Statistical Report on Internet Development in China

(January 2017)

CNNIC
中国互联网络信息中心
CHINA INTERNET NETWORK INFORMATION CENTER

Preface

In 1997 China's competent departments authorized China Internet Network Information Center (CNNIC) to organize relevant Internet entities to jointly carry out an Internet development survey. Ever since then, CNNIC has published 38 statistical reports on Internet development in China, and this report is the 39th report. All the reports of CNNIC have witnessed the whole development process of China's soaring Internet industry. With precise and objective data, the reports provide a significant basis for government departments and companies to master the development of Internet in China and make relevant decisions.

Since 1998 CNNIC has been issuing the Statistical Report on Internet Development in China at the beginning and middle of every year by convention. The Internet has growing influence on the overall social stability, economic development and cultural development, and the national strategy of cyber development has been moved forward. As a witness to Internet development, CNNIC correspondingly expanded and deepened its survey on the whole society's application of Internet. The main body of this report consists of five chapters: Basic Resources, Enterprise Application, Personal Application, Government Application and Cyber Security. The chapter of Basic Resources introduces the development of basic resources for Internet in China; that of Enterprise Application conducts surveys on Chinese companies to have an understanding of application of the Internet in the operation of these enterprises; that of Personal Application is dedicated to the size and structure of Internet users, the environment for Internet access and the development of personal application of Internet; that of Government Application focuses on the overview of e-government services, and development of Zhengwutoutiao (headlines of government affairs based on the App Top News) and official Weibo of government affairs; and that of Cyber Security concentrates on the basic situation of domestic cyber security. The report aims to accurately and objectively reflect the development of the Internet and IT application in China in 2016 through the aforesaid five aspects.

We hereby express our sincere gratitude to Internet users who have participated in our 39th

statistical survey on Internet development. Meanwhile, we would like to extend our sincere thanks to the government, enterprises and other related institutions supporting the data collection in this annual Report.

China Internet Network Information Center (CNNIC)

January 2017

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Abstract

1. Basic Information

◇ Up to December 2016, China had 731 million Internet users, with a yearly increase of 42.99 million. The Internet penetration rate reached 53.2%, up 2.9 percentage points from the end of 2015.

◇ As of December 2016, the number of mobile Internet users in China reached 695 million, an increase of 75.50 million from the end of 2015. Mobile netizens accounted for 95.1% of the total netizen population, while this percentage was 90.1% in 2015.

◇ Up to December 2016, Chinese rural netizens accounted for 27.4% of the national total, reaching 201 million, up by 5.26 million from the end of 2015.

◇ As of December 2016, the proportion of Chinese netizens using desktops or laptops to access the Internet was 60.1% and 36.8% respectively. The utilization ratio of mobile phones as a means to access the Internet was 5.0 percentage points more than that at the end of 2015, reaching 95.1%, and this percentage was 31.5% for tablet computers and 25.0% for TV.

◇ Up to December 2016, China had a total of 42.28 million domain names, of which 20.61 million or 48.7% were ended with ".CN", and 474,000 were suffixed with ".中国".

◇ As of December 2016 China had a total of 4.82 million websites, of which 2.59 million were under ".CN".

◇ Up to December 2016, 99.0% of Chinese companies used computers for their office work and 95.6% were Internet users; 93.7% of them accessed Internet via fixed broadband and 32.3% via mobile broadband; 45.3% of them were engaged in online sales and 45.6% in online purchase, and 38.7% launched online marketing and promotional activities.

II. Features of Application

I. Basic Resources

The number of .CN domain names registered exceeds 20 million, ranking No.1 among global ccTLDs.

By the end of December 2016, the number of .CN domain names had reached 20.61 million, increasing by 25.9% year on year and accounting for 48.7% of all domain names of China; the number of ".中国" domain names had totaled 474,000, up 34.4% annually.

II. Personal Application

Internet users up to 731 million, a figure equivalent to the population of Europe

Up to December 2016, China's Internet users amounted to 731 million, with an Internet penetration rate of 53.2%, 3.1 percentage points higher than the world average and 7.6 percentage points higher than the Asian average[1]. In 2016, China had 42.99 million new netizens, with an annual growth rate of 6.2%. The total number of China's netizens is equivalent to the population of Europe.

Mobile Internet users taking up 95.1% of the total, with an annual growth rate exceeding 10% for three consecutive years

As of the end of 2016 the number of mobile Internet users in China reached 695 million, with an annual growth rate exceeding 10% for three consecutive years. More and more individuals used the mobile phone to access the Internet, resulting in the declining use of desktops and laptops. Mobile Internet and offline economy are increasingly interconnected, which promotes the consumption model featuring resource sharing, intelligent devices and diversified scenarios.

The number of mobile online payment users up to nearly 470 million, with an offline payment habit developed

As of December 2016, China had 469 million mobile online payment users, an annual growth of 31.2%, and the proportion of mobile online payment users increased from 57.7% to 67.5%. More offline payment is made by means of mobile payment, greatly creating more payment scenarios. 50.3% of netizens pay bills through mobile payment when shopping at a physical store.

The number of online car-hailing users increasing 37.9% in half a year; ride-sharing

[1] For the Internet penetration rate for the world and for Asia, please visit http://www.internetworldstats.com/stats.htm.

service entering the period of standardized development

The number of online car-hailing users[2] reached 168 million, representing a half-year increase of 46.16 million, or 37.9% when compared with that in the first half of 2016. Online car-hailing service is a typical service of sharing economy, playing an important role in efficiently using vehicle resources to meet travel needs of users. It has entered the period of standardized development, with related policies released.

30% of netizens practicing online philanthropies; the Internet developing a new transparent ecology for public welfare

Up to December 2016, 32.5% of China's netizens has practiced online philanthropies, registering 238 million. New Internet-based models for public welfare include donation, crowdfunding and social network fundraising, making charitable donations more transparent, convenient and diversified.

III. Government Application

30% of netizens use e-government services and Internet pushes forward the building of service-oriented government

Up to December 2016, 239 million people or 32.7% of all netizens received e-government services based on Alipay, WeChat, government WeChat official accounts, websites, Weibo, and mobile Apps. All these interconnected platforms and their detailed service content make e-government services more smart and improve users' happiness and satisfaction.

New-media e-government platforms cover all regions and fields to facilitate the release of government information.

In 2016, 31 provinces, autonomous regions and municipalities directly under the Central Government in Mainland China launched government Weibo and Zhengwutoutiao covering all vertical fields such as government, public security, Youth League committee, transportation, justice, etc. Governments and institutions at all levels should speed up the development of "WeChat, Weibo and news Apps" and boost the instant and transparent release of government information via the Internet.

[2] Online car-hailing services include private car booking and carpooling services.

IV. Enterprise Application

The number of China's listed Internet companies amounted up to 91, with a total market value of more than RMB 5 trillion.

Up to December 2016, China's Internet companies going public at home and abroad[3] totaled 91, with a total market value of RMB 5.4 trillion. Among them, Tencent and Alibaba are two representatives of China's Internet companies whose market value accounted for 57% of the total, standing at over RMB 3 trillion.

Chinese companies have gained universal access to computer and the Internet.

In 2016, the computer usage rate, Internet usage rate and fixed broadband access rate of Chinese companies respectively reached 99.0%, 95.6% and 93.7%, up by 3.8, 6.6 and 7.4 percentage points respectively from 2015. In addition, in terms of Internet applications for internal support such as those applications for information communication and finance and human resource management, the proportion of enterprises launching Internet activities maintained a growth momentum.

More than 40% companies carry out online sales and procurement, with the integration of the traditional industry and the "Internet +" being expedited.

In 2016, the proportion of Chinese companies conducting online sales and procurement respectively reached 45.3% and 45.6%, increasing by more than 10 percentage points. Against the backdrop of the fast integration of the new and traditional media, the Internet has played an increasingly important role in the marketing system of enterprises, with the proportion of companies doing marketing via the Internet amounting to 38.7%. In addition, 60% of enterprises have built a system of IT applications, increasing by 13.4 percentage points compared with 2015. In the transformation of supply chain, companies have given high priority to and brought into full play the role of the Internet.

[3] Internet companies in this report refer to those enterprises whose revenue in Internet business accounts for more than 50% of the total, and Internet business includes Internet advertising and marketing, personal Internet value-added services, online games, e-commerce, etc. The standards for the above definition need to be set by seeing whether these companies mainly depend on Internet products in their operation including mobile Internet operating systems, mobile Internet Apps and traditional PC Internet sites.

Basic Resources

Chapter I Basic Internet Resources

I. An Overview of Basic Internet Resources

Up to December 2016, China had 338 million IPv4 addresses and 21,188 blocks/32 of IPv6 addresses.

There were totally 42.28 million domain names in China. Specifically, ".CN" domain names annually increased by 25.9% to 20.61 million and accounted for 48.7% of the total domain names in China.

There were altogether 4.82 million websites, an annual increase of 14.1%, among which 2.59 million were ".CN" websites.

International Internet bandwidth reached 6,640,291 Mbps, with an annual growth rate of 23.1%.

Table 1 Comparison - Basic Internet Resources in China from December 2015 to December 2016

	December 2015	December 2016	Annual increment	Annual growth rate
IPv4	336,519,680	338,102,784	1,583,104	0.5%
IPv6 (block/32)	20,594	21,188	594	2.9%
Domain name	31,020,514	42,275,702	11,255,188	36.3%
Wherein, .CN Domain name	16,363,594	20,608,428	4,244,834	25.9%
Website	4,229,293	4,823,918	594,625	14.1%
Wherein, .CN website	2,130,791	2,587,365	456,574	21.4%
International Internet bandwidth (Mbps)	5,392,116	6,640,291	2,521,628	23.1%

Ⅱ. IP Address

By December 2016, the number of IPv6 addresses in China had reached 21,188 blocks/32, a year-on-year increase of 2.9%.

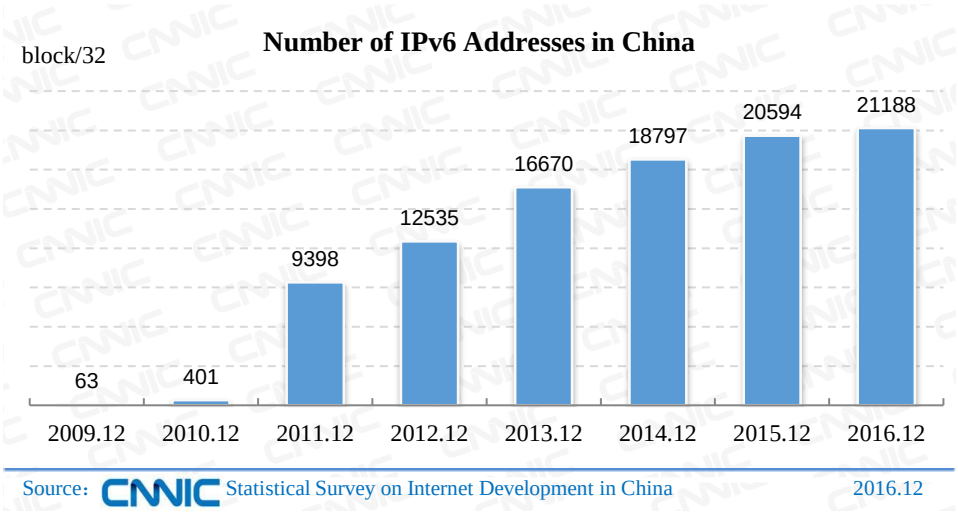


Figure 1 Number of IPv6 Addresses in China

All IPv4 addresses had been assigned by February 2011 and since then the total number of IPv4 addresses in China had been basically stable, being 338.10 million up to December 2016.

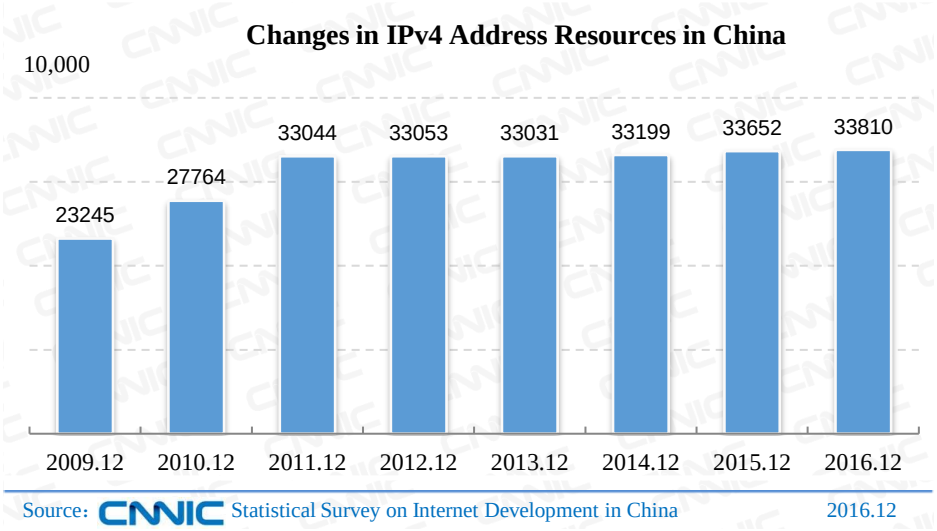


Figure 2 Changes in IPv4 Address Resources in China

III. Domain Name

By December 2016, the total number of domain names of China had increased to 42.28 million, up 36.3% annually.

Table 2 Number of Domain Names in Each Category[4]

	Number	Proportion in total domain names
CN	20,601,491	48.7%
COM	14,345,243	33.9%
NET	1,633,071	3.9%
ORG	330,457	0.8%
中国	474,115	1.1%
BIZ	210,062	0.5%
INFO	224,321	0.5%
Others	4,456,942	10.5%
Total	42,275,702	100.0%

Up to December 2016, the number of ".CN" domain names reached 20.61 million, increasing by 25.9% year on year and accounting for 48.7% of all domain names of China; ".COM" domain names were 14.35 million, taking up 33.9%; and ".中国" domain names were 474,000.

Table 3 Number of ".CN" Domain Names in Each Category

	Number	Proportion in total ".CN" domain names
cn	15,044,749	73.0%
com.cn	2,803,714	13.6%
adm.cn	1,343,009	6.5%
net.cn	938,169	4.6%
ac.cn	15,322	0.1%
org.cn	402,907	2.0%
gov.cn	53,546	0.3%
edu.cn	6,937	0.0%
mil.cn	75	0.0%
Total	20,608,428	100.0%

Ⅳ. Websites

As of the end of 2016, China had 4.82 million websites[5], representing a yearly increase of

[4] Generic top-level domains (gTLD) are provided by domestic domain name registration units. Previous data is provided by WebHosting.Info, a domain name statistical agency. Note: The number of .cn domain names does not cover .edu.cn.

[5] Websites refer to those websites whose domain name registrants are in China.

14.1%.

Figure 3 Number of Websites in China

Note: Websites with the domain name of ".EDU.CN" are excluded.

Ⅴ.Web Pages

As of the end of 2016, China had 236 billion web pages[6], representing a yearly increase of 11.2%.

Figure 4 Number of Web Pages in China

There were 176.1 billion static web pages and 59.9 billion dynamic web pages, accounting for 74.6% and 25.4% of total web pages, respectively.

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

Table 4 Number of Web Pages in China

	Unit	2015	2016	Growth rate
Total web pages	Page	212,296,223,670	235,997,583,579	11.2%
Static web page	Page	131,447,834,396	176,083,292,929	34.0%
	Proportion in total web pages	61.9%	74.6%	20.5%
Dynamic web page	Page	80,848,389,274	59,914,290,650	-25.9%
	Proportion in total web pages	38.1%	25.4%	-33.3%
Web page length (total number of bytes）	KB	14,815,932,917,365	13,539,845,117,041	-8.6%
Average number of webpages per website	Page	50,197	48,922	-2.5%
Average number of bytes per page	KB	70	57	-18.6%

VI. International Internet Gateway Bandwidth

By the end of 2016, China has 6,640,291 Mbps of international Internet Gateway bandwidth, up 23.1% annually.

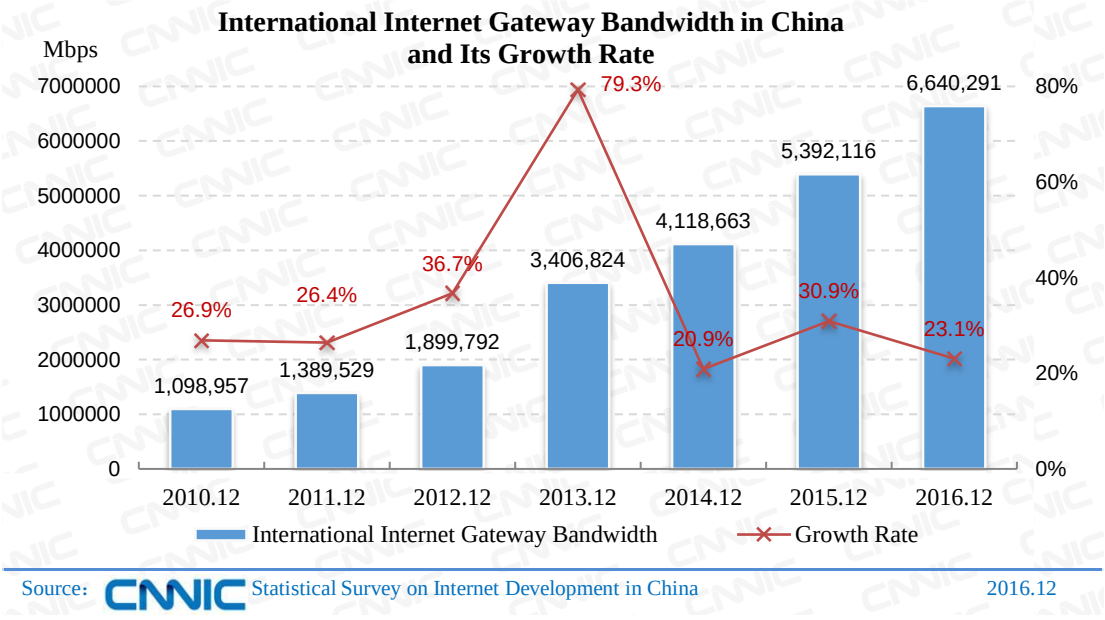


Figure 5 International Internet Gateway Bandwidth in China and Its Growth Rate

Table 5 International Internet Gateway Bandwidths of Backbone Networks

	International Internet gateway bandwidth (Mbps)
China Telecom	3,886,527
China Unicom	1,700,446
China Mobile	959,108
China Education and Research Network	40,960
China Science and Technology Network	53,248
China International Economy and Trade Network	2
Total	6,640,291

Enterprise Application

Chapter II Basic Internet Development of Enterprises

Ⅰ. Use of Computers

The enterprises that used computers[7] to handle office affairs accounted for 99.0% of Chinese enterprises up to December 2016. Through many years of development, computers have been made available for Chinese companies.

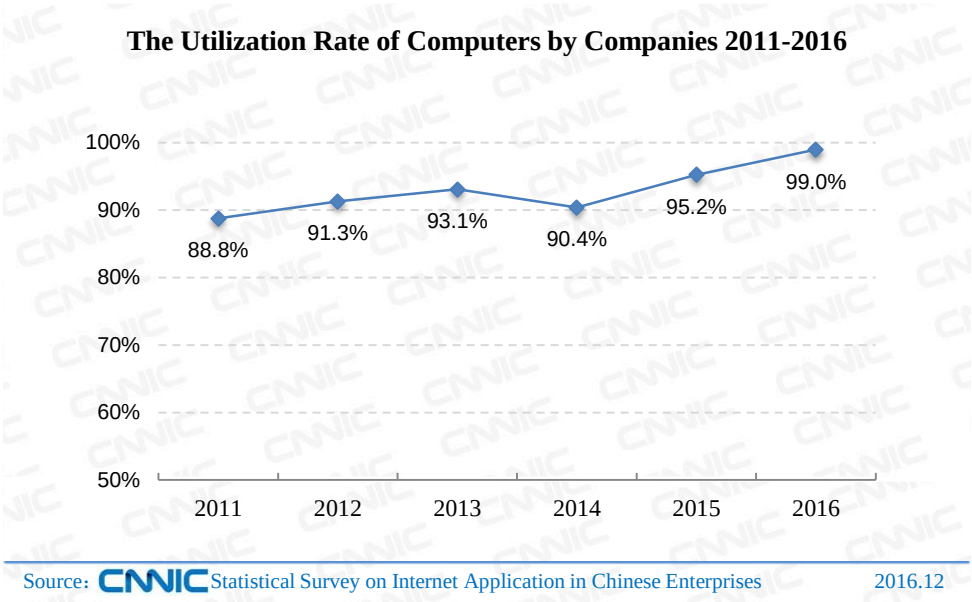


Figure 6 The Utilization Rate of Computers by Companies 2011-2016

Ⅱ. Use of the Internet

As of December 2016, 95.6% of companies in China used the Internet for office work[8]. The proportion of companies using the Internet for office work has exceeded 90% for the first time,

[7] Computers refer to desktop computers or notebook computers, excluding those devices with certain embedded computing function, such as cellular mobile phones, Personal Digital Assistant (PDA) or TV sets.

[8] It means that the Internet is directly used in all activities of the enterprises. Some enterprises use the Internet for advertisements/promotion, but do not directly use it for work, and therefore are not included. All devices (more than just computers) equipped with the Internet access function may be used as the tools to access the Internet. These include mobile telephones, PDAs, game machines and digital televisions which may be used on the fixed or mobile network.

which narrowed the gap to a record low between the proportion of those using the Internet and the proportion of those using the computer.

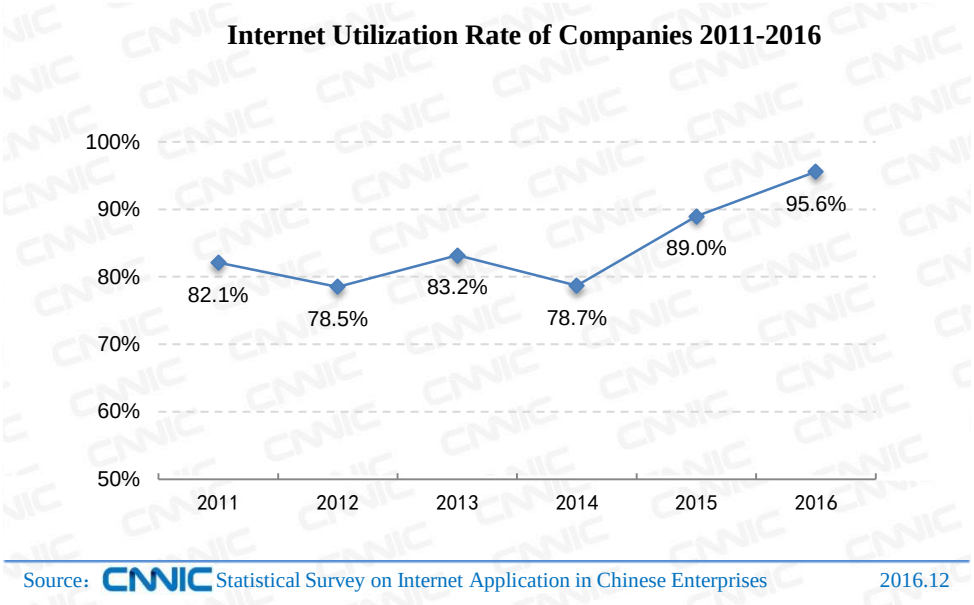


Figure 7 Internet Utilization Rate of Companies 2011-2016

III. Broadband Access

As of December 2016, the proportion[9] of companies that accessed the Internet via fixed broadband was 93.7% and that via mobile broadband, 32.3%, up by 8.4 percentage points from 2015.

[9] The utilization ratios of the Internet access ways released in this survey refer to the proportion of enterprises which access the Internet in various ways among all the interviewed enterprises.

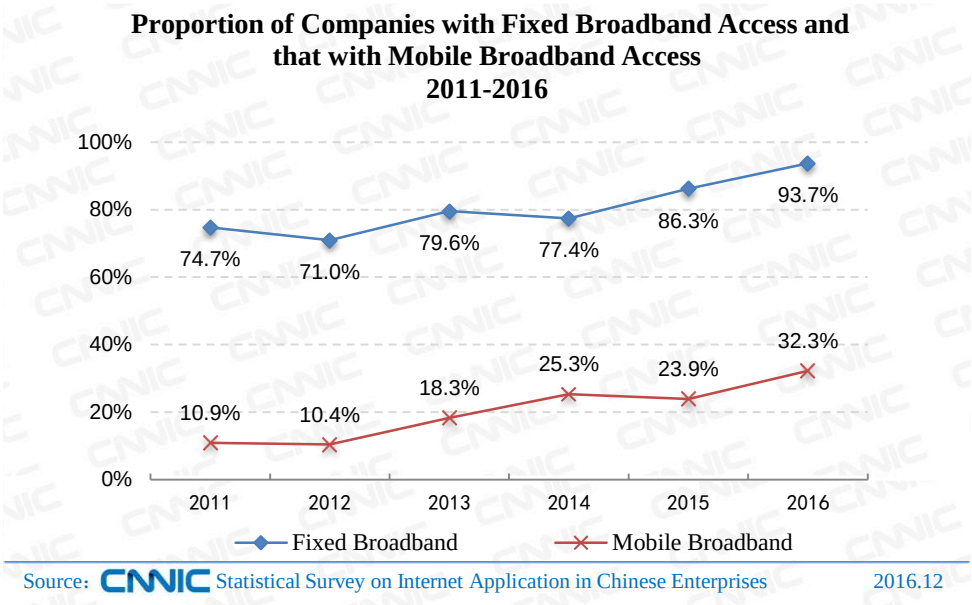


Figure 8 the Proportion of Companies with Fixed Broadband Access and that with Mobile Broadband Access 2011-2016

Chapter III Basic Internet Application of Enterprises

I. Basic Internet Activities

(I) Internet Application for Information Communication[10]

As of the end of 2016, among companies with Internet access, 91.9% sent or received e-mails via the Internet in the year before, and 63.7% had their own enterprise email service.

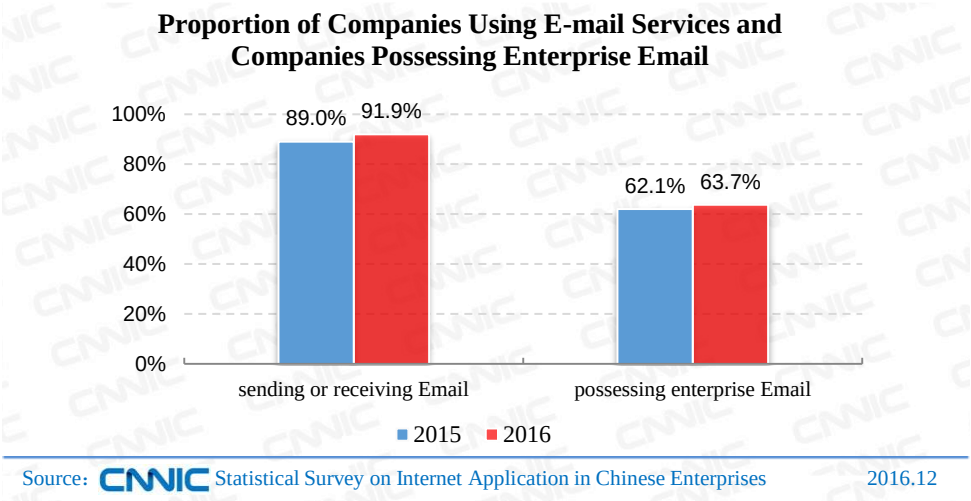


Figure 9 Proportion of Companies Using E-mail Services and Companies Possessing Enterprise Email

In addition, 77.0%, 73.3% and 63.6% of companies with Internet access had conducted the following three types of Internet activities, respectively: activities to obtain information on goods or services, to release information or instant messages, and to obtain information from government agencies.

[10] Internet application for information communication refers to those applications using the Internet to acquire, release or exchange information, such as receiving and sending email instant messages, obtaining information on commodities or services, acquiring information from government agencies, publishing information or instant messages, etc.

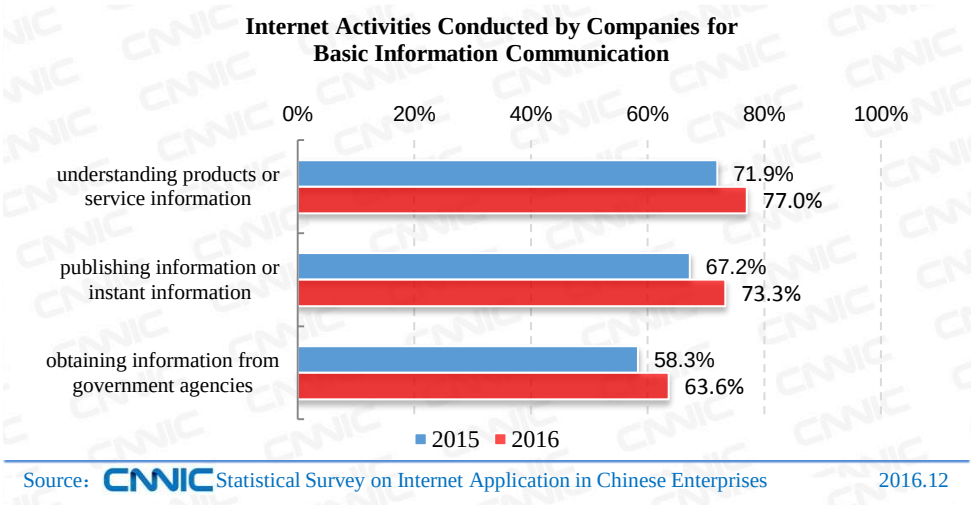


Figure 10 Internet Activities Conducted by Companies for Basic Information Communication

(II) Internet Application for Internal Support[11]

Up to December 2016, 86.4% of enterprises having access to the Internet have used online banking; 82.3% of enterprises gaining access to the Internet have conducted interaction with government agencies via the Internet; the proportion of enterprises managing human resources via the Internet has been on the rise compared with 2015; and the proportion of enterprises carrying out online recruitment and online training respectively reached 61.7% and 31.9%.

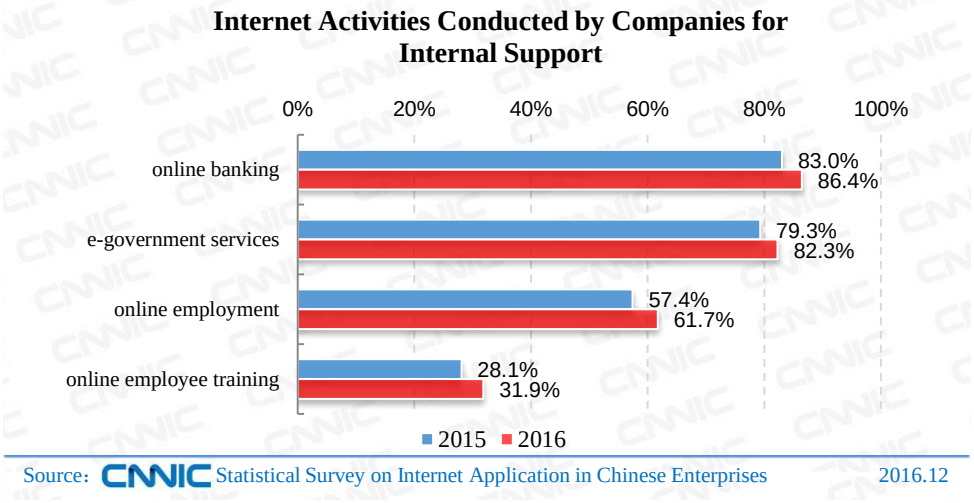


Figure 11 Internet Activities Conducted by Companies for Internal Support

(III) Cyber Security Measures

[11] Internet application for internal support refers to the Internet application using the Internet to carry out internal management and internal efficiency promotion, including online banking, interaction with government agencies, online recruitment, online employee training.

As of December 2016, 92.4% of companies have taken basic cyber security measures. As cyber security receives significant attention and companies set higher requirements for cyber security more urgently, more investment is being put into cyber security measures. The survey indicates that 51.4% of enterprises (including those only using paid version and those using both free and paid version) pay for anti-virus software and firewall, up by over 25 percentage points compared with 2015.

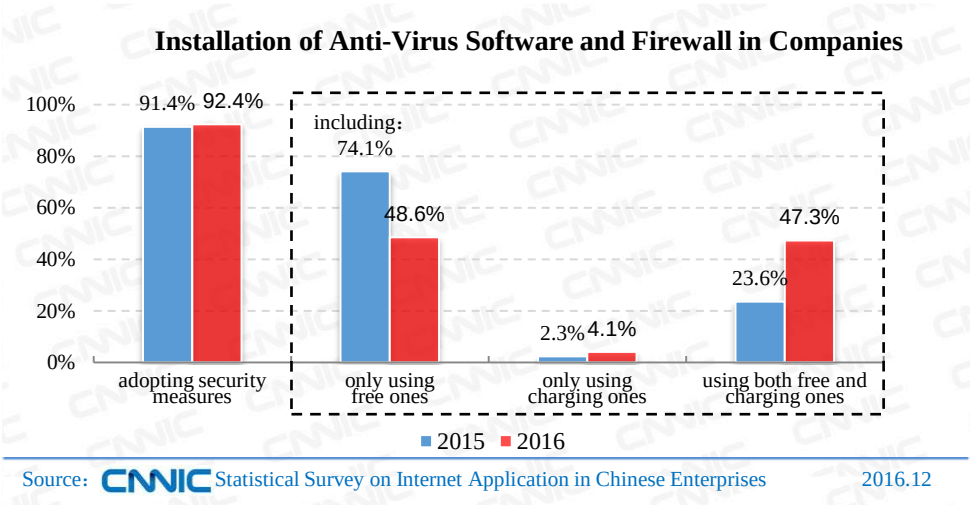


Figure 12 Installation of Anti-Virus Software and Firewall in Companies

II. The Setup of Grassroots Internet-Related Full-Time Posts

As of the end of 2016, 42.4% of companies set up Internet-related full-time posts at the grassroots level, significantly rising compared with the 2015 level of 34.0%. More than 50% of enterprises with a staff number of 100 and above set up the full-time posts, showing an obvious increase; little change was shown in the proportion of small and micro enterprises with a staff number of 50 and below setting up the posts compared with 2015.

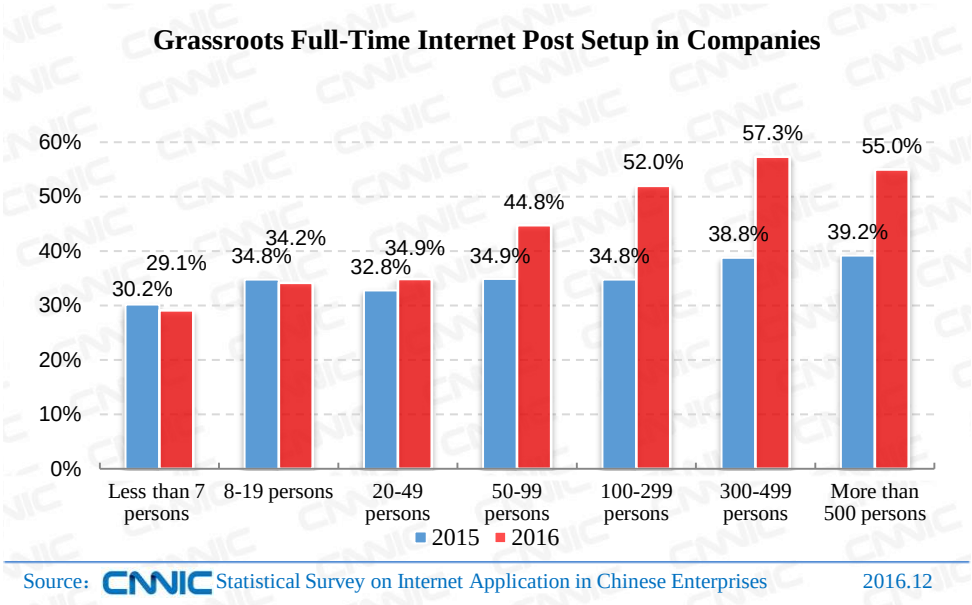


Figure 13 Grassroots Full-Time Internet Post Setup in Companies

Chapter IV Internet Application in Enterprise Operation

I. Internet Application in Key Links of Enterprise Operation

(I) Internet-Based Reform of the Supply Chain

As of December 2016, 60.0% of companies with Internet access had deployed the IT system, up by 13.4 percentage points compared with 2015. Among them, 50.4%, 28.2% and 25.9% had installed the office automation (OA) system, the enterprise resource planning (ERP) system and the customer relationship management (CRM) system, respectively.

