Research on Digital Technology Enabling Urban Public Service Construction

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Abstract: Currently, the development of global digital technology is still on the rise, promoting the change of production and life style, and becoming an important force to promote the modernisation of urban governance. Under the digital society, networked and intelligent technologies not only bring revolutionary changes to human learning, work and life. At the same time, digital technology is also gradually integrated with the depth of smart city construction, constantly improving the efficiency of urban public services and promoting the high-quality development of urban public services. Digital technologies such as big data and cloud computing also provide new ideas for digital public services, but there are also problems such as weak awareness of big data, data security and data leakage, digital divide problems and lack of digital technology talents. Countermeasures are proposed to address these issues to better promote the development of digital public services.

Keywords: digital technology; urban public services; problems and countermeasures

1 Introduction

With the rapid development of China's big data, blockchain, artificial intelligence and other digital technologies, some of the technologies have been widely used, better integrated with the development of the economy and society, and provide important technical support for promoting the high-quality development of urban public services. [1] Actively responding to the public service needs of the people and optimising the supply of public services have become the centre of contemporary global public service development. Smart city, on the other hand, refers to the use of digital technology to improve the quality of life of residents in addition to improving the efficiency of urban or regional processes. Public services play a crucial role in this. [2] In recent years, the public service system of China's cities has been improved and perfected, but with the acceleration of the urbanisation process and the expansion of the city's scale, the problem of unbalanced and insufficient development of the city's public services has become increasingly obvious, and the technological requirements for digitisation have also been increasing.

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2 The current state of digital technology-enabled public services in China's cities

Smart cities are now being applied in research and practice as an approach to urban development that involves not only the development of new public smart services for citizens, but also the construction of city-wide technological infrastructure. [3] China has accelerated into a digital era driven by digital government, supported by digital economy and pulled by digital society. The integration of the Internet and public services can better promote the high-quality development of public services. The scale of Internet users in China has been expanding in recent years, and the Internet penetration rate has been increasing. (As shown in Figure 1)

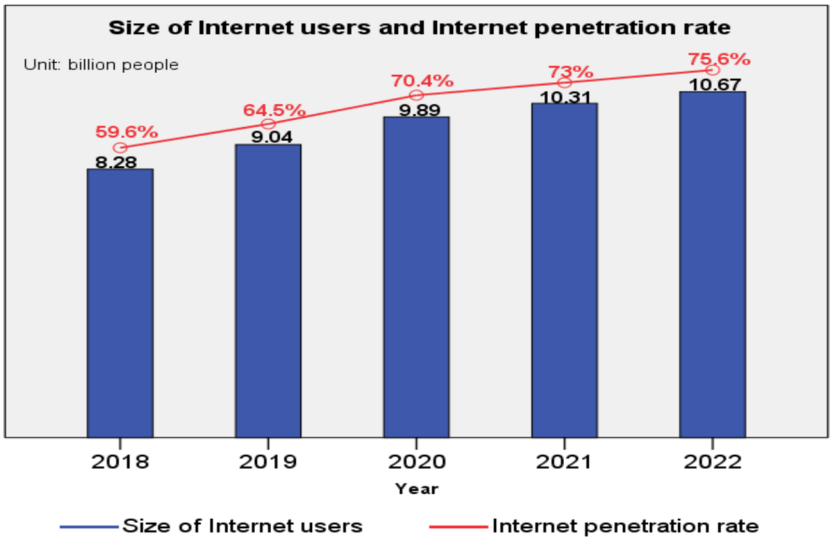

Figure 1 Size of Internet Users and Internet Penetration Rate
Source of data: Statistics based on the China Internet Development Statistics Report.

