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Bridging the Elderly Digital Divide: Research on Strategies of Chinese Public Service

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Abstract: The aging of the population is a huge problem facing China. In the context of vigorously promoting "internet + public services", new digital public services such as online ticket purchase, smart medical care, online car-hailing, online tax payment and online social insurance are emerging, bringing convenience to the people in enjoying public services, and also causing a series of problems for the elderly. This article discusses the three digital divides that the elderly are facing in public services, and proposes corresponding governance methods for these problems. These research strategies aim to ensure that the elderly can enjoy equal rights to a better life in the digital society. They also hope to provide valuable reflections on the reform strategy of Chinese public service and the long-term development of bridging the digital divide.

Keywords: digital divide, public service, elderly

1. Introduction

In order to promote long-term balanced population development and high-quality economic development, China launched The seventh National Census in 2020. On May 11, 2021, the results of The seventh National Census announced that the total population of China was 1,411,787,724. From the perspective of age structure, the population of 60 years and over was 264.02 million, accounting for 18.70% of the total population. Compared with 2010, the proportion of the population aged 60 and above had increased by 5.44% [1]. That means the population aging has further deepened in China.

In this aging society, the elderly have become the "vulnerable group" used by the internet and various smart applications or devices, due to the imbalance of digital development. Especially during the period of the COVID-19 pandemic, technology has been adapted to try and mitigate negative effects, offering individuals digital alternatives to many of the day-to-day activities which can no longer be completed normally [2]. This means that people's dependence on the internet has increased severely. However, the elderly population, which has been worst affected by both the virus, and the lockdown measures, has seen the least benefits from these digital solutions [2].

Although advanced technological innovations and the internet appear to be available everywhere, a large section of society was still on the wrong side of the digitizing, and citizens unable to fully enjoy the benefits of the revolutionary changes taking place [3]. Actually, this dividing line is the so-called "digital divide". The age based digital divide described a longstanding inequality in the access to, and skills to make use of, new technology [2]. While this problem is not new, it has caused a large

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portion of the population (especially the elderly) unable to make use of many digital measures to get more help in now digital age. Therefore, how to narrow the digital divide of the elderly is worth doing.

At present, what urgently needs to be resolved in China is the digital divide between the elderly and social public services, rather than the digital problems in the communication and entertainment of the elderly. In the digital age, the provision model of Chinese public services had undergone a fundamental change, forming an interactive service model based on big data technology[4]. New forms of digital public services such as online ticket purchase, smart medical care, online education, digital library and online payment are emerging, bringing unprecedented convenience to the people in enjoying public services. For example, Shangcheng District in Hangzhou, has created a 5A-style community digital public service model that fully meets the various needs of residents by introducing internet technology and smart terminal equipment. This proved that the digital connection between community public services and residents' daily lives has been realized[5]. Among them, public services such as medical care, elderly care, traffic service and so on are closely related to the lives of the elderly, which means that those public services are more urgent to find a suitable development strategy to balance digital development and the use of the elderly.

The General Office of the State Council of the People's Republic of China issued an implementation plan for practically solving the difficulties of the elderly in using smart technology on November 24, 2020. The document stated that it is necessary for the elderly to better enjoy the results of informatization development and it must further promote the construction of a smart society for the elderly[6]. Therefore, this article aims to explore how the digital divide in public services for the elderly is caused, and what specific solutions are available for this problem. It also aims to highlight the need to pay more attention to the construction of a smart elderly society and the development of the silver-haired economy. It hope to provide valuable suggestions for the change strategy of Chinese public services and to close the digital divide for good in the long-term.

2. Literature review

The term digital divide first appeared in the United States in the 1990s. At that time, new technologies represented by information and communication technology(ICT) not only brought economic development to human society, but also brought new inequality and digital differentiation. The description of the connotation of the "digital divide" in the previous literature basically tends to be consistent. The "digital divide" was usually defined as the difference between people who can and cannot use information and communication technology. To be more specific, its essence was the imbalance in popularization and application of emerging digital, information, and communication technologies represented by the interne[7]. This imbalance generally exists between different countries, regions, classes, industries and groups. The United States was the first country that began to pay attention to the issue of the digital divide, and regarded the "digital divide" as its primary economic and human rights issue. With the proliferation of the internet, the digital divide has attracted the attention of governments and societies around the world.

