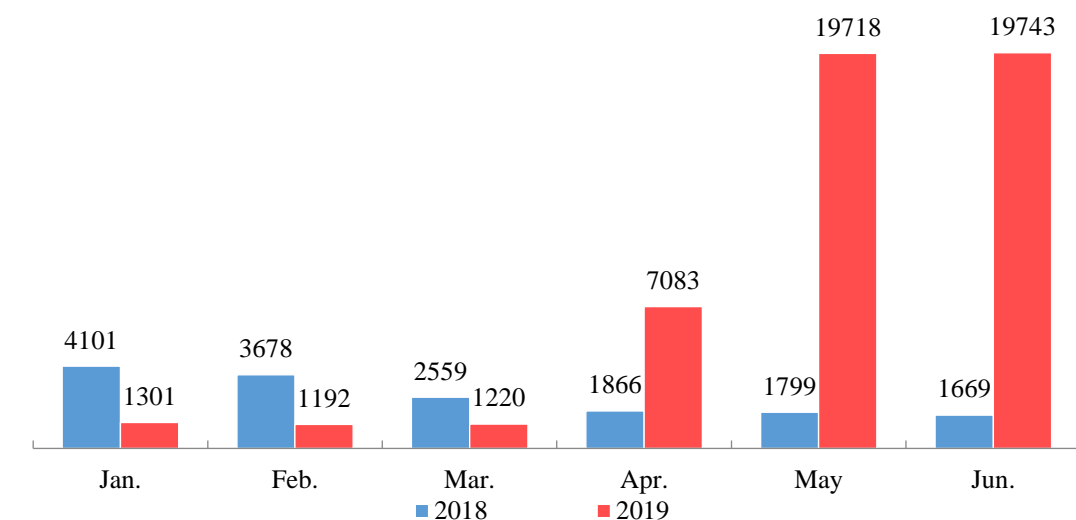
(I) Number of Websites Tampered with by Hackers in China

In the first half of 2019, China National Computer Network Emergency Response Technical Team (known as CNCERT) monitored and handled nearly 40,000⁶⁶ tampered websites⁶⁷ in China, including 222 government websites.

⁶⁶ Source: *China's Internet Security Situation in the First Half of 2019* released by the CNCERT. In this chapter, CNCERT's data all come from *China's Internet Security Situation in the First Half of 2019*, and monthly data from CNCERT's *Internet Threat Report by month*.

⁶⁷ 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.

Number of Websites Tampered with by Hackers in China

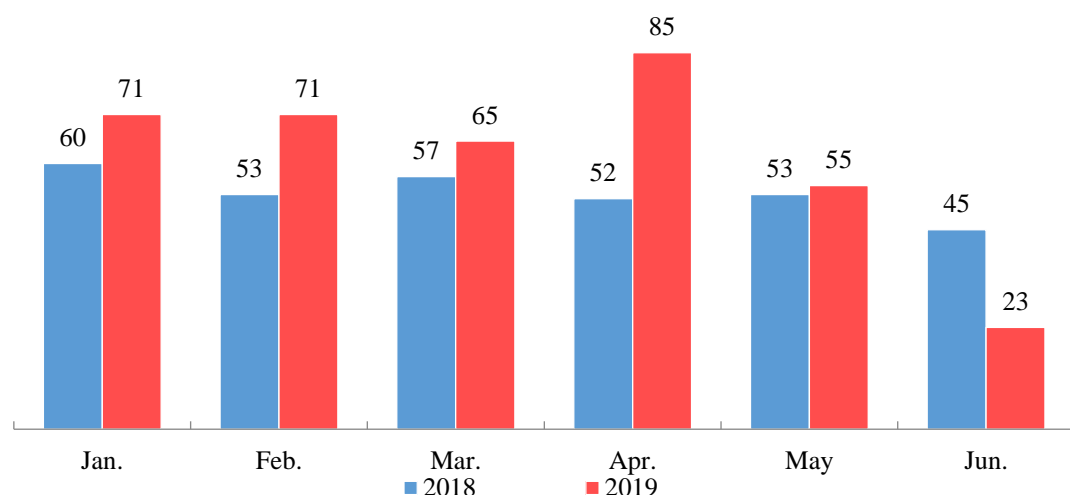


Source: CNCERT

2019.6

Figure 65 Number of Websites Tampered with by Hackers in China⁶⁸

Number of Tampered Government Websites in China



Source: CNCERT

2019.6

Figure 66 Number of Tampered Government Websites in China

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

In the first half of 2019, CNCERT found that, through about 14,000 IP addresses at home and abroad, hackers had about 26,000 websites implanted with backdoor malware in China, a 2.2-fold increase on a year-on-year basis.