2.1 Digitally Enabled Urban Transport Services

Cities are built on transport, and transport is the foundation of production, life and socio-economic development of human society. The construction of transport can not only facilitate people's lives, to meet the requirements of people's daily life of food, clothing, housing and transport in the "line", to meet the ever-expanding city how to be more convenient, more comfortable, more punctual commuting requirements, the transport is more related to the development of the national economy. Intelligent transport is to optimize the traffic control system, improve the comprehensive efficiency of traffic and ensure traffic safety as the goal, fully apply the information and communication network, Internet of Things, cloud computing, big data, artificial intelligence, blockchain and other new technologies and the deep integration of the transport industry, build a smart integrated transport system covering vehicles, people, transport infrastructure, the environment and other factors. [4]

Chengdu TOCC (Chengdu Traffic Operation and Coordination Centre) leverages AliCloud's powerful computing power and dynamic scalability to meet the complex data processing needs of urban traffic with large traffic volume, high concurrency, and quasi real-time, efficiently aggregating various types of traffic information in the same spatial and temporal domain, providing important support for digital decision-making, precise management, and intelligent public travel in traffic operation. Relevant data show that intelligent transport can make vehicle safety accident rate reduced by more than 20%, traffic congestion reduced by about 60%, short-distance transport efficiency increased by nearly 70%, the capacity of the existing road network increased by 2-3 times. Reviewing the development history of China's intelligent transport system, compared with developed countries started late. (As shown in table 1)

Table 1 Development history of intelligent transport in China

times	Relevant Policies	Related content
2012	National Indicator System for Pilot Smart Cities (Districts and Towns) (Trial)	The concept of "intelligent transport" was proposed for the first time.
2015	Guiding Opinions on Actively Promoting "Internet Plus" Actions	Proposing the combination of "Internet Plus" and the transport industry
2017	Action Programme on Smart Transport for Easier Travel (2017-2020)	Proposed comprehensive construction of intelligent transport
2019	Outline for the Construction of a Powerful Transportation State	Inclusion of Intelligent Transport in Key Industry Development
2021	Digital Traffic "14th Five-Year Plan" Development Plan	The development pattern of "one brain, five networks and two systems" will be basically completed by 2025.
2022	Plan for Scientific and Technological Innovation in the Field of Transport in the Fourteenth Five-Year Plan	Proposing synergistic development of smart transport and smart city

2.2 Digital empowerment of urban education services

At present, the rapid development of information technology has created favourable conditions for building a networked, personalized, intelligent and digital education system. Digital education should be fair and inclusive and of better quality. Digitalisation is the new wave leading the future development, and the combination of digitalisation and education is bound to promote profound changes in education. Digital education can not only effectively improve the quality of teaching and learning, but also promote a more equitable education, and promote the precision and equalisation of the supply of educational resources. Making full use of big data, AI and other information technology, we can provide better quality, more convenient and more efficient education services, improve the digital literacy and ability of learners, and create a borderless teaching in which "everyone learns, can learn at all times, and can learn everywhere". Empowering education with digital technology and comprehensively promoting the digital transformation of education is conducive to promoting the development of education from basic balance to high balance.

By 2021, the number of schools with full wireless network coverage in primary schools in China will account for 75.3 per cent of the total number of primary schools, and the number of schools with full wireless network coverage in junior middle schools will account for 76 per cent of the total number of junior middle schools. At present, the Internet access rate of primary and secondary schools (including teaching points) nationwide has reached 100%,

which is 75 percentage points higher than that in 2012. In March 2022, the Ministry of Education revamped and upgraded the former National Primary and Secondary School Network Cloud Platform into the National Primary and Secondary School Wisdom Education Platform. On July 7, 2023, Yanji City and the Yanbian branch of China Unicom signed a strategic cooperation agreement to "help Yanji City Education Digital Transformation" strategy. Helping Yanji City's education digital transformation" was officially launched. After signing the agreement, the two sides will deepen the cooperation of the digital base of education MAN, set up a joint innovation and practice base for education digital transformation, create a 5G+ wisdom education experience hall, comprehensively explore the education industry "on the cloud with digital empowerment of wisdom", accelerate the deep integration of 5G and campus network, and face the multiple application scenarios, such as teaching, exams, evaluation, campus, management, and so on. application scenarios.To create a "1 network + 1 cloud + 1 platform + N applications" of intelligent education digital system, to promote the high-quality development of education informatisation in Yanji City.