In the early days, people believed that bridging the digital divide could be solved by improving ICT access, such as increasing the construction of communication infrastructure, rising the number of internet access, reducing tariff costs, and allowing more people to use the internet[8]. Indeed, the internet access gap has gradually been filled with the upgrading of ICT technology. The "access gap" was usually called the first digital divide. Nevertheless, there are still some problems at the level of the elderly. First of all, the economic capacity of the elderly is relatively weak, such as the cost of smartphones or broadband will pose a large economic burden for them. In addition, the motivation of the elderly to access the internet is generally not strong because of the generally low level of education and lack of necessary knowledge and skills for them. According to the data of iResearch, in 2019, Chinese smartphone users reached 1 billion, accounting for 70% of the total population, while the

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proportion of smartphones held by the elderly was much lower than this number[8]. According to the "Mobile Internet Report for Elderly Users" released by Tencent in 2018, there were currently 80 million elderly internet users in China, accounting for about 30% of the elderly population, which was a huge gap between the proportion of smartphones held by the total population[8].

Actually, the internet penetration rate of the elderly in China has also achieved a major breakthrough under the catalysis of the epidemic. The massive increase in access not only brings new dividends to the survival, life and development of the elderly, but also brings new challenges. Due to differences in economy, education, environment, and innate endowments between different groups, there were differences in abilities at the application level, forming the so-called "application gap" which was the second digital divide[8]. A study funded by the British Academy and the Leverhulme Trust found that elderly people may had physical impairments when using digital media and technology. For example, some elderly people have physical and mobility barriers, some text fonts on digital media are too small to read, or screen buttons are too small to control. On the other hand, the study found that there were cultural differences in network communication. When the elderly used social media to communicate online, most of them showed a passive state. Because they didn't like the way of communicating with other people through social media[9]. The 47th "Statistical Reports on Internet Development in China" released in February 2021 also pointed out that there were some problems in the application of digital media among the elderly, such as lack of skills (not knowledgeable about computers/networks, 51.5%), restrictions on education (do not understand pinyin etc., 21.9%), etc[10]. In addition, the "Research Report on Internet Life for the Middle-aged and Elderly" jointly issued by the Institute of Sociology, Chinese Academy of Social Sciences and the Tencent Social Research Center pointed out that the three basic operations were the biggest obstacles to the use of digital media by the elderly. Those were the use and operation of basic functions, the set and maintenance of the mobile phone system, and the download of applications. Obviously, the elderly have the awareness to participate in digitalization, but they lack the ability to apply information and communication technology, which includes the ability to acquire, use, and create information content. This means that even if they have a smart phone, they cannot use it proficiently and have limited use functions.

In addition, some scholars believed that digital divide was caused by the social system which imbalanced between in behavioral differences and resource allocation, that is, the weak position of the elderly who had suffered long-term rights damage[11]. This was defined as the third digital divide called the "rights gap", which included age discrimination and rights damage[11]. At the level of the "rights gap", the digital rights of the elderly are more vulnerable to infringement. On the one hand, the problem of fraud against the elderly is endless, so that a safe and risk-averse network environment still needs to be improved. For example, the elderly are trapped by lengthy and obscure user agreements when using APP, and they are "forced" to check and agree some agreements. For some rights traps that may exist in the internet, because the elderly lack the ability to distinguish, they are more likely to fall into this trap. Their data rights, network privacy rights, virtual reputation rights, and rights of expression are easily harmed. Therefore, it is very important to protect the elderly from telecommunications, finance, and internet fraud, provide convenient judicial relief channels for the elderly, and establish a sound accountability system in the government. On the other hand, digital media still has algorithmic discrimination against the elderly. For example, an old man named John in the UK mentioned the difficulty of placing an order online. As a user who used online banking for the first time, his card was marked as suspicious and could not be verified[9]. In fact, many elderly people like John had to rely on the internet for the first time during the COVID-19 pandemic. But online banking has not simplified the identity verification process, especially for those who use digital shopping for the first time, the system settings are very unfriendly. Because the elderly lack social capital and they are not the mainstream group of data algorithms in digital media and applications, it

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is difficult for them to get any motivational support from the beginning. In online fraud and algorithmic discrimination, the rights of the elderly cannot be guaranteed on the internet.