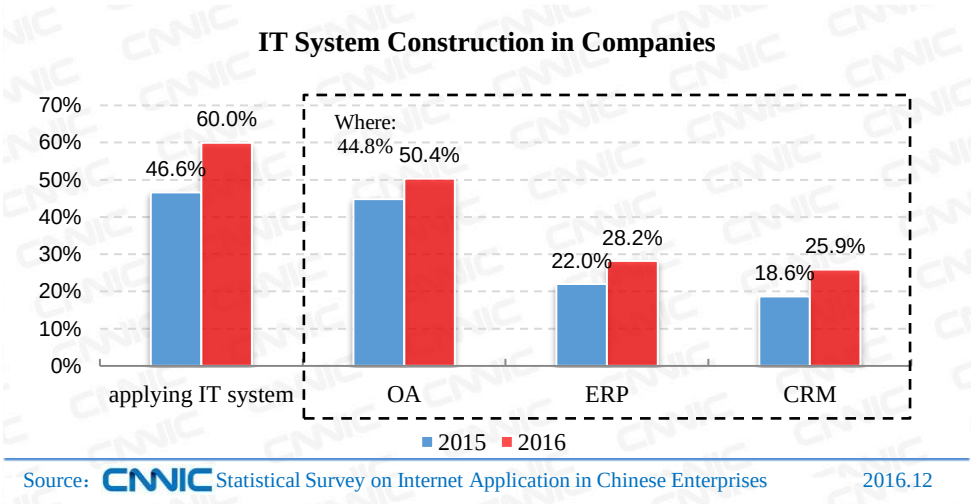


Figure 14 IT System Construction in Companies

The enterprises that carried out online sales accounted for 45.3% of the national total up to December 2016. During the 12th Five-Year Plan period, e-commerce market developed rapidly, quadrupling its turnover. The year of 2016 is the first year of the 13th Five-Year Plan. E-commerce market remains robust, enterprise engagement continues to deepen, and the proportion of enterprises engaged in online sales rise substantially.

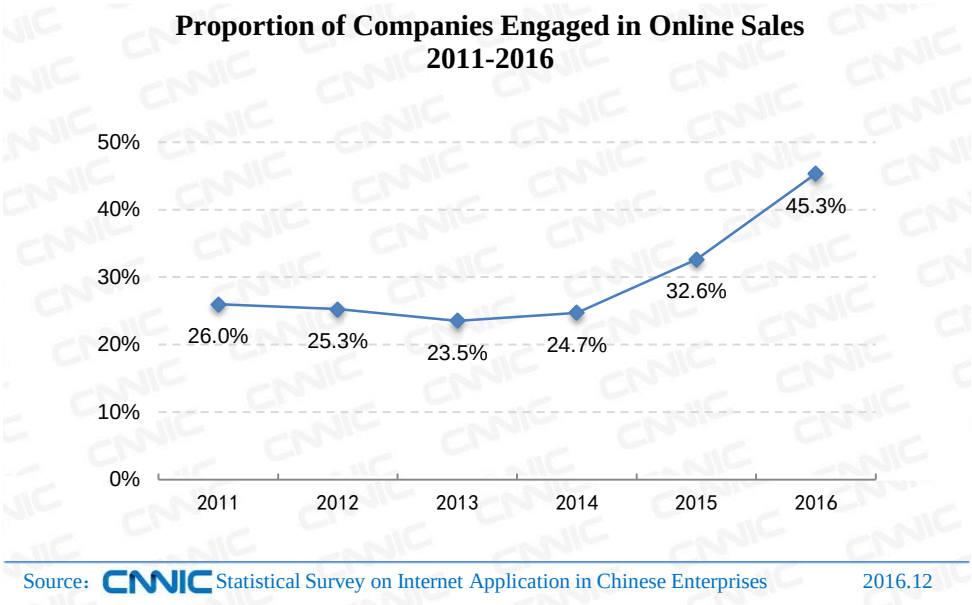


Figure 15 Proportion of Companies Engaged in Online Sales 2011-2016

The enterprises that carried out online procurement had accounted for 45.6% of Chinese enterprises by December 2016. Thanks to the development of emerging enterprise service market featuring the Internet finance and cloud services, the e-commerce platform serving the procurement is turning itself into a collaborative supply-chain service platform based on information flow, capital flow and logistics which makes online procurement more convenient and safer.

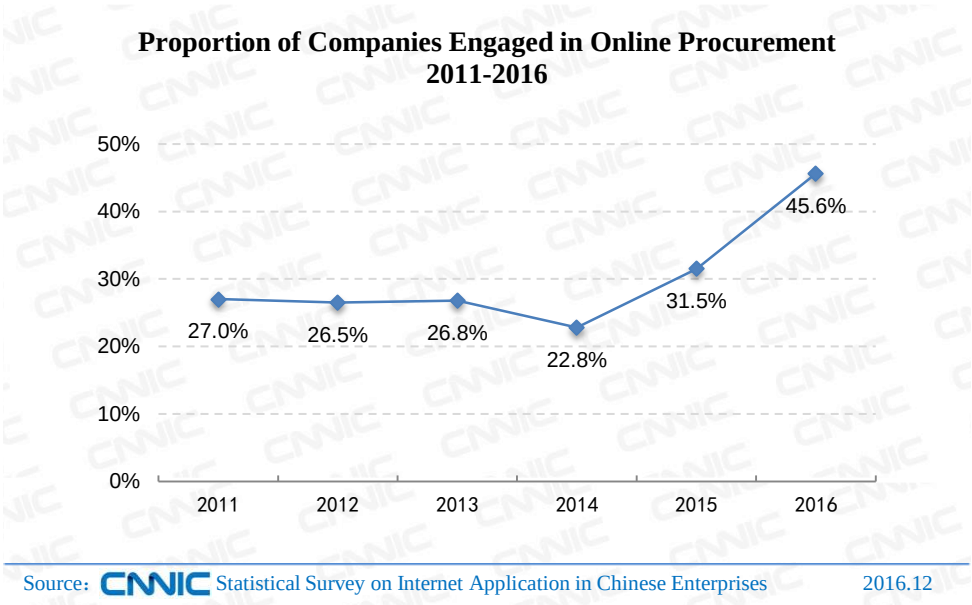


Figure 16 Proportion of Companies Engaged in Online Procurement 2011-2016

As of December 2016, 38.7% of companies had launched Internet-based marketing

activities[12]. The Internet has become an indispensable marketing and promotional channel utilized by enterprises, playing a key role in accelerating the integration of traditional media and new media.

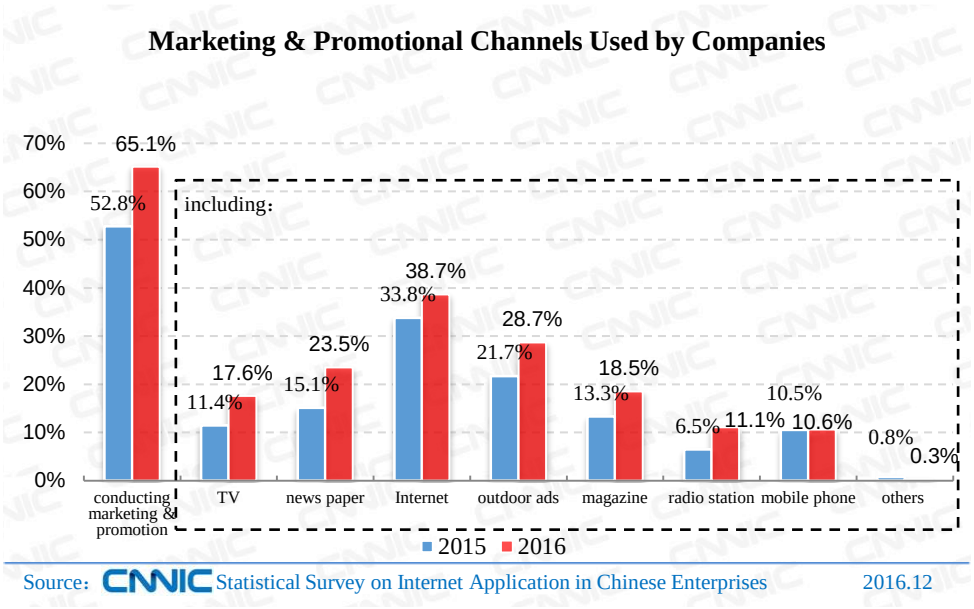


Figure 17 Marketing & Promotional Channels Used by Companies[13]

In 2016, the proportion of enterprises conducting Internet-based marketing and promotion increased by nearly 5 percentage points compared with 2015, having maintained a growth momentum since 2013. Enterprises raise their awareness of brand promotion, e-commerce is becoming more popular, and China's Internet advertising market is being gradually standardized. However, there is still a lot of room for the Internet marketing market to grow.

[12] It refers to using the Internet to carry out marketing and/or promotion activities such as advertisements put or promotions carried out by enterprises themselves or via their agents/ advertisement companies, including paid and free promotions.
[13] Mobile phone-based promotion employs short messages and calls, excluding those via mobile Internet.

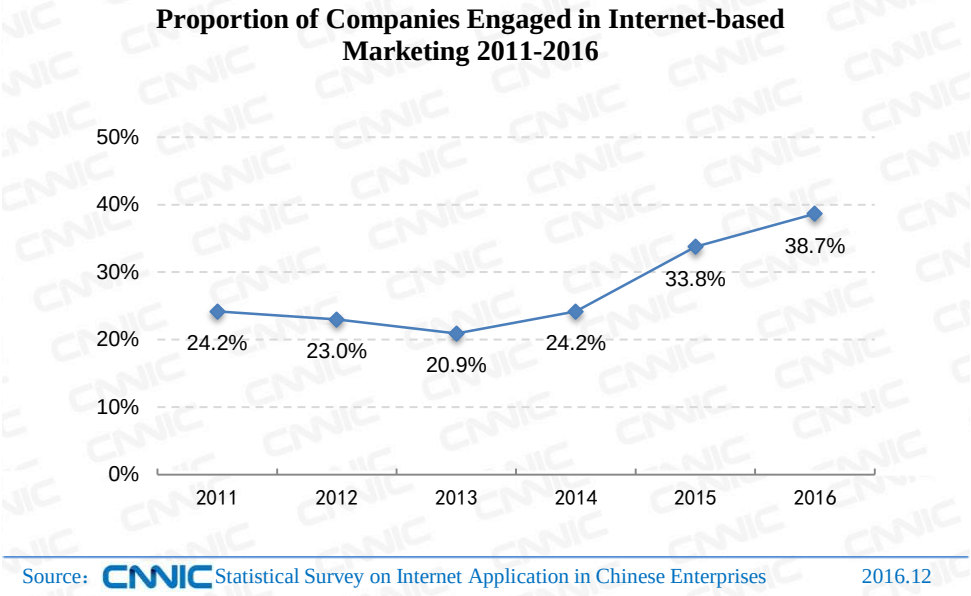


Figure18 Proportion of Companies Engaged in Internet-based Marketing 2011-2016

Among a variety of mainstream Internet marketing channels, the instant messaging service is companies' favorite marketing tool, used by 65.5% of them; it's followed by e-commerce platforms and search engines, 55.1% and 48.2%, respectively. The instant messaging service, e-commerce platform and search engine have become the top three channels of enterprises' Internet-based marketing and promotion for a long term.

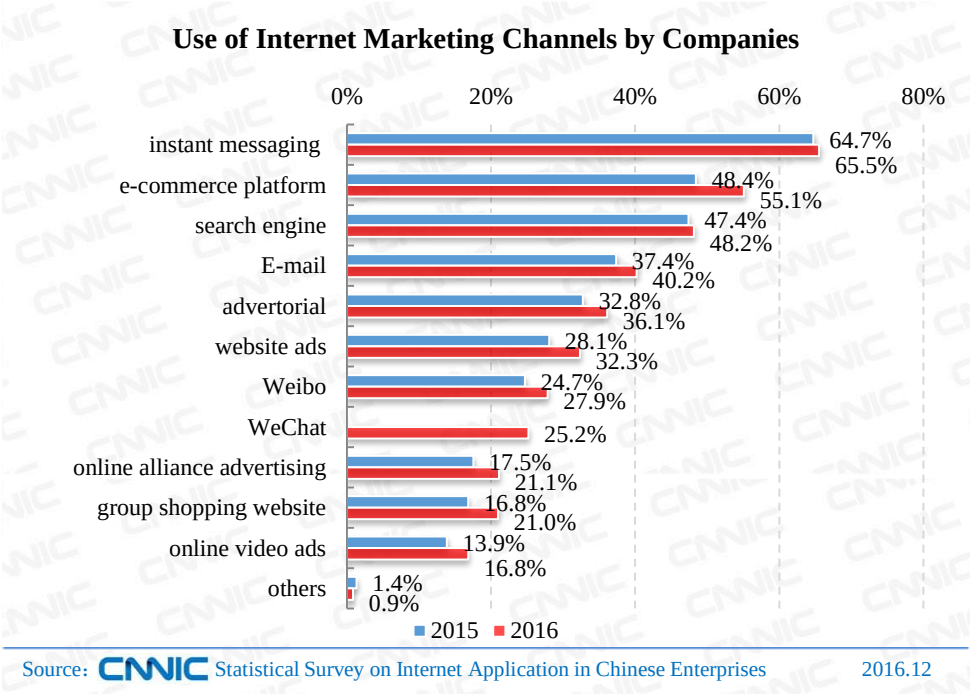


Figure19 Use of Internet Marketing Channels by Companies

(II) Cyber Security System Development

By December 2016, 9.5% of companies had deployed the hardware protection system for cyber security and 22.3% the hardware and software integrated protection system. When compared with the development in 2015, companies have given more importance to the development of the hardware and software integrated protection system, and the proportion of companies deploying the software protection dropped by nearly 6 percentage points.

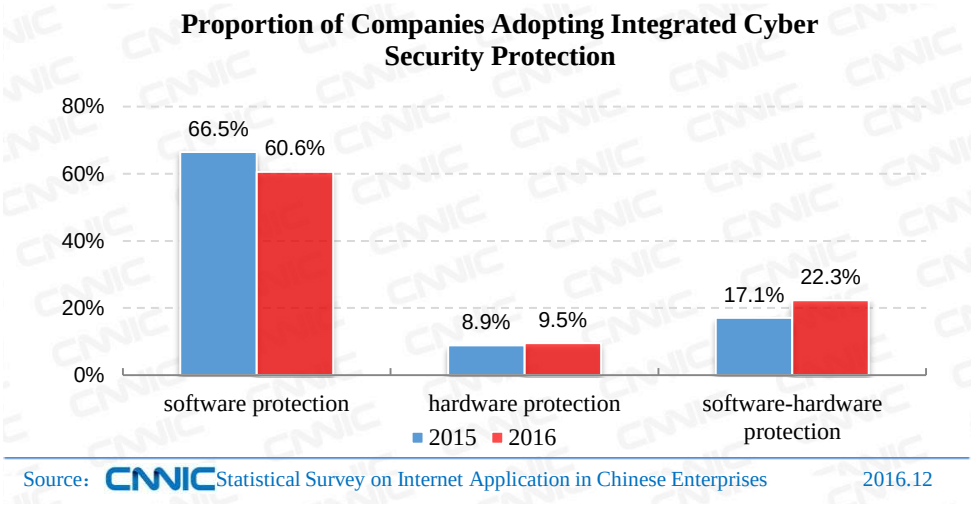


Figure20 Proportion of Companies Adopting Integrated Cyber Security Protection

II. The Setup of Full-time Internet Teams and IT Training for Employees

By December 2016, 32.9% of companies had set up full-time teams responsible for Internet-related operation & maintenance, development, e-commerce and e-marketing, significantly rising compared with 2015.

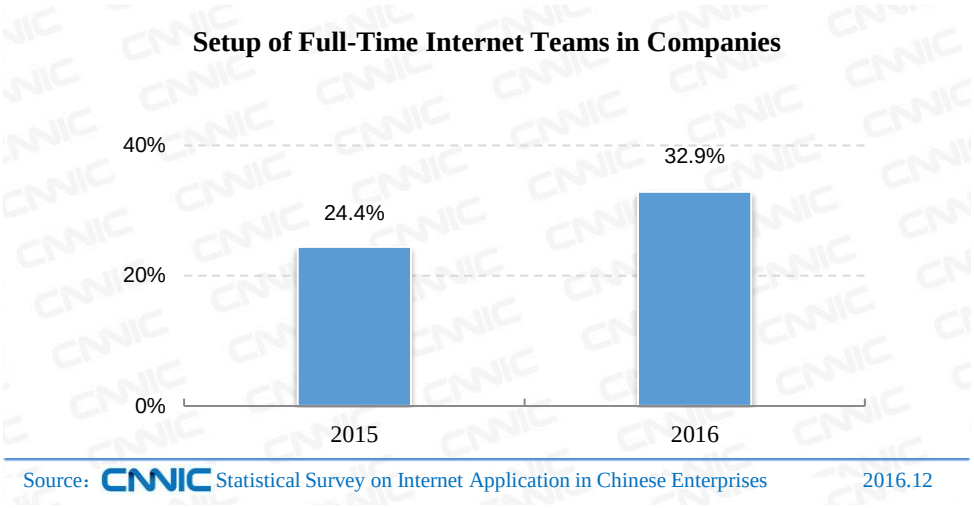


Figure21 Setup of Full-Time Internet Teams in Companies

The survey shows that the IT training for employees in the surveyed companies scored at an average of 4.6 points in 2016, up by 0.3 points from 4.3 points in 2015. That also indicates companies have given higher priority to the improvement of employees' IT capabilities.

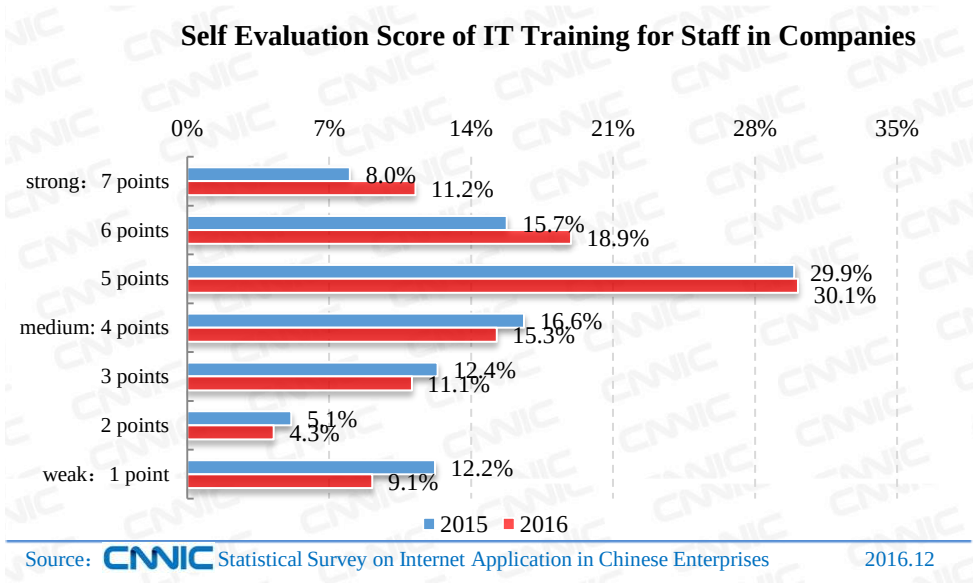


Figure 22 Self Evaluation Score of IT Training for Staff in Companies

Chapter V Internet Application in Enterprise Transformation

I. Understanding and Adoption of Creative Technologies and Modes

(I) Marketing via Mobile Internet

Among companies with the experience in e-marketing, 83.3% did so via mobile Internet (of whom 67.8% paid to promote), while 46.0% did so in 2015. As more consumers choose mobile Internet, mobile traffic is growing at a high rate. After a period of exploration, products designed to be promoted via mobile Internet are maturing and recognized by corporate clients. Predictably, in a short time ahead, the utilization ratio of marketing via mobile Internet will be close to that via the entire Internet, with market size growing rapidly.

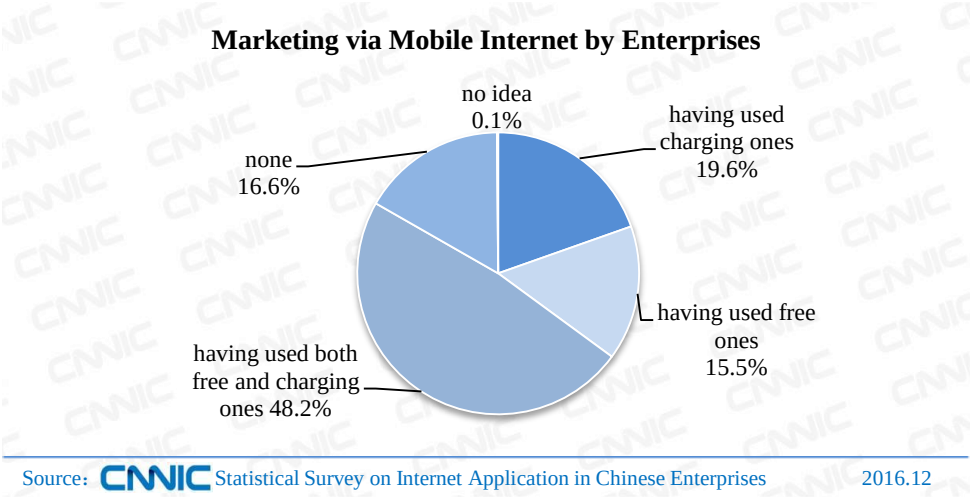


Figure 23 Marketing via Mobile Internet by Enterprises

Among all kinds of mobile marketing tools, WeChat is the favorite of companies, used by 75.5% of them. Despite little change in the channels of companies marketing via mobile Internet compared with 2015, corporate clients are turning to the mobile marketing market, which is seen from breakthroughs in the proportion of mobile revenue published by large Internet companies.

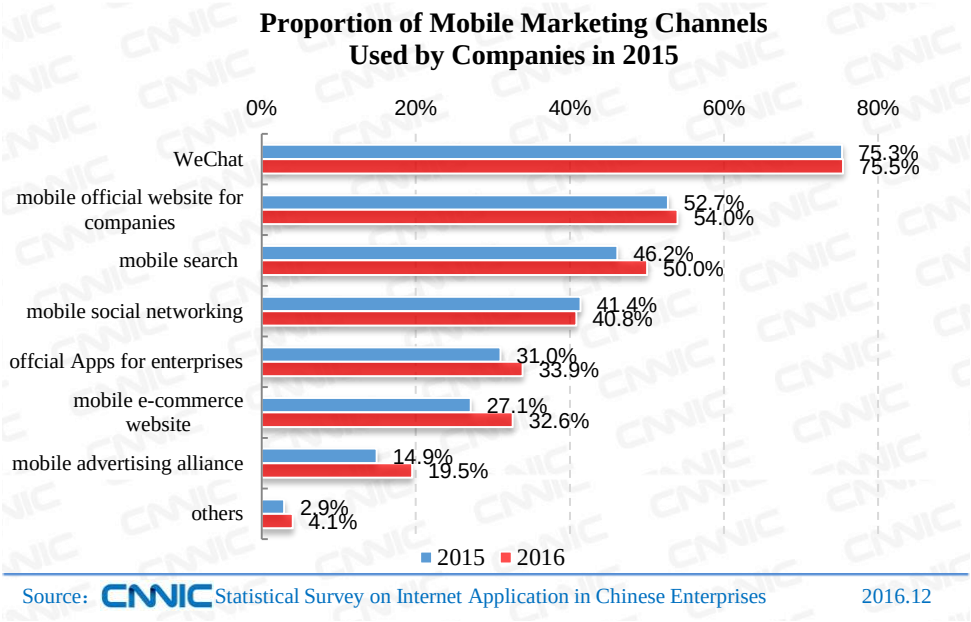


Figure 24 Use of Mobile Marketing Channels by Companies in 2015

(II) Understanding and Application of Cloud Computing, the Internet of Things and Big Data

The survey shows that cloud computing, the Internet of things, and big data are known by 57.9%, 53.4% and 52.1% of interviewed enterprises, the same level with that in 2015.

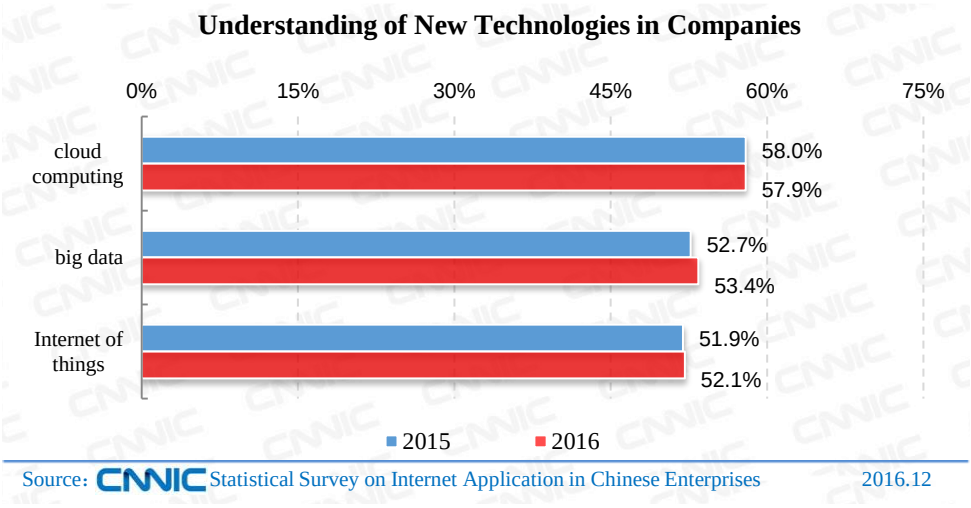


Figure 25 Understanding of New Technologies in Companies

The proportion of companies adopting or planning to adopt technologies of cloud computing, the Internet of Things and big data has neared or exceeded 20%, representing an obvious increase compared with 2015. In 2016, the nationwide innovative atmosphere took shape which benefited from government encouragement and gained policy support in the development and application of

innovative technologies. It has a profound impact on the path of transformation enterprises need to follow.

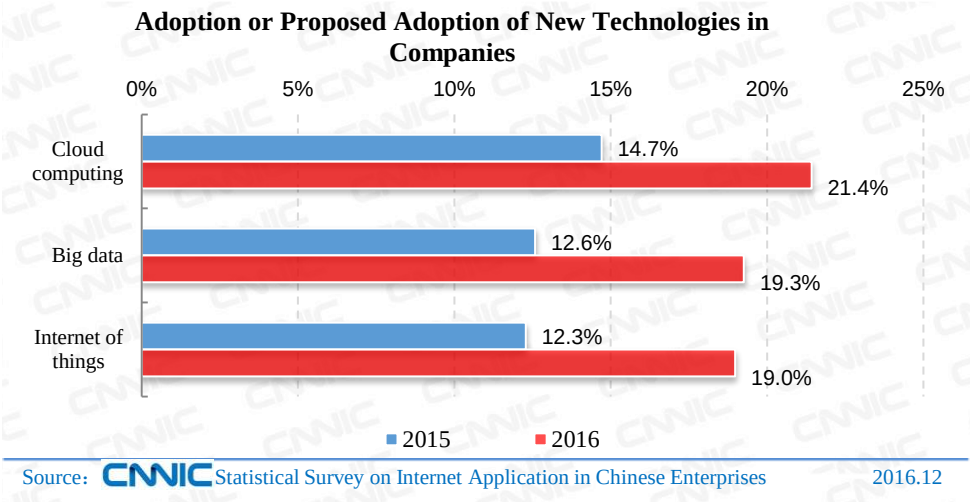


Figure 26 Adoption or Proposed Adoption of New Technologies in Companies

(III) Understanding and Undertaking of Creative Services and Smart Manufacturing

As shown in the survey, one-stop services, customized services and the social collaboration platform, all of which are creative service modes, are known respectively by 65.9%, 51.3% and 41.7% of companies in the service sector, basically the same with that in 2015.

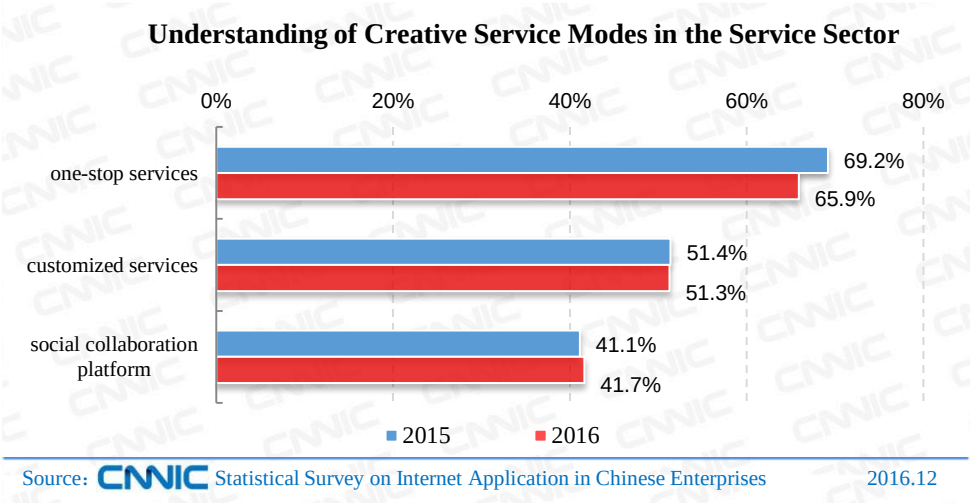


Figure 27 Understanding of Creative Service Modes in the Service Sector

One-stop services, customized services and the social collaboration platform, all of which are creative service modes, are launched or to be launched respectively by 25.6%, 19.0% and 14.0%

of companies in the service sector, much higher than in 2015.

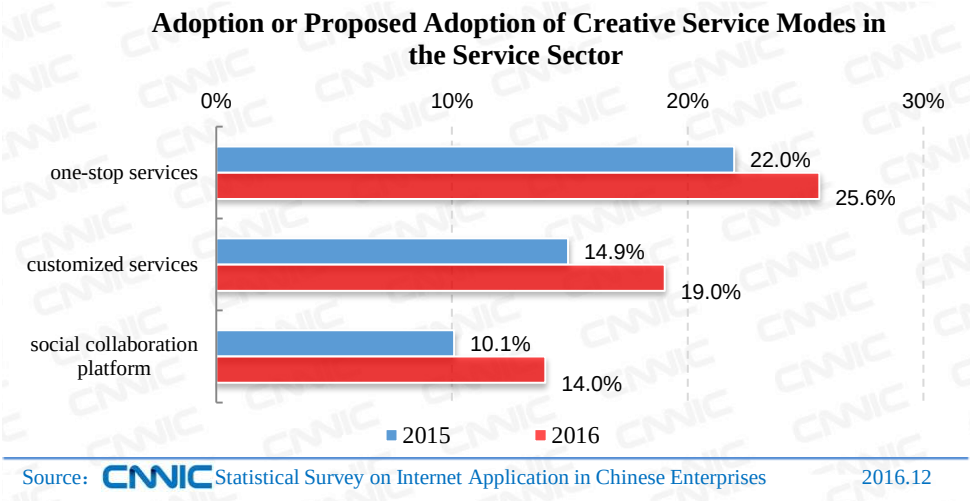


Figure 28 Adoption or Proposed Adoption of Creative Service Modes in the Service Sector

Compared to 2015, the awareness proportions of automatic manufacturing, industrial robots application and network collaborative manufacturing in the "smart manufacturing" field known by manufacturing enterprises are on the decline, while the awareness proportions of flexible production and customized production in these enterprises are of the same level with that in 2015.

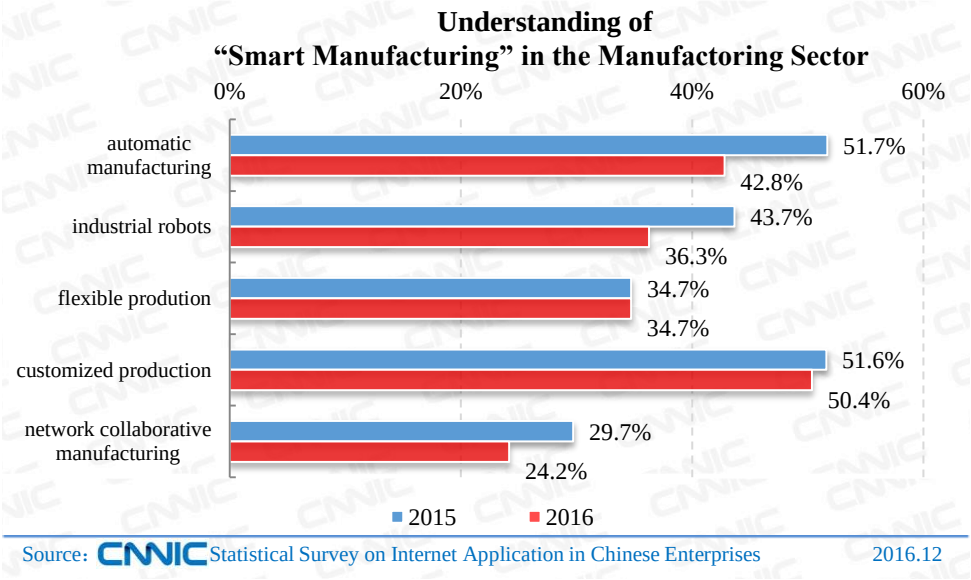


Figure 29 Understanding of "Smart Manufacturing" in the Manufactoring Sector

Compared with the practice of service-oriented enterprises in new modes, manufacturing enterprises prudently consider the adoption or proposed adoption of related technologies and modes of the "smart manufacturing". Specifically, the proportion of companies adopting or

planning to adopt customized production, increased by 1.4 percentage points when compared with that in 2015.

