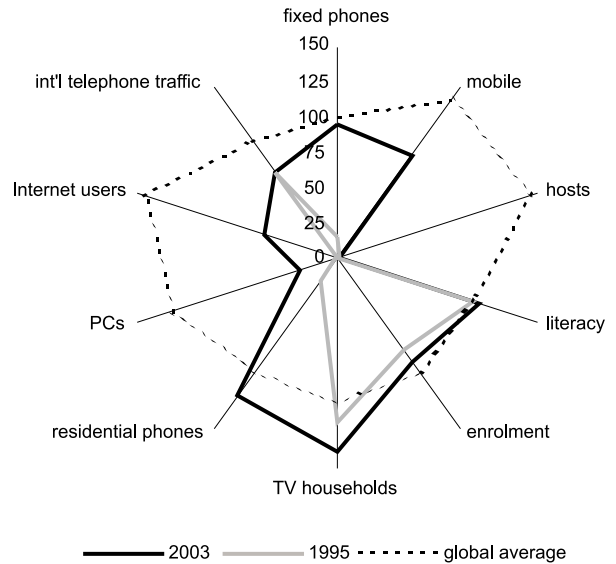


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China

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Source: *Monitoring the Digital Divide*. © Orbicom 2004

The number of Chinese going online continues to increase. At the same time, R&D efforts in the country are beginning to yield a number of important ICT innovations that manufacturers have commercialised for the large domestic market. The government has maintained its support for ICT and is dedicating sustained efforts to developing industries related to the new technologies while promoting their use to the people.

Local online content

The number of Chinese domain names ballooned from 250,000 in June 2003 to 349,349 in March 2004. Likewise, local online content grew. Data from the China Internet Network Information Centre (CNNIC) show that in 2003 Chinese users spent 89.1 percent of their time online visiting Chinese websites, an increase of 9.6 percent over 2002.¹

Online games have become very popular in China, particularly multi-user role-playing games such as *Legend*, *Pick* and *Heaven* from South Korea and Taiwan. According to market research firm IDC, the gaming industry in China will grow rapidly with the number of game players increasing from 13 million in 2003 to 41.8 million in 2007 and industry revenue growing from RMB 1.3 billion in 2003 to RMB 6.7 billion in 2007 (US\$1 = RMB 8.27).² About 68 percent of current game players access from Internet bars; as such, much of the competition in the industry will concentrate on these establishments.

The number of Chinese blogs grew rapidly in 2003. According to a blog census conducted by the National Institute for Technology and Liberal Education, USA, there were 3,543 simplified Chinese blog websites, ranking them 14th in the world, and 7,712 traditional Chinese blogs, putting them at 9th place.³ Blogs now cover almost every field, including novels, arts, and farming issues. However, some of the better-known sites are personal chronicles such as the controversial "Sex Diaries" of Mu Zimei.

The number of government websites also grew rapidly in 2003. A survey conducted by the State Council Informatisation Office shows that most of these websites, especially those of counties, continue to provide only basic information. Some progress has been made in making government information available to the public, but users remain dissatisfied with the lack of interactive services.⁴

The outbreak of SARS in 2003 raised the importance of the Internet as a communication medium in China. During the epidemic, the Chinese people received 10.5 percent of their information from the Internet, ranking it just after television and newspapers.⁵

Although 47 percent of the 8.3 million small and medium enterprises in the country are using the Internet, only 11.1 percent have engaged in e-commerce. Many companies have established only a website and email, and they do not update their information on a timely basis.

Online services

Certain online services expanded unexpectedly with the outbreak of SARS. Distance education, B2B e-commerce, telemedicine and videoconferencing were among them. Online services have become a huge market with revenue forecasted by CCID Consulting to climb from RMB 7.3 billion in 2003 to RMB 10.6 billion in 2004.⁶

E-government

The year 2003 was significant in the development of China's e-government, and investments totalling about RMB 250 billion were made during the year. The central municipal government began to set up an e-government infrastructure that consists of a government portal, an intranet and an extranet, 4 databases (on China's population, geology, natural resources, and macroeconomy) and 12 projects to develop application systems for public finance, auditing, customs, taxation, social security, agriculture, hydrology, etc.