⁶⁸ Since April 2019, CNCERT has expanded the scope of monitoring, so the data have increased greatly.
The 44th Statistical Report on Internet Development in China



Number of Websites Implanted with Backdoor Malware in China

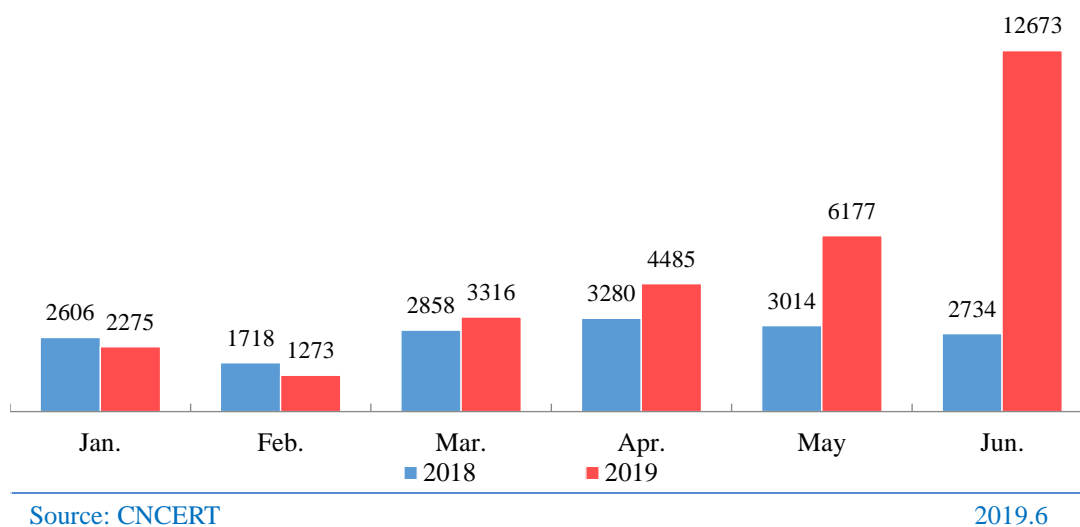


Figure 67 Number of Websites Implanted with Backdoor Malware in China⁶⁹

(III) Number of Information System Vulnerabilities

In the first half of 2019, China National Vulnerability Database (CNVD)⁷⁰ recorded 5,859 general vulnerabilities, a year-on-year decrease of 24.4%, including 2,055 high-risk vulnerabilities, a year-on-year decline of 21.2%.

⁶⁹ Since April 2019, CNCERT has expanded the scope of monitoring, so the data have increased greatly.

⁷⁰ 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.