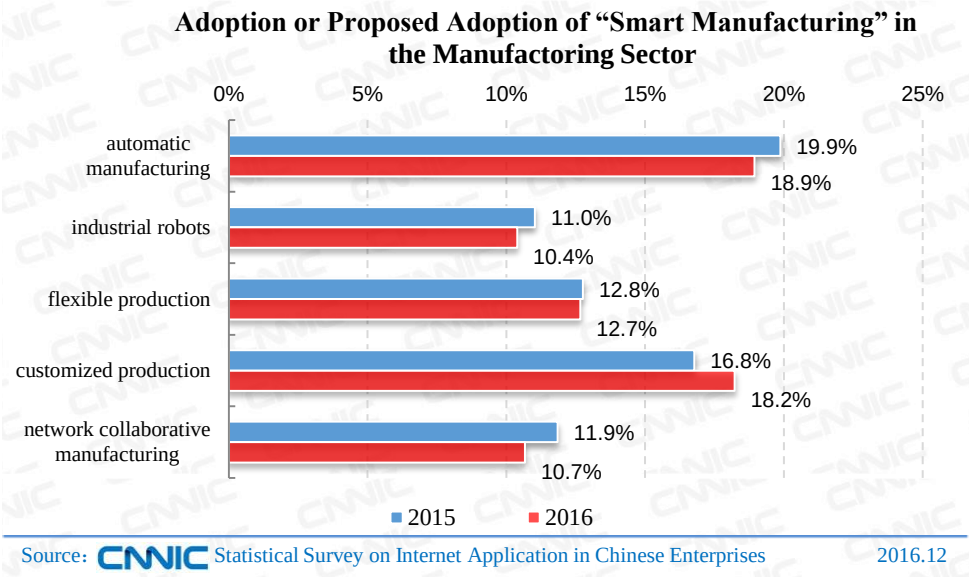


Figure 30 Adoption or Proposed Adoption of "Smart Manufacturing" in the Manufactoring Sector

II. The Integration of Internet Planning and Corporate Strategy

The survey finds that 22.7% of companies have their decision makers leading the Internet planning, doubling the proportion in 2015. The Internet planning has played an increasingly important role in the development strategy of enterprises.

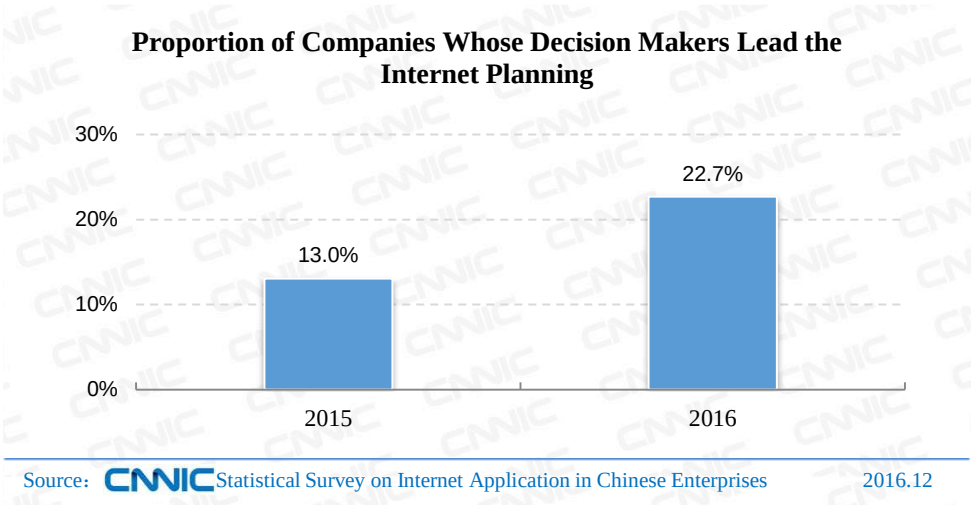


Figure 31 Proportion of Companies Whose Decision Makers Lead the Internet Planning

III. Companies' Recognition for the Internet's Role

The survey shows that an increasing number of companies recognize the role of the Internet in helping solve managerial problems. Enterprises have much higher expectations for the role of the Internet in the market economy environment, operating system, finance and manufacturing in 2016. Compared to 2015, the proportions of enterprises' expectations for the various functions of the Internet are all on the rise. But the rankings of different problems are changing: the rankings of procurement, sales and talents are on the decline while those of operating system, finance and manufacturing on the increase. This reflects that the capabilities of the Internet solving core problems of enterprises are improving.

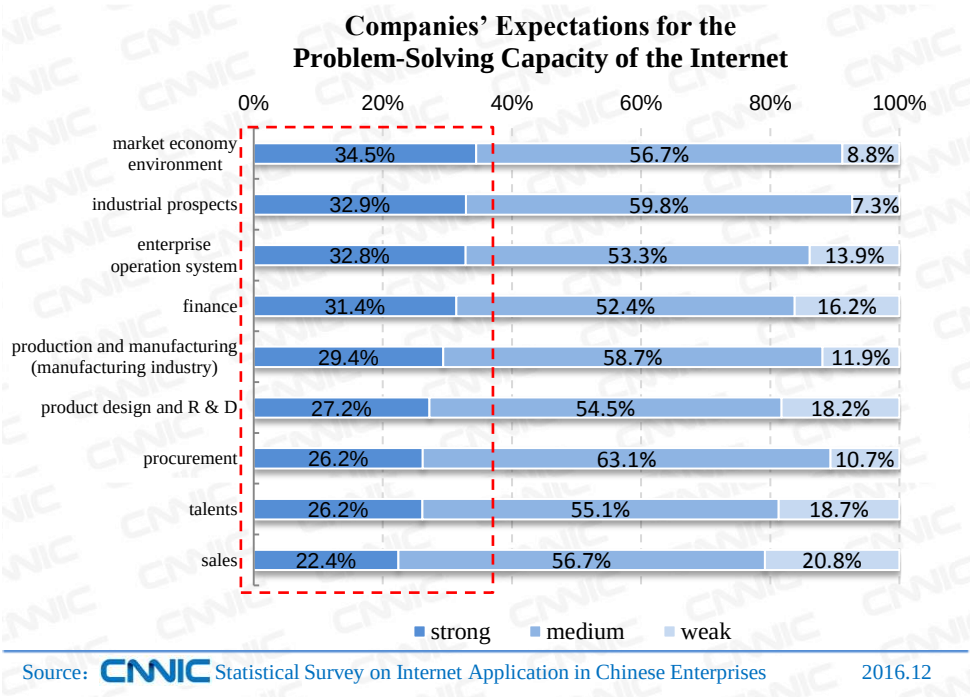


Figure 32 Companies' Expectations for the Problem-Solving Capacity of the Internet

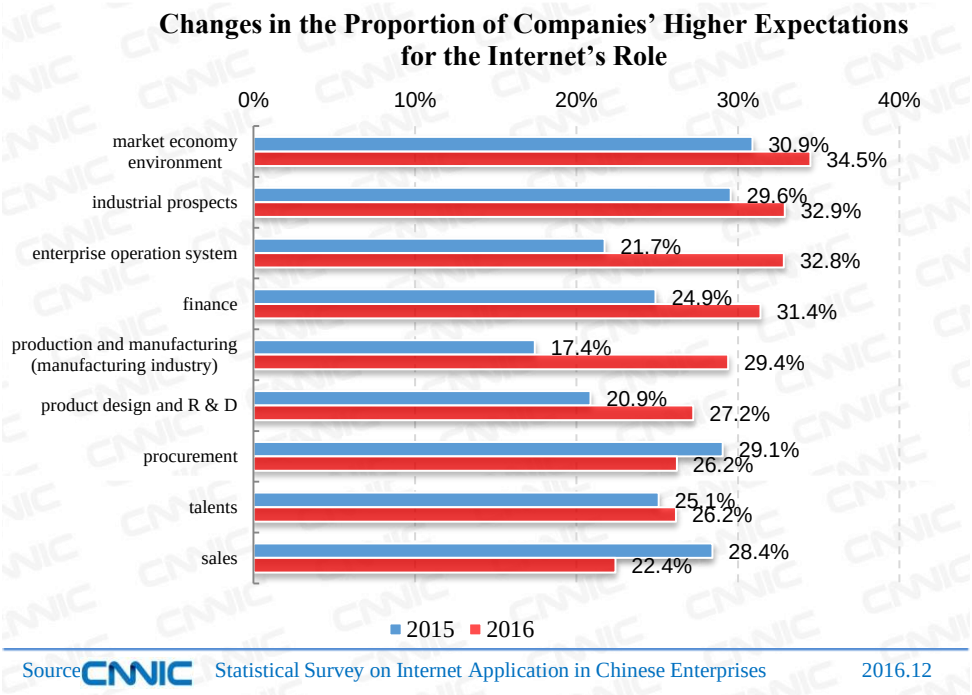


Figure 33 Changes in the Proportion of Companies' Higher Expectations for the Internet's Role

Chapter VI The Overview of Listed Internet Enterprise Scale

Up to December 2016, China's Internet companies[14] going public at home and abroad totaled 91, with a total market value of RMB 5.4 trillion. Internet companies getting listed in the US accounted for 55.7% of the total market value, those in Hong Kong 29.7% of the total and those in Shanghai and Shenzhen 14.6%.

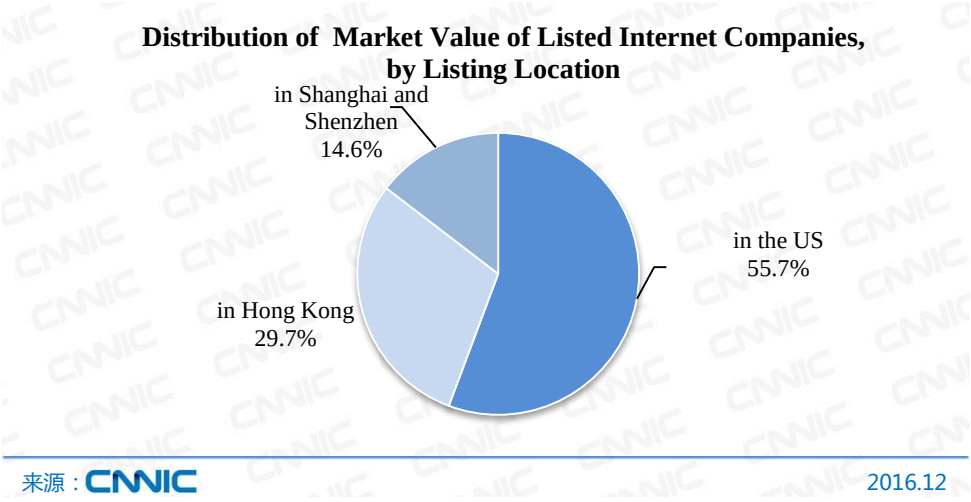


Figure 34 Distribution of Market Value of Listed Internet Companies, by Listing Location

Tencent (listed in Hong Kong) and Alibaba (listed in the US) are two representatives of China's Internet companies whose market value accounted for 57.0% of the total of China's listed Internet companies, standing at RMB 3 trillion.

[14] Listed Internet companies refer to those going public in the US, Hong Kong, Shanghai and Shenzhen, whose revenue from their respective Internet business takes up more than 50% of their total. Internet business includes Internet advertising and marketing, personal Internet value-added services, online games, e-commerce, etc. The standards for the above definition need to be set by seeing whether these companies mainly depend on Internet products in their operation including mobile Internet operating systems, mobile Internet Apps and traditional PC Internet sites.

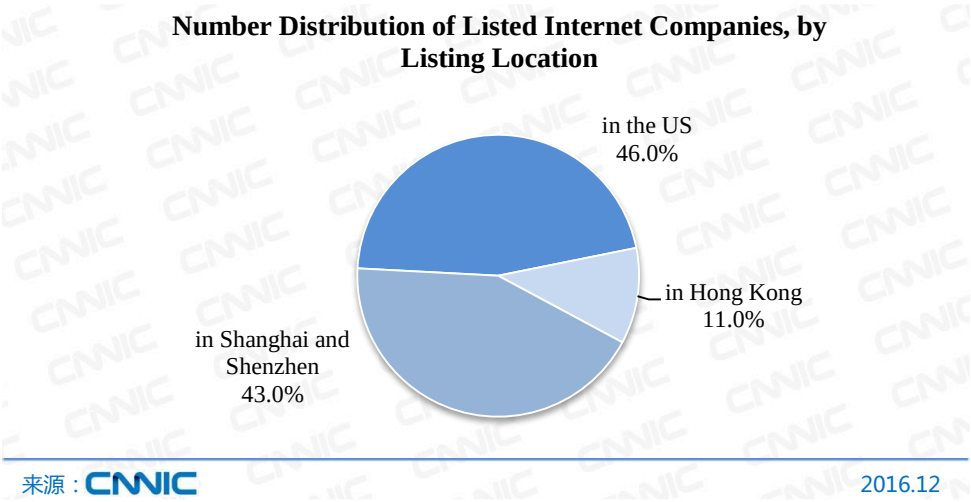


Figure 35 Number Distribution of Listed Internet Companies, by Listing Location

The number of Internet companies going public in Shanghai and Shenzhen is the same as that in the US. But, China's large Internet companies were inclined to get listed in the US, which leads to a big gap between the total market value of China's Internet companies in Chinese capital market and that in the US's capital market. The total market value of China's Internet companies being listed in the US is 3.8 times as much as that in Shanghai and Shenzhen.

Personal Application

Chapter VII The Size and Structure of Internet Users

I. The Size of Internet Users

(I) Overall Size of Internet Users

Up to December 2016 China had 731 million Internet users, up 42.99 million over the previous year. The Internet penetration rate was 53.2%, a growth of 2.9 percentage points compared with the end of 2015.

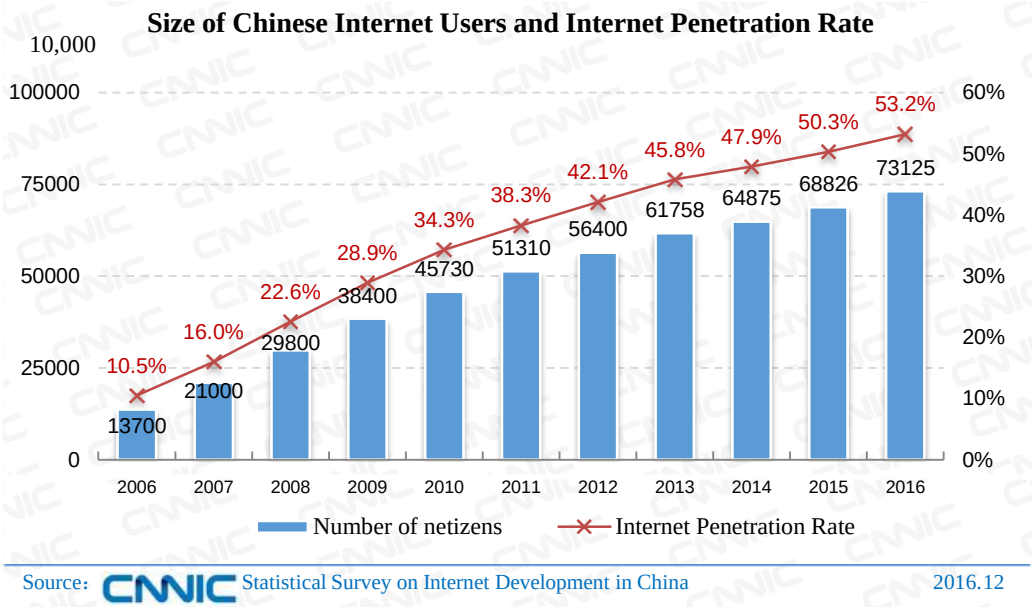


Figure 36 Size of Chinese Internet Users and Internet Penetration Rate

After China's Internet users have rapidly grown for almost 10 years, demographic dividend is gradually disappearing and Internet users are growing steadily. In 2016, the Internet industry generally moved towards being standardized and value-oriented in China. First, China has introduced many policies to speed up the orderly and sound development of Internet-based fields and improve the development environment of the Internet; next, with a growing per capita spending power of Internet users and more per capita consumption in online shopping, O2O services and online entertainment, the driving effect of online consumption on GDP comes into being; last, the Internet enhances its influence on enterprises and more enterprises will get access

to the Internet at a fast pace, with the "Internet +" initiative implemented.

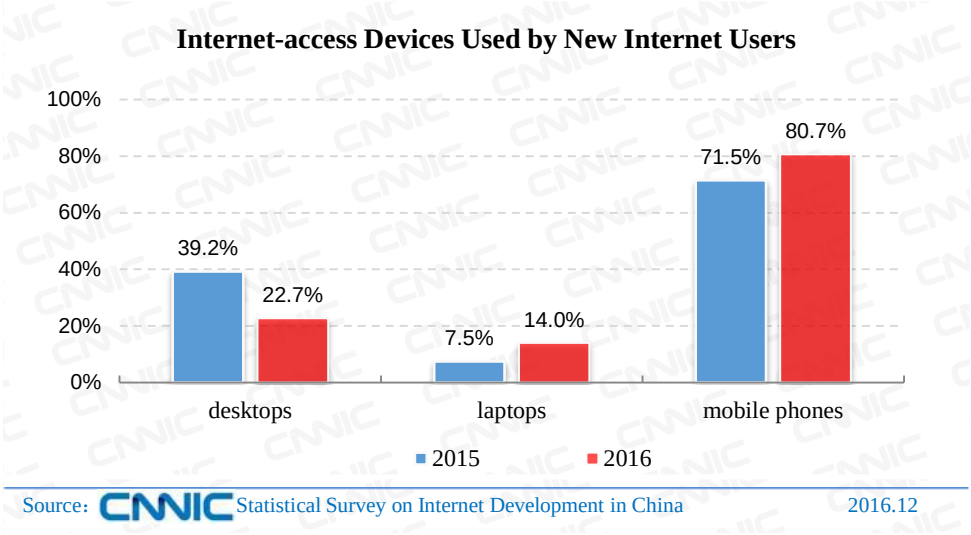


Figure 37 Internet-access Devices Used by New Internet Users

The development of mobile Internet remains the principal factor that boosts the growth of Internet users in China. As of December 2016, Chinese newly-added netizens using mobile phones to access the Internet accounted for 80.7% of the total Chinese newly-added netizens, up 9.2 percentage points over the end of 2015, showing a sustained growth trend. In contrast, the proportion of those netizens using desktops fell 16.5 percentage points. Meanwhile, the age of newly-added netizens showed a polarized trend. The proportions of those under 19 and those above 40 respectively stood at 45.8% and 40.5%, indicating that the Internet is continuing to penetrate into these two age groups.

(II) Size of Mobile Internet Users

As of December 2016, the number of mobile Internet users in China reached 695 million, representing an increase of 75.5 million from the end of 2015. The mobile netizens accounted for 95.1% of the total netizen population, while this percentage was 90.1% in 2015. The proportion of mobile netizens further climbed on a high base.

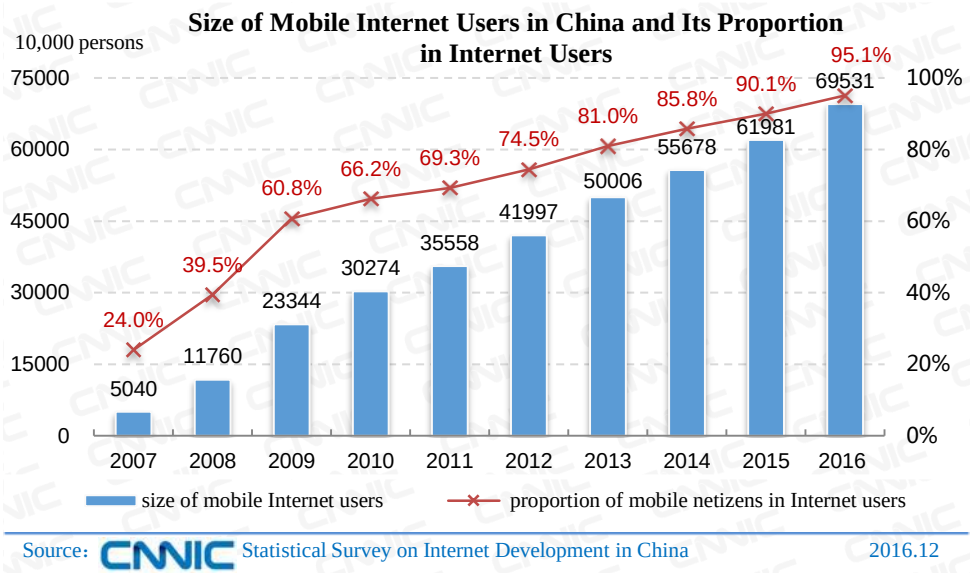


Figure 38 Size of Mobile Internet Users in China and Its Proportion in Internet Users

Mobile Internet promotes the consumption model featuring resource sharing, intelligent devices and diversified scenarios. First, mobile Internet provides the sharing economy with platforms and sharing models emerge including online car-hailing service, shared bike and online short-term rental, further cutting transaction costs and improving resource use efficiency; then, the rapid development of intelligent wearable equipment, smart home and intelligent industry facilitates the interconnection of intelligent hardware via mobile Internet, with the advent of the "interconnectivity" era; last, the online-offline integration and the diversified development of workplace and consumption scenarios of mobile netizens further refine different scenarios and expand the service scope.

(III) Size of Internet Users in Provinces

By December 2016, 26 out of 31 Chinese provinces, autonomous regions and municipalities directly under the central government boasted more than 10 million Internet users each, the same with that in 2015. Internet users in Jiangxi Province and Anhui Province grew the fastest, up respectively by 15.7% and 13.6%.

As provinces, municipalities directly under the central government and autonomous regions advance the "Internet +" initiative, the Internet penetration rate of provinces is increasing, with Jiangxi Province's penetration rate growing the most, up by 5.9 percentage points over the end of 2015. Because of the gap in local economic development and Internet infrastructure construction,

the digital divide still exists. Due to a high correlation between Internet development level and economic growth rate in different regions, highest Internet penetration rates are mainly seen in eastern provinces while lowest rates mainly in southwestern provinces.

Table 6 Netizen Population and Internet Penetration Rate in Different Provinces (Municipalities Directly under the Central Government and Autonomous Regions) of Mainland China in 2016

Province	Number of Internet users（10,000 people）	2016.12 Internet penetration rate	2015.12 Internet penetration rate	Size growth	Ranking of penetration rate
Beijing	1690	77.8%	76.5%	2.6%	1
Shanghai	1791	74.1%	73.1%	1.0%	2
Guangdong	8024	74.0%	72.4%	3.3%	3
Fujian	2678	69.7%	69.6%	1.1%	4
Zhejiang	3,632	65.6%	65.3%	1.0%	5
Tianjin	999	64.6%	63.0%	4.5%	6
Liaoning	2,741	62.6%	62.2%	0.4%	7
Jiangsu	4,513	56.6%	55.5%	2.2%	8
Shanxi	2,035	55.5%	54.2%	3.0%	9
Xinjiang	1,296	54.9%	54.9%	2.7%	10
Qinghai	320	54.5%	54.5%	0.8%	11
Hebei	3,956	53.3%	50.5%	6.0%	12
Shandong	5,207	52.9%	48.9%	8.7%	13
Shaanxi	1,989	52.4%	50.0%	5.5%	14
Inner Mongolia	1,311	52.2%	50.3%	4.1%	15
Hainan	470	51.6%	51.6%	0.9%	16
Chongqing	1,556	51.6%	48.3%	7.6%	17
Hubei	3,009	51.4%	46.8%	10.5%	18
Jilin	1,402	50.9%	47.7%	6.7%	19
Ningxia	339	50.7%	49.3%	3.7%	20
Heilongjiang	1,835	48.1%	44.5%	7.5%	21
Tibet	149	46.1%	44.6%	5.5%	22
Guangxi	2,213	46.1%	42.8%	8.8%	23
Jiangxi	2,035	44.6%	38.7%	15.7%	24

Province	Number of Internet users（10,000 people）	2016.12 Internet penetration rate	2015.12 Internet penetration rate	Size growth	Ranking of penetration rate
Hunan	3,013	44.4%	39.9%	12.2%	25
Anhui	2,721	44.3%	39.4%	13.6%	26
Sichuan	3,575	43.6%	40.0%	9.7%	27
Henan	4,110	43.4%	39.2%	11.0%	28
Guizhou	1,524	43.2%	38.4%	13.2%	29
Gansu	1,101	42.4%	38.8%	9.6%	30
Yunnan	1,892	39.9%	37.4%	7.4%	31
The whole country	73,125	53.2%	50.3%	6.2%	-

(IV) Size of Rural Internet Users

Up to December 2016, China had 201 million rural Internet users, accounting for 27.4% of the national total, with an increase of 5.26 million or 2.7% from the end of 2015; it had 531 million urban Internet users, accounting for 72.6%, with an increase of 37.72 million or 7.7% from the end of 2015.

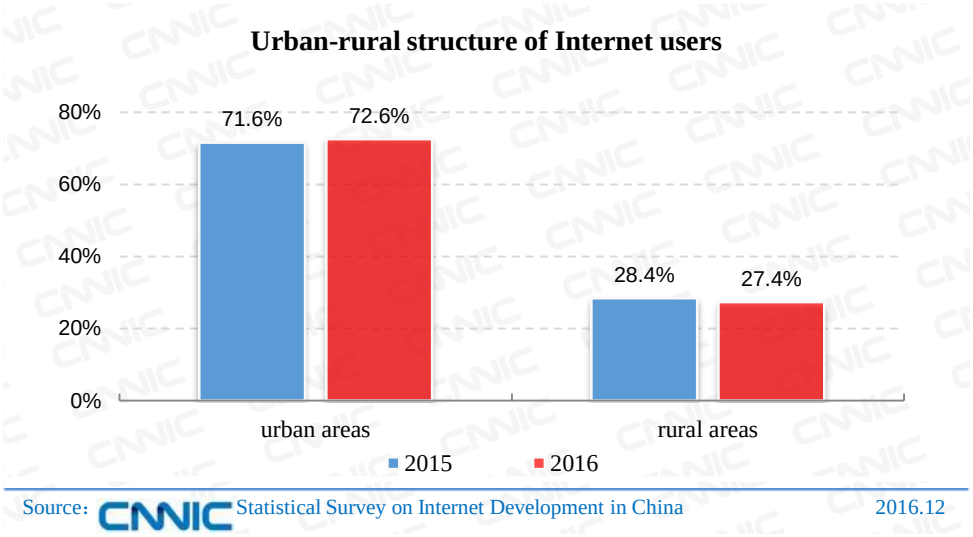


Figure 39 Urban-rural structure of Internet users

The number of rural netizens is on the rise, but a wider urban-rural gap still exists in the Internet penetration rate. As of December 2016, Internet penetration in urban areas was 69.1%

while that in rural areas was 33.1%, with an urban-rural gap of the penetration rate increasing from 34.2% in 2015 to 36.0%. With a small urban-rural gap of utilization ratio of basic Internet applications including instant messaging and online entertainment, an about 4% urban-rural gap of utilization ratio is reflected in instant messaging, online games and online music. But the urban-rural gap of utilization ratio shown in online shopping, payment and travel booking applications exceeds 20%. This situation shows that entertainment and communication applications are the main ones prompting rural residents to access the Internet and that rural netizens have potentials in Internet-based consumption fields.

(V) Analysis of Non-Internet Users' Status Quo

Rural residents form the major part of non-Internet users. By December 2016, there are 642 million non-Internet users in China, among which those in urban areas had took up 39.9% while those in rural areas 60.1%.

Shortage of Internet skills and limited literacy level are major factors preventing non-netizens from accessing the Internet. The survey finds that 54.5% of non-netizens don't access the Internet due to shortage of knowledge about computer or the Internet and 24.2% of those not because they don't master pinyin or the Chinese phonetic alphabet; 13.5% of non-Internet users without the demand for or the interest in the Internet don't get access to the Internet; 12.8% of non-netizens without computers or local access cannot access the Internet.

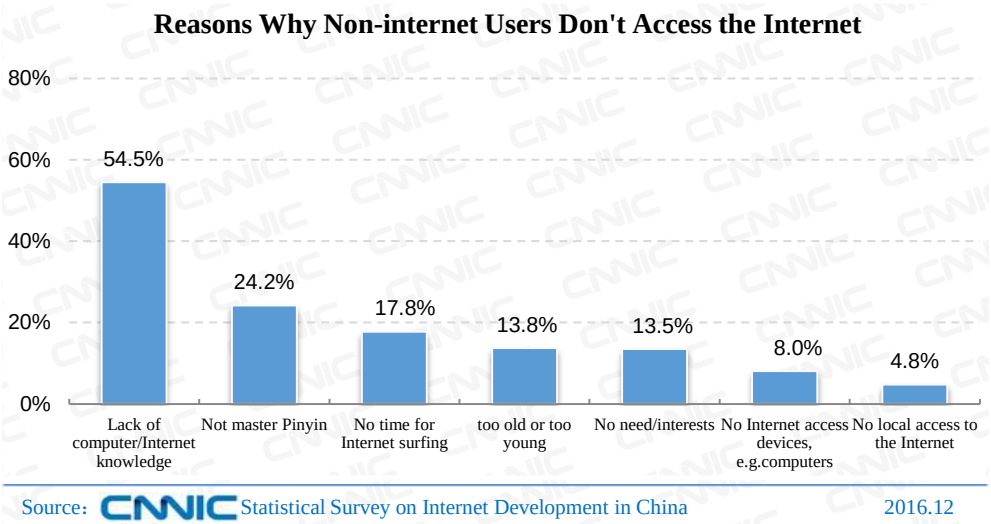


Figure 40 Reasons Why Non-internet Users Don't Access the Internet

To prompt non-netizens to surf the Internet is to improve their Internet skills, reduce the

Internet access cost and spur the demand of non-netizens for the Internet. According to the survey, of non-netizens being willing to access the Internet, 25.8% do so because of free Internet training, 23.6% reduced Internet charge and 23.2% free accessible Internet devices; of non-netizens choosing to access the Internet for their demands, 25.3% do so in order to communicate with others, 19.9% increase their incomes and 17.6% do online shopping.

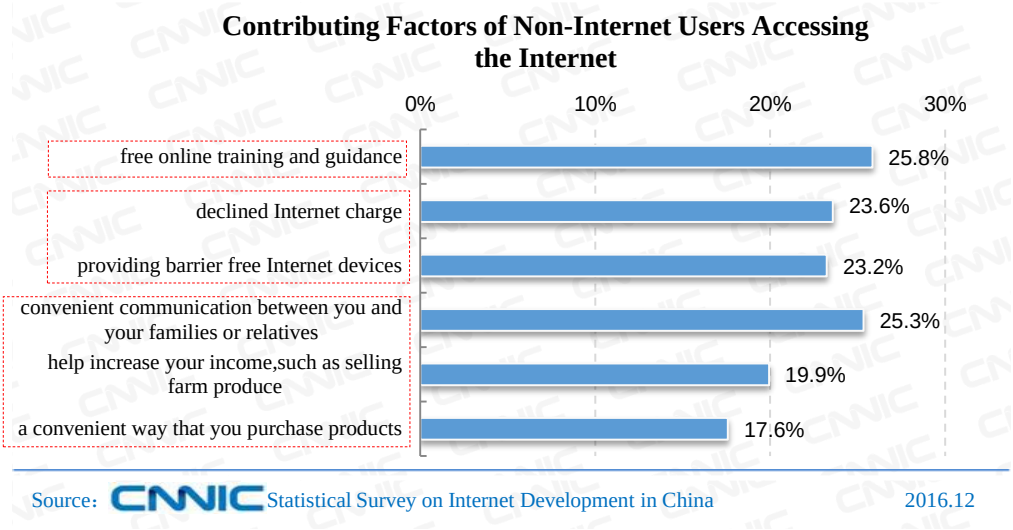


Figure 41 Contributing Factors of Non-Internet Users Accessing the Internet

II. The Structure of Internet Users

(I) Gender Structure

Up to December 2016, the male-to-female ratio was 52.4:47.6 among Chinese Internet users and as of the end of 2015 the male-to-female ratio was 51.2:48.8 in the total population of China, which shows that Chinese netizens' gender structure is gradually close to the sex ratio of the total population.

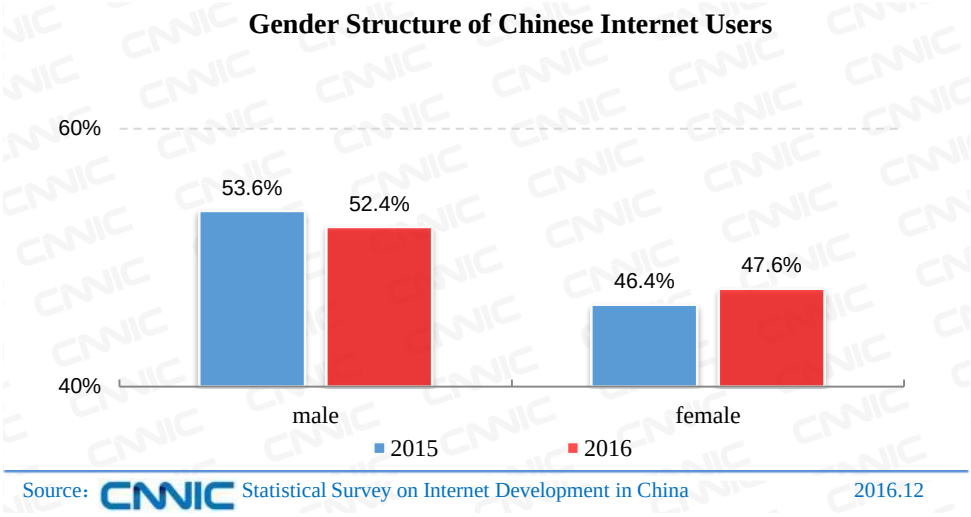


Figure 42 Gender Structure of Chinese Internet Users

(II) Age Structure

An overwhelming majority of Chinese netizens were aged 10-39. Up to December 2016, of Chinese Internet users, 73.7% aged 10-39, and 30.3% aged 20-29, the largest part; 20.2% aged 10-19 and 23.2% aged 30-39, representing a slight fall from the end of 2015. Compared with the end of 2015, the percentage of those under 10 and of those above 40 both rose, indicating that the Internet is continuing to penetrate into these two age groups.

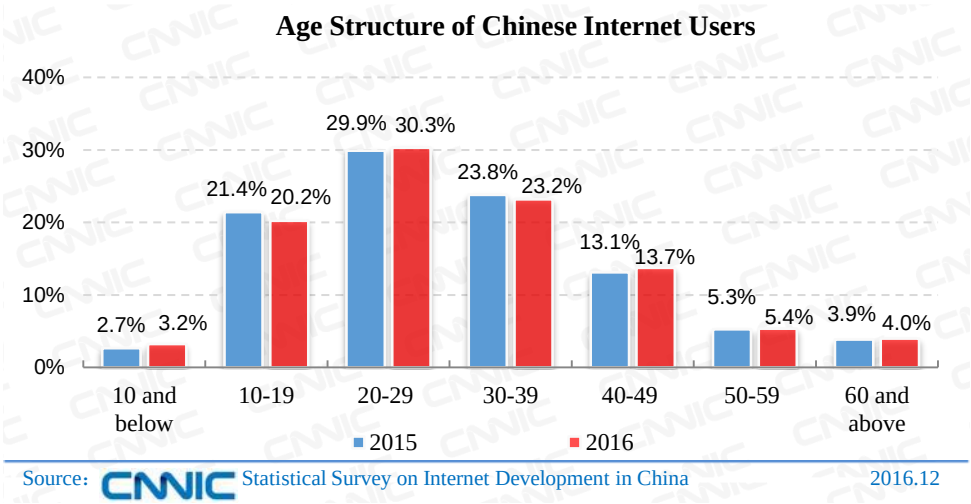


Figure 43 Age Structure of Chinese Internet Users

(III) Education Structure

Most netizens of China were those with a secondary education level. Up to December 2016, netizens with the education level of junior high school constituted 37.3% of the Chinese netizen

population, and this percentage was 26.2% for those with the education level of senior high school/secondary specialized school/technical school. The latter fell 3.0 percentage points from the end of 2015. When compared with the data at the end of 2015, the percentage of netizens with primary school education or below rose by 2.2 percentage points, showing that the Internet continues penetrating among those poorly educated.