Distance education and e-learning

The Xiao Xiao Tong (connecting schools) project has been launched to make the Internet available to all primary and middle schools in the eastern counties and western medium-sized cities. Simultaneously, it will strive to link the middle schools and central primary schools of counties in the western and other poor districts to the China Education Broadband Satellite Net.

The Internet proved valuable in another area during the SARS outbreak when students in Beijing attended classes from home through the Web. In another development, the Ministry of Labour and Social Security began training courses delivered through satellite broadcasts for the unemployed in eight western provinces.

A special certification training course on the standard for the national quality management system and the quality control of distance education was conducted to improve the quality of this sector. Also, the Ministry of Education has conducted research on the ISO 9000 standard with the aim of establishing a quality control system for e-education.⁷

E-commerce and e-business

E-commerce has started in some cities as well as at the regional level. For example, an information platform established in Wuxi, a city located in Jiangsu Province in the east, has attracted more than 1,000 small and medium enterprises after its launch in May 2003.

Eachnet, a Chinese C2C website which has attracted a large number of users, was purchased by eBay, the world's largest C2C website, in June 2003. The takeover has triggered new interest in the Chinese C2C market, and some well-known Internet enterprises, such as Yahoo, are preparing to enter this market.

Telemedicine

Online consultation has evolved into online diagnosis and remote surgery with the advent of full-screen and interactive video facilities.⁸ Many of the suspected SARS cases were diagnosed using telemedicine technology. Efforts have now begun to build a national information network for the prevention of diseases. However, this sector continues to face a number of obstacles, including the lack of funds, technologies and, especially, bandwidth. The other difficulties faced include the shortage of medical experts at telemedicine facilities as well as the absence of laws and regulations guiding this new sector.⁹

E-conferencing

E-conferencing was a popular mode of communication for large and multinational companies during the SARS outbreak.¹⁰ Regrettably, the expansion of this market is retarded by a lack of equipment, trained personnel, and qualified suppliers.

E-forums

E-forums are quite popular in China. The views and opinions expressed at these forums can influence the decision-making process of the government, as the SARS epidemic has shown. E-forums can provide the government with a useful way of gauging public opinion.

E-communities

Compared with e-forums, e-communities are in their infancy. Their popularity varies greatly across the country, being established mainly in the larger cities. In Beijing, for example, an e-community network was built in 2003 that covers 14 areas of interest with a total of 180 themes ranging from housekeeping and service agencies to logistic services.¹¹

Industries

The turnover of the computer industry rose by 15.4 percent in 2003 to RMB 332.7 billion, the highest in the electronics and information sector. Hardware sales reached RMB 238.3 billion, representing an increase of 10.2 percent over the previous year. Software sales grew by 15.8 percent to RMB 40.0 billion. Information services accounted for RMB 54.4 billion, having increased by 26.7 percent. IT services and network products contributed the most to the rapid expansion of the industry.¹²

The telecommunications industry's revenue increased 14.4 percent in 2003 to RMB 421 billion. The number of mobile phone users totalled 263 million in the same year and for the first time exceeded the number of fixed-line users, which stood at 260 million. The turnover for mobile communications was RMB 197.8 billion, representing an 18 percent growth and accounted for almost half of the total turnover of the telecommunications industry. The SMS market expanded vigorously in 2003 with 200 billion messages sent, more than double the number in 2002. On average, SMS users each sent or received 10.9 messages per week, 46.5 percent of which were textual information from websites.¹³

China launched its first 3G mobile phone based on the TD-SCDMA standard in 2003. However, few people at present access the Internet via the mobile phone. The potential market size for 3G mobile phones is about 300 million people. It will take time for the technology to become widespread, as it is still considered expensive.

Over in the Internet market, the number of netizens in China grew to 79.5 million by the end of 2003. In April 2003, China Netcom together with the top telecommunications carriers of South Korea and three other countries formed the first marketing federation in the world for wireless LANs.¹⁴ China's telecommunications carriers spared no effort in promoting their broadband services. By the end of 2003, the number of broadband users had exceeded ten

million. In the works is the construction of 5,000 hotspots throughout Beijing by 2008 for wireless broadband access. However, the development of Internet applications which exploit broadband technology remains limited.¹⁵

Key national initiatives and enabling policies

The government has been carrying out numerous projects to develop and promote the application of ICT. There have been many achievements so far, as shown by the development of new technologies and the rapid increase in users. However, problems remain, as seen in the uneven development between industries and between different regions. Despite these problems, informatisation will continue.