2.3 Digitally Enabled Healthcare Services

In the process of human survival and social development, life and health security is the foundation of human social development and the most crucial issue that all human beings are bound to face. Access to medical care is the most important foundation of every country. The medical services empowered by digital technology have, to a certain extent, improved the efficiency of medical access, saved medical resources and reduced medical costs. Connected technology is also driving the simplification of the process of access to healthcare. Efficient use of limited resources is realised through mobile internet technology. Online technology simplifies the medical process, reducing the number of queues and shortening queuing time. Let information run more, let the public run less", from "door-to-door service" to "door-to-door service", so that the public can complete the booking of registration, payment, query results and other matters through the APP, so that it is more convenient to see the doctor and seek medical treatment. This makes it more convenient and faster to see a doctor. As of December 2022, China's Internet medical user scale reached 363 million, accounting for 34.0% of the overall Internet users.

Zhejiang Province is the birthplace of the "most run once" work. Since 2021, Anji County Health Bureau has been pioneering and innovative, continuing to increase the effectiveness of digital reform, so that medical care to achieve "1 + N" a variety of possibilities, from the development of online cloud HIS system, put into use 120 intelligent pre-hospital emergency system, the development of "Internet +" project health care. "Benefiting the people project health insurance card" multi-code universal "and other areas, various aspects of the people to provide convenient services. To create a new model of intelligent medical care, to promote the deep integration of medical and public health services, and to promote the deep integration of public health services into the construction of the medical community. [5]

2.4 Digital-enabled elderly public services

Nowadays, the "digital wisdom" of the elderly is gradually penetrating into the lives of the elderly, and with the advancement of digital technology, the elderly are bound to enjoy a better quality of life in old age, and the digital technology-enabled pension services make old age more convenient and warm. With the accelerated aging of society, local governments are

responding to the demand to actively address the "digital divide" problem of the elderly, and various places have launched actions to help the elderly connect to the "digital life". Digital technology is not always difficult for the elderly, but also provides them with a lot of convenience. As of December 2022, there will be 344 million non-internet users in China. In terms of age, the elderly group aged 60 and above is the main group of non-Internet users, and the proportion of non-Internet user groups aged 60 and above in China to the overall number of non-Internet users is 37.4 per cent.The elderly group aged 60 and above is still the main group of non-Internet users, but the proportion of the group of Internet users aged 50 and above is also increasing. (Figure 2)

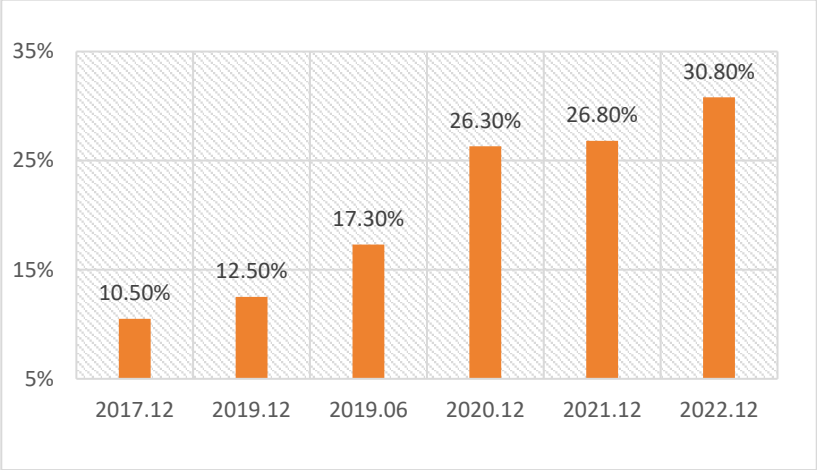

Figure2. Percentage of Internet users in the 50+ age group
Source of data: Statistics based on the China Internet Development Statistics Report.

In Shanghai, where digital life has been promoted earlier, the elderly have encountered more problems with the "digital divide". The Opinions on Comprehensively Promoting the Digital Transformation of Shanghai City point out that efforts should be made to solve the problem of "digital divide", advocate "digital accessibility" of all kinds of public services, and promote the adaptive modification of relevant services for the elderly and the disabled, so as to create a new picture of digital life that is ubiquitous, high-quality and inclusive. We also advocate "digital accessibility" for all kinds of public services, and promote the adaptation of relevant services for the elderly and people with disabilities, so as to create a new picture of ubiquitous, high-quality and inclusive digital life. [6] In Nanjing, Jiangsu Province, in order to solve the problem of the elderly not knowing how to use smartphones, community volunteers come to the city almost every week. Community volunteers come over almost every week to help take care of the elderly and provide them with training and other forms of service activities to help the elderly. In Kunming City, Yunnan Province, Dongnan community "drip nurses" conduct tests on blood sugar, blood pressure, urine routine, electrocardiograms and cholesterol for the elderly, saving them the trouble of queuing up at hospitals for minor tests.