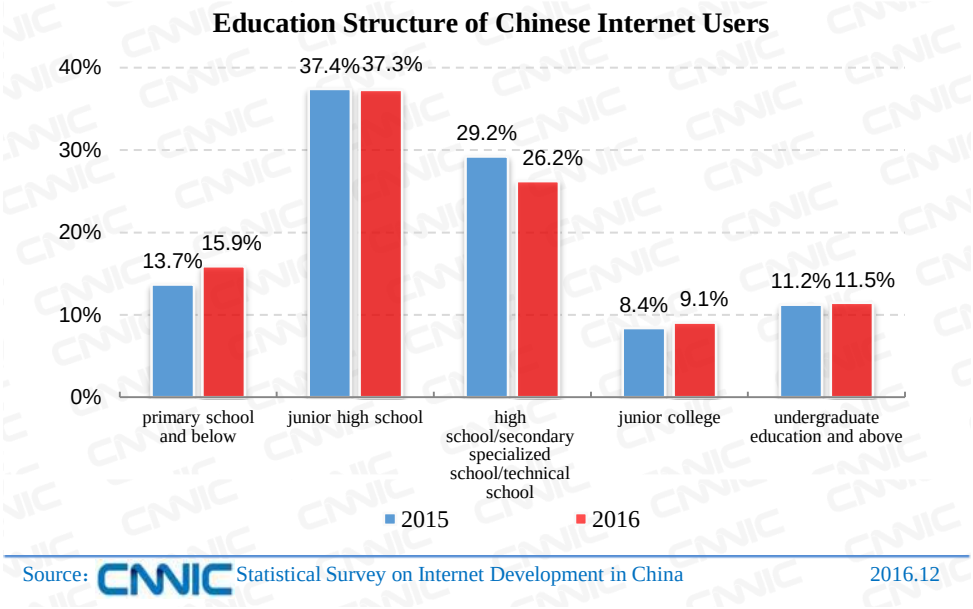


Figure 44 Education Structure of Chinese Internet Users

(IV) Occupational Structure

Students are the largest group of Internet users. By December 2016, 25.0% of Chinese netizens were students; 22.7% were self-employed persons/freelancers, up by 0.6 percentage points from the end of 2015; and 14.7% were enterprise managers/ordinary staff members. The proportions of these three groups remained relatively stable.

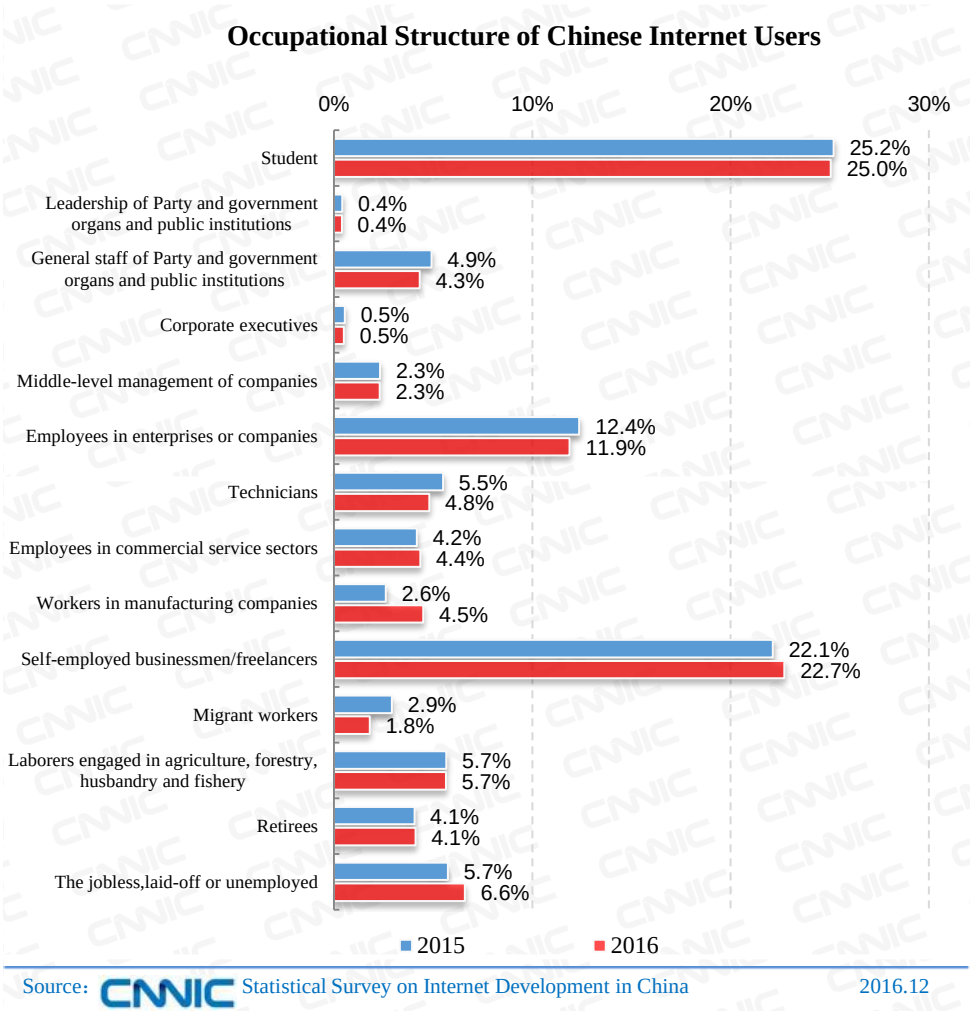


Figure 45 Occupational Structure of Chinese Internet Users

(V) Income Structure

Netizens with a middle-level monthly income[15] are the largest group of China's netizens. Up to December 2016 the proportions of netizens with a monthly income of RMB 2001-3000 and RMB 3001-5000 were respectively 17.7% and 23.2%. In 2016, as the number of low-income netizen group increased, the proportion of the netizen group with a monthly income of less than 1,000 increased by 1.2 percentage points over the end of 2015.

[15] Specifically, the income of students includes living allowances provided by families, salary earned from work-study programs, scholarships and others. The income of peasants 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.

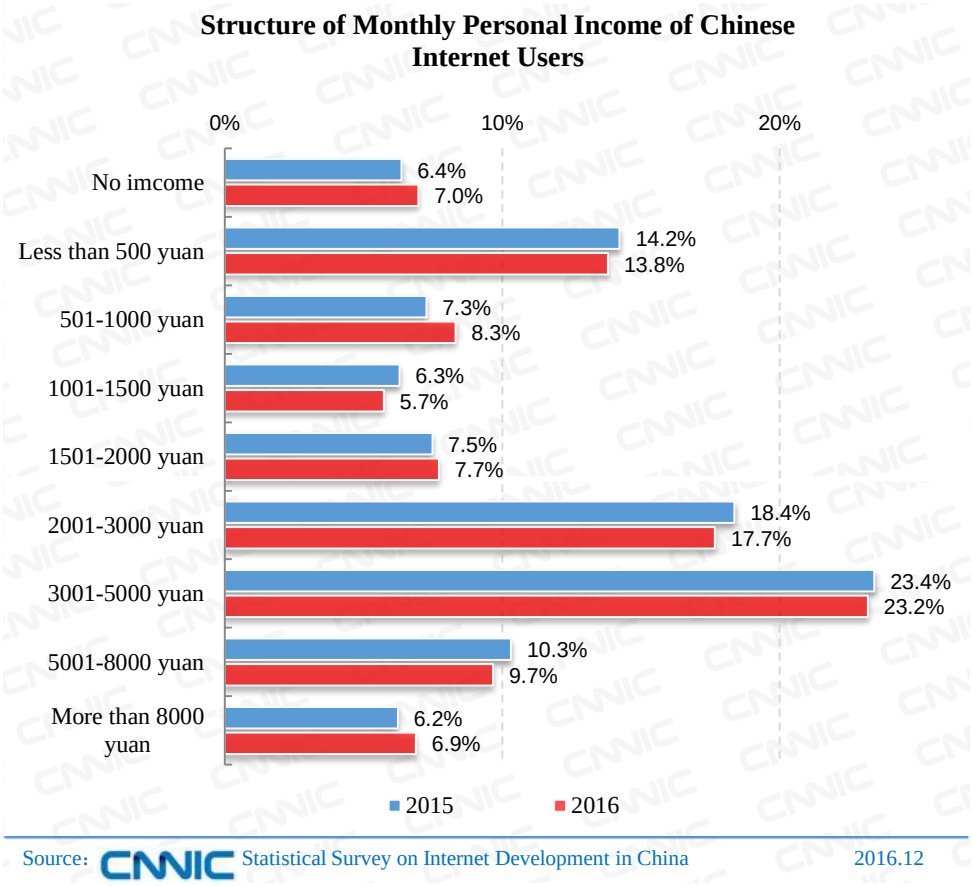


Figure 46 Structure of Monthly Personal Income of Chinese Internet Users

Chapter VIII Internet Access Environment

I. Internet Access Devices

The number of netizens using mobile phones and TVs to access the Internet grows rapidly, while the number of netizens using desktops and laptops is declining. By December 2016, 95.1% of Chinese netizens accessed the Internet on the mobile phone, up by 5 percentage points from the end of 2015; 60.1% used desktops and 36.8% laptops, all of which declined compared with those at the end of 2015. Up to the end of 2016, Smart TV, an entertainment and Internet access device at home, was used by 25.0% of netizens, up by 7.1 percentage points from the end of 2015.

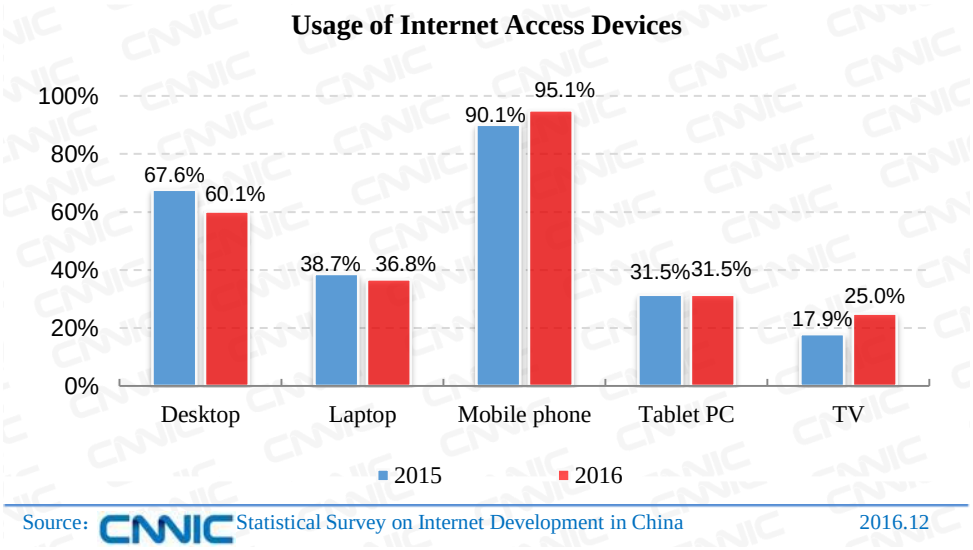


Figure 47 Usage of Internet Access Devices

II. Venues of Internet Access

Up to December 2016, 87.7% of Chinese netizens accessed the Internet via computers at home, down by 2.7 percentage points from the end of 2015; the proportion of netizens who did so at the workplace and schools all edged up while that of those who did so at Internet bars and public places slightly slipped.

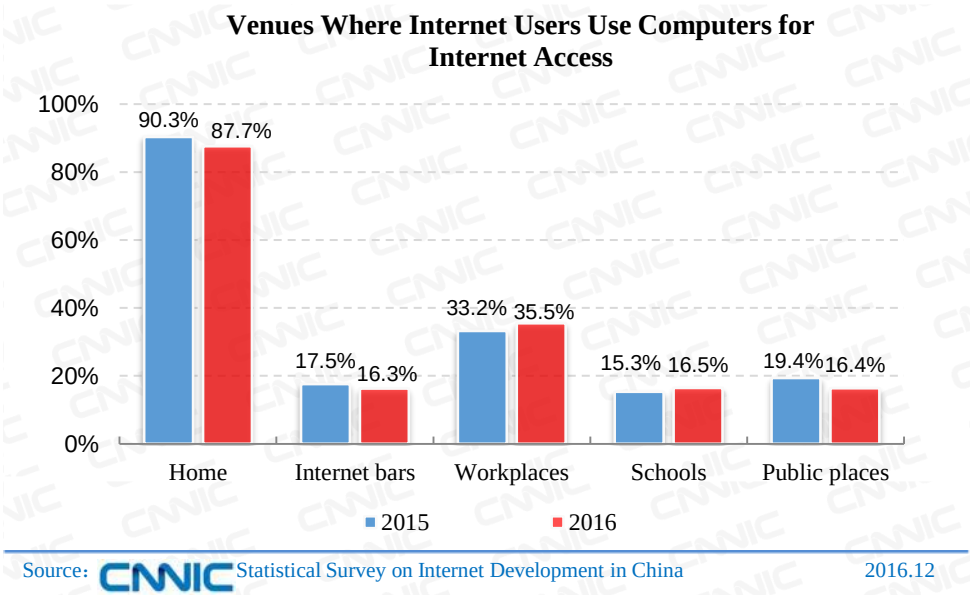


Figure 48 Venues Where Internet Users Use Computers for Internet Access

III. Online Duration

In 2016, the average online duration per netizen in China was 26.4 hours, basically the same with that in 2015.

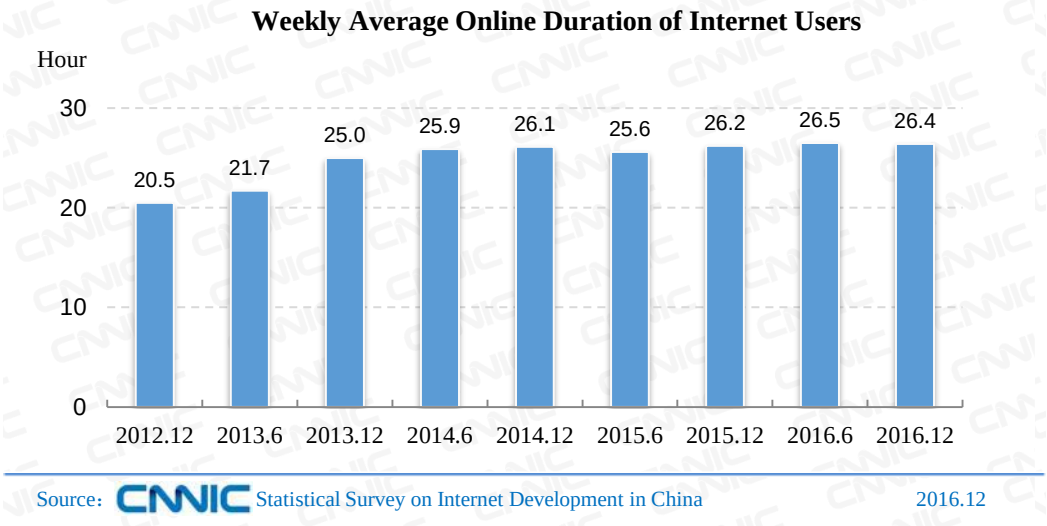
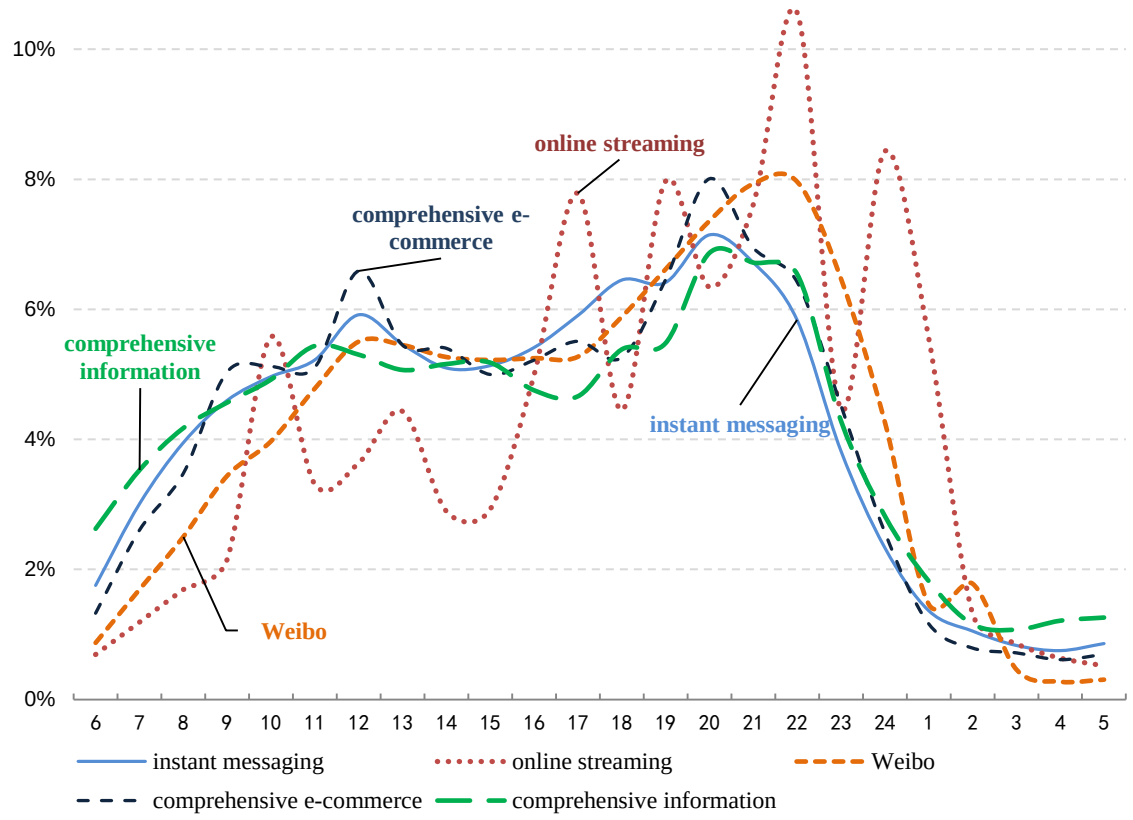


Figure 49 Weekly Average Online Duration of Internet Users

In 2016, among the five types of Apps frequently used by mobile netizens, instant messaging Apps had a high correlation to netizens' daily schedule, showing a basically even distribution of time of use throughout the day; the utilization ratio of live streaming Apps peaked at 17:00, 19:00, 22:00, and 0:00; the utilization ratio of Weibo and social networking Apps was evenly distributed

after 10:00, and peaked at around 22:00; users of e-commerce Apps preferred to shop online at 12:00 and 20:00; and the number of comprehensive information Apps users reading news was on the rise during the period from 6:00 to 10:00.

Distribution of Utilization Period of Five Apps



Source：Quest Mobile 2016.12

Figure 50 Distribution of Utilization Period of Five Apps[16]

[16]Distribution of utilization period: the period distribution of utilization duration of Apps in all fields. For example, if a user uses an instant messaging application for 15 minutes 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.

Chapter IX The Development of Personal Internet Applications

The year of 2016 saw the fast development of personal Internet applications. Except for e-mail, users of other applications were growing. Users of online meal ordering and online medical services grew respectively by 83.7% and 28.0%; in terms of mobile phone applications, users of mobile meal ordering and mobile education increased respectively by 86.2% and 84.8%.

Users of basic Internet applications grow steadily and enterprises focus on expanded content.

Users of basic Internet applications such as those for instant messaging, information searching, network news and social networking grow steadily, with core business entering a relatively mature stage of development. Instant messaging regains growth by expanding service content, with individual's instant messaging differentiated more obviously; search engine makes progress in technological innovation and service extension and provides targeted services for users to meet their personalized demands for different scenarios, forming a multi-service ecology system with search as an interface; network news is introduced to a diverse range of platforms with various forms, which sets higher requirements for supervision and content innovation; and further segmented and enriched, social networking platforms are becoming more innovative and targeted at smaller user groups.

The scale of online meal ordering users sees significant increase, with the integration of online and offline services being expedited.

Business transaction applications kept increasing in 2016. Users of online meal ordering annually grew by 83.7%. The online shopping market is becoming more diversified and standardized. Specifically, online shopping, driven by Internet celebrity and live broadcast, enriches itself with more entertainment and enables its customers to experience more content; cross-border e-commerce enters the phase of adjustment; and rural e-commerce improves its services at a faster pace. As the scale of online meal ordering users increases by leaps and bounds,

meal ordering platforms start to refine their operation models to better match industrial resources with users' demands. In terms of travel booking, online platforms and traditional travel service providers are playing a cooperation-competition game, with a striking online-offline integration trend.

With a "no wallet" era quietly initiated, the scale of online wealth management users grows steadily.

E-payment companies vigorously develop the market and greatly enrich payment scenarios, which prompts netizens to initially develop the habit of using mobile payment tools to pay bills when shopping at physical stores such as restaurants, supermarkets and convenience stores. 50.3% of netizens pay bills through mobile payment when shopping at a physical store, with a "no wallet" era quietly initiated. Through several years of development, online wealth management platform covering a variety of financial products has been completed and traditional banking institutions promote their products on the Internet. Internet has become a regular channel for netizens to manage financial affairs. In 2016, 98.90 million of Chinese netizens purchased online financial products, up by 8.63 million over the end of 2015, with the user scale growing steadily.

Users of online entertainment grow steadily, with online games as the highlight.

In 2016, the online game industry as a whole maintained a steady growth. As a core growth area, mobile games saw a growth in the user scale and utilization ratio, whose revenue exceeds that from PC client games. The piracy of online literature was effectively cracked down on in 2016. Meanwhile, the business model of online literature was transformed from one-time sale to sustained content development as a way to conduct more cross-border cooperation. The online video industry focused on producing premium self-produced contents and its revenue from membership fees maintained a good momentum of growth, with a video ecosphere coming into being. Through fierce competition and development in the first half of 2016, live streaming was put under stricter supervision, entering a standardized period.

More educational and medical services are available on the Internet, and online car-hailing services are standardized.

In terms of online education, primary and secondary school education is the most used and

parents are willing to pay high tuition fees for it, which boosts the development of the market; online hospital registration services keep improving, but telemedicine and medical big data are in the exploration stage and face with many challenges; online car-hailing services, a typical service of sharing economy, are playing an important role in meeting personalized travel needs of users and will be more standardized and safer with related measures introduced; with the help of online public welfare platforms, charities prompt more people to participate in public welfare actions and smaller, more convenient and diversified charitable donations are underpinned by online donation, public welfare crowdfunding and social network fundraising.

Table 7 Usage Rate of Internet Applications by Chinese Netizens in 2015 / 2016

	2016		2015		
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	Annual growth rate
Instant messaging	66,628	91.1%	62,408	90.7%	6.8%
Search Engine	60,238	82.4%	56,623	82.3%	6.4%
Online news	61,390	84.0%	56,440	82.0%	8.8%
Online video	54,455	74.5%	50,391	73.2%	8.1%
Online music	50,313	68.8%	50,137	72.8%	0.4%
Online payment	47,450	64.9%	41,618	60.5%	14.0%
Online shopping	46,670	63.8%	41,325	60.0%	12.9%
Online games	41,704	57.0%	39,148	56.9%	6.5%
Online banking	36,552	50.0%	33,639	48.9%	8.7%
Online literature	33,319	45.6%	29,674	43.1%	12.3%
Travel booking[17]	29,922	40.9%	25,955	37.7%	15.3%
E-mail	24,815	33.9%	25,847	37.6%	-4.0%
Forum/bbs	12,079	16.5%	11,901	17.3%	1.5%
Internet financing	9,890	13.5%	9,026	13.1%	9.6%
Online stock or	6,276	8.6%	5892	8.6%	6.5%

[17]Travel booking: It is defined in this report as booking air tickets, hotel, train tickets and travel & vacation products via Internet in the last 6 months.

	2016		2015		
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	Annual growth rate
fund trade					
Weibo	27,143	37.1%	23,045	33.5%	17.8%
Map query	46,166	63.1%	37,997	55.2%	21.5%
Online meal ordering	20,856	28.5%	11,356	16.5%	83.7%
Online education	13,764	18.8%	11,014	16.0%	25.0%
Online medical services	19,476	26.6%	15,211	22.1%	28.0%
E-government	23,897	32.7%			

Table 8 Usage Rate of Mobile Internet Applications by Chinese Netizens in 2015 / 2016

	2016		2015		
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	Annual growth rate
Mobile instant messaging	63,797	91.8%	55,719	89.9%	14.5%
Mobile Netnews	57,126	82.2%	48,165	77.7%	18.6%
Mobile search	57,511	82.7%	47,784	77.1%	20.4%
Mobile online music	46,791	67.3%	41,640	67.2%	12.4%
Mobile online video	49,987	71.9%	40,508	65.4%	23.4%
Mobile online payment	46,920	67.5%	35,771	57.7%	31.2%
Mobile online shopping	44,093	63.4%	33,967	54.8%	29.8%
Mobile online game	35,166	50.6%	27,928	45.1%	25.9%
Mobile banking	33,357	48.0%	27,675	44.6%	20.5%

	2016		2015		
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	Annual growth rate
Mobile online literature	30,377	43.7%	25,908	41.8%	17.2%
Mobile travel booking	26,179	37.7%	20,990	33.9%	24.7%
Mobile mail	19,713	28.4%	16,671	26.9%	18.2%
Mobile forum /bbs	9,739	14.0%	8,604	13.9%	13.2%
Mobile stock or fund trade	4,871	7.0%	4,293	6.9%	13.5%
Mobile educational courses	9,798	14.1%	5,303	8.6%	84.8%
Mobile Weibo	24,086	34.6%	18,690	30.2%	28.9%
Mobile map and mobile navigation	43,123	62.0%	33,804	54.5%	27.6%
Mobile meal ordering	19,387	27.9%	10,413	16.8%	86.2%

I. Most Frequently Used Apps by Internet Users

Instant messaging was the most frequently used mobile App among netizens in 2016. The survey result shows that WeChat is the most frequently used App by 79.6% of netizens; QQ is used by 60.0% of Internet users, ranking the second; and Taobao, mobile Baidu and Alipay are used respectively by 24.1%, 15.3% and14.4% of netizens, ranking the third, fourth and fifth.

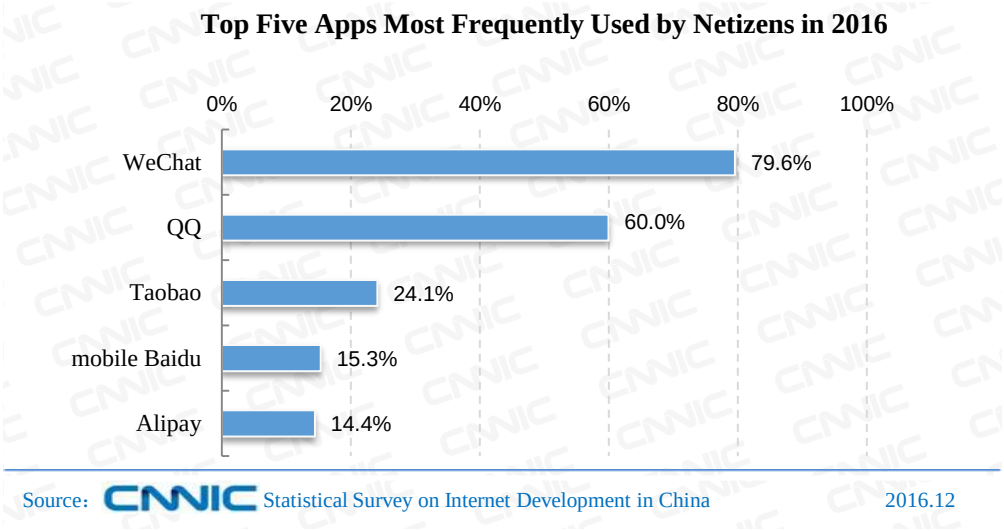


Figure 51 Top Five Apps Most Frequently Used by Netizens in 2016

II. The Development of Basic Applications

2.1 Instant messaging

Up to December 2016, China had 666 million users of instant messaging, accounting for 91.1% of the total netizen population and representing an increment of 42.19 million from the end of 2015. In particular, users of mobile instant messaging reached 638 million, constituting 91.8% of mobile netizens and recording an annual increase of 80.78 million.

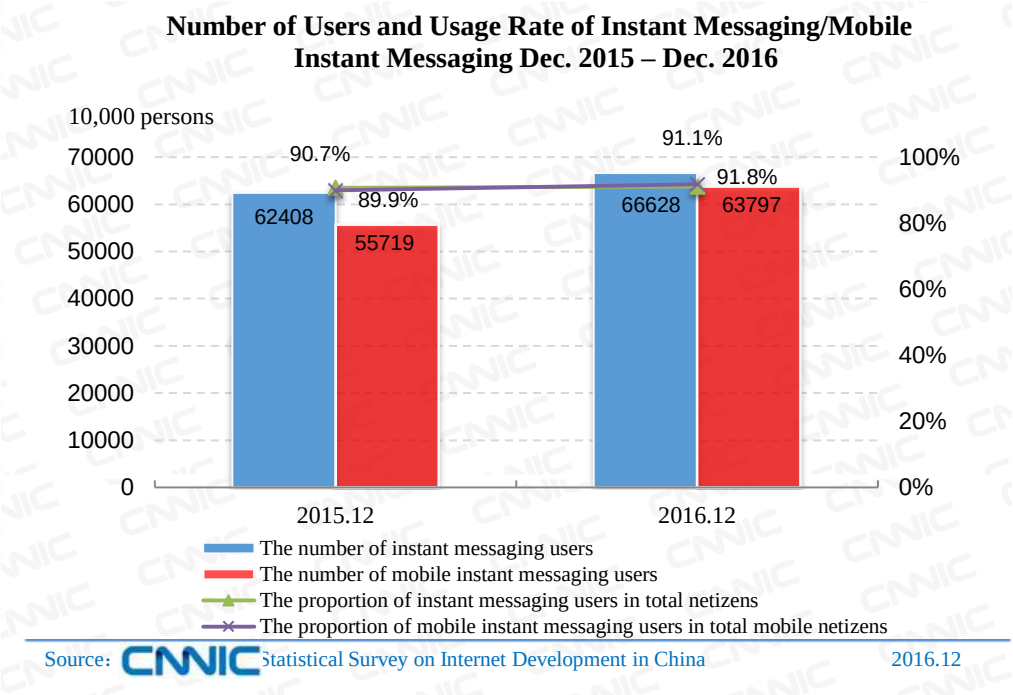


Figure 52 Number of Users and Usage Rate of Instant Messaging/Mobile Instant Messaging Dec. 2015 – Dec. 2016

Instant messaging belonging to the basic Internet application thrives once again by expanding its service content in 2016. Instant messaging products for individual use markedly vary from each other while those for enterprise use designed for working scenarios have become the strategic focus of companies.

For individuals, mainstream instant messaging products, represented by QQ and WeChat, have obvious function differences. In the first quarter of 2016, WeChat canceled the function of importing QQ contacts and focused on meeting living needs like shopping and travel, while QQ's functions were designed to satisfy entertainment demands of young users for reading and music because of the low average age of its user group. In addition, Momo, a social networking App for meeting strangers with similar interests, developed rapidly by introducing the live streaming service. Its revenue from this service exceeds 70% of the total.

For enterprises, customized mobile instant messaging products based on working scenarios have become key areas of competition among developers. Instant messaging products for enterprise use represented by Slack attained success in the overseas market, which prompts Alibaba, Tencent and NetEase to set foot in the field. The influx of capital and technology resources can rapidly improve product functions and gradually integrate itself with office

automation (OA), customer relationship management (CRM) and enterprise cloud service so as to enhance the working efficiency of teams. Communication, collaboration and security of instant messaging will become the three core elements of future competition among enterprises.

2.2 Search Engine

Up to December 2016, China had 602 million search engine users, an annual increase of 36.15 million or 6.4%, with a usage ratio of 82.4%; it also had 575 million mobile search users, an annual increase of 97.27 million or 20.4%, with a usage ratio of 82.7%.

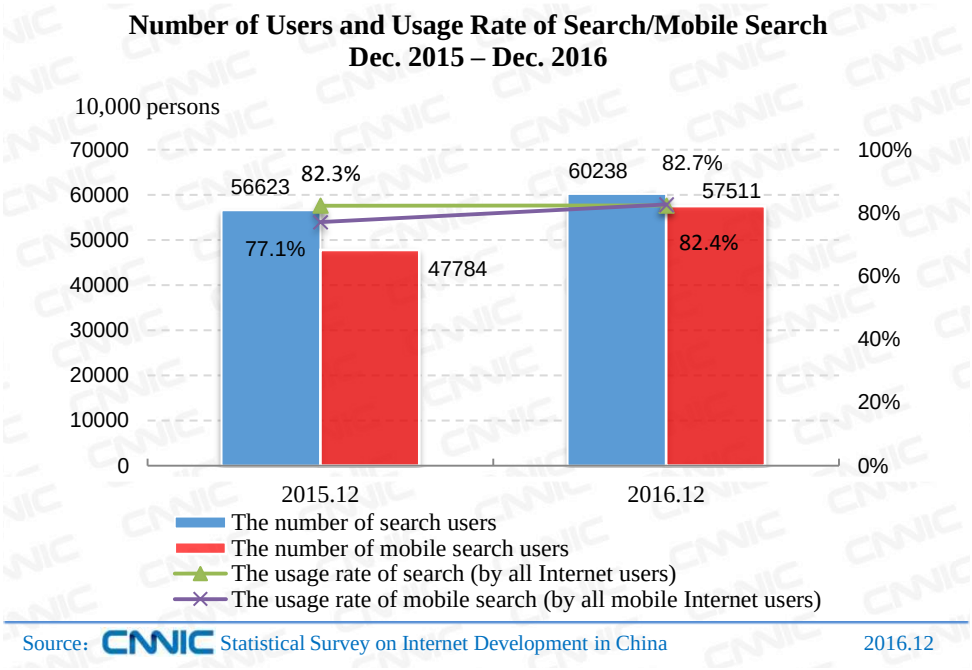


Figure 53 Number of Users and Usage Rate of Search/Mobile Search
Dec. 2015 – Dec. 2016

In terms of technological innovation, the collaborative development and deep integration of search products and many cutting-edge technologies has become an increasingly prominent trend. The increasingly strong demands of users for localized and personalized searches spur search engine enterprises to increase their investment in advanced technologies. Service providers provides their users with personalized, scenarized and targeted information search services through the in-depth integration of search products and technologies including voice and image recognition, information recommendation based on big data, and human-computer interaction, keeping enriching functions of search products and expanding the information coverage.

In terms of service extension, the ecosystem has taken shape, featuring interconnected

Internet services and with search products as data-usage entrances. Search applications are being integrated with information, entertainment, business and consumer applications covering instant messaging, social networking, news, online retail, O2O services, Internet financial credit, etc. In particular, fast-growing O2O services are becoming new services of innovative value in the search engine market.

In terms of search service standards, due to bad incidents in the search engine marketing market in the first half of 2016, *the Provisions on the Administration of Internet Information Search Services* and *Interim Measures for the Administration of Internet Advertising* were released successively by the Cyberspace Administration of China and the State Administration for Industry and Commerce. All these regulations has greatly reduced bad business promotion information and improved the information search environment. As policies are being implemented, search engine companies take positive action and netizens raise their awareness of accessing the Internet safely, the Internet environment is becoming more clean and more rights and interests of netizens will be safeguarded.

2.3 Online news

As of December 2016, China had 614 million of netnews readers, accounting for 84.0% of all netizens, with an annual increase rate of 8.8%. Specifically, 571 million mobile netizens, or 82.2% of mobile Internet users, read news on their phones, representing an annual increase of 18.6%.