Development of the ICT infrastructure

The proposal to construct a national ICT infrastructure that includes broadband networks and high-speed Internet was an important component of the Tenth Five-Year Plan. Implementation of the plan has led to the rapid growth of broadband Internet and efforts to converge telecommunications networks, cable television networks and the Internet. These developments lay a good foundation for the deployment of the next-generation Internet.

The number of broadband users increased by 390 percent in the second half of 2003, and was projected to exceed the number of non-broadband users by the end of 2004. The development of broadband has benefited much from the adoption of enabling policies and the availability of relevant technologies. Competition in the telecommunications market has helped to lower the price of broadband services. At the same time, the open IP standard has driven innovation and advancement in ICT, which in turn has led to the old, closed network being replaced by an open digital broadband network. However, insufficient bandwidth and relatively high charges impede the widespread use of the new network.

The government is keen to converge broadcast, telecommunications and Internet services. A key aspect of this convergence plan is the launch of digital television. To facilitate convergence, the State Administration of Radio, Film and Television (SARFT) is implementing a three-step development strategy¹⁶ to digitise Chinese radio and television content, beginning with the digitisation of cable television in 2003. In the pilot phase, digital cable television networks were built in more than 46 cities in 26 provinces, and 34 subscription digital cable television channels were launched. Each of the subscription channels provides niche programming, such as Beijing opera, popular music, fishing, shopping, football, childcare and cars.

The strategy of upgrading the cable television infrastructure to digital standards for an entire community all at once helped to boost digital television subscription from 90,000 in 2002 to 276,000 in 2003. However, this

number is still far short of the multimillion viewership target. Under this upgrading scheme, not only is the equipment at the cable television station serving a particular community replaced with new digital hardware, but members of the community subscribing to the digital service are also provided with help to purchase new digital television sets.

At the same time, most of China's telecommunications services have been converted to operate on IP, resulting in

The telecommunications gap in western China

The uptake of ICT in western China is relatively low compared with the rest of the country. It is estimated that fixed-line telephone networks in western China lag 5–6 years behind those in the east, and mobile phones 2–3 years. The cost of building and operating the telecommunications infrastructure in the vast western region is much higher than in the east owing to its small population and complex terrain. This is the main restraining factor. There are 742,000 administrative villages in the rural areas of China. The availability of telecommunications services in these villages varies: 95 percent in the eastern region of the country, 80 percent in the central region, and 47 percent in the western region.

What is the cause of this imbalance? Firstly, policy support is lacking. The prohibitive cost of building the ICT infrastructure has discouraged private investment in the western region, while government development programmes in the region have focused on other sectors of the economy rather than ICT.

Secondly, and to make matters worse, the lack of planning and coordination in the construction of the ICT infrastructure has led to excess capacity and waste. For instance, there are five high-capacity fibre optic cables connecting Urumchi and Lanzhou, whereas it has been estimated that one is sufficient to meet the needs over the next several years. The money invested in the other cables could have been used for building other missing components of the infrastructure. Another example is the construction by a large state-owned corporation in Ningxia of a long-distance fibre optic cable that is being utilised at less than 25 percent of its full capacity. But this has not discouraged other telecommunications corporations in the same district from investing huge sums of money in laying new cables along the same route.

95 percent of all telecommunications data being transmitted through the Internet today. Preparatory work has started to upgrade networks to IPv6 so as to meet the requirements of the converged infrastructure. CERNET2, the prototype next-generation backbone of the IPv6-based Internet, was commissioned in March 2004, marking the beginning of the next-generation Internet in China. It is expected to lead to the establishment of the world's largest IPv6 network by 2005. If accomplished, the network is expected to bring immense benefit to China's ICT industry. Moreover, the application of IPv6 will open up many opportunities for Chinese manufacturers and may even help to spawn new industries.

However, administrative inefficiency is impeding the convergence of telecommunications and cable television networks. The uncoordinated development efforts of the Ministry of Information Industry and SARFT have led to independent expansion of the networks. The disorganisation within SARFT and its lack of enthusiasm for collaboration and forming alliances with others have also become an obstacle. At the same time, resources allocated to the broadcasting sector are being dispersed among regional authorities. In spite of these deficiencies, the government has gained much useful experiences from the programme. It has begun to encourage all urban residents to adopt digital television in an effort to accelerate the expansion of this network.