When linking the “digital divide” with public services, the “digital divide” can be directly regarded as the gap between groups that can use the internet to obtain public services and those who cannot or hard to use the internet to obtain public services. The disadvantaged position of the elderly in the digital age and their special needs for services make public services which based on big data facing the "marginalization" of demand expression, the "formalization" of service response, the "technical indifference" of service delivery and the “digital divide” of service access[4]. These questions may lead to more important social problems, such as elderly people not being able to register online, health codes difficult to use, and travel difficulties. This also makes it impossible for the development of social public services to make real progress. In the process of development and formulation of public services which under the interactive model of big data, they have chosen one side of the digital divide rather than the other. The chosen side is majority of young people who can actively use these services, rather than old people who passively accept them. Therefore, what public services need to do is not only to narrow the digital divide for the elderly, but also to take care of the people at both ends of the digital divide at the same time (active and passive people), formulating different plans to achieve the same goal which is to truly serve the people.

3. Analysis the change strategy of Chinese public service

The intensification of "digital inequality" will cause public anxiety, erode public trust, and undermine social harmony. Only when social governance strives to achieve "digital equality" and "digital tolerance", it can stabilize the country and bring fundamental changes to the efficiency of social undertakings [12]. Therefore, the United Nations 2030 Sustainable Development Goals put the principles of digital inclusion, empowerment, equality, and the concept of “leave no one behind” at the core. Under this traction, this paper builds a comprehensive governance method for public services in China based on the basic characteristics of the digital divide among the elderly. It analyze specific governance paths from the four dimensions of bridging the access gap, bridging the application gap, bridging the rights gap, and public service governance methods, so as to ensure that the elderly have equal rights to a better life in the digital society.

3.1. Bridging the access gap

Bridging the construction of appropriate aging of public services can increase the number of access by the elderly. In detail, in view of the problem in the access gap of the elderly, in addition to improving information and communication technology, public services should be innovated the construction of digital governance mechanisms and reasonably developed products suitable for use by the elderly.

Nowadays, smart phones which with large buttons, larger fonts, and high-volume speakers tailored for the elderly have appeared. 5G smart phones for the elderly can be equipped with various services, such as remote assistance, synchronizing family photos, sharing albums, and fast medical consultation services, which play an important role in promoting the transition of the elderly to the digital space. In addition, the government and enterprises should combine the current needs of the elderly to launch more products suitable for the elderly, such as R&D with a simple interface, easy-to-operate design, one-key operation, voice input and other convenient functions. At the same time, it can also strengthen the device's ability to recognize dialects to convenient for people who do not speak Mandarin. When the elderly can get a sense of satisfaction from these elderly-friendly products, the access rate of the elderly can increase rapidly.

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For example, JD.com and ZTE launched a new type of mobile phone named "Time Machine" for the elderly. In addition to adopting settings that are more friendly to the elderly in terms of display, ringtones, etc., the application scenarios of smart phones for the elderly have been formed around the three capabilities of "family hours light", "low threshold for getting started" and "seeking doctors but not seeking people", which realize the coverage of life, medical care, travel and other fields. Now in China, Gothe has launched a one-click taxi-hailing applet for the elderly. This application can provide priority dispatch service for the elderly, and can also locate the location of the elderly in real time, avoiding manual location input. Taobao has launched an APP that is low-cost and worry-free version for the elderly. In response to the shopping needs and habits of the elderly, it reduce information display and reduce the difficulty of shopping for the elderly. The internet company Baidu launched a large-character version of Baidu APP in response to the common problem of vision decline among the elderly. On the basis of processing the large characters of the content on the whole site, this version has replaced the content on the homepage with a short video format preferred by the elderly. At the same time, it strictly controls the video content to ensure the authentic authority of the content, and it push content focuses on the military, technology, health care and other fields that the elderly favor. In addition, this version of Baidu has launched a differentiated product called "Accompanying Radio" which focuses on the lack of companionship of the elderly. This function can broadcast news by voice with one click, which fundamentally solves and satisfies the needs of elderly users to obtain information in the "listening" scene. And it can also allow the children of elderly users to record 20 sentences to generate their voice packets, so as to realize the "voice accompaniment" of the children to their parents. In addition to satisfying the basic needs of the elderly for information acquisition, various internet products also bring more possibilities to their digital lives.

In short, reducing the cost of smart phones and strengthening the aging construction of smart devices and services can improve the satisfaction of the elderly in digital use, consequently effective narrow their access gap.