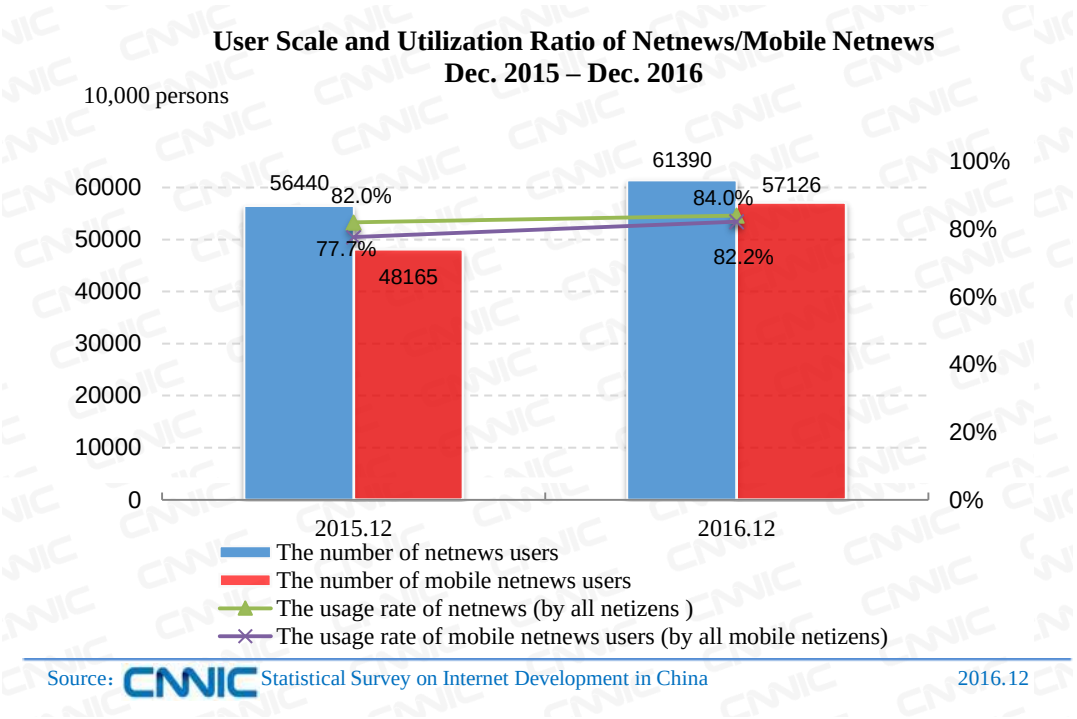


Figure 54 User Scale and Utilization Ratio of Netnews/Mobile Netnews Dec. 2015 – Dec. 2016

As basic Internet applications have developed for many years, network news has entered a relatively mature stage of development. In 2016, the market showed the following characteristics:

As content is being displayed in creative forms, new requirements for governmental supervision are presented. In 2016, news agencies enriched forms of news by developing short videos and live broadcast, which improved users' experience. The new real-time broadcasting form presents higher requirements for censoring news. In November 2016, *Provisions on the Administration of Internet Live-Streaming Services* were released by the Cyberspace Administration of China. With the forms of network news developing in the future, the government must improve its supervision.

Social networking platforms become an important tool for spreading news and collecting materials. The collaboration between information clients and social networking tools such as Weibo and WeChat greatly enhances the scope and speed of news communication; We Media applications based on social networking have an advantage of user scale, bringing out more sources of news material. In 2016, social media became the source of many hot social issues and further encouraged news websites and traditional media to follow up.

Content and users have been hotly contested by various media. Commercial media platforms

such as Tencent and Top News subsidize We Media with great investment, and copyright expenses have become one of main expenditures of these platforms. Meanwhile, business news client-end Apps including Top News, Sohu News, Yidianzixun and Kuaibao improve their own utilization ratio and brand awareness by conducting cooperation with upstream mobile phone producers in pre-loaded Apps and stepping up efforts on ads delivery.

2.4 Social networking

In 2016, social networking applications grew steadily, with social networking Internet platforms being used extensively. For one thing, comprehensive social networking applications introducing live streaming brought more users and traffic; for another, further segmented and enriched, social networking platforms are becoming more innovative and targeted at smaller user groups, according to different scenarios, vertical user groups and information-bearing channels.

The top three typical social networking applications belong to comprehensive social networking ones. WeChat Moments and Qzone are social networking services based on instant messaging. As of June 2016, their utilization ratio had reached 85.8% and 67.8% respectively. Weibo, serving as social media, benefit from celebrities, Internet celebrities and the establishment and improvement of media content ecology as well as the in-depth deployment of short videos and mobile live streaming, whose utilization ratio continued growing and reached 37.1%, up by 3.1 percentage points from June 2016. Among vertical social networking applications, Douban, a typical one of interests and social networking applications, had a utilization rate of 8.1%.

WeChat Moments, Qzone and Weibo, belonging to comprehensive social networking applications, significantly vary from each other in social relationship closeness, user properties and geographical features. From the perspective of exchange properties, WeChat Moments form a relatively closed individual community, and the shared information is from the interaction between friends. Weibo is a public platform for information spreading based on social relations, whose users increasingly focus on interest-based vertical and segmented fields. Qzone falls in between them. Seen from user features, WeChat Moments have a high user penetration rate, with all user groups having almost the same utilization ratio, except the low-age user group (aged 6-9) and the user group with low educational background (primary school or below). Netizens living in

fifth-tier cities and those aged 10-19 have an obvious high utilization ratio of Qzone, which is favored by young users. User features of Weibo are prominent, and the utilization ratios of Weibo among netizens in first-tier cities, female netizens, netizens aged 20-29, netizens with a bachelor degree or above and urban netizens are much higher than those of other user groups.

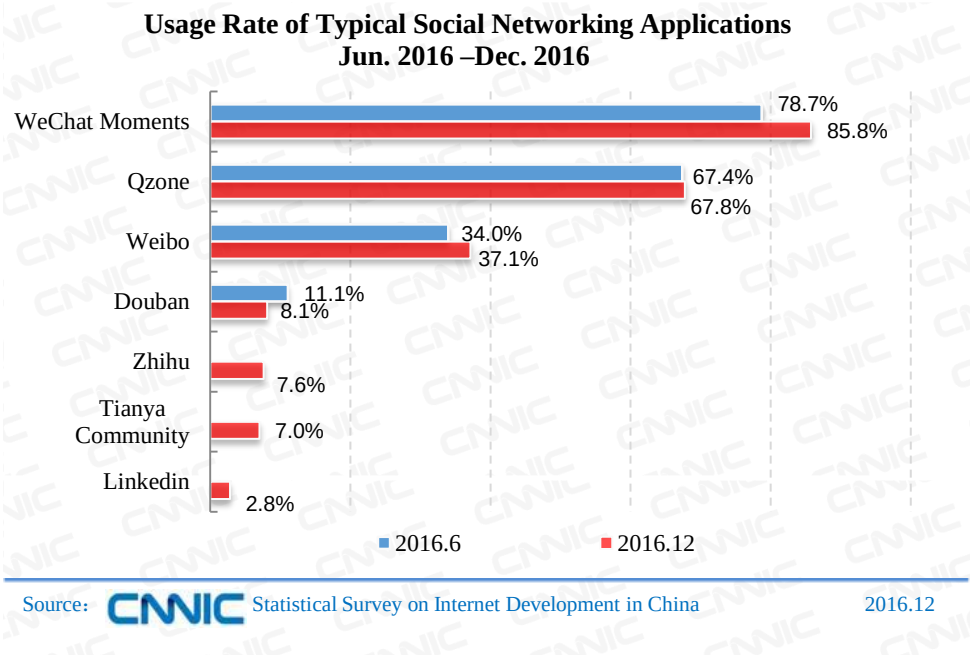


Figure 55 Usage Rate of Typical Social Networking Applications Jun. 2016 – Dec. 2016

III. The Development of Business Transaction Related Applications

3.1 Online shopping

By December 2016, there have been up to 467 million online shopping users taking up 63.8% of the total netizens, with a 12.9% growth rate from the end of 2015. Specifically, 441 million people, or 63.4% of mobile internet users, have conducted online shopping on their phones, with an annual increase of 29.8%.

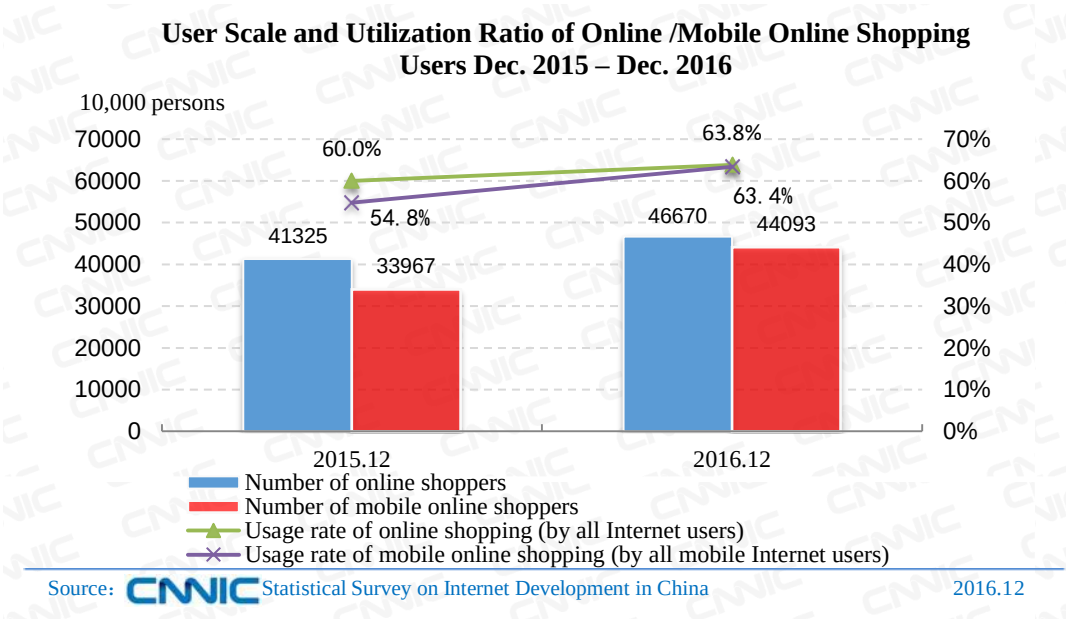


Figure 56 User Scale and Utilization Ratio of Online /Mobile Online Shopping Dec. 2015 – Dec. 2016

The online shopping market entered the mature stage in 2016. The increasing proportion of B2C transactions results in the further deepened online-offline integration and more industrial consolidation and acquisitions. In some fields, there are the following new features:

The application of new technologies and new models has driven the diversification of the forms of e-commerce. As live streaming enjoys more audience and We Media develops rapidly in a more professional way, online shopping, driven by Internet celebrities and live streaming, enriches itself with more entertainment and enables its customers to experience more content. E-commerce platforms have increased investment in content fields and new aggregated traffic has promoted the conversion of transactions in specific categories. Meanwhile, the application of VR and AR in e-commerce has brought customers new shopping experience and future technologies will change the forms of retailing.

New policies on cross-border e-commerce gradually standardize the industry. Influenced by the new policies in 2016, the market as a whole was improved and standardized. From the perspective of the market structure, SMEs lacking qualification and supply chain management capabilities will be gradually eliminated, with market concentration further improved; structurally, the mode is shifting from bonded delivery and hot sale to direct mail delivery and multi-category long-tail sale, which benefits the long-term orderly development of the industry.

E-commerce needs to expand its production and marketing channels to rural areas in a bid to

alleviate the poverty in these areas. The year of 2016 witnessed the fast expansion of the channels of major e-commerce platforms. As jd.com launched its offline joined cooperation marketing model covering all areas at or below the county level and Alibaba entered the period of Rural Taobao 3.0, the rural online shopping market has been improved in logistics, finance and services, which not only promotes rural e-commerce but also facilitates the poverty alleviation in rural areas.

3.2 Online meal ordering

As of December 2016, China had 209 million netizens using online meal ordering services, accounting for 28.5% of the total, with an annual growth of 83.7%. Specifically, 194 million of them did it on mobile phones and their proportion in total mobile Internet users increased from 16.8% to 27.9%.

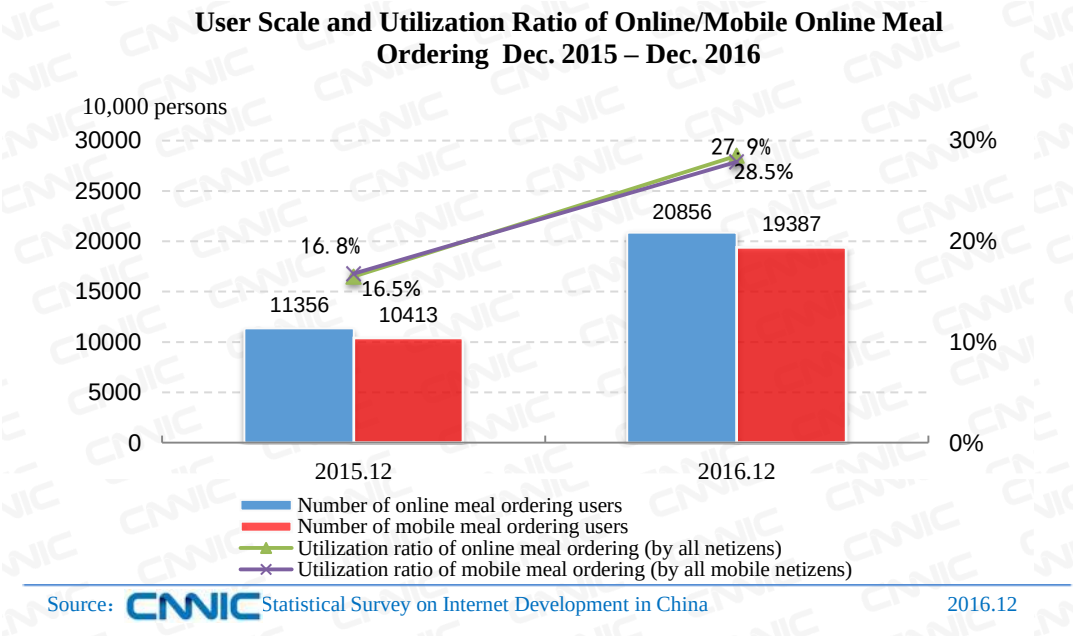


Figure 57 User Scale and Utilization Ratio of Online/Mobile Online Meal Ordering Dec. 2015 – Dec. 2016

At the industry level, online meal ordering is still at a primary stage of development, but the platforms start to have an awareness of the importance of refinement management, as the resources of restaurants registered on them are more or less the same with each other. Logistics timeliness and user experience are improved by exploring self-support delivery system, using the crowdsourcing of express delivery and utilizing algorithms to recommend nearby orders. Under

the dual pressures of revenue increase and fierce competition, online meal ordering platforms have limited investment in restaurant qualification inspection and product quality audit. Therefore, illegal restaurants register on many platforms and receive recommendation through bid ranking. The online meal ordering industry needs to be further standardized.

Seen from the market level, the online meal ordering market formed a three-way race in which ele.me, meituan.com and Baidu competed in 2016, with market concentration further improved. However, for the market, profits are a core problem concerning these platforms. Meituan.com operates its Maoyan movie ticket business, ele.me marches towards the traditional logistics, and Huangtaiji closed a large number of factory outlets after its transformation into an online meal ordering platform one year ago. All these market behaviors reflect the huge profit challenge in this field. As online meal ordering is limited by high marginal labor costs, to gain profits is to bring into full play the infromatization of the "Internet +" initiative and the data mining, improve the quality of upstream traditional dining and the delivery efficiency, or reduce transaction costs of downstream users and improve user experience.

3.3 Travel booking

As of December 2016, the number of netizens with the experience of booking air tickets, hotel rooms, train tickets or holiday travels on the Internet reached 299 million, representing an increase of 39.67 million or 15.3% over the end of 2015. The Internet users who had booked train tickets, air tickets, hotel rooms and holiday travels online respectively accounted for 34.0%, 15.9%, 17.2% and 7.4% of total netizens. Specifically, the number of netizens having booked air tickets, hotel rooms, train tickets and holiday travels on the mobile Internet reached 262 million, representing an increase of 51.89 million or 24.7% over the end of 2015. Chinese netizens' utilization ratio of mobile travel booking increased from 33.9% to 37.7%.

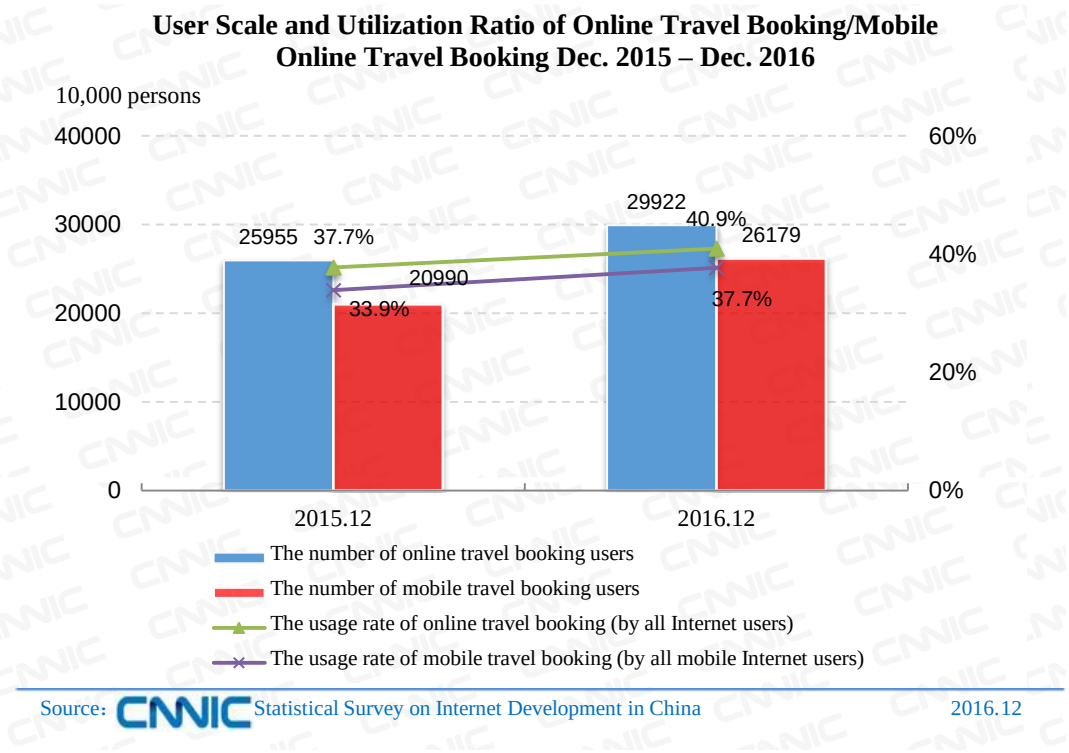


Figure 58 User Scale and Utilization Ratio of Online Travel Booking/Mobile Online Travel Booking Dec. 2015 – Dec. 2016

In 2016, online platforms and traditional travel service providers are playing a cooperation-competition game in online booking market.

In terms of online air ticket booking, a more fierce competition between OTA platforms and airlines further reduce the profitability of platforms. Despite the pressure of "enhancing direct selling and reducing agent distribution"[18], airlines still rely on online distribution. OTA needs to accelerate its transformation while maintaining its cooperation with airlines. Therefore, in 2016, the market performance was shown in the following two aspects. First, airlines expedited the development of self-operating channels; second, OTA platforms prepared to establish their own airlines, made strategic investment in the offline tourism chain, and marched towards the Internet insurance and financial fields.

In the field of hotel booking, although hotel unions have exerted some impacts on OTA platforms, the competition of hotel booking still exists between OTA platforms due to the limited pricing power and industrial influence. However, acquisitions between OTA platforms gradually differentiate their product positioning. After Ctrip purchased Qunar, Qunar ceased its high-end

[18] increasing direct sales of air tickets and reducing the sales by agents

independent hotel business. The competition of the middle and low-end market between Xinmeida and Qunar took place, with high-end hotel business market dominated by Ctrip and eLong.

The holiday travel booking field features internationalization and the online-offline integration trend. When compared with the air ticket and hotel markets, the travel market focuses on the offline business due to its long decision-making period. In 2016, OTA platforms including Ctrip, Qunar, Tuniu and LY regained their offline business, showing a striking trend of integrating offline tourism resources. As the outbound travel market grows rapidly, OTA platforms speed up their international process. Ctrip makes investment respectively in India Tourism Company and the US's three large tourism companies; Alitrip launches outbound travel services by cooperating with a number of state tourism administrations of Singapore, Finland and other countries.

IV. The Development of Internet Finance Applications

4.1 Internet financing

As of December 2016, Internet financing products had been purchased by 98.9 million netizens, up by 8.63 million over the end of 2015; and the utilization ratio was 13.5%, up by 0.4 percentage points.

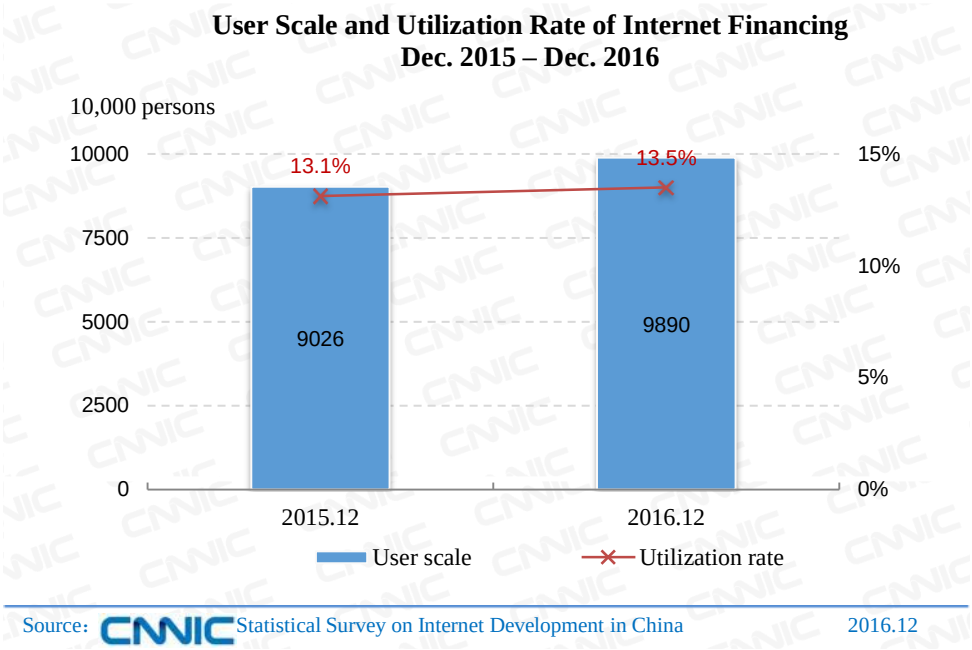


Figure 59 User Scale and Utilization Rate of Internet Financing Dec. 2015 – Dec. 2016

After several years of development, Internet financing has shifted from the leading product stage into the integrated product matrix stage and the Internet has become a conventional channel for netizens' financing. In 2016, Internet financing users entered a relatively steady growth period. First, seen from the development path, many financing platforms play the roles of channel and entrance of traditional finance and the market lacks phenomenal products such as Yu'ebo, which can boost the second high-speed growth in the industry; next, the overdue problem of some platforms or financial products exerts negative impacts on the market and dismisses the idea of some users trying the products; last, influenced by the loose monetary policy and the economic slowdown, the yield of financial products in 2016 fell to a historically low level in recent years, with users' interest waning.

Enterprise financing become a new development direction of the Internet financing market. Compared with the relatively full-fledged personal financing market, the enterprise financing market with a wealth of precipitation funds is still a "blue ocean". Current enterprise financing models rely more on traditional financial institutions while Internet financing provides convenient and diversified financial ways for enterprises. Based on the successful experience of personal financing and the development of the Internet financial industry, many platforms began to engage in customized financing and cash management for enterprises. Generally speaking, enterprise financing has vast prospects, but it set forth higher requirements for its clients in capital allocation,

liquidity and risk control compared with personal financing.

4.2 Online payment

Up to December 2016, China had a total of 475 million online payment users, an increase of 58.31 million or 14.0% over the end of 2015, and the utilization ratio increased from 60.5% to 64.9%. At the same time, China had 469 million mobile online payment users, an annual growth of 31.2%, and the utilization ratio increased from 57.7% to 67.5%.

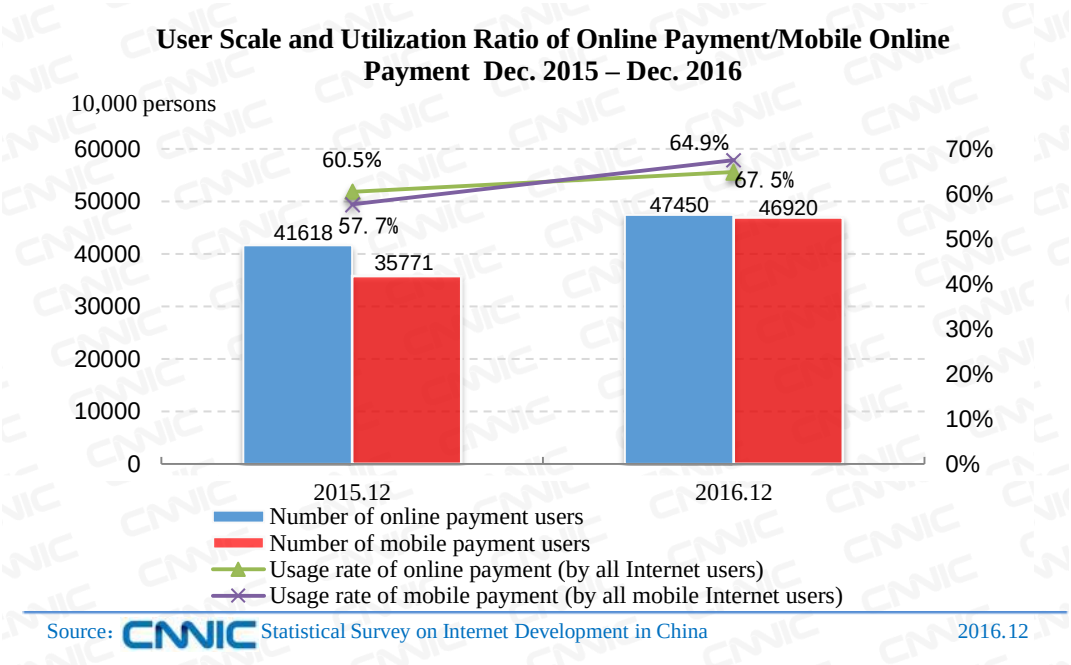


Figure 60 User Scale and Utilization Ratio of Online Payment/Mobile Online Payment Dec. 2015 – Dec. 2016

In terms of online payment, e-payment companies deepen their cooperation with governments at all levels, public service agencies and communities to launch services of public utility payment, building and promoting an all-round online payment system for public service. Regular utility payment covering water, electricity, gas, property, Internet and cable TV is incorporated into the online payment system, with a smart reminder of payment given to users; medical registration fee, traffic fine and campus-related payment can also be paid via the Internet, which greatly improves the efficiency of public service agencies and effectively minimizes the payment inconvenience of the public.

In terms of offline payment, e-payment companies vigorously develop the market and greatly enrich payment scenarios, prompting consumers to initially develop the habit of using

mobile payment tools to pay bills when shopping at physical stores such as restaurants, supermarkets and convenience stores. The payment habit is rapidly developed among consumers living in low-tier cities, with a "no wallet" era quietly initiated. Online payment brings shopping users convenience and minimizes the inconvenience of merchants in reducing operating costs and managing cash, greatly promoting the use of offline payment Apps. According to the survey, 50.3% of netizens pay bills through mobile payment when shopping at a physical store. Offline payment Apps have strong development potential, with the utilization ratio in rural areas, fourth-tier cities and fifth-tier cities respectively registering 31.7%, 43.5% and 38.0%.

V. The Development of Online Entertainment Applications

5.1 Online games

Up to December 2016, China had 417 million online game players who accounted for 57.0% of all netizens and represented an increase of 25.56 million from 2015. In particular, the number of mobile online game users reached 352 million, an increase of 72.39 million from the end of 2015, accounting for 50.6% of mobile Internet users.

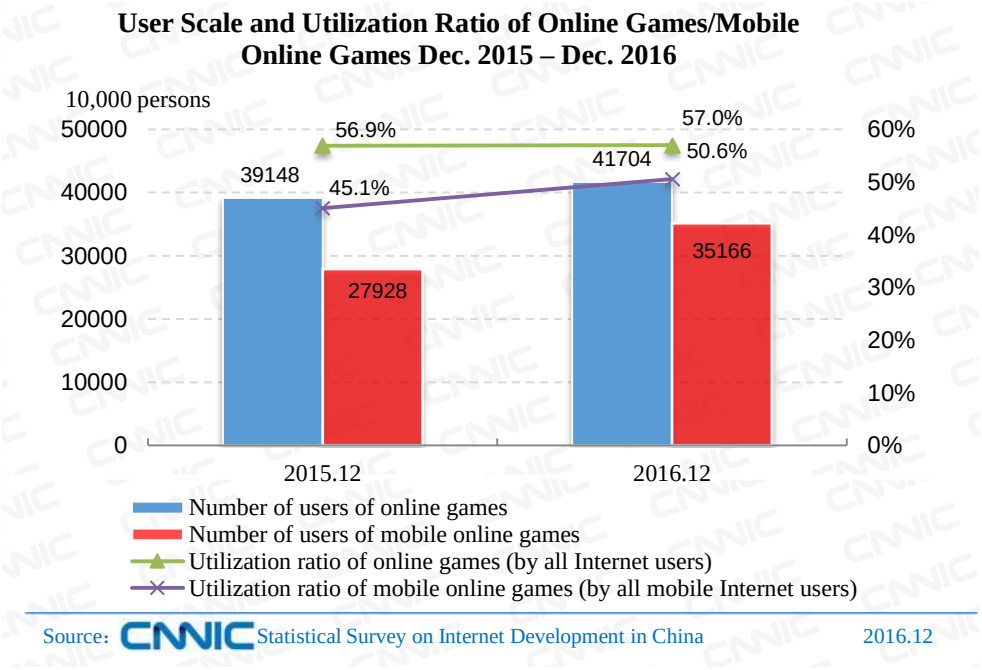


Figure 61 User Scale and Utilization Ratio of Online Games/Mobile Online Games Dec. 2015 – Dec. 2016

In 2016, the online game industry as a whole maintained a steady growth. As a core growth

area, mobile games saw a growth in the user scale and utilization ratio, whose revenue exceeds that from PC client games. But, as regulators tight up their supervision, small to medium-sized game makers face a growing survival pressure and more industrial oligarchs appear.

The revenue of PC client-end games has almost drawn to stagnation. Through many years of development, large game makers has dominated the market and focused on developing mobile games, with an increasingly smaller growth potential left for PC games. According to some public financial statements, most online game makers in 2016 saw that their revenue from mobile games exceeded that from PC games, with the growth rate of the latter being far lower than that of the former. In addition, as the number of games independently developed by game makers declines year by year, the revenue from overseas agent PC games takes up a growing proportion of the domestic total.

Mobile games become the revenue pillar of the online game industry, and related policies advance its sound development. But the Matthew Effect is being highlighted. The *Notice on the Administration of Mobile Game Publishing Services* was put into force in July 2016, which lays a solid foundation for solving the long-term problem of poor-quality and pirate games haunting the industry. Meanwhile, the regulations set forth higher requirements for registered capital and related qualifications of game publishers, objectively raising the threshold of the industry. As the sluggish domestic capital market is accompanied by the disappeared flow dividend, increased marketing costs and raised industrial threshold, small game makers will gradually lose competitiveness within the industry while large online game makers with strong capital reserve and R & D capabilities will gain more edges in the competition.

5.2 Online literature

Up to December 2016, the user scale of Internet literature was 333 million, accounting for 45.6% of the total netizen scale and representing an annual increment of 36.45 million. In particular, users of mobile Internet literature reached 304 million, constituting 43.7% of total mobile netizens and recording an annual increase of 44.69 million.

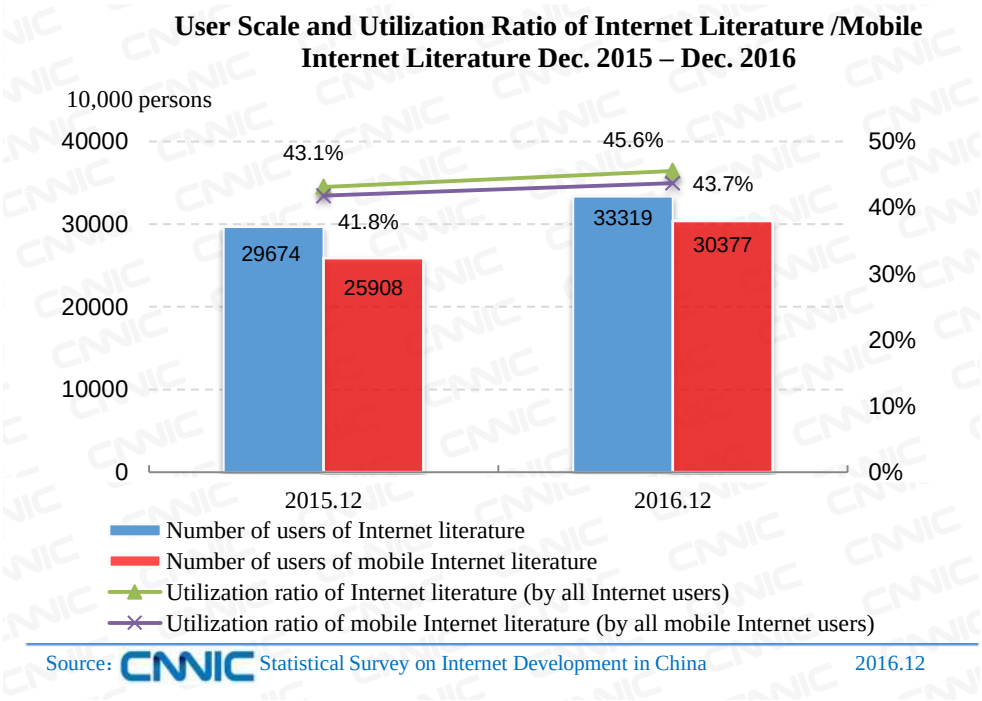


Figure 62 User Scale and Utilization Ratio of Internet Literature /Mobile Internet Literature Dec. 2015 – Dec. 2016

In 2016, the online literature industry embarked on the track of sound development, as shown in the following two aspects. First, the piracy of online literature hindering the industrial development in a long term was effectively cracked down on, significantly improving the copyright environment; second, the business model of online literature was transformed from one-time sale to sustained content development as a way to conduct more cross-border cooperation.

The piracy of online literature was fought by related departments in 2016, with the awareness of intellectual property protection inside the industry coming into being. In January, Yuewen Group established a “Copyright Alliance”, announcing that it has contained the illegal spreading of 40,000 copyrighted works, and filed 193 lawsuits of right protection and succeeded in them. In May, Baidu Tieba rectified the online literature infringement on a large scale, closing a large number of post bars relating to online literature works and deleting infringing content. In July, the “Sword Network 2016” campaign was jointly initiated by the Cyberspace Administration of China, the Ministry of Public Security and other related departments, which aimed at putting more efforts to combat piracy against online literature. The corresponding system of black and white lists was established.