Informatisation efforts

The government has implemented a development strategy of building an e-government and driving industrialisation with informatisation while at the same time accelerating informatisation with industrialisation. Three major projects have been launched as part of this strategy: the E-Government Project, the Enterprise Internet Project and the Family Internet Project. The basic infrastructures for the first two projects have been established, thereby allowing them to commence operations. The other project is still in the early phase of implementation.

There are many obstacles getting in the way of developing e-government, such as the uneven development between different regions of the country and between industries, as well as the restrictions imposed by old and existing systems.

Although most local governments have established intranets, the state of these networks varies according to the local economic conditions. The e-government facilities in the more prosperous eastern region are much better than those in the rest of the country.

Communication between the various government intranets has proven difficult because of the uncoordinated construction of infrastructure, differences in the level of authority of the different government departments and other reasons. There is also a lack of information on government

activities and public services on government websites, even though the government manages 80 percent of all public information resources.

The 12 Golden Projects form an important component of the larger E-Government Project with the aim of developing key industries. E-government in the areas related to trade and economy, such as finance, customs and tax, has developed much quicker than in other areas, such as agriculture. The golden projects are expected to spawn a new market worth no less than RMB 50 billion for the ICT industry.

The Golden Card, Golden Tax and Golden Customs projects have achieved their primary objectives. The Golden Card Project has made an extraordinary impact, helping to stabilise China's financial system during its ten years of operation. A nationwide bank-card information exchange network has been set up, which provides the foundation for e-business. At the same time, the project has stimulated the development of the local IT industry.

The Enterprise Internet Project has aggressively promoted the informatisation of local enterprises, which form the major group of Internet users in China. It is estimated that the Internet sector contributed more than 0.3 percent to national economic growth in 2003 due mainly to business use of the Internet.

Most of the large enterprises in China have set up their own intranets and extranets connected to the Internet. E-business has developed very quickly in the business community, especially in large enterprises such as Haier and Lenovo. However, problems associated with e-payment, security of online transactions, distribution channels for merchandise, and the absence of policies and laws have stymied the development of e-commerce.

The financial industry, which includes banks and stockbroking firms, is the leader in e-commerce. Online banking and stock trading are the most successful applications of the Enterprise Internet Project. Online banking services are growing rapidly. Services available include fund transfer and remittance as well as online payment for B2B and B2C transactions. This healthy growth is expected to persist with the completion of new service and security management systems and the widespread adoption of the China Financial Certification Authority's certification system.

Stockbroking firms expanded their online services in 2000 after the China Securities Regulatory Commission issued temporary management measures for online stock trading commission, paving the way for online trading. By February 2003, 72 percent of all stockbroking firms were offering online services. This rapid growth was made possible by the availability of advanced ICT that is secure, reliable and efficient as well as the provision of advisory services to investors. However, obstacles remain to impede the further growth of online trading: the irrationality of existing policies and laws (e.g. investors cannot open online accounts in different parts of the country) and the general lack of security over the Internet.

The implementation of the Family Internet Project needs to be speeded up. Although the number of Internet users has increased significantly in recent years, only 6 percent of the population has access to the Internet. Growth is restrained by the lack of online content in Chinese, inadequate knowledge of Internet applications, and the high cost of hardware and services. The high cost of services is considered one of the main restrictive factors.

The Chinese Digital Life Promotion Year was launched by the Ministry of Information Industry in March 2003 to encourage the consumption of digital products and services. The campaign included activities such as events, forums and exhibitions on digital life, as well as educational programmes on digital technologies. To some extent, awareness of digital products and their applications has increased after this year-long campaign.

Internet security measures

The volume of spam China receives is among the highest in the world. The first to act on spam was an NGO, the Internet Society of China, which together with other NGOs formed an anti-junk email group in November 2002. The group regularly compiled and circulated a black list of IP addresses

involved in spamming and also coordinated joint action on the offenders. In spite of these efforts, statistics from CNNIC show that the percentage of junk email received weekly by Chinese users increased from 51.8 percent in December 2002 to 57.7 percent a year later.