3.2. Bridging the application gap

Aiming at the problem of the elderly's lack of the ability to apply information and communication technologies, it is a very important method to cultivate their digital literacy for lifelong learning. Actually, the digital age is updating the definition of the elderly. As the average life expectancy increases, the psychological age determines that the elderly have a high learning momentum and can adapt to the digital age. Therefore, in order to solve the problem of the application gap for the elderly, it is the responsibility of the entire society to carry out training and learning of digital technology for the elderly.

First, the government can take digital skills as an important part of compulsory education to provide a solid foundation for the digital capabilities of the entire society. Secondly, community agencies can help local members nearby, organize group learning and regular training for them, and provide them with necessary help. In this way, it can not only guide the elderly to understand and learn digital skills, improve their network skills, awareness of information resources and interest in learning, but also it can greatly alleviate the elderly's fear of new technologies and reduce their sense of strangeness and distance from high-tech and digitalization. For example, the Community Training College of Jurong City, used the "Smart Classroom" to organize the "A Series of Training Classes on the Use of Smart Phones for the Elderly". The training class invited staff from China Mobile and professional technicians from China CITIC Bank. It plans to teach basic smart technologies related to daily life such as mobile phone calls, APP downloads, consumer payments, query "health codes", online medical appointments, online transportation appointments, bank card bundling, and prevention of financial fraud, which through a combination of offline focus and online micro-video within four weeks. In addition, in order to effectively solve the difficulties in using smartphones for the elderly

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in Shanghai, the community school in Xinqiao Town organized a "Smart Learning Fingertips" activity for the elderly. This activity allows the elderly to better adapt to and integrate into smart life by carrying out practical training on smart phones for the elderly in the jurisdiction. As of March 2021, the school has opened 10 teaching activities in 5 communities. In the future, the school will gradually promote full coverage in various communities, so that the "Smart Learning Fingertips" project will benefit more elderly people. Finally, internet companies and social service departments should integrate technical resources, educational resources, and public welfare resources, building a smart service platform that provides digital learning for the elderly. They should also jointly promote the development and dissemination of products such as the online lifelong education and learning system for the elderly [13].

Although the digital access of the elderly has been greatly improved, we still need to help the elderly to improve their digital literacy and application ability, so that the elderly can become active technology users, not just passive technology recipients. More importantly, the relatively weak digital learning capabilities of the elderly cannot be coordinated in a way that restricts the rapid development of the digital economy. On the contrary, the government should effort to promote the "internet + public services" model in order to accelerate the growth of the digital economy. It also should use digital technology to optimize public services, and lay the foundation for building a digitally inclusive society for the elderly [14].

3.3. Bridging the rights gap

At the level of the “rights gap”, it is undeniable that the “digital rights” of the elderly are more vulnerable to infringement. In the face of the rapid development of "internet + public services", governments must clearly recognize the complexity of the current governance pattern, so as to strengthen the legalization process of digital services, increase supervision and crackdowns, and avoid the negative impact of the rights gaps on the elderly.

On the one hand, relevant government departments must issue corresponding regulatory policies based on their respective functions in response to digital illegal and criminal acts. With regard to prominent problems such as "digital speculative groups" disrupting market order, infringing on citizens' rights, and using internet platforms to make illegal profits, government departments should establish and improve corresponding laws and regulations as soon as possible [5]. On the basis of ensuring the security of the personal information of the elderly, it eliminates all obstacles for the elderly to participate in family, community, and social life, so as to provides the elderly with a safe and convenient social environment that can avoids risks. Actively cultivating and shaping a legalized digital environment can encourage more elderly people to participate in social activities and become "enjoyers" of the information society. For example, the "Ehuiban" APP established by the Hubei Provincial Government, in addition to providing government services, it has also established an "internet + Supervision" platform that integrates information inquiry, coordinated supervision, joint rewards and punishments, risk warning, efficiency supervision, complaints and other functions, which has greatly improved the government's governance capabilities. The platform has a risk warning system. Through the establishment of risk models, the system provides early warning of risks such as money laundering, tax evasion, pyramid schemes, fraud, transportation of dangerous goods and illegal medical advertisements, therefore, improves the predictability of government supervision. Such product functions and supervision system can not only effectively protect the rights of the elderly during use, but also create an open, tolerant and orderly development environment for "internet + public services".