The utilization model of online literature copyright is transformed from one-time sale to the sustained development of content as a way to maximize the copyright value of online literature. The formation of a large online literature group makes it possible to make the most of the copyright of online literature content. Originally, the business model of selling online literature copyright in one time gradually falls behind. The cross-border cooperation between online literature and other entertainment business inside the group expands revenue sources of online literature platforms, enabling these platforms to mine the economic value of copyright resources in the long run. Moreover, it can also attract authors to continue contributing works to online literature platforms, promoting the sound development of copyrighted content production.

5.3 Online video

As of December 2016 China's online video user scale and utilization ratio were respectively 545 million and 74.5%, up respectively by 40.64 million and 1.3 percentage points over the end of 2015. The annual growth rate of Chinese online video users was 8.1%. In particular, mobile video users numbered nearly 500 million, an increase of 94.79 million or 23.4% over the end of 2015, and the utilization ratio was 71.9%, up 6.5 percentage points. It is more popular for netizens to watch short videos through mainstream Apps such as Weibo and WeChat, thanks to the further improvement of 4G network and reduction of mobile phone service charges.

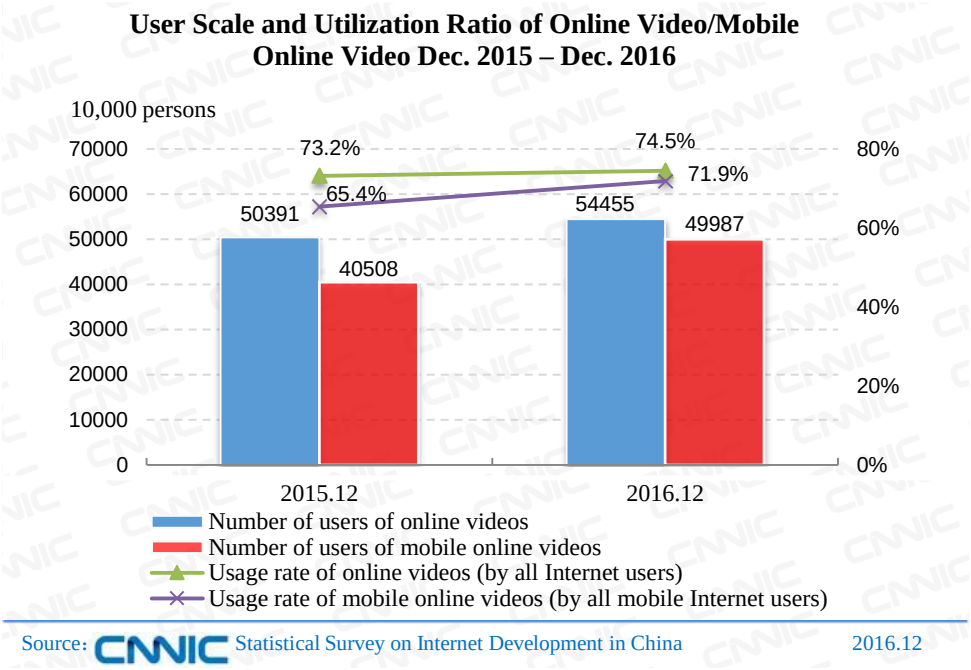


Figure 63 User Scale and Utilization Ratio of Online Video/Mobile Online Video Dec. 2015 – Dec. 2016

In 2016, under the supervision of related national departments, the online video industry as a whole developed in a sound and orderly manner, featuring the following three aspects.

First, in terms of video contents, major video websites took a strategic approach to self-produced drama and started to focus on producing quality contents of their own. From January 1 to November 30, 2016, a total of 16,938 episodes belonging to 4,430 online dramas put on record by video websites, showing an explosive growth compared with that in 2015[19], according to the online audio-video program recordation database of Network Division of the State Administration of Press, Publication, Radio, Film and Television (SARFT). In addition, self-produced online programs were made more artistic, enjoyable and professional. With the brand and quality-work awareness enhanced, some online dramas were listed among annually hit dramas.

Next, in terms of broadcasting modes, quality contents based on video websites will be first played on video platforms and change the audience and then be broadcast free of charge by the websites and platforms, with a new win-win mode for video websites and platforms coming into being. Video platforms have gradually developed their own video-playing systems. VIP members

[19] From January 1 to September 30, 2015, a total of 6,658 episodes belonging to 549 online dramas kept in the recordation database by the SARFT.

pay for "good videos" or for the priority to watch some videos earlier than other users, which not only shortens the period from content production to broadcast but also speeds up the recovery of investment made by production companies. Comments on the paid premiere programs improve the ratings of TV series and the follow-up broadcasting by platforms and websites can draw more attention to the series. That means a platform or website can complement other platforms or websites in the user coverage and help them attract more audience.

Last, in terms of business mode, the revenue from VIP members show a strong growth momentum, with an online video ecosphere gradually taking shape. For one thing, the online video industry sees weak growth in revenue from ads while it has strong potentials for value-added services such as members' payment. Large video websites make efforts to expand membership services among netizens by creating new modes for arranging hit dramas and effectively developing the contents for VIP member; for another, with online video as its core, the video ecosphere featuring live streaming, online shopping mall, games, literature, social networking and movie ticket sales is coming into being, providing one-stop experience and services for consumers and prompting upstream and downstream industries of the entire digital entertainment market to thrive.

5.4 Online music

Up to December 2016, the number of online music listeners reached 503 million, an increase of 1.76 million over the end of 2015, accounting for 68.8% of all Internet users. In particular, the number of mobile music listeners reached 468 million, an annual increase of 51.52 million, accounting for 67.3% of mobile Internet users.

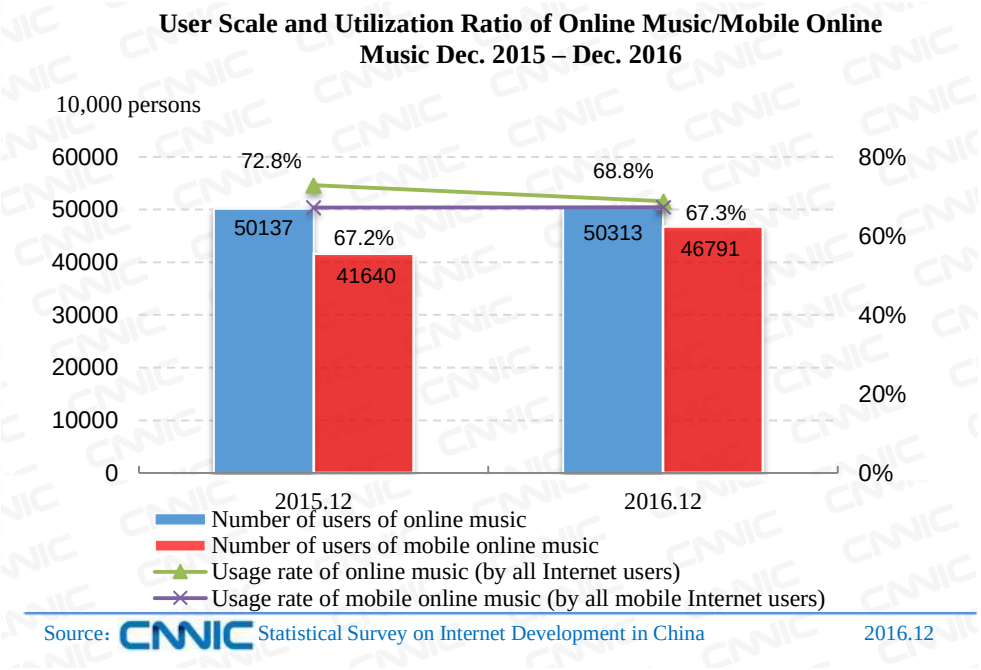


Figure 64 User Scale and Utilization Ratio of Online Music/Mobile Online Music Dec. 2015 – Dec. 2016

The online music market integration was basically completed in 2016. Online music users are shifting from PC end to mobile end, but the user scale as a whole sees no obvious growth. Meanwhile, benefiting from the enhancement of the industrial copyright awareness and improvement of users' willingness to pay, the revenue of online music enters a high-speed growth period.

Through consecutive acquisitions dating back to 2015, a four-way race has taken shape, where Tencent, Alibaba, Baidu and Netease Cloud Music have competed with each other. Exteriorly, these four online music groups consolidate copyright resources, which create profits and improve user experience while forming a sound mode for copyright transfer. Interiorly, the co-movement of online music and other online entertainment services such as online game and video is gradually smoother. With IP as its core, the approach of maximizing the value of fans through multiple services has grown more mature.

The domestic online music has broad prospects for its revenue, lying in the following three reasons. First, favorable policies drive the sound development of the industry. At the end of 2015, *the Opinions on Promoting the Development of the Music Industry in China* was released, reiterating that "we must crack down upon the infringement of spreading music works without authorization". As the market gives higher priority to copyright, the cooperation cases of

obtaining online music copyright through investment, acquisition of copyright owner or direct purchase are on the rise. Next, users' affordability is greatly enhanced. As the business model of online music groups utilizing exclusive copyright resources to attract users to pay is growing mature, an increasing number of users start to approve the payment mode of online music. Last, online platforms conduct cooperation with Internet operators to provide multiple value-added services for users, expanding revenue modes of online music.

5.5 Live broadcasting

Live streaming services[20], driven by capital, achieved sustained development in 2016. Up to December 2016, China had 344 million live streaming users who accounted for 47.1% of all netizens and represented a half-year increase of 19.32 million from June 2016. Specifically, live game broadcasting enjoys the biggest rise in the users' utilization ratio, increasing by 3.5 percentage points in half a year while the utilization ratio of live concert streaming, live sport broadcasting and host live show maintaining relative stability.

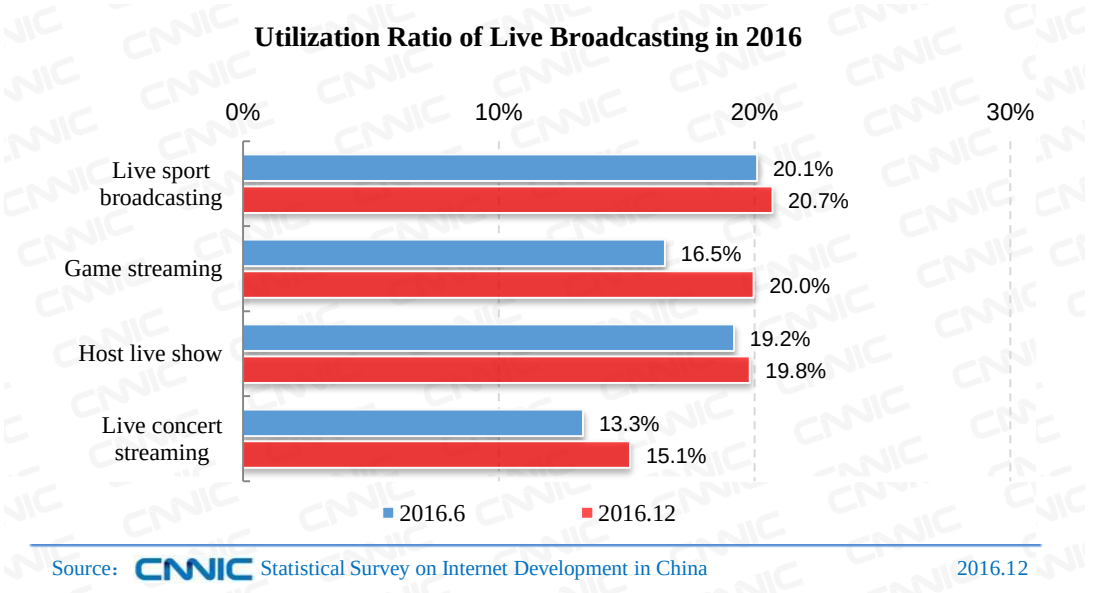


Figure 65 Utilization Ratio of Live Broadcasting in 2016

In 2016, the industrial disorder arising from the high-speed development was effectively combated under tighter supervision over the content of live game streaming and host live show, as well as related policies and crackdown operations. In April 2016, the Ministry of Culture

[20]Live streaming services surveyed for this report include live sport broadcasting, host live show, live game streaming, and live concert streaming.

launched a campaign against violations of China's large live streaming platforms, requiring real-name authentication of online hosts and recordation of content; in July, 26 online performance platforms affiliated to the 23 first-batch Internet culture business entities were investigated, with more than 4,000 show rooms offering illicit content shut down. Afterward, the *Notice on Issues concerning Strengthening Administration on the Live-Streaming Service of Online Audio-Visual Programs* and *Provisions on the Administration of Internet Live-Streaming Services* were put into force as a way to lay a solid policy foundation for the further sound development of the industry.

Despite increasingly stricter supervision, online live streaming shows huge profits. As such, investors feel optimistic about its developments. According to some public financial statements, online live streaming services became the principal revenue source of Momo and YY shortly after going online, and maintained fast-pace growth in the first three quarters of 2016. This is the reason why Mobile QQ, Weibo, Letv, Shanda and PPTV launched or invested in online live streaming services. In addition, Douyu and Huajiao, two online live streaming platforms taking shape, received large amounts of financing in 2016. The increasing influx of capital will intensify the competition in the online live streaming field in the future.

VI. The Development of Public Service Applications

6.1 Online education

Up to December 2016, China had 138 million online education users, an increase of 27.50 million or 25.0% over the end of 2015, and the utilization rate stayed basically stable at 18.8%, up by 2.7 percentage points over the end of 2015. In particular, mobile education users numbered 97.98 million, an annual increase of 44.95 million or 84.8%, and the utilization ratio was 14.1%, up 5.5 percentage points from the end of 2015.

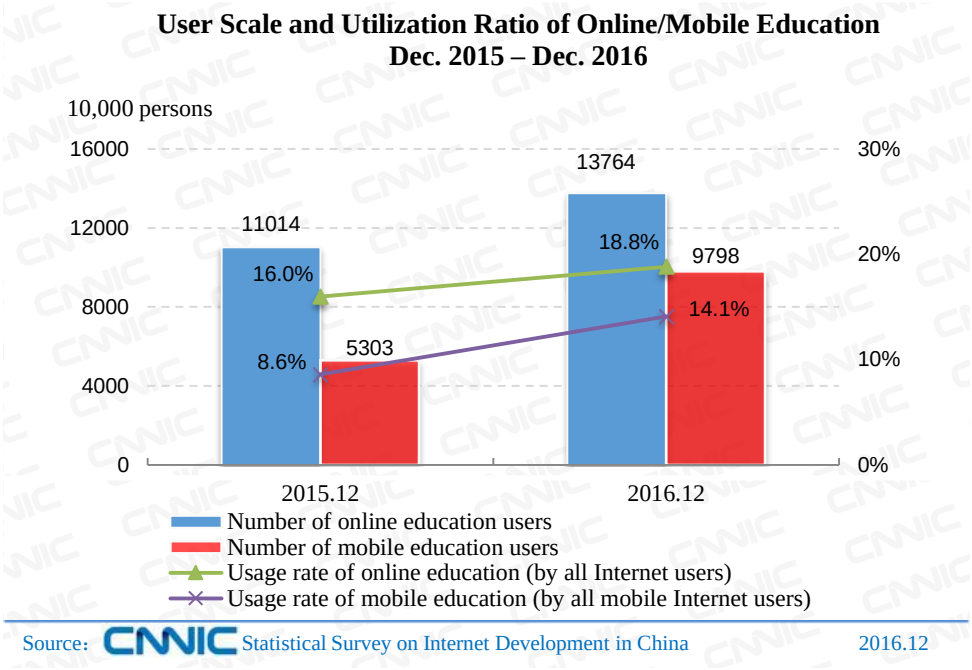


Figure 66 User Scale and Utilization Ratio of Online/Mobile Education Dec. 2015 – Dec. 2016

Key segmented fields of China's online education developed to various extents. First, the online education market of primary and middle schools saw fast growth in 2016. In all these categories, the primary and middle school education (also called K12 education) had the highest utilization ratio of 53.4%, up by 15.7 percentage points from the end of 2015. It had 73.45 million users, with an annual growth rate of 76.9%. Improved Internet facilities in primary and middle schools underpin high-definition live courses and other online teaching means, and young teachers familiar with the Internet are specialized in promoting online education products. The online education market of primary and middle schools focuses on offline training, and is supplemented with online test library, homework and course review. The online-offline integration can achieve better training effects. Parents, as decision-makers of training courses, have strong willingness and affordability to pay for quality education services. Second, online professional education[21] is in huge demands in China. It has 47.31 million users, with a utilization ratio of 34.4%. As China's economy is being transformed, the structural imbalance of talents is increasingly severe, and the number and structure of high-level technical talents cannot meet market demands, the online professional education is still a blue ocean to be developed. In addition, the proportions of netizens participating in online language training and online

[21] In the 37th survey conducted in December 2015, in terms of professional education, the proportions of netizens attending professional exam and vocational & skill trainings are investigated respectively. But the questions are different from those in this survey, so the data cannot be compared.

undergraduate and postgraduate education reached 28.6% and 17.2% respectively.

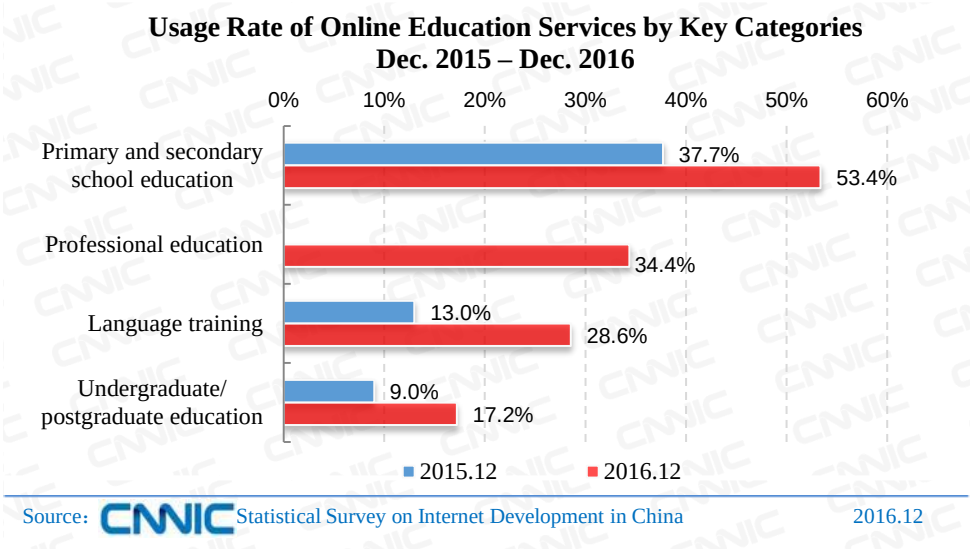


Figure 67 Usage Rate of Online Education Services by Key Categories Dec. 2015 – Dec. 2016

6.2 Online medical services

Up to December 2016, China had 195 million users of online medical services who accounted for 26.6% of all netizens, with an annual increase of 28.0%. Specifically, medical information query and online hospital registration booking have high utilization ratios, 10.8% and 10.4% respectively. The utilization ratios of online medical consultation, online-purchased drugs/medical devices/healthcare products and sports fitness management all register about 6%.

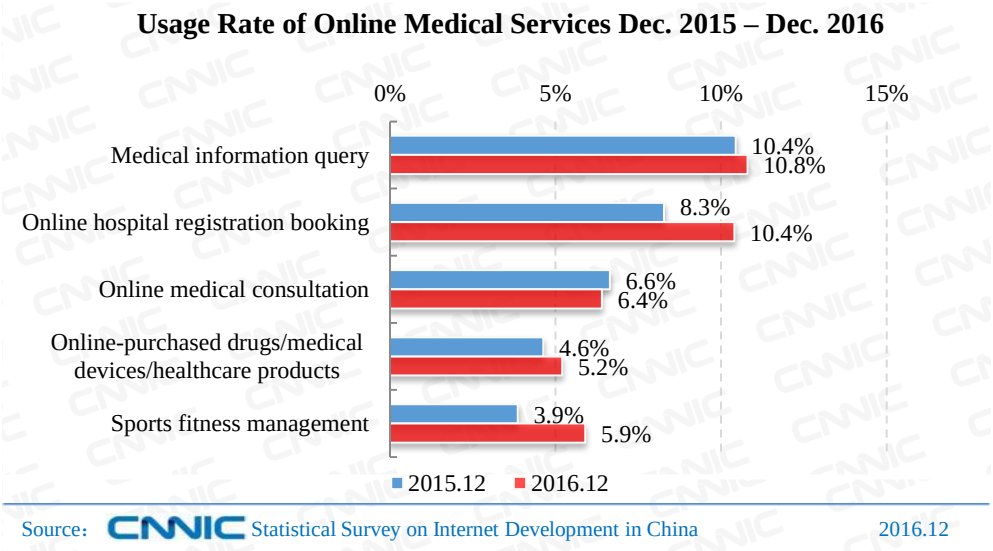


Figure 68 Usage Rate of Online Medical Services Dec. 2015 – Dec. 2016

In terms of online hospital registration booking, hospital registration booking platform and commercial registration booking platform keep improving to boost the market development, with the utilization ratio of online hospital registration booking increased from 8.3% to 10.4%. In terms of online medical consultation, several Internet platforms with certain scale have formed and started to expand business into offline medical services after owning financial strength. For example, Chunyu Doctor, Dingxiangyuan, Pingan Doctor, Xingren Doctor and other online medical consultation platforms have opened offline medical services.

As online drug retail services are kept under strict supervision, the O2O model is becoming the development trend of medical e-commerce. Since August 1, 2016, the pilot online drug retail via third-party Internet platforms has been brought to a halt. Strict supervision policies over drug retail will facilitate offline drugstores in building online self-operating channels and medical e-commerce platforms in transition to O2O model. Therefore, accountabilities of platforms and physical drugstores will be clarified, drug safety will be ensured and supervision costs will be cut.

In addition, online medical services have accumulated enormous data and the field of medical big data is faced with both opportunities and challenges. In 2016, *Opinions of the General Office of the State Council on Promoting and Regulating the Development of Healthcare Big Data Application* was released to provide the policy environment for the development of medical big data. The capital market driven by the policy has given high priority to those enterprises engaged in medical information and medical data services, including Shanghai Kyee Technology Co., Ltd. and Sipai (Beijing) Network Technology Co., Ltd., whose financing scales exceed RMB 10 million. Still, the field of medical big data is confronted with many challenges such as inconsistent standards and complicated data structure.

6.3 Online taxi/car booking

Up to December 2016, China had 225 million users of online taxi booking service who increased by 66.13 million or 41.7% over the first half of 2016 and accounted for 30.7% of all netizens, up by 8.4 percentage points from the middle of 2016; it had also 168 million users of online car booking services[22] who increased by 46.16 million or 37.9% over the first half of 2016

[22] Online car booking services include private car booking and carpooling services.

and accounted for 23.0% of all netizens, up by 5.8 percentage points over the first half of 2016.

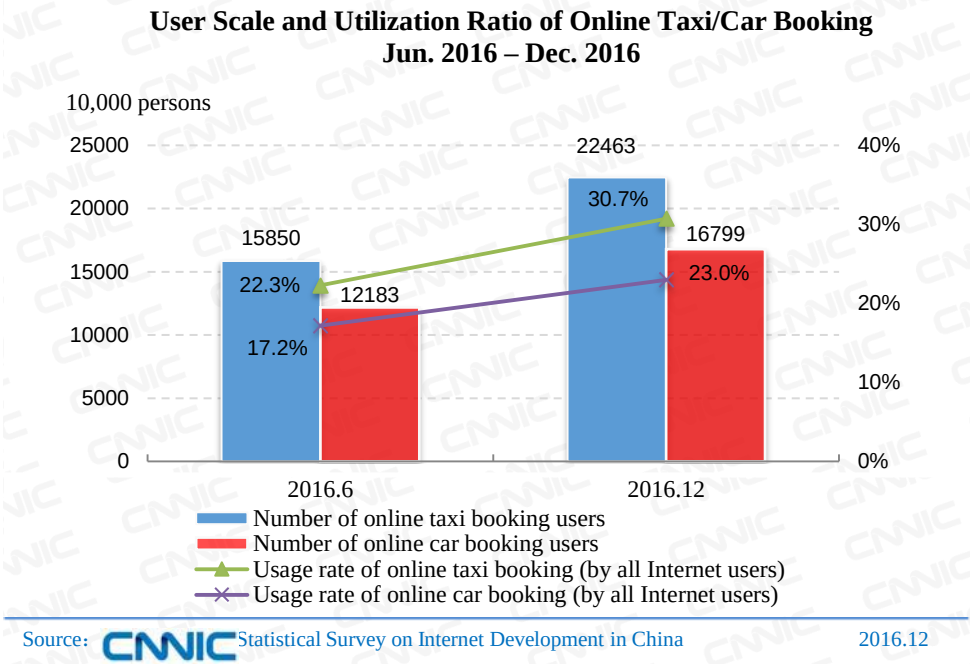


Figure 69 User Scale and Utilization Ratio of Online Taxi/Car Booking Jun. 2016 – Dec. 2016

Online car-hailing service is a typical service of sharing economy, playing an important role in efficiently using vehicle resources to meet travel needs of users. Online car-hailing market was gradually stabilized in 2016.

Related measures on the management of online car-hailing services have been introduced to standardize the market. In July 2016, the *Guiding Opinions on Deepening the Reform to Promote the Healthy Development of the Taxi Industry* was released to promote the reform of the taxi industry and establish a diversified service system in which cruising taxis and bookable taxis coexists. Guided by the policy, the scale of online taxi-hailing users grew by 41.7% in the second half of 2016. The *Interim Measures for the Administration of Online Taxi Booking Business and Services* came into force on November 1, 2016. From the perspective of national laws and regulations, it has legalized the status of online car-hailing, incorporated online car-hailing into the taxi system, and imposed strict access conditions on drivers and vehicles. It has also set higher requirements for online car-hailing platforms to protect the private information of passengers and ensure the safe operation of online car-hailing services.

Online car-hailing service platforms have worked to explore new profitable directions as a way to underpin their transformation. In 2016, Didi was committed to promoting its overseas car rental business and made strategic investment in the field of shared bike. In addition, it launched

the minibus business and focused on short-distance carpooling services. Currently, Didi covers nine business systems including taxi, private car booking, carpooling, substitute driving, test driving, bus, etc. CAR Inc. developed automobile finance and automobile e-commerce and launched one-stop automobile finance service platform in the second half of 2016. It provides its clients with automobile consumer credit including second-hand car finance and car mortgage loan, and raises funds to develop its automobile e-commerce platform.

6.4 Online philanthropy

Up to December 2016, 32.5% of China's netizens have practiced online philanthropy, registering 238 million. Specifically, poverty alleviation was the most practiced online philanthropy, accounting for 16.8%, and disease assistance was the second most, 16.0%.

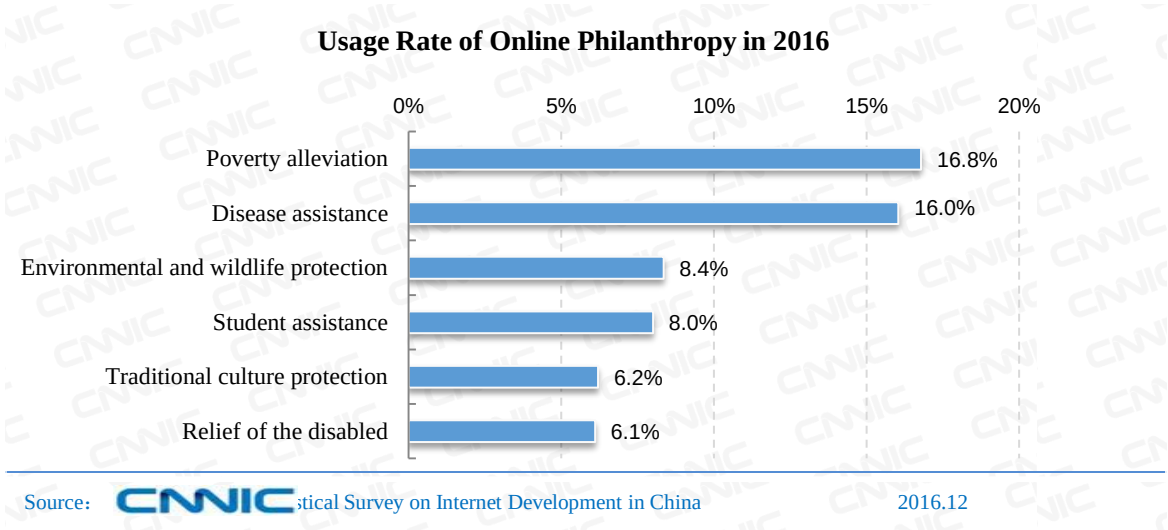


Figure 70 Usage Rate of Online Philanthropy in 2016

Since 2016, the rapid development of the Internet has radically changed related industries. Through innovation, China's public charity has prompted more people to participate in poverty alleviation, disease assistance and relief of the disabled by utilizing online charity platforms. New Internet-based models for public welfare include donation, crowdfunding and social network fundraising, making charitable donations more transparent, convenient and diversified.

The new operating model of the "Internet +" charity is shown in the following three features:

First, it promotes the gradual development of a social atmosphere, where "everyone supports charity". The new model of online philanthropy not only enables the public to make charitable

donations by improving the convenience of the public attending public welfare, but also makes public welfare projects which need to be funded more diversified. These projects include traditional ones covering poverty alleviation, medical care and education, and new ones covering environmental protection, culture, art and agriculture, allowing the public to have more donation choices and attracting different groups to take part in charitable donations. Moreover, the new model of online philanthropy can receive small donations, which lower the threshold of public donations and effectively promote the public welfare.

Second, it boosts the spreading of public welfare philosophy and the development of public welfare culture. From the "Free Lunch" to the "Ice Bucket Challenge" fundraising, a range of successful public welfare activities utilizing new fundraising model show the advantage of mobile Internet in communication, which timely delivers charitable information to netizens, subtly raises netizens' awareness of philanthropy and promotes the development of social charity culture.

Third, it makes charitable organizations more efficient, transparent and sustainable. The new mode of charitable fundraising featuring the "Internet +" presents higher requirements for project quality and information disclosure, requiring the fundraising party to explain details of public welfare projects including purposes, significance, goals, budget, management, etc. This prompts the public welfare industry to work hard to improve its capabilities in project development and information release.

Government Application

Chapter X The Overview of Government Application

On February 19, 2016, Chinese President Xi Jinping emphasized, “We must adapt ourselves to the trend of differentiated and audience-oriented communication to speed up the establishment of a new pattern of public opinion guidance. We must promote the integration of new and traditional media by taking the initiative to make full use of new media’s edge” at a CPC news and public opinions symposium. Therefore, making good use of new technologies and platforms is essential for disseminating government information of Party and government organs at all levels. Currently, e-government platforms include government websites with the suffix “.gov.cn”, government Apps, Weibos and WeChat official accounts, and Zhengwutoutiao, which serve as important platforms for Party and government organs to publish authoritative information and respond to public concerns. Up to December 2016, 239 million people or 32.7% of all netizens received e-government services. There are 53,546 domain names with the suffix “.gov.cn”, 164,522 government Weibos, and 34,083 Zhengwutoutiaos.

The concept of “WeChat, Weibo and news Apps” was presented for the first time by the Cyberspace Administration of China at the experience sharing meeting on the development of new e-government media in February 2015. In August 2016, the General Office of the State Council issued the *Notice on Effective Response to Public Opinions in Open Government Work*, requiring that all local departments should adapt to the trend of audience-oriented communication, further improve the proportion of departments owning their “WeChat, Weibo and news Apps”, make full use of new media featuring exchanges on an equal footing, interaction and communication and of the interaction function of government websites, and improve the access rate of response information. Therefore, this section will reflect the development of mobile e-government Apps in 2016 by integrating the data from the statistical survey on netizens with the data from information clients, government Weibos and other enterprise platforms.

I. The Overview of E-government Services

(I) The User Scale and Utilization of E-government Services

Up to December 2016, 239 million people or 32.7% of all netizens received e-government services. Specifically, the utilization ratio of e-government services based on Alipay or WeChat urban service platform was 17.2%, which became the most popular way of using e-government services; the utilization ratio of government WeChat official accounts was 15.7%; and those of government websites, government Weibos and Apps were respectively 13.0%, 6.0% and 4.3%.

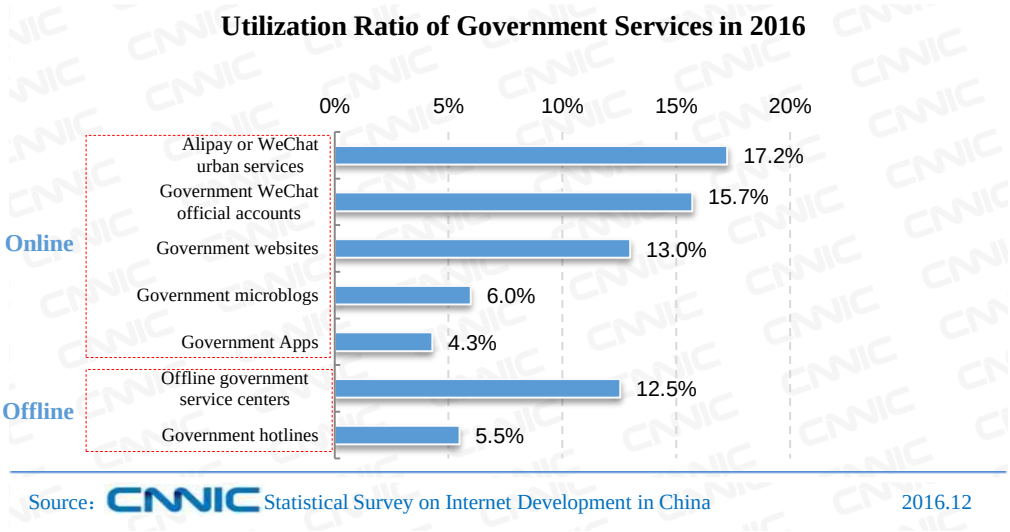


Figure 71 Utilization Ratio of Government Services in 2016

In 2016, the utilization ratio of China's e-government services exceeded those of offline government service centers and government hotlines. For one thing, mobile e-government service platforms grew rapidly, governments set up interfaces in Alipay and WeChat Apps to improve their service content, and verified Weibo accounts of governments and Zhengwutoutiao services were respectively based on weibo.com and Top News Apps, all of which expedited the service layout of e-government; for another, the service content were categorized to cover all aspects of users' life, including car owner services, government services, medical care, travels, recharge and payment. Meanwhile, information platforms kept enriching their content and Weibos, official accounts and Zhengwutoutiaos, which developed rapidly in various fields, such as weather, industry and commerce, justice, public security, etc.

(II) E-government Service Satisfaction

As of December 2016, 48.5% of users were very satisfied with or fairly satisfied with e-government services, showing China's achievements in e-government services in 2016.