The government started taking action against spamming at the beginning of 2004. Various departments have been mobilised to investigate email service providers around the country and to supervise their activities. In the meanwhile, legislation against spamming has been initiated.

In addition, Internet emergency measures will also be enforced to ensure the security of the Internet. However, apart from adopting legislative and technical measures, the government should also strengthen international cooperation in securing the Internet.

Other initiatives

The software sector was the focal point of the ICT industry in 2003. Many policies adopted by the government are designed to promote local software development and use. For example, the Government Software Purchasing Regulation released by the Ministry of Information Industry and the State Department Purchasing Centre requires

The Golden Card Project

The Golden Card Project was initiated in June 1993 to develop China's e-money system using integrated-circuit (IC) card technologies. Initially, the system was deployed solely by the People's Bank of China, but it was gradually adopted by many other commercial banks working together to make the transformation. The project is playing an increasingly important role in coordinating the secure and efficient use of bank cards, the supervision and management of financial transactions, and the application of IC card technologies.

The Golden Card Project has succeeded in increasing the number of financial organisations adopting IC cards from 5 to 91 by the end of June 2003. The total number of cards issued soared to 569 million compared with 4 million in 1993, and the savings attributed to the cards were valued at RMB 994 billion. The number of merchants accepting these cards, including stores, hotels and restaurants, rose from 20,000 in 1993 to 200,000. The number of ATMs reached 490,000 units compared with 4,700 units in June 1995. The volume of card-enabled trade grew from RMB 200 billion in 1995 to RMB 11,560 billion in 2002. This increased volume included interbank trade, which was never transacted before. The volume of trade in the first half of 2003 was RMB 75,700 billion, of which RMB 132 billion was in the form of retail sales. The bank-card system has evolved into a web of interbank and inter-district information exchange networks for customer service, financial administration, marketing, risk and fraud management, and other uses.

IC cards have also been adapted for application in the telecommunications, social security, tax, trade, transportation, customs, and construction sectors. These cards can store essential data, and they are secure, quick and easy to use. The number of cards in use reached 1.3 billion by the end of June 2003, with 70 million of them as telephone cards, 30 million as mobile phone SIM cards, and another 30 million as cards of societies and organisations, transport fare cards, fuel cards and others.

The Golden Card Project has also hastened the establishment of an integrated industrial base for the IC card industry: from chip design and production to the R&D of reading and writing implements used in the coding and application of these cards. It also includes the development of all kinds of applications and software as well as the integration of systems. About 80 percent of the materials and services used in the project are locally produced. These information products, which are the necessary accessories of the Golden Card Project, now make up a very promising new sector that contributes towards the growth of the national economy.

government ministries to use software produced in China. As such, Chinese software manufacturers will have the largest share of the market created by the 12 Golden Projects and the E-Government Project. In addition to the local software market, the sector has also started to target overseas markets. Five software export centres will be constructed in Shanghai, Dalian, Shenzhen, Tianjin and Xi'an.

Competition between telecommunications carriers has grown more intense since 2002. Conflict in interconnection and imbalance in competition plague the various networks. In order to maintain their smooth operation, the Ministry of Information Industry has speeded up development of the telecommunications network quality-monitoring system, investigation of network problems and drafting of the Telecommunications Law, which will regulate competition in the market. The draft law was submitted to the State Department in July 2004 and is expected to be approved sometime in 2005.

Regulatory environment

In spring 2003, some legislators proposed strengthening the legislative environment for the ICT sector. Among the proposals was Internet security legislation. However, laws enacted in 2003 were not related to Internet security. One of them was the regulation drafted by SARFT governing content distributed over the Internet and other information communication networks. It prescribes that network managers must apply for permission to distribute audio and visual content over the Internet. In addition, the Ministry of Culture drew up the Internet Culture Interim Regulation for controlling the production and distribution of cultural products over the Internet. The regulation also covers the provision of Internet cultural services. Any organisations proposing to set up such activities are required to obtain official permission.

The first legislative document dealing with the supervision and management of China's telecommunications market was drawn up by the Ministry of Information Industry. It emphasizes that problems in the telecommunications market should be solved through legal, economic and technological measures.