On the other hand, in view of the algorithmic problems of digital products, public services should be designed and updated reasonably according to the needs of the elderly. For example, the National Immigration Administration announced that starting from April 1st, six new measures will be

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implemented to facilitate the handling of entry and exit documents for the elderly. These include establishing a green channel for the elderly to apply for licenses; facilitating the use of self-service equipment for the elderly; simplifying the process of collecting photos for the elderly; providing a variety of payment methods; improving the online experience of the elderly; and opening the government service platform for document delivery services. Therefore, real-time attention to and response to the needs of the elderly in digital development is an important guarantee for the rights of the elderly.

3.4. Methods of public service governance

The disadvantaged position of the elderly in the digital age exists objectively. In order to meet the diversified, complicated and heterogeneous service needs of the elderly, the government needs to strive to resolve the obstacles caused by demand differentiation. First, the government should provide institutional guarantees for elderly people to participate in digital public services, including extensively listening to service needs and criticisms, and responding and adjusting in a timely and effective manner. The second is that the government should establish a scientific and refined management system for public service demands, and improve the pertinence of public services and the coordination of responsible entities [5]. Especially for public services that are closely related to the lives of the elderly, such as medical care, travel, and payment, the government should strengthen the bridge between the digital development of these public services and the elderly.

For example, in terms of medical care, the health of residents belongs to the category of social security and is also an important goal of the government's public services. In the face of changes in physical function, slow movement, and memory decline in the elderly, reasonable online registration and online medical services can solve these problems. In addition, the establishment and development of "Family health leaders" can also easily reduce the health worries faced by the elderly. The so-called "Family health leaders" refers to a member of the family who establishes health files, makes online registration, makes online consultations, and purchases health insurance for other members. This group is collectively called "Family health leaders" [15]. At present, in view of the aging and the development of the internet, there is an urgent need for the government to transform public service functions, change the content of public services, and improve the public service system.

In public services based on big data, online information interaction provides the elderly with the possibility to express their needs. However, we must be aware that not all elderly groups can autonomously express their needs through online channels. Therefore, the improvement of the public service management system also needs to start from the aspect of retaining the traditional service methods, which toward realize the service mode combining online and offline. In high-frequency service fields such as medical care, social security, civil affairs, finance, telecommunications, postal services, letters and visits, entry and exit, and living payment, offline service channels should be retained to ensure that the elderly who lack digital application capabilities and internet knowledge can accept normal Public Service. For example, the offline system of the Wuhan government service department can automatically identify elderly over the age of 65 and let them do business with priority. This demonstrates the application of digital offline services, which greatly enhances the convenience of offline work. On the other hand, some auxiliary measures can be taken in the process of public service to help the elderly complete online demand expressions. Such as many banks and physical stores also arrange assistants in dedicated areas to help elderly customers deal with digital business and digital payments. For example, Ruijin 2nd Road in Shanghai has developed a mobile app linked to a large public service database. Professional social workers take the mobile APP to visit the elderly in the area, enter the basic information and service needs of the elderly into the APP, and finally integrate it into a large public service supply database[4]. In this way, the combination of online and offline can effectively solve the needs of the elderly.

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4. Conclusion

The convergence of the two waves of "digitization" and "aging" is a distinctive feature of contemporary Chinese society. While the population structure is getting old rapidly, technology products are continuously updated, which has caused the elderly to become the most extensive and profound people affected by the “digital divide”. With the development of digital technology, the elderly have greater problems in digital access, application, and rights gaps. However, in the era of digital governance, intelligent applications and devices based on information technology are deeply absorbed into the supply of public services. This not only changed the pattern and form of public service supply, but also caused a series of problems for the elderly under digital public services.

In order to bridge the digital divide between the elderly and digital public services, the government should integrate the needs of the elderly into the entire process of service system, design, and use. The first is to investigate and evaluate the needs of the elderly, so then reasonably develop products suitable for the elderly. The second is to implement digital feedback and cultivate the digital literacy of lifelong learning for the elderly. The third is to improve the legal system, especially in key areas such as medical care and travel, to protect the rights of the elderly to participate and develop fairly, and to crack down on digital discrimination. The fourth is to establish a "special channel for the elderly" handling procedures, using a combination of online and offline models, so that the policy is truly implemented.

In conclusion, bridging the digital divide is an inevitable choice for China to embrace the digital economy and build a more fair and friendly digital environment. In the new era of the intersection of "silver hair" and "digital", the concept of "leave no one behind" should be incorporated into the development of social public services, so that the elderly can fully enjoy the development results of the digitizing, and build a sustainable digitally inclusive elderly society.

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