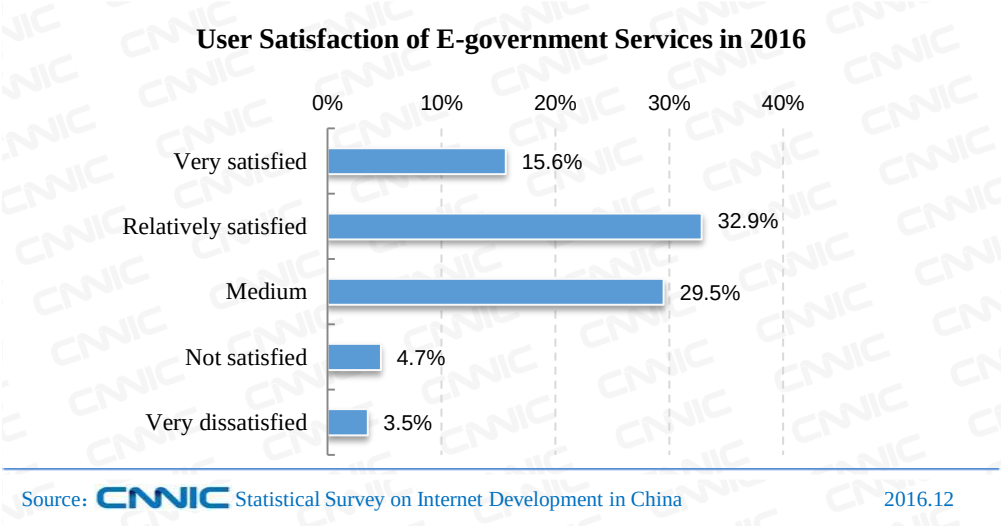


Figure 72 User Satisfaction of E-government Services in 2016

As an increasing number of e-government services go online and the public's expectations for convenient, low-cost and efficient public services keep growing, the importance of government in technical capacity and service quality is more prominent. Therefore, e-government service platforms need to raise their service awareness, take a targeted approach to identify public demands and deepen the cooperation between governments and NGOs as a way to improve the service level and user satisfaction.

(III) The Overall Distribution and Distribution by Province of Domain Names with the Suffix ".gov.cn"

As of December 2016, China had 53,546 domain names with the suffix ".gov.cn" covering 31 Chinese provinces, autonomous regions and municipalities directly under the central government.

Table 9 The Distribution by Province of Domain Names with the Suffix ".gov.cn" in Mainland China in 2016

Province	Number	Proportion	Ranking
Shandong	4,341	8.1%	1
Jiangsu	3,910	7.3%	2
Sichuan	3,760	7.0%	3

Province	Number	Proportion	Ranking
Zhejiang	3,714	6.9%	4
Guangdong	3,120	5.8%	5
Anhui	2,583	4.8%	6
Henan	2,545	4.8%	7
Hubei	2,395	4.5%	8
Beijing	2,201	4.1%	9
Hebei	2,063	3.9%	10
Fujian	1,881	3.5%	11
Shaanxi	1,870	3.5%	12
Hunan	1,542	2.9%	13
Guizhou	1,535	2.9%	14
Inner Mongolia	1,528	2.9%	15
Liaoning	1,386	2.6%	16
Jiangxi	1,295	2.4%	17
Shanxi	1,288	2.4%	18
Heilongjiang	1,253	2.3%	19
Yunnan	1,205	2.3%	20
Gansu	1,067	2.0%	21
Chongqing	1,028	1.9%	22
Guangxi	1,002	1.9%	23
Jilin	927	1.7%	24
Xinjiang	776	1.4%	25
Shanghai	628	1.2%	26
Qinghai	491	0.9%	27
Tianjin	414	0.8%	28
Ningxia	347	0.6%	29
Tibet	278	0.5%	30
Hainan	250	0.5%	31
Others	923	1.7%	-
Total	53,546	100.0%	-

II. Government Weibo

(I) The Overview of Government Weibo

Up to December 2016, the number of government Weibo verified by Sina had reached 164,522, representing a growth of 8.0% over the end of 2015 and including 125,098 Weibo for governmental institutions and 39,424 Weibo for civil servants.

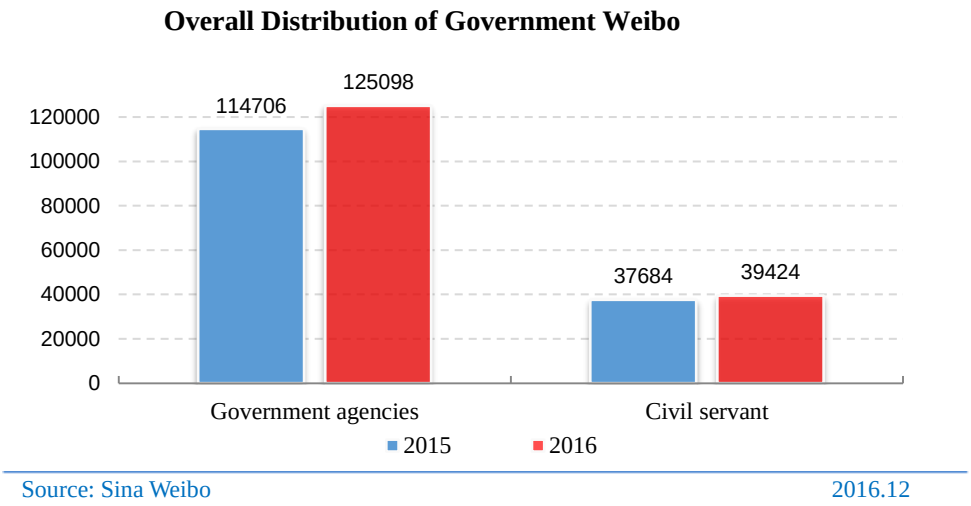
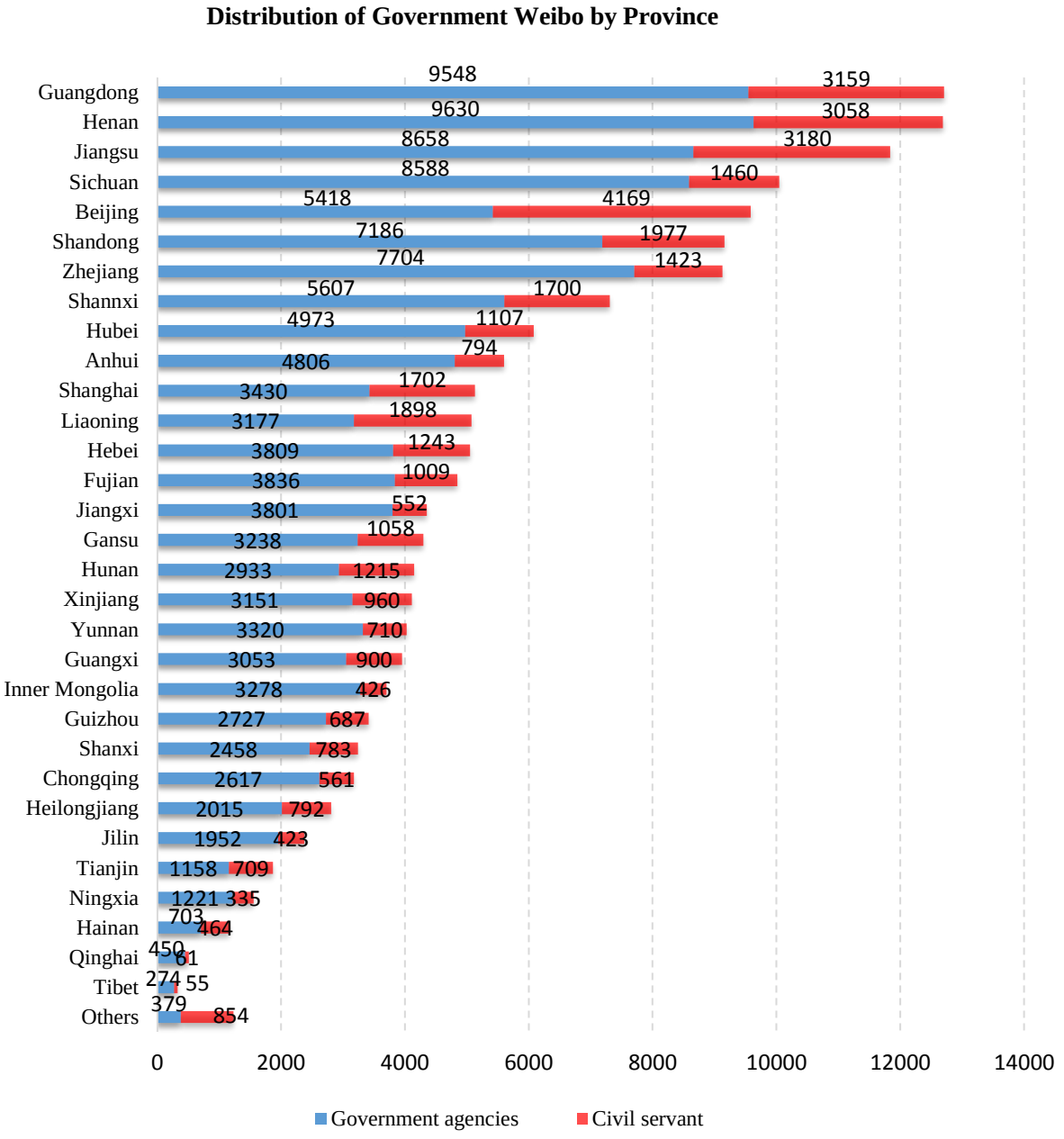


Figure 73 Overall Distribution of Government Weibo

(II) The Distribution of Government Weibo by Province

As of December 2016, 31 provinces, autonomous regions and municipalities directly under the central government in Mainland China launched government Weibo. Specifically, Guangdong Province had the most government Weibo nationwide, standing at 12,707; Henan Province had the most Weibo for governmental institutions in China, registering 9,630; and Beijing had the most verified Weibo for civil servants nationwide, totaling 4,169.



Source: Sina Weibo 2016.12

Figure 74 Distribution of Government Weibo by Province

(III) The Composition of Government Weibo

In 2016, government Weibo were launched, mainly covering such fields as government, public security, Youth League committee, transportation, justice, etc. Youth League committees had the most government Weibo, totaling 36,494. Governmental institutions were in the second place, having 36,089 Weibo. Governments at all level had the most Weibo for governmental institutions, standing at 33,269 while Youth League committees and public security had more

Weibo for civil servants, respectively registering 8,385 and 7,828.

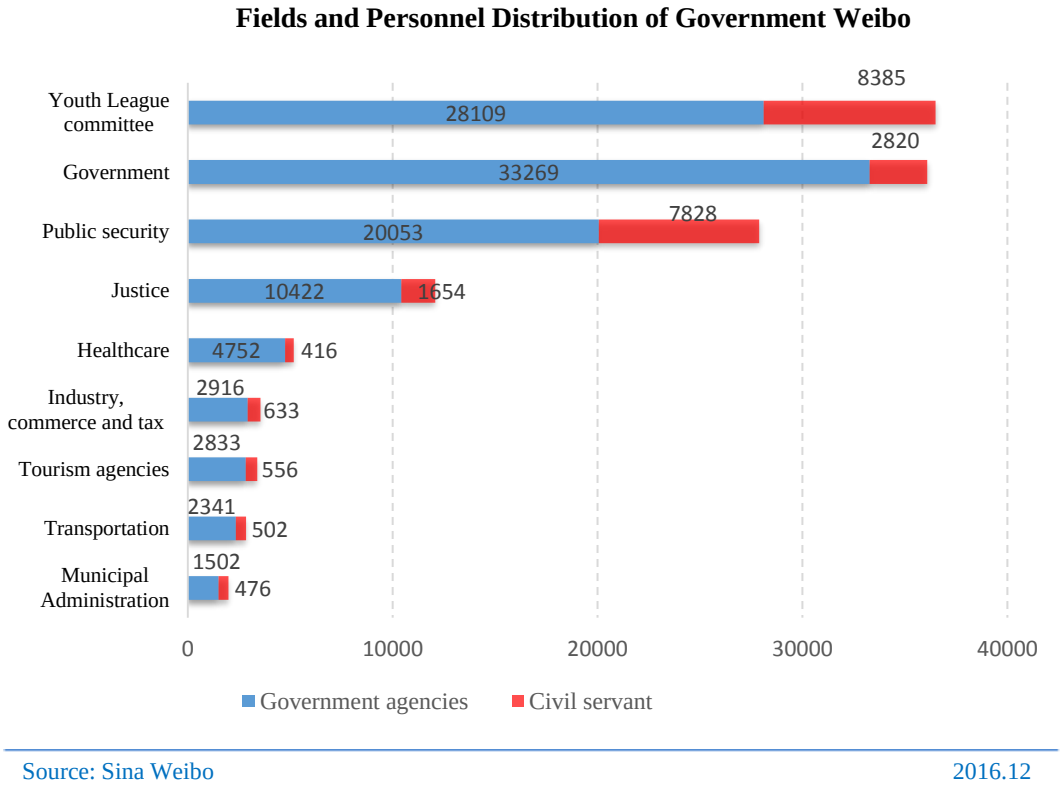


Figure 75 Fields and Personnel Distribution of Government Weibo

(IV) Operation of Government Weibo

Up to December 2016, the Central Committee of the Communist Youth League ranked first by the number of Weibo reposts totaling 8.48 million. Seen from fields, Weibo for governments, public security and justice enjoy the highest public attention. Among the top 20 government Weibo, there are 8 government agencies taking up the highest proportion and 5 public security organs enjoying the second highest proportion. By regions, the promotion of online government services was most vigorous in Beijing in 2016. Among the top 20 government Weibo, there are 8 in Beijing taking up the highest proportion, and 4 in Henan owning the second highest proportion.

Table 10 Top 20 Government Weibo by the Number of Repost Jan. 2016 – Dec. 2016

Ranking	Name of Weibo	Province	Field	Number of fans	Number of repost
1	the Central Committee of the Communist Youth League	Beijing	Youth League committee	4,517,723	8,481,513

Ranking	Name of Weibo	Province	Field	Number of fans	Number of repost
2	Henan Committee of the Communist Youth League	Henan	Youth League committee	965,377	4,528,125
3	Crime-fighting Office, Ministry of Public Security	Beijing	Public security	29,903,999	4,301,360
4	wenming.cn	Beijing	Government	286,551	3,557,348
5	The People's Procuratorate of Henan	Henan	Justice	754,548	3,123,158
6	Shanghai Railway Bureau	Shanghai	Transportation	1,708,572	2,505,123
7	Jiangning Online Public Security	Jiangsu	Public security	1,954,956	1,227,298
8	Gulou Information	Jiangsu	Government	5,233,540	1,172,224
9	Supreme People’s Procuratorate	Beijing	Justice	9,309,589	872,848
10	Shenzhen Traffic Police	Guangdong	Public security	1,626,231	828,038
11	The Standing Committee of Nanjing Municipal People's Congress	Jiangsu	Government	1,797,538	795,274
12	Supreme People’s Court	Beijing	Justice	15,182,902	747,703
13	Clean Zhengzhou	Henan	Government	1,770,900	693,537
14	Safe Beijing	Beijing	Public security	11,945,870	687,509
15	China Quick Reporting Network for Earthquake	Beijing	Government	5,572,206	658,132
16	Shandong Provincial Supreme People's Court	Shandong	Justice	1,611,759	646,742
17	Children missing information release platform of Ministry of Public Security	Beijing	Public security	440,873	619,882
18	Chengdu Release	Sichuan	Government	6,292,304	619,308
19	Longnan Release	Gansu	Government	151,298	615,085
20	Clean Central China	Henan	Government	2,928,526	614,169

Source: Sina Weibo

III. Zhengwutoutiao

(I) The Overview of Zhengwutoutiao[23]

As of December 2016, the number of Zhengwutoutiao launched by the Party and government organs at all levels reached 34,083, representing an increase of 30,062 from the end of 2015. Zhengwutoutiao covered the systems of procuratorate, food and medicine supervision, public security and petition nationwide.

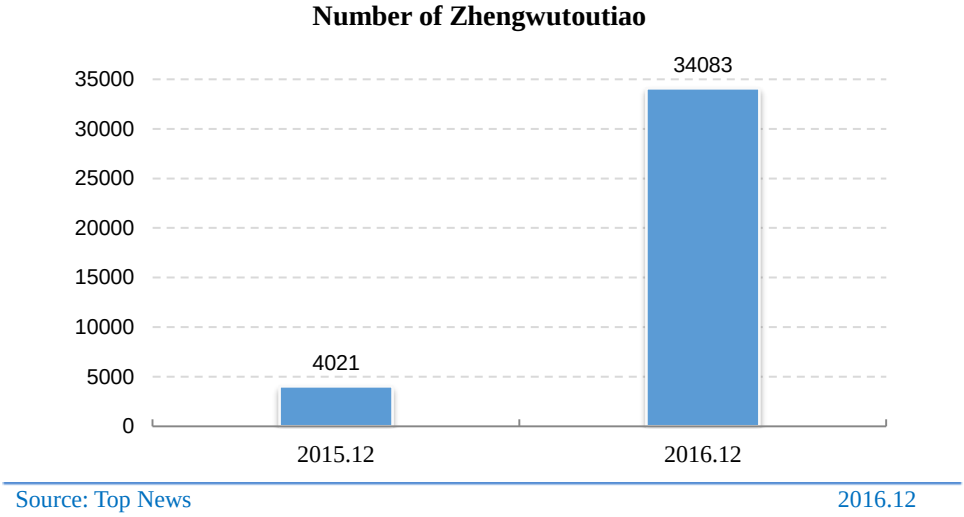


Figure 76 Number of Zhengwutoutiao

(II) Distribution and Times of Views of Zhengwutoutiao by Province

Up to December 2016, 31 provinces, autonomous regions and municipalities directly under the central government in Mainland China launched Zhengwutoutiao. Specifically, there are 16 provinces whose number of Zhengwutoutiao exceeds 1,000 and 7 provinces whose number of Zhengwutoutiao ranges from 500 to 1,000. Henan owned 5,345 Zhengwutoutiaos, ranking first in China.

[23] Zhengwutoutiao: a public information publishing platform for governmental departments which is based on the App Top News.

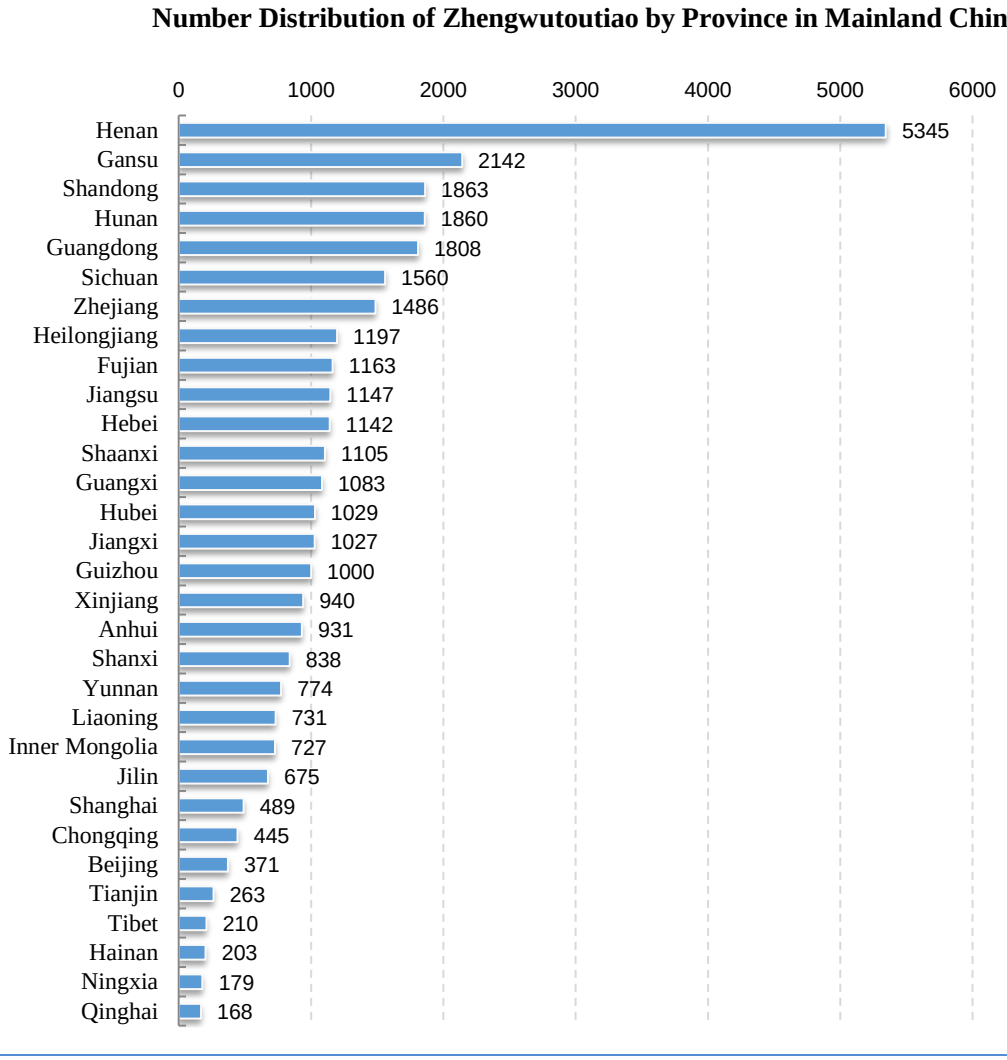


Figure 77 Number Distribution of Zhengwutoutiao by Province in Mainland China

In terms of times of views, Hebei had the most times of views in China, standing at 410 million. In addition, there are 16 provinces whose times of views in Zhengwutoutiao exceed 100 million.

Table 11 Top 10 Provinces, Autonomous Regions and Municipalities Directly under the Central Government by Times of Views Jan. 2016 – Dec. 2016

	Province	Number of Zhengwutoutiao	Number of articles	Times of views
1	Hebei	1,142	83,863	405,575,536
2	Shandong	1,863	170,478	380,209,813
3	Heilongjiang	1,197	102,864	319,069,738
4	Sichuan	1,560	114,615	295,405,539

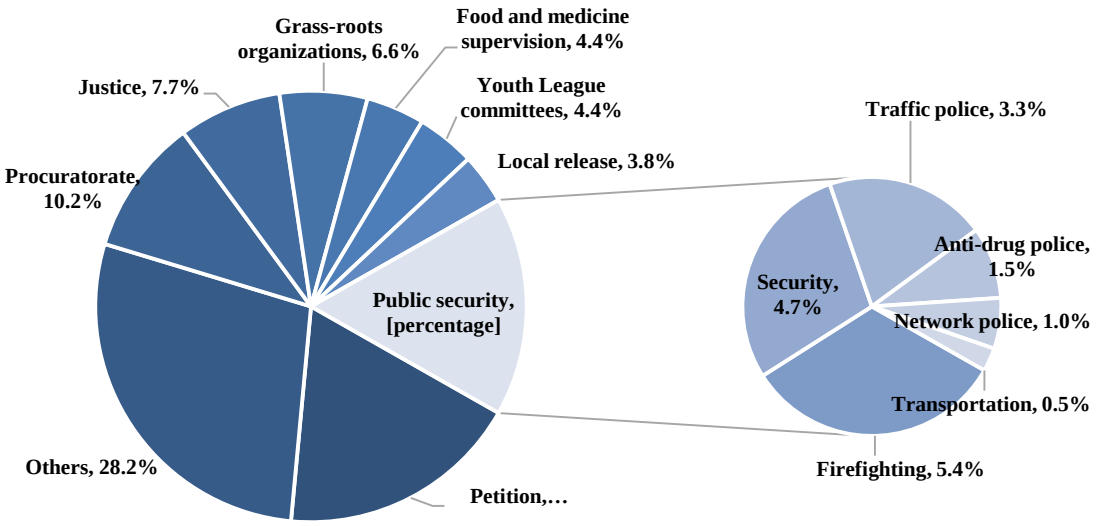
	Province	Number of Zhengwutoutiao	Number of articles	Times of views
5	Shaanxi	1,105	123,753	291,820,463
6	Jiangsu	1,147	90,353	290,697,877
7	Jiangxi	1,027	51,540	233,969,330
8	Guangdong	1,808	94,577	190,135,942
9	Guangxi	1,083	78,803	165,637,544
10	Zhejiang	1,486	103,646	155,311,518

Source: Top News

(III) Fields Covered by Zhengwutoutiao

As of December 2016, more than 100 vertical systems launched Zhengwutoutiao, covering petition, security, procuratorate, justice, grass-roots organizations, food and medicine supervision, Youth League committee, etc. Specifically, Zhengwutoutiaos for petition accounted for 18.3% of the total; in the second place, public security took up 16.4%, including firefighting, security, traffic police, anti-drug police, network police, transportation, etc.

Fields Covered by Zhengwutoutiao



Source: Top News 2016.12

Figure 78 Fields Covered by Zhengwutoutiao

In terms of number of Zhengwutoutiaos for all vertical systems, petition, public security and procuratorate intensify more efforts on e-government services; justice, food and medicine

supervision, and Youth League committee show great initiative; and other vertical systems still need improvement.

(IV) Operation of Zhengwutoutiao

Currently, 47 central state organs launched Zhengwutoutiaos including the Supreme People's Procuratorate, the Supreme People's Court, the Ministry of Public Security, the Ministry of Education and the Ministry of Commerce, etc. Specifically, the top three Zhengwutoutiaos by number of articles respectively belonged to China Meteorological Administration, the National Development and Reform Commission and the Supreme People's Procuratorate.

Table 12 Number of Articles Published by Zhengwutoutiaos for Central State Organs Jan. 2016 – Dec. 2016

Ranking	Name of Zhengwutoutiao	Institution	Time when put into use	Number of articles	Times of views
1	China Meteorological Administration	China Meteorological Administration	9/25/2014	9,999	33,091,403
2	The National Development and Reform Commission	The National Development and Reform Commission	7/22/2015	4,023	4,247,348
3	Supreme People's Procuratorate	Supreme People's Procuratorate	11/18/2014	3,843	22,369,723
4	Supreme People's Court	Supreme People's Court	12/2/2014	3,035	7,819,043
5	The National Tourism Administration	The National Tourism Administration	7/28/2015	2,560	1,542,290
6	gov.cn	The Office of Government Information Disclosure of the General Office of the State Council	3/4/2015	2,475	99,205,041
7	wenming.cn	The General Office, Central Commission for Guiding Cultural and Ethical Progress	6/12/2015	2,182	3,813,620
8	Healthy China	The National Health and Family Planning Commission	12/5/2014	2,042	7,636,537
9	Chinese Railway	China Railway Corporation	9/29/2015	1,752	3,202,495

10	The Voice of Women	All-China Women's Federation	10/10/2015	1,655	785,208

Source: Top News

Network Security

Chapter XI THE OVERVIEW OF Internet USER Security

I. Users' Perception of Internet Security and Cyber Security Incident Type

Throughout the year of 2016, China's basic networks have maintained stability on the whole, with all test indicators of backbone networks of the Internet being normal. However, as new business of mobile Internet rapidly develops, the Internet security environment is becoming increasingly complex. In terms of policies, laws related to netizens' Internet security have been gradually improved, with related policies launched. It is of significant importance to advance the national strategy of cyber development and safeguard national security. On November 7, 2016, the *Cybersecurity Law of the People's Republic of China* was adopted at the 24th Session of the Standing Committee of the Twelfth National People's Congress of the People's Republic of China. It is developed for the purposes of guaranteeing cybersecurity, safeguarding cyberspace sovereignty, national security and public interest, protecting the lawful rights and interests of citizens, corporation and other organizations, and promoting the sound development of economic and social informatization. On December 27, the *National Cyberspace Security Strategies* released by the Cyberspace Administration of China set a direction for China to carry out its cyber security work in the future.

(I) Users' Perception of Internet Security

The survey finds that more than 30% of netizens have confidence in the Internet security environment. 38.8% of netizens considered China's network environment safe or very safe, and 20.3% regarded it as unsafe or very unsafe.

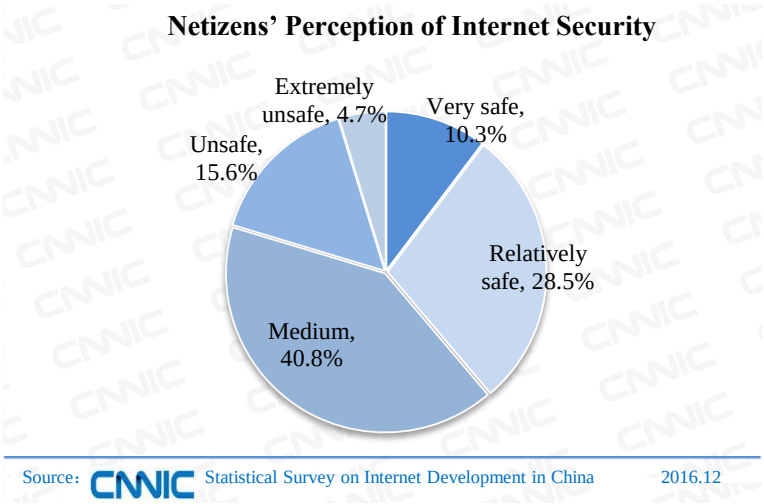


Figure 79 Netizens' Perception of Internet Security

(II) Types of Cyber Security Incidents Encountered by Internet Users

Cyber security incidents have taken a toll on most of netizens. According to related data, in 2016, 70.5% of netizens encountered cyber security incidents, of which online fraud is the principal problem. 39.1% of netizens ran into the fraud incidents.

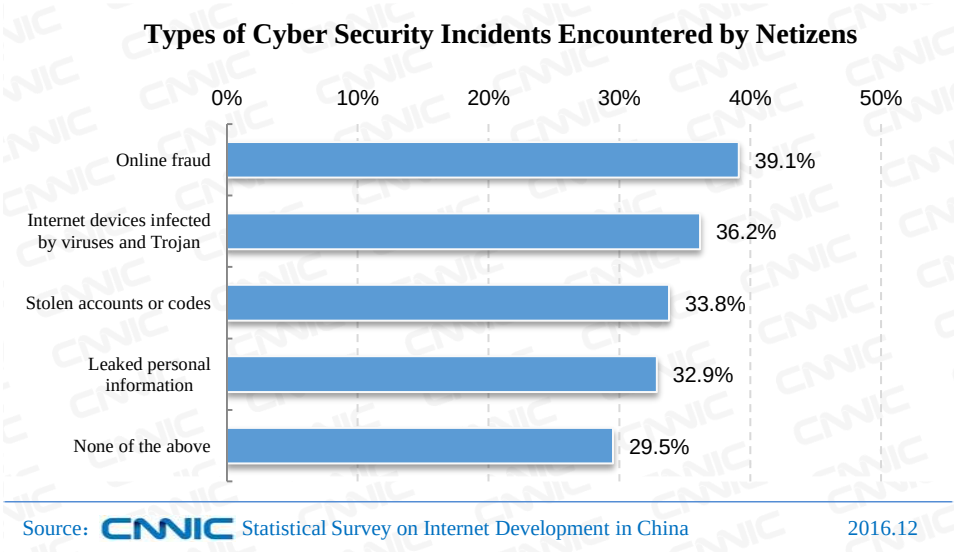


Figure 80 Types of Cyber Security Incidents Encountered by Netizens

According to the further investigation into netizens coming across online fraud in 2016, 75.1% of online fraud incidents belong to the most widespread online fraud type of bonus-winning information; 50.2% of the fraud incidents are based on the scenario of pretending to be a friend to cheat netizens through social networking software.

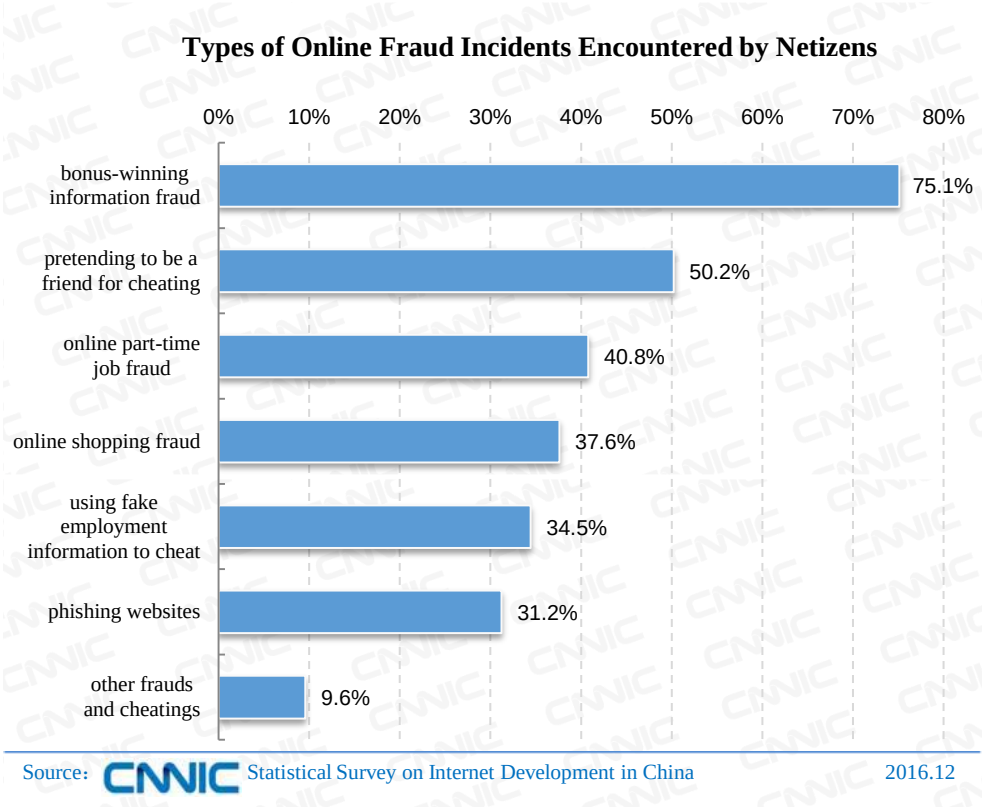


Figure 81 Types of Online Fraud Incidents Encountered by Netizens

II. The Malware Infection of PC and Mobile Phone

(I) Number of PCs Infected by Trojan Viruses

Up to December 2016, 247[24] million PCs were infected by various Trojan viruses, which was monitored by 360 Security Center. The monthly number of infected PCs ranged from 40 million to 55 million. According to the monitoring data by province, the top three provinces in the number of PCs infected by Trojan viruses were Guangdong, Zhejiang and Jiangsu.

[24] The data is processed through duplication eliminating.

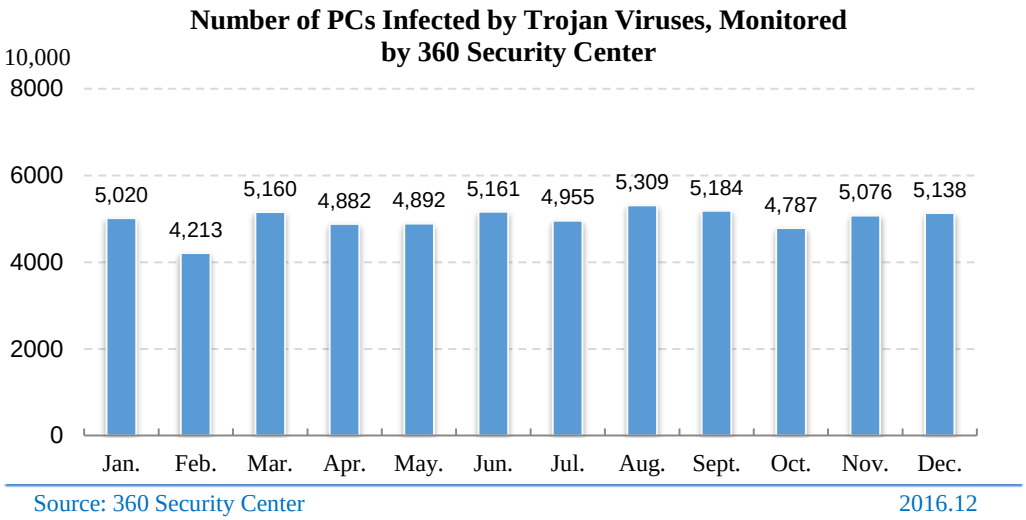


Figure 82 Number of PCs Infected by Trojan Viruses, Monitored by 360 Security Center

(II) The Number of Android Mobile Phones Infected by Malware

Up to December 2016, 108[25] million android mobile phones were infected by various malware, which was monitored by 360 Security Center. The number of infected devices reached 36.62 million and 27.87 million respectively in January and February, two higher figures. The number of infected devices was on the decline in the third and fourth quarters.