The regulatory environment for the ICT sector is complicated by contradictory laws and regulations. For example, the Internet Culture Interim Regulation issued by the Ministry of Culture contradicts the Internet Publishing Interim Regulation issued by the National Copyright Administration and the Ministry of Information Industry. This contradiction in regulation has made it difficult for companies to obtain approval and copyright for their products.

As noted earlier, spam has become a huge headache. Among the useless content mass distributed is a fast-expanding population of computer viruses and worms, seriously threatening the security of networks. Network

security was the focus of proposed legislation in 2004. A bill for speeding up legislation against spamming was introduced during the second meeting of the Tenth National Political Consultative Conference and discussed at a seminar in February 2004. Government officials, representatives of Internet associations and related enterprises, and legal experts attending the seminar unanimously supported the bill.

Open source movement

The government continues to promote the development and use of open source software and has agreed to cooperate with Japan and South Korea in this area. Although not yet standardised, Chinese Linux distributions such as Red Flag have been adopted by government departments. Meanwhile, Linux-based software has been developed that uses the scripts of some of the languages of minority groups in the country.

In October 2003, IBM and the Ministry of Education announced that they would adopt NetLog technology to promote their cooperation in education, scientific research and other areas at universities all over China. This is an excellent opportunity to diffuse Linux across China, and it may help to make the country the largest user of Linux systems in the world. However, before this can happen, hurdles associated with copyright, standards, access and content localisation need to be overcome.

Research and development

To raise the low research capacity in the country for core technologies, the government in 1986 launched Plan 863 to nurture the development and application of technologies and software. Significant breakthroughs have since been made in several areas, especially IPv6 and Linux. The National Development and Reform Commission has invested some RMB 400 million in the construction of the prototype next-generation Internet based on IPv6.

After more than a year of research, the final draft of the digital video standard was released on 25 November 2003 for public review.

The first 3G cellular phone and its core chip were successfully developed in Chongqing and Shanghai towards the end of 2003. With these innovations, China joined the ranks of advanced developers of mobile telecommunications technology.¹⁷

Lenovo Company and Shuguang Information Co., Ltd successfully built the high-performance computers Shenteng 6800 and Shuguang 4000A, with computation speeds of 4.2 trillion times and 10 trillion times per second respectively.

Trends

The development of the Internet in China remains in its infancy, in spite of the encouraging progress made so far.

The range of web-based applications, multimedia content, and Internet services offered by local providers will expand with the increasing number of users who have broadband access. The outbreak of SARS has helped to stimulate the demand for Internet-based applications and services, which include online games, advertising, messaging, e-conferencing, e-commerce, telemedicine, distance education, e-banking, e-government and blogs.

China's huge population makes it a massive Internet market. However, it is not yet a powerful Internet market, as its penetration rate has not reached half of that of developed and emerging economies. The digital divide is widening. Furthermore, the Internet sector has yet to be integrated with other sectors and industries. Relevant laws and regulations for the ICT sector have yet to be finalised, and network security remains weak. These challenges for now stand in the way of the Internet developing to its full potential.

A review of the informatisation efforts shows that the various initiatives have chalked up many achievements. However, the uneven development between industries and between regions, as well as the lack of coordination between the hardware and software sectors, indicates that much remains to be done. The three major informatisation projects also clearly illustrate that informatisation efforts are interrelated. For example, the uneven development within the E-Government Project has affected the Enterprise Internet Project. Furthermore, the lack of enabling policies and clear regulations, obsolete social systems, and other impediments have also adversely affected these projects.

Despite all the challenges, improvement in technologies and the increasingly sophisticated demands of users are expected to spur the growth of the Internet to its full potential in China. The government and research institutes are strengthening work in areas such as IPv6 and grid technology to cope with future needs. The Internet Society of China and other NGOs will play an increasingly important role in enhancing industrial autonomy and information security and in the drafting of Internet laws and regulations. China's Internet of the future will ride on a second wave which will bring about a period of more rational and mature development.

In the meantime, the government should intensify its effort to promote the harmonious development of the different sectors and regions. This will include the coordination of hardware and software development and the facilitation of beneficial interaction between projects. Informatisation needs to be appreciated as one huge project that ultimately seeks to bring about social innovation. The active participation of the whole society, together with harmonious innovation within various fields, is necessary for this project to succeed. The sustained implementation of government projects with the active participation of NGOs and civil society will bring a bright future for the informatisation of China.

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