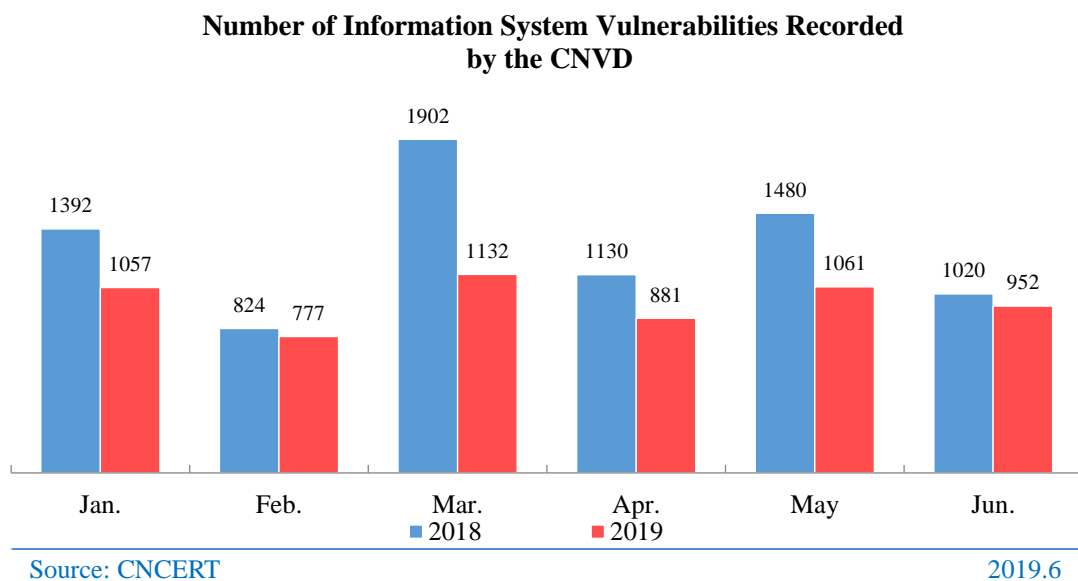


Figure 68 Number of Information System Vulnerabilities Recorded by the CNVD

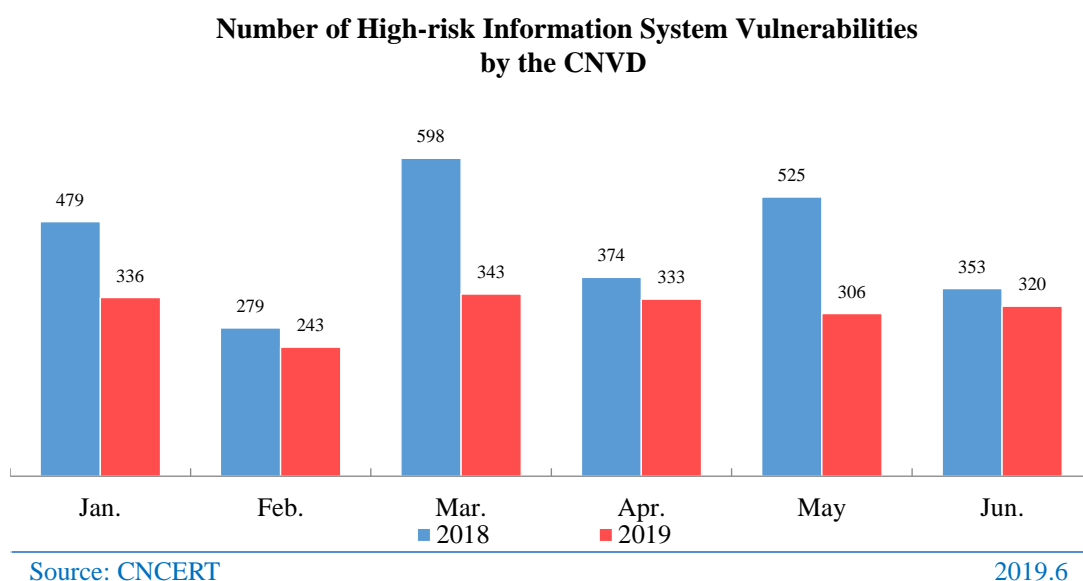


Figure 69 Number of High-risk Information System Vulnerabilities by the CNVD

III. The Reporting and Handling of Internet Incidents

(I) Number of Cyber Incidents Handled by CNCERT

In the first half of 2019, CNCERT handled about 49 thousand cyber incidents, a year-on-year decrease of 7.7%.

Number of Cyber Incidents Handled by CNCERT

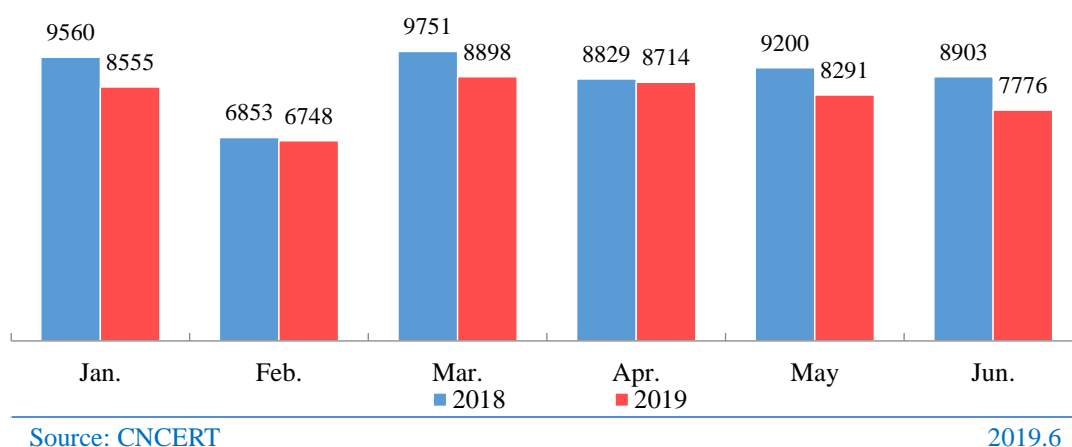


Figure 70 Number of Cyber Incidents Handled by CNCERT

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

In the first half of 2019, network reporting departments at all levels received 68.58 million reports nationwide, up 8.9% from 62.96 million in the same period in 2018.