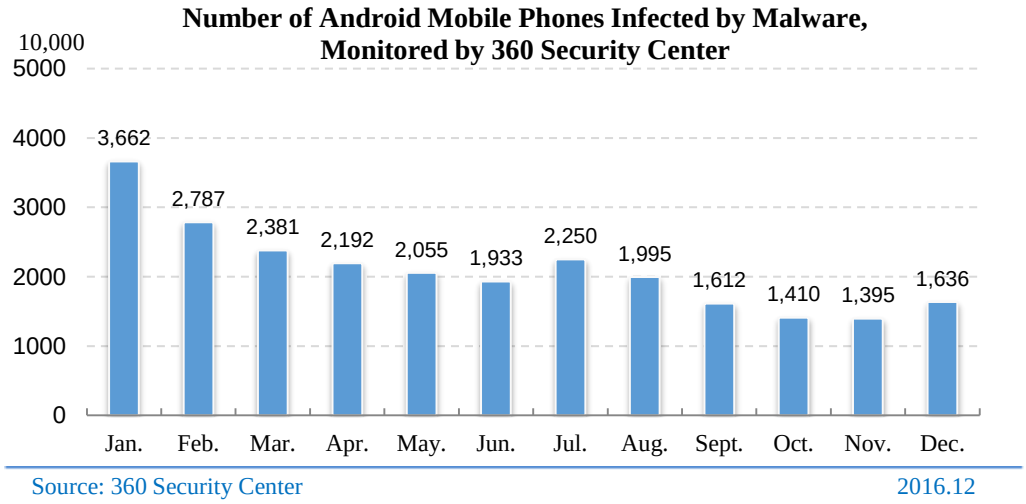


Figure 83 Number of Android Mobile Phones Infected by Malware, Monitored by 360 Security Center

[25] The data is processed through duplication eliminating.

III. The Number of Harassing Text Messages and Crank Calls Marked by Users

As of December 2016, 18.38 billion harassing and cheating text messages marked by android mobile phone users were monitored by 360 Security Center and Tencent Security, including 610 million cheating text messages.

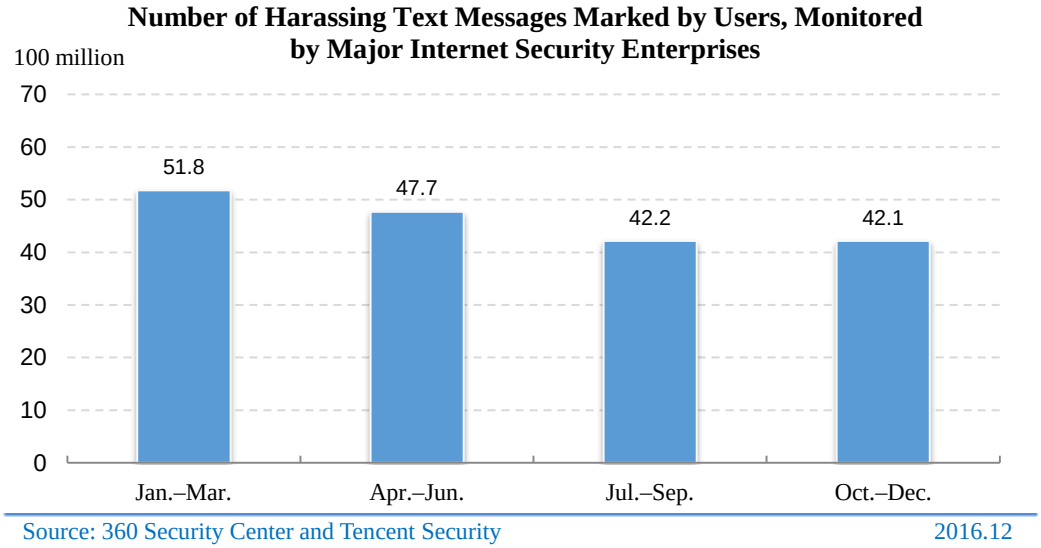


Figure 84 Number of Harassing Text Messages Marked by Users, Monitored by Major Internet Security Enterprises

Up to December 2016, 39.12 billion crank and cheating calls marked by android mobile phone users were monitored by 360 Security Center and Tencent Security, including 4.89 billion cheating calls.

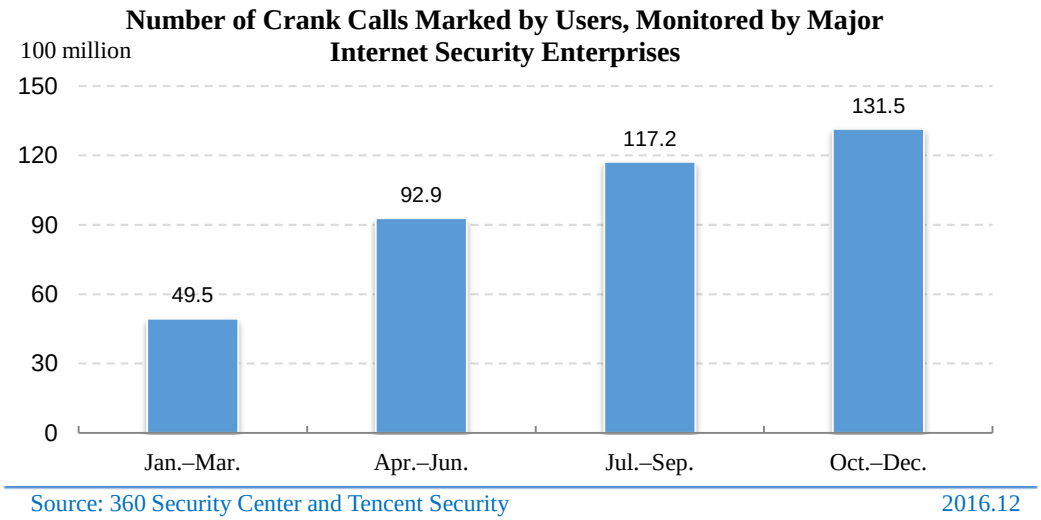


Figure 85 Number of Crank Calls Marked by Users, Monitored by Major Internet Security Enterprises

Appendix 1 Survey Methodology

I. Survey Methodology

(I) Survey on Individual Internet Users

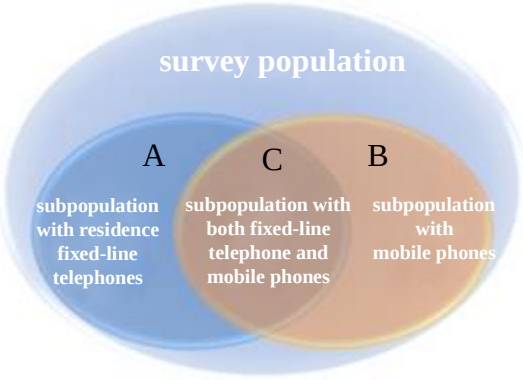
1.1 Survey Population

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

◇ Sample size

There were 60,000 survey samples in total covering 31 provinces, autonomous regions and municipalities directly under the central government in Mainland China.

◇ 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 are allocated for each district, city and prefecture (including the governed districts and counties) in accordance with the proportion of the people at the age of 6 or above in the local area covered by residence fixed-line telephones in the total population covered 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 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 for easier operability in the visit and implementation work, 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 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.

1.3 Survey Method

The computer-assisted telephone interviewing (CATI) system is adopted for the survey.

1.4 Differences between survey population and targeted population

A study for the subpopulation who are not covered by telephones at the end of 2005 by CNNIC 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 and mobile phones are negligible.

(II) Enterprise Survey

2.1 Survey Population

Business entities in Mainland China (excluding Hong Kong, Macau and Taiwan) excluding privately-owned businesses and other legal entities

According to the statistical standard issued by National Bureau of Statistics of the PRC, business entities are divided into eighteen major industry categories: (1) agriculture, forestry, animal husbandry, and fishery; (2) mining; (3) electricity, gas and water production and supply; (4) manufacturing; (5) construction; (6) transportation, warehousing and postal services; (7) information transmission, computer services and software; (8) finance; (9) leasing and business services; (10) wholesale and retail trade; (11) accommodation and catering; (12) residential and other services; (13) real estate; (14) scientific research, technical services and geological prospecting; (15) water conservancy, environmental and public facilities management; (16) education; (17) health, social security and social welfare; and (18) culture, sports and entertainment.

2.2 Sample size

There were 3,000 survey samples in total, covering Mainland China.

2.3 Sampling method

This survey adopts the approach of stratified random sampling.

Standard for regional stratification: Thirty-one provinces, municipalities directly under the central government and autonomous regions are divided into Eastern China, Central China,

West China and Northeast China based on their economic development according to relevant standards issued by National Bureau of Statistics of the PRC:

East China consists of 10 provinces and municipalities directly under the central government, namely Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan.

Central China consists of 6 provinces, namely Shanxi, Anhui, Jiangxi, Henan, Hubei and Hunan.

West China consists of 12 provinces, municipalities directly under the central government and autonomous regions: Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang.

Northeast China consists of 3 provinces: Liaoning, Jilin and Heilongjiang.

Standard for industrial stratification: Business entities are divided into eighteen major industry categories according to the statistical standard issued by National Bureau of Statistics of the PRC. Based on the similarities and differences in the use of Internet by industries, CNNIC combines the eighteen major industry categories into nine industry categories:

No.	Industry name
1	Agriculture, forestry, animal husbandry, and fishing
	Mining
	Production and supply industries for electric power, fuel gas and water
2	Manufacturing
3	Construction
	Transportation, storage and postal industries
4	Information transmission, computer service and software
	Finance
	Leasing and commercial service
5	Wholesale and retail
6	Accommodation and catering

	Resident service and other services
7	Real estate
8	Scientific research, technical service and geological survey
	Water conservancy, environment and public facility management
9	Education
	Health, social security and social welfare
	Culture, sports and entertainment

Cross stratification is conducted by two indicators: regions and combined industries, with a total of 4*9=36 layers. Samples are distributed at each layer according to the distribution of business entities by province, city and industry in the second economic census in 2008. Business entities are randomly sampled from each layer for investigation, and the ultimate effective samples cover a total of 3,000 enterprises.

2.4 Implementation method of the survey

This project adopts the approach of Computer Assisted Telephone Interview (CATI). Randomness and accuracy of the survey are controlled as follows:

1） Calls are made from 9 am to 6 pm on working days.

2） After the survey is accomplished, the telephone investigation company is asked to provide the detailed dialing information of all the phones for random checks.

3） To avoid the randomness being influenced by the put-through rate, numbers that cannot be connected will be dialed for at least three times.

4） To avoid the influence of investigator’s personal perspective to the investigation, it is stated that items that are not needed to be read out cannot be given any prompt and the questions should be asked properly.

5） After telephone survey, the data are pre-processed to check the logical relation between the value of a variable and the variable itself. Unqualified samplings shall be all deleted.

(III) 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.

3.1. Total Number of IP Addresses

The data of IP addresses counted by provinces come from the IP address databases of Asia-Pacific Network Information Center (APNIC) and CNNIC. Registered data in each database, that can clearly distinguish the provinces 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, will require our IP address allocation organizations to report the IP addresses they own biannually. To ensure the accuracy of IP data, CNNIC will compare and verify APNIC statistical data and the reported data to confirm the final quantity of IP addresses.

3.2. Total Number of Domain Names and Websites in China

Total number of domain names and websites in China can be derived from:

The number of domain names: The number of domain names with .CN and .中国 comes from CNNIC database; and the number of gTLDs comes from the data released by WebHosting.Info, a domain name statistical agency.

The number of websites: It is worked out by CNNIC according to the list of domain names. The list of domain names with .CN and .中国 comes from the CNNIC database, while the list of gTLDs comes from relevant international domain name registries.

3.3. International Internet Gateway Bandwidth

Through a reporting system, the Ministry of Industry and Information Technology can obtain on a regular basis the number of total bandwidth of Internet connecting Chinese carriers with other countries and regions. The reported data are included in the Statistical Report on Internet Development in China.

II. Definitions of Terms in the Report

◇ **Internet Users:** Chinese residents at the age of six 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 six 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 six months.

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

◇ **Domain Name:** Domain name in the Report only refers to the English domain name, which is a string comprised of numbers, letters, and hyphens (-) and separated by dots (.). It is a hierarchical structural Internet address identifier corresponding to the IP address. Common domain names are divided into two categories: country code top-level domain (ccTLD), such as the domain names ended with ".CN" which represents China; and generic top-level domain (gTLD), such as the domain names ended with ".COM", ".NET" and ".ORG".

◇ **Website:** It refers to the web sites with domain name itself or "WWW. + domain name" as the web address, including the web sites under our top-level domain name ".CN" and gTLD. The registrant of the website is 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 like "whois.cnnic.cn" and "mail.cnnic.cn" with such domain name as the suffix are regarded as different channels of the website.

◇ **Enterprises:** They refer to those enterprises which have registered with industry and commerce administration authorities at all levels, and obtained the License of Business Corporation and the corporate capacity in accordance with the *Regulations of the People's Republic of China for Controlling the Registration of Enterprises as Legal Persons* and the *Regulations of the People's Republic of China on Administration of Registration of Companies*.

◇ **Online Sales or Online Purchase:** Orders receiving or delivering products or services via the Internet, with payment and final delivery completed online or offline. The statistics cover

enterprises using the Internet.

◇ **Internet Marketing:** Marketing and promotional activities which are carried out through the Internet. The statistics cover all enterprises.

◇ **E-commerce Platform Promotion:** Online marketing and promotional behaviors on the B2B, B2C and C2C websites, such as setting up online shops, publishing product information, offering paid search listing or purchasing advertising. The statistics cover enterprises conducting Internet marketing.

◇ **Search Engine Marketing:** Search engine marketing (SEM) including search engine optimization (SEO), search keyword advertising, etc. SEO refers to the optimization of the content and structure of a website, in order to improve the website's ranking by search engines. Search keyword advertising means that a company purchase keywords through the search engine companies. When users search the keywords, the company's products will appear on the search page and users are attracted to visit the company's website by clicking the product link, facilitating transactions. The statistics cover enterprises conducting Internet marketing.

◇ **Online Alliance Advertising:** A website registers and participates in the affiliate program of an advertising agency to obtain a specific link. After the website owner puts the link on its website, the advertising agency will pay the owner the pre-agreed commission fee if users visit the advertising agency's website through the link. The statistics cover enterprises conducting Internet marketing.

◇ **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 December 31, 2016.

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	338,102,784	20A+39B+10C
Taiwan	35,502,336	2A+29B+185C
Hong Kong SAR	11,713,024	178B+186C
Macau SAR	333,056	5B+21C

Table 2 Allocation of IPv4 Addresses among Organizations in Mainland China

Organization name	Number of Addresses	Total Number of IPv4 Addresses
China Telecom	125,763,328	7A+126B+255C
China United Network Communications Corporation	69,866,752[Note 1]	4A+42B+21C
CNNIC IP Address Allocation Alliance	61,063,936[Note 2]	3A+163B+195C
China Mobile Communications Corporation	35,294,208	2A+26B+140C
China Education and Research Network	16,649,728	254B+14C
China Tietong Telecommunications Corporation.	15,796,224[Note 3]	241B+8C
Others	13,668,608	208B+145C
Total	338,102,784	20A+39B+10C

Data sources: APNIC and CNNIC

Note 1: The addresses of China United Network Communication Limited include the addresses of former China Unicom and former China Netcom. Specifically, the IPv4 address 6316032 (96B+96C) of former China Unicom is 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 Assignment Alliance of China. So far, the total number of IPv4 addresses held by the members of CNNIC IP Address Assignment Alliance is 81,785,088, equivalent to 4A+223B+241C. The IPv4 addresses of the members of IP Address Assignment Alliance of China 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 Telecommunications Corporation are assigned by CNNIC;

Note 4: The deadline for the above statistical data is December 31, 2016.

Table 3 the Number of IPv6 Addresses in Different Regions of China

Region	Number of Addresses
Mainland China	21,188 blocks/32
Taiwan	2,359 blocks/32
Hong Kong SAR	283 blocks/32
Macau SAR	5 blocks/32

Table 4 IPv6 Address Allocation in Mainland China

Organization name	The Number of IPv6 Addresses (/32[Note 1])
CNNIC IP Address Allocation Alliance	6,450[Note 2]
China Telecom	4,099
China United Network Communications Corporation	4,097
China Mobile Communications Corporation	4,097
China Tietong Telecommunications Corporation.	2,049[Note 3]
China Education and Research Network	18
China Science and Technology Network	17[Note 4]
Others	361

Data sources: APNIC and CNNIC

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

Note 2: At present, the total IPv6 addresses held by the members of IP Address Assignment Alliance of CNNIC are 7,921/32. The IPv6 addresses held by the members of IP Address Assignment Alliance listed in the above table do not include those IPv6 addresses already assigned to China Tietong and CSTNET.

Note 3: The IPv6 addresses of China Tietong Telecommunications Corporation 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 December 31, 2016.

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

Province	Proportion
Beijing	25.48%
Guangdong	9.53%
Zhejiang	6.46%
Jiangsu	4.76%
Shanghai	4.50%
Shandong	4.90%
Hebei	2.85%
Liaoning	3.34%
Henan	2.63%
Hubei	2.39%
Sichuan	2.77%
Fujian	1.94%
Hunan	2.37%
Shaanxi	1.63%
Anhui	1.65%
Heilongjiang	1.21%
Guangxi	1.38%
Chongqing	1.68%
Jilin	1.21%
Tianjin	1.05%
Jiangxi	1.73%
Shanxi	1.28%
Yunnan	0.98%
Inner Mongolia	0.78%
Xinjiang	0.60%
Hainan	0.47%
Guizhou	0.44%
Gansu	0.48%
Ningxia	0.28%
Qinghai	0.18%
Tibet	0.13%
Others	8.94%
Total	100.00%

Data sources: APNIC and CNNIC

Note 1: The above IP address statistics are for the provinces/autonomous regions/municipalities where the IP address owners are located.

Note 2: The deadline for the above statistical data is December 31, 2016.

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

Province	Domain Name		Including: .CN Domain Name		.中国 Domain Names	
	Number	Proportion in total domain names	Number	Proportion in total CN domain names	Number	Proportion in total .中国 domain names
Beijing	6,457,379	15.3%	3,288,765	16.0%	238,605	50.3%
Guangdong	5,565,728	13.2%	2,018,360	9.8%	39,387	8.3%
Fujian	5,095,881	12.1%	2,789,537	13.5%	11,721	2.5%
Zhejiang	3,361,612	8.0%	1,550,269	7.5%	15,259	3.2%
Shanghai	2,632,136	6.2%	1,174,350	5.7%	15,258	3.2%
Jiangsu	1,732,428	4.1%	547,496	2.7%	19,168	4.0%
Shandong	1,720,673	4.1%	737,900	3.6%	16,694	3.5%
Sichuan	1,380,915	3.3%	423,384	2.1%	12,563	2.6%
Hunan	1,371,930	3.2%	774,488	3.8%	4,175	0.9%
Henan	1,177,483	2.8%	413,877	2.0%	5,881	1.2%
Hubei	1,019,556	2.4%	532,941	2.6%	5,360	1.1%
Hebei	749,406	1.8%	192,994	0.9%	6,566	1.4%
Anhui	745,403	1.8%	233,707	1.1%	3,534	0.7%
Liaoning	592,988	1.4%	181,633	0.9%	9,870	2.1%
Chongqing	528,323	1.2%	197,161	1.0%	6,411	1.4%
Guangxi	522,256	1.2%	244,378	1.2%	3,144	0.7%
Shaanxi	430,800	1.0%	138,618	0.7%	4,587	1.0%
Jiangxi	384,982	0.9%	134,711	0.7%	5,181	1.1%
Tianjin	353,755	0.8%	113,681	0.6%	2,612	0.6%
Yunnan	275,182	0.7%	94,529	0.5%	5,849	1.2%
Shanxi	239,006	0.6%	74,283	0.4%	2,903	0.6%
Heilongjiang	236,937	0.6%	78,083	0.4%	6,255	1.3%
Jilin	204,574	0.5%	65,184	0.3%	2,682	0.6%
Guizhou	188,110	0.4%	76,950	0.4%	1,953	0.4%
Hainan	146,650	0.3%	59,125	0.3%	546	0.1%
Xinjiang	133,669	0.3%	55,014	0.3%	1111	0.2%
Gansu	111,130	0.3%	29,941	0.1%	702	0.1%
Inner Mongolia	107,501	0.3%	43,325	0.2%	2152	0.5%
Qinghai	45,972	0.1%	21,700	0.1%	183	0.0%
Ningxia	42,549	0.1%	15,843	0.1%	457	0.1%
Tibet	10,475	0.0%	6,433	0.0%	283	0.1%

Others	4,710,313	11.1%	4,292,831	20.8%	23,063	4.9%
Total	42,275,702	100.0%	20,601,491	100.0%	474,115	100.0%

Note: The total number of domain names by province does not cover .EDU.CN.

Table 7 the Number of Websites by Province

	Number of Websites	Proportion in total number of websites
Guangdong	728,235	15.1%
Beijing	609,298	12.6%
Shanghai	399,983	8.3%
Zhejiang	335,887	7.0%
Fujian	285,936	5.9%
Shandong	272,766	5.7%
Jiangsu	254,074	5.3%
Henan	200,370	4.2%
Sichuan	196,377	4.1%
Hebei	126,574	2.6%
Liaoning	118,373	2.5%
Hubei	101,126	2.1%
Hunan	72,780	1.5%
Anhui	68,201	1.4%
Shaanxi	58,800	1.2%
Shanxi	53,249	1.1%
Chongqing	51,424	1.1%
Tianjin	51,168	1.1%
Guangxi	43,281	0.9%
Heilongjiang	40,408	0.8%
Jiangxi	37,191	0.8%
Jilin	27,437	0.6%
Yunnan	22,443	0.5%
Hainan	18,079	0.4%
Inner Mongolia	15,534	0.3%
Guizhou	15,491	0.3%
Gansu	11,008	0.2%
Xinjiang	10,379	0.2%
Ningxia	5,983	0.1%
Qinghai	3,524	0.1%
Tibet	1,228	0.0%
Others	586,752	12.2%
Total	4,823,918	100.0%

Note: The total number of websites by province does not cover .EDU.CN.

Table 8 Web Pages Classified by Updating Cycle

Web Page Updating Cycle	Proportion
Update weekly	5.3%
Update monthly	14.9%
Update every three months	19.6%
Update every six months	18.1%
Update every more than six months	42.1%
Total	100%

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

Table 9 Web Pages Classified by Suffix

Web Page Suffix	**Proportion**
html	36.22%
htm	2.99%
/	20.84%
shtml	3.68%
asp	2.84%
php	14.16%
txt	0.01%
nsf	0.00%
xml	0.01%
jsp	1.20%
cgi	0.01%
pl	0.00%
aspx	1.95%
do	0.32%
dll	0.00%
jhtml	0.01%
cfm	0.00%
php3	0.00%
phtml	0.00%
Other suffixes	15.76%
Total	100%

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

Table 10 Web Pages Classified by Multimedia Form

Web page multimedia forms	Proportion (in multimedia web pages)
jpg	38.69%
gif	40.94%
zip	1.26%
swf	1.04%
doc	7.76%
pdf	3.68%
rm	0.00%
mid	0.00%
ram	0.00%
mp3	0.02%
ppt	0.12%
mpg	0.00%
Other multimedia	6.49%
Total	100%

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

Table 11 the Number of Web Pages by Province

	Total of web pages after duplicated ones are removed	Static	Dynamic	Proportions of static to dynamic
Anhui	2,203,600,859	1,758,058,654	445,542,205	3.95
Beijing	84,006,464,674	63,572,304,377	20,434,160,297	3.11
Fujian	7,031,053,839	5,310,081,167	1,720,972,672	3.09
Gansu	203,607,422	97,976,985	105,630,437	0.93
Guangdong	29,607,636,113	21,192,627,934	8,415,008,179	2.52
Guangxi	898,945,013	515,930,945	383,014,068	1.35
Guizhou	180,576,375	111,609,803	68,966,572	1.62
Hainan	1,622,933,021	720,390,198	902,542,823	0.80
Hebei	8,727,147,250	6,946,657,937	1,780,489,313	3.90
Henan	10,901,539,276	8,891,514,720	2,010,024,556	4.42
Heilongjiang	2,088,604,056	1,816,573,814	272,030,242	6.68
Hubei	2,291,888,188	1,588,757,065	703,131,123	2.26
Hunan	2,145,241,032	1,627,235,764	518,005,268	3.14
Jilin	1,408,269,147	1,007,791,131	400,478,016	2.52
Jiangsu	13,417,727,486	10,040,311,338	3,377,416,148	2.97
Jiangxi	2,276,290,931	1,839,946,528	436,344,403	4.22
Liaoning	1,711,389,644	1,135,140,057	576,249,587	1.97
Inner Mongolia	141,086,211	69,848,531	71,237,680	0.98
Ningxia	119,883,614	19,241,460	100,642,154	0.19
Qinghai	24,732,937	20,069,733	4,663,204	4.30
Shandong	4,469,286,898	3,017,854,903	1,451,431,995	2.08
Shanxi	4,279,684,045	2,718,710,605	1,560,973,440	1.74
Shaanxi	1,860,337,354	1,478,428,001	381,909,353	3.87
Shanghai	16,617,228,345	12,063,736,957	4,553,491,388	2.65
Sichuan	2,874,973,213	1,743,379,898	1,131,593,315	1.54
Tianjin	3,670,904,149	2,422,240,933	1,248,663,216	1.94
Tibet	4,915,396	3,471,509	1,443,887	2.40
Xinjiang	145,924,093	70,702,450	75,221,643	0.94
Yunnan	1,563,509,702	1,357,259,562	206,250,140	6.58
Zhejiang	28,277,408,194	22,083,446,020	6,193,962,174	3.57
Chongqing	1,224,795,102	841,993,950	382,801,152	2.20
The whole country	235,997,583,579	176,083,292,929	59,914,290,650	2.94

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

Table 12 the Number of Web Page Bytes by Province

	Total page size	Average Page Size (KB)
Anhui	77,881,809,790	35
Beijing	5,589,559,124,911	67
Fujian	327,782,579,531	47
Gansu	7,380,390,131	36
Guangdong	1,560,952,317,900	53
Guangxi	50,102,502,038	56
Guizhou	5,102,327,245	28
Hainan	59,591,594,261	37
Hebei	546,396,726,941	63
Henan	529,893,402,155	49
Heilongjiang	115,250,224,098	55
Hubei	89,067,991,347	39
Hunan	78,643,708,204	37
Jilin	67,436,158,942	48
Jiangsu	658,477,800,359	49
Jiangxi	84,927,028,781	37
Liaoning	92,509,833,708	54
Inner Mongolia	7,032,914,642	50
Ningxia	3,616,100,227	30
Qinghai	820,408,281	33
Shandong	194,525,916,971	44
Shanxi	371,554,183,010	87
Shaanxi	47,492,005,270	26
Shanghai	958,621,109,813	58
Sichuan	119,144,969,057	41
Tianjin	194,004,953,275	53
Tibet	254,909,501	52
Xinjiang	6,398,241,885	44
Yunnan	76,067,642,084	49
Zhejiang	1,546,446,650,499	55
Chongqing	72,909,592,183	60
The whole country	13,539,845,117,041	57

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

Table 13 Proportion of Web Page Classified by Updating Cycle in Each Province

	Update weekly	Update monthly	Update every three months	Update every six months	Update every more than six months
Anhui	6.0%	15.1%	17.6%	22.6%	38.7%
Beijing	4.8%	13.9%	18.7%	17.0%	45.5%
Fujian	5.2%	13.9%	18.3%	17.5%	45.1%
Gansu	7.1%	17.3%	28.1%	17.6%	29.8%
Guangdong	4.8%	13.3%	18.3%	18.4%	45.3%
Guangxi	7.5%	20.1%	20.0%	16.3%	36.1%
Guizhou	12.5%	25.4%	23.4%	15.8%	22.9%
Hainan	5.8%	16.2%	19.4%	25.6%	32.9%
Hebei	5.4%	15.3%	18.0%	17.9%	43.5%
Henan	6.3%	14.1%	17.1%	15.4%	47.0%
Heilongjiang	4.8%	17.0%	25.2%	17.5%	35.5%
Hubei	6.2%	20.9%	22.5%	20.4%	30.0%
Hunan	6.0%	17.6%	25.2%	18.8%	32.4%
Jilin	5.8%	15.9%	18.7%	16.1%	43.4%
Jiangsu	5.5%	14.8%	19.7%	16.8%	43.2%
Jiangxi	7.2%	21.4%	20.0%	20.9%	30.5%
Liaoning	6.2%	18.9%	19.1%	19.9%	36.0%
Inner Mongolia	9.8%	19.3%	26.3%	15.2%	29.4%
Ningxia	10.2%	12.7%	15.7%	11.6%	49.9%
Qinghai	6.8%	33.9%	15.2%	7.2%	36.8%
Shandong	6.8%	19.4%	24.4%	19.5%	29.9%
Shanxi	4.6%	13.2%	20.5%	18.0%	43.8%
Shaanxi	9.1%	40.4%	31.8%	8.0%	10.7%
Shanghai	4.7%	14.2%	21.3%	20.5%	39.4%
Sichuan	7.0%	20.1%	24.3%	20.6%	28.0%
Tianjin	5.1%	14.9%	18.3%	17.4%	44.2%
Tibet	7.0%	24.7%	27.2%	15.0%	26.0%
Xinjiang	6.7%	18.1%	18.0%	13.5%	43.6%
Yunnan	4.7%	12.6%	14.6%	11.4%	56.7%
Zhejiang	5.7%	15.8%	21.4%	20.8%	36.3%
Chongqing	7.2%	23.4%	22.0%	20.4%	27.0%
The whole country	5.3%	14.9%	19.6%	18.1%	42.1%

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

Table 14 Proportion of Web Page Classified by Coding Type in Each Province

	Chinese	Traditional Chinese	English	Others
Anhui	99.5%	0.3%	0.1%	0.1%
Beijing	98.9%	0.2%	0.3%	0.6%
Fujian	98.9%	0.5%	0.2%	0.4%
Gansu	99.5%	0.0%	0.2%	0.2%
Guangdong	99.1%	0.3%	0.2%	0.4%
Guangxi	99.4%	0.2%	0.2%	0.2%
Guizhou	99.2%	0.3%	0.5%	0.0%
Hainan	99.6%	0.3%	0.0%	0.1%
Hebei	99.3%	0.1%	0.4%	0.1%
Henan	99.3%	0.2%	0.2%	0.4%
Heilongjiang	99.0%	0.1%	0.4%	0.5%
Hubei	99.2%	0.3%	0.4%	0.2%
Hunan	99.4%	0.2%	0.2%	0.2%
Jilin	98.3%	0.3%	1.1%	0.3%
Jiangsu	99.4%	0.1%	0.3%	0.2%
Jiangxi	99.0%	0.8%	0.2%	0.1%
Liaoning	99.7%	0.1%	0.1%	0.1%
Inner Mongolia	99.6%	0.0%	0.2%	0.1%
Ningxia	99.9%	0.0%	0.1%	0.0%
Qinghai	99.7%	0.0%	0.1%	0.1%
Shandong	95.7%	2.6%	1.5%	0.2%
Shanxi	98.7%	0.6%	0.2%	0.5%
Shaanxi	99.6%	0.0%	0.2%	0.2%
Shanghai	98.7%	0.8%	0.3%	0.2%
Sichuan	99.4%	0.1%	0.4%	0.1%
Tianjin	98.5%	0.5%	0.5%	0.5%
Tibet	97.8%	0.0%	1.6%	0.6%
Xinjiang	98.7%	0.7%	0.1%	0.5%
Yunnan	99.5%	0.1%	0.1%	0.3%
Zhejiang	96.2%	2.4%	1.2%	0.2%
Chongqing	98.7%	0.6%	0.7%	0.0%
The whole country	98.6%	0.6%	0.4%	0.4%

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

Appendix 3 Organizations Supporting the Survey

We would like to express our heartfelt thanks to the following organizations that have provided strong support for the collection of basic resources data in this survey. (Not listed in any particular order)

China Telecom

China Education and Research Network Center

Network Center of CSTNet

China United Network Communications Limited

China Mobile Communications Corporation

Government Organ and Public Institution Domain Name Registration Network

Alibaba Communication Technology (Beijing) Co., Ltd.

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

Beijing Guangsuliantong Technology and Trade Co., Ltd.

Beijing Quest Mobile Information Technology Co., Ltd. (Quest Mobile)

Beijing Wangzun Technology Co., Ltd.

Beijing Innovative Linkage Software Service Ltd.

SanFront Information Technology Company

Beijing Zihai Science and Technology Co., Ltd.

Beijing Bytedance Technology Co., Ltd. (Top News)

Chengdu West Dimension Digital Technology Co., Ltd.

Chongqing Zhijia Information Technology Co., Ltd

Foshan Yidong Network Co., Ltd.

Fuzhou Zhongxu Network Technology Co., Ltd.

Guangdong Huyi Network Intellectual Property Rights Co., Ltd.

Guangdong Jinwanbang Technology Investment Co., Ltd.

Guangdong NiceNic International Group Co., Limited

Guangdong Eranet International Limited

Guizhou Eric Enterprise Corporation

Hangzhou E-Commerce Connection Science and Technology Co., Ltd.

Henan Weichuang Network Technology Co., Ltd.

Jiangsu Bangning Science and Technology Co., Ltd.

Blue Ocean Foundation Information Technology Co., Ltd.

Qihoo 360 Technology Ltd.

NAWANG.CN

Xiamen 35.com Technology Co., Ltd

Xiamen Shangzhong On-line Technology Co., Ltd (its brand Bizcn)

Xiamen ZZY Network Service Co., Ltd

Xiamen eName Technology Co., Ltd.

Oray

WWW.CHINAFU.COM

CNDNS.COM

Shanghai Yovole Network Co., Ltd.

WWW.IDCICP.COM

Shenzhen Tencent Computer System Co., Ltd. (Tencent Security)

WWW.EIMS.COM.CN

WWW.CNKUAI.COM

Sina Weibo

WWW.DNSPOD.CN

Zhengzhou Century Chuanglian Electronic Technology Development Co., Ltd.

Zhengzhou Zitian Network Technology Co., Ltd.

Zhongqi Power S&T Co., Ltd.

Appendix 4 Introduction to CNIDP

cnidp.cn -- open and shared Internet statistical data and services

- Launched and run by CNNIC
- Providing Internet statistical data and services for free
- Reflecting the situation of Internet development in China objectively and timely

Website of the platform: **www.cnidp.cn**

Introduction to the Platform

The China Internet Information Data Platform, launched and run by CNNIC, adopts the research method of fixed sample panel to reflect multiple facets (macro and micro) of the Internet development situation in China and provide multifaceted decision-making support for the participants of the Internet industry, by investigating the Internet using behavior data of Chinese Internet user samples collected at the client-side continuously in real time and by analyzing those data statistically.

Function Demonstration

Statistical data
Provide weekly, monthly, quarterly and half-year statistical data including the covered users, visiting times, page views, visiting duration and other indicators for domestic mainstream websites/software; the data are updated within no more than 3 days.

User characteristics
Provide multi-dimensional structural distribution data including gender, age, education background, occupation, income, region and tier of city corresponding to mainstream domestic websites/software.

Overlap analysis
Make statistics about user group overlaps and the structural distribution of different user groups corresponding to different websites/software.

Trend comparison
Provide detailed historical statistics on a daily basis corresponding to mainstream domestic websites/software so as to reflect their trends of historical changes.