3 Problems of digitally enabled urban public services

Currently, big data and digital technologies are widely used in the construction of urban public services, but while digital technologies have a positive impact on urban public services, there are also some potential risks. The development of digital technology also faces some new problems and challenges. For example, digital technology to promote the development of public services may face problems such as data security and data leakage, uneven development of digital technology has exacerbated the digital divide between urban and rural areas, lack of digital talent, insufficient attention to digitally disadvantaged groups, and lack of a unified digital management department. All these factors affect the high-quality development of public services.

3.1 Weak awareness of big data

The government, as the main body of urban public service provision, has mastered a large number of data resources, creating conditions for city managers to provide public services, but it lacks the awareness of integrating and analysing data, and lacks a unified digital management department, which limits the role of big data in the construction of urban public services. In addition, the digital resources held by the government are often dispersed in various departments, and some government personnel are unwilling to share their own digital resources, leading to the problem of "siloing and fragmentation" of information, which, to a certain extent, hinders the development of urban public services. How to improve the government's awareness of big data, enhance the ability of digital governance, so as to improve the quality of service and service efficiency has become a very important issue.

3.2 Data security and other issues

Data security is is the foundation of cyberspace security and an important part of national security. In recent years, China has made remarkable achievements in building a digital China and developing a digital economy. However, in the era of digital economy, while giving full play to the role of data elements, problems such as the abuse and leakage of data have become increasingly prominent, and there is also a need to guard against data leakage, theft, tampering, misuse, etc., to bring damage to individuals, enterprises, society and even national interests. The development of big data, while bringing convenience to people's lives, also brings great potential danger to personal security and privacy, and from time to time there are problems of citizens' privacy leakage. Some Trojan viruses, software vulnerabilities and other risks, specialised cybercrime organisations love will also pose a threat to the information and data of individuals and enterprises. [7] Therefore, safeguarding data security is also a key step in promoting the development of urban public services.

3.3 Constraints of Digital Divide

In the process of digital technology deeply embedded in social development, the social problems derived therefrom have become increasingly serious, and the digital divide is the most representative hotspot problem, mapping out the persistence of inequality in the digital realm. [8] First, the digital access divide, digital infrastructure is the basic conditions for the digital transformation of urban public services, some rural areas of digital infrastructure conditions lag behind urban areas, digital technology fails to cover all urban residents, the

digitisation of urban public services has also to a certain extent widened the gap between groups. Secondly, the digital use divide, the digital divide problem of the elderly and disabled groups is becoming more and more prominent, in the inability to use digital technology and the Internet, but also affects their daily life and social participation, such as travelling, medical treatment, consumption, etc., reducing their sense of access to digital public services.

3.4 Lack of digital technology talents

In the era of digital economy, digital technology empowers social and economic development, which in turn amplifies the siphon effect on global digital talents, and at present, China still lags behind developed countries in the digital field. Relevant research shows that in 2022, the number of Chinese digital economy talents in the field is close to 30 million people, and the talent gap is about 18 million people. It is expected that by 2025, the talent gap will exceed 25 million people. Due to factors such as geography and policy, developed regions are more capable of attracting high-level digital talents than backward regions. Big data, cloud computing and other digital technologies have become an inevitable choice for the government to provide public services, and there is an increasing demand for digital technology expertise. The current talent structure is difficult to meet the rapid development of the digital economy industry, both master professional big data technology, business ability and strong comprehensive talent is more scarce. The supply of talents in digital technology can not meet the needs of the market, and the cultivation of digital talents is very mismatched with the development of China's digital economy. [9]

4 Digital empowerment of urban public service policy recommendations

4.1 Strengthen the government's digital governance capacity

In the digital era, the government faces many challenges and is given more missions and expectations. New governance needs emerge in society, and social information and social resources in the digital era are digitised, so the government needs to make adjustments towards the new governance environment, create a new type of government, and accelerate the innovation of urban digital public service model. It is necessary to strengthen the digital technology training of the cadres and improve the awareness of institutional security and digital technology level of the government's digital governance staff. The rapid expansion of digital technology has paved the way for new forms of organisation, with increased exchange of data and knowledge between individuals and organisations. [10] Digital technology-enabled urban public service innovation involves a number of government departments, which puts higher demands on inter-departmental synergies, and should further clearly define the functions of government departments to integrate resources and form synergies. As shown in Figure 3, the government needs deeper synergy to create a new type of government, promote the sharing of resources, and facilitate the precise matching of governance demand and governance supply.