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

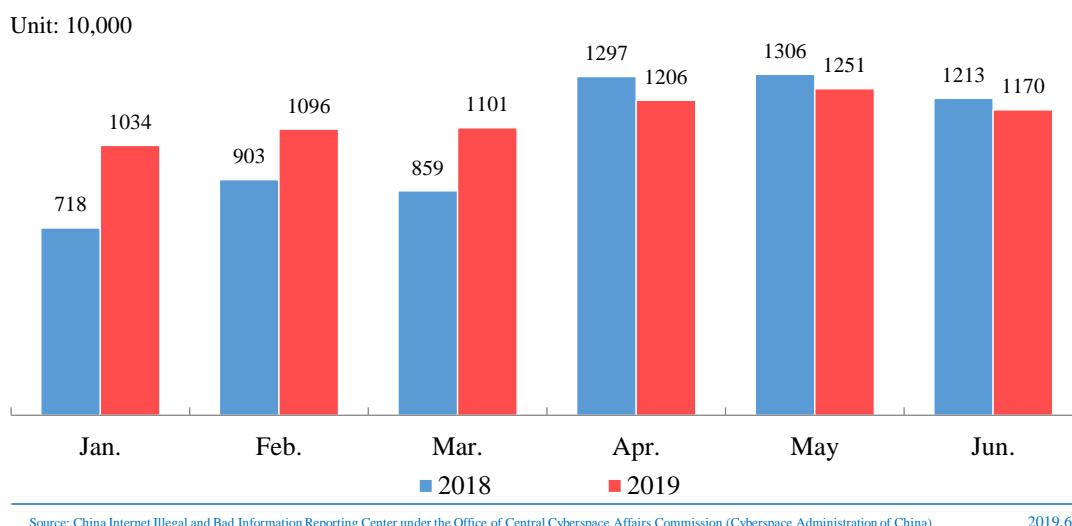


Figure 71 Number of Reports Received by Network Reporting Departments at All Levels Nationwide

Appendix 1 Survey Methodology

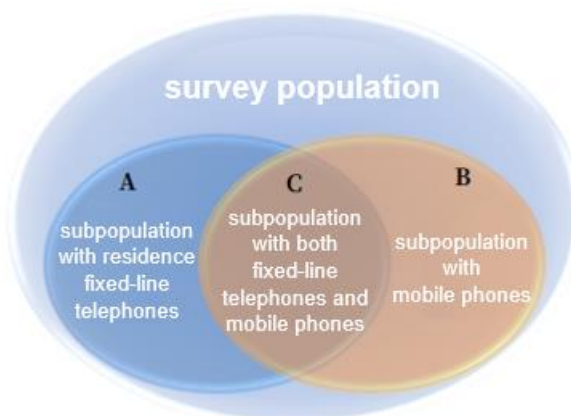
I. Survey Methodology

(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 Jun. 30, 2019.

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	338,991,360	20A+52B+153C
Taiwan	35,678,976	2A+32B+107C
Hong Kong SAR	10,972,672	167B+110C
Macau SAR	336,128	5B+33C

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

Organization Name	Number of Addresses	Equivalence
China Telecom	125,763,328	7A+126B+255C
China Unicom	69,866,752 ^{note1}	4A+42B+21C
IP Address Allocation Alliance of CNNIC	61,960,448 ^{note2}	3A+177B+113C
China Mobile	35,294,208	2A+26B+140C
China Education and Research Network	16,649,728	254B+14C
China Tietong Telecom	15,796,224 ^{note3}	241B+8C
Others	13,660,672	208B+114C
Total	338,991,360	20A+52B+153C

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 84.95 million, equivalent to 5A. 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 Jun.30, 2019.

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

Region	Number of Addresses
Mainland China	47315
Taiwan	2515
Hong Kong SAR	449
Macau SAR	7

Table 4 The Allocation of IPv6 Addresses in Mainland China

Organization Name	Number of IPv6 Addresses (/32)
China Telecom	16387
IP Address Allocation Alliance of CNNIC	14025 ^{note2}
China Education and Research Network	6162
China Unicom	4097
China Mobile	4097
China Tietong Telecom	2049 ^{note3}
China Science and Technology Network	17 ^{note4}
Others	481
Total	47315

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 16103/32. 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 Jun. 30, 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	1.95%
Jiangxi	1.73%
Chongqing	1.68%
Anhui	1.65%
Shaanxi	1.63%
Guangxi	1.38%
Shanxi	1.28%
Heilongjiang	1.21%
Jilin	1.21%
Tianjin	1.05%
Yunnan	0.98%
Inner Mongolia	0.77%
Xinjiang	0.60%
Hainan	0.47%
Gansu	0.47%
Guizhou	0.44%
Ningxia	0.28%
Qinghai	0.18%
Tibet	0.13%
Others	8.92%
Total	100.00%

Data sources: APNIC and CNNIC

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

Note 2: The deadline for the above statistical data is Jun. 30, 2019.

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	Guangxi Beibu Gulf Online Investment Co., Ltd.
China Telecom Cloud Company	Guangzhou Mingyang Information Technology Co., Ltd.
China Organizational Name Administration Center	Guangzhou Yiyao Information Technology Co., Ltd.
Alibaba Cloud Computing Co. Ltd	Hangzhou 22.cn Co., Ltd.
Beijing Oriental Wangjing Information Technology Co. Ltd.	Hangzhou E-commerce Interconnection Technology Co., Ltd.
Beijing XDNS.cn Co. Ltd.	Hangzhou Marksmile.com Co., Ltd.
Beijing Hongwangshenzhou Technology Development Co. Ltd.	Hangzhou Yunji Communication Technology Co., Ltd.
Beijing Jinluoshen E-commerce Co., Ltd.	Henan Weichuang Network Technology Co., Ltd.
Beijing Wanweitonggang Technology Co. Ltd.	Heilongjiang E-link Network Co., Ltd.
Beijing Xinnet Digital Information Technology Co., Ltd.	Jiangsu Bangning Technology Co., Ltd.
Beijing ZW Network Technology Co., Ltd.	Kunming Lewang Digital Technology Co., Ltd.
Chengdu Feishu Technology Co., Ltd.	Maoming City Qunying Network Co., Ltd.
Chengdu Shijidongfang Network Communication Co., Ltd.	Ningxia Hengsheng Friends Network Technology Co., Ltd.
Chengdu West Dimension Digital Technology Co., Ltd.	Qinghai Cloud Electronic Technology Co., Ltd.
Chongqing Zhijia Information Technology Co. Ltd.	Xiamen Nawang Technology Co., Ltd.
Dalian Zhongyi Interconnection Technology Co., Ltd.	Xiamen 35.com Technology Co., Ltd.
Daqing Zhuochuang Multi-media Production Co., Ltd.	Xiamen Shangzhong Online Technology Co., Ltd.
Foshan Yidong Network Co., Ltd.	Xiamen eName Technology Co., Ltd.
Guangdong Huyi Network Intellectual Property Co., Ltd.	Xiamen ZZY Network Service Co., Ltd.
Guangdong Jinwanbang Technology Investment Co., Ltd.	Shanghai Oray.com Co., Ltd.
Guangdong Nicenic.net Inc.	Shanghai Chinafu.com Co., Ltd.
Guangdong Shidai Hulian Technology Co., Ltd.	Shanghai Meicheng Technology Information Development Co., Ltd.

Shanghai Yovole Network Co., Ltd.	Wenzhou Zhongwang Computer Technology Service Co., Ltd.
Shenzhen Idcicp.com Co., Ltd.	Yantai DNSpod Network Technology Co., Ltd.
Shenzhen Internet Works Online Technology Co., Ltd.	Ejee Group Beijing Co., Ltd.
Shenzhen Web Information Technology Co., Ltd.	Yunnan Landui Cloud Computing Co., Ltd.
Shenzhen Yingmaisi Culture Technology Co., Ltd.	Zhejiang 22net Inc.
Sichuan Yuqu Network Technology Co., Ltd.	Zhengzhou Shanglv Technology Co., Ltd.
Tianjin Zhuiri Technology Development Co., Ltd.	Zhengzhou Shijichuanglian Electronic Technology Development Co., Ltd.
Wangju Brands Management Co., Ltd.	Zhengzhou Yifang Technology & Trade Co., Ltd.
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