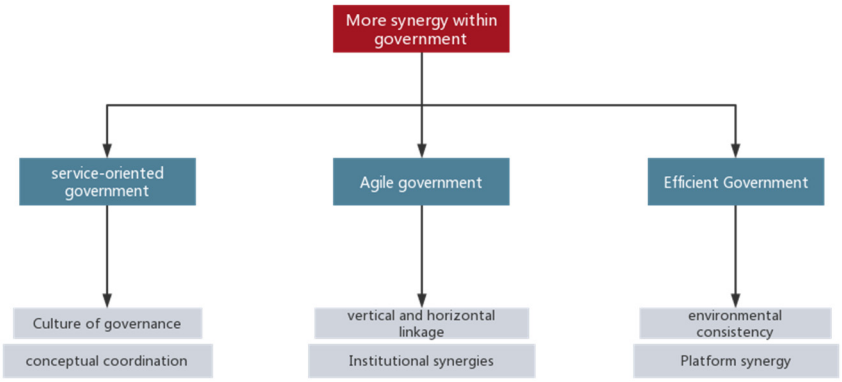

Figure3 Internal synergies

4.2 Improve the level of data security technology

While digital technology brings convenience to production and life, it also brings new risks and security risks, and it is necessary to continuously improve the level of data security technology. Together with the security governance of data, it can not only protect the privacy of individuals and enterprises, but also has great significance for the information security of the country. Government departments need to enhance their digital regulation and service capabilities based on government digital governance-enabled public services. Government departments at all levels should set up corresponding data security protection departments to carry out specialised data security governance. Secondly, it is necessary to improve the laws and regulations on data security and scientifically set the principle of attribution of responsibility, so that the relevant laws can provide better governance of data security issues. In addition, we should actively develop the data security industry, and further promote the systematic and intensive development of the data security industry, in order to provide industrial support for building a solid data security technology barrier.

4.3 Pay attention to digitally vulnerable groups

The relative "digital divide" in the era of digital intelligence will persist for a long time. With the advancement of digital technology, people on the digital fringe not only can't share the convenience brought by digital technology, but also increase the burden. Especially for the elderly, the development of digital technology has made many elderly people feel at a loss, and many of them have been forced to become the "disadvantaged group" in the era of digital intelligence. Public services should be targeted at all citizens, and local governments should also actively address the problem of the "digital divide" among the elderly. Increase training and publicity for the digitally "disadvantaged" and encourage older people to learn digital skills. The development of "ageing" and "vulnerable" products requires the participation of multiple service providers to maximise the access and participation of all citizens in digital public services, so that they can enjoy digitally-intelligent public services.

4.4 Cultivate digital technology talents

Technological competition boils down to talent competition. Enhancing the effectiveness of data security governance is difficult to achieve without an excellent talent team. Therefore, it is necessary to cultivate a large number of data security governance talents who are adapted to the development of digital technology in the new era. China's shortage of big data talents should establish data governance-related disciplines in universities and encourage universities to set up data science, data engineering and other related majors. Universities and various research institutions are encouraged to pay attention to talents, such as Peking University, which has established the Peking University Big Data Research Institute. Digital empowerment of urban public services, the demand for digital professional talents is also increasing. It is necessary to give relevant policy support and financial guarantee to the cultivation of big data talents, and attract more comprehensive data talents with higher professionalism and stronger business ability to participate in the process of digital transformation of China's government public services.

5 Conclusion

Cities have come a long way from emergence to development, and we are moving into the digital era of digitisation, intelligence and wisdom, and doing a good job in city construction, transformation, development and operation will be related to the stability of the country and the development of the region. The digital transformation of cities needs to be technology-enabled, and new digital and smart technologies should be widely applied. The relevant recommendations for the digital empowerment of urban public services can better promote the high-quality development of urban public services.

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