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Digital Inclusion to Actively Address Population Aging

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Abstract

Accelerating the digital integration of the elderly is a new demand and an important element of the digital society to promote active aging. Using literature analysis and field research, this paper analyzes the dilemma and formation process of digital integration of older people in the aging process from the perspective of digital economy, and tries to propose specific strategies to improve the current dilemma of digital integration of older people. The results show that active aging has prompted the elderly to join the digital wave, and the digital divide is mainly analyzed from the "access side" and "use side", and the dilemma can be solved from the top-level government design, family feeding, quality improvement and technological innovation.

Keywords

Aging, Digital Divide, Digital Inclusion, Age-Friendly Products

1. Preface

Population aging and social digitalization are two major processes that overlap and run parallel in today's world, and have become global trends. China is one of the countries with the largest aged population and the fastest aging rate in the world. China's population aged 60 and above accounted for 18.9 percent of the country's population last year (2021), while those aged 65 and above topped 200 million, accounting for 14.2 percent of the country's population, according to China's economic data for 2021 released by the National Bureau of Statistics. During the 14th Five-Year Plan period, the proportion of the population aged 60 and above in the total population will exceed 20%, exceeding 300 million, and the mild aging will enter the moderate aging stage.

However, while the in-depth development of information technology brings

digital opportunities and digital dividends, it also brings a new social governance problem—the digital divide of the elderly. In the rapid progress of digital construction, due to the constraints of technology, system, culture and the elderly's own factors, there is a huge difference between the elderly and other groups in terms of the degree of information technology possession and application, which eventually leads to a huge information gap, actively or passively disconnected from the information era, excluded from the digital society. They are excluded from the digital society and reduced to "digital relics" and "digital refugees". In particular, the "digital problem" and the "digital divide" faced by the elderly in China are more obvious under the New Pneumonia epidemic. For example, during the epidemic in China, the government adopted mandatory home quarantine measures, and many elderly people are lagging behind in obtaining information about the epidemic due to poor information access, which increases their health risks. Accelerating digital integration of the elderly is a new demand and an important element of digital society to promote active aging.

2. Literature Review

Foreign research on digital divide and digitalization of the elderly has started early and has made rich research results, and has also extended the research topics to communication, management, economics and sociology, etc. Norris (2001) defines the "digital divide" as "the difference in socio-economic levels between Norris defines the "digital divide" as "the gap in access to information and communication technologies (ICT) and multiple Internet usage behaviors between individuals, households, businesses and regions at different socioeconomic levels. Digital skills can be classified as instrumental, informational, and strategic skills based on different levels of digital skill mastery (Van Dijk, 2002). A related study by Colin Sparks (2013) argues that social and cultural factors also have an impact on the creation of the digital divide. While most scholars believe that digital inclusion has positive implications, some scholars also point out the negative effects of digital inclusion divorced from equity and democracy, leading to conditional, punitive, intrusive, and discriminatory responses to social security. Foreign scholars have focused on its manifestations and influencing factors.

Most domestic scholars' studies focus on the digital divide theory, Internet use behavior of older adults, and physical, psychological, and economic barriers of older adults.

Yang Lulu (2004) dissected the essence of the digital divide and argued that the essence of the digital divide problem is the expansion of the digital revolution, while Yang & Pan (2019) drew on the concept of "cultural lag" (culture lag) in sociology and derived it as the rapid growth of material production capacity and technology in the digital process with the advancement, the gap in intergenerational digital application capabilities due to institutional and conceptual delays. According to Sally Jiang and Zonghai Chen (2021), older adults who use the Internet have significantly higher subjective well-being. Hu Angang and Zhou

Shaojie (2002) argue that the various types of digital divides that exist at this stage in China lead to the risk of individuals in society falling into the information poverty trap. Zhou Jintao (2021) found the blockages and difficulties in the use of digital devices by the elderly in Shanghai based on their actual lives. Lu Jiehua & Wei Xiaodan (2021) put the main objectives of digital divide governance. Yang Bin, and Jin, Dongchang (2021) argue for the implementation of an "age-friendly" digital strategy to improve the level of refinement of national public services.

On the whole, the digital integration of older people in China is still in a spontaneous state, the proportion and degree of digital integration need to be improved, the whole society does not have a deep understanding of the role of digital integration of older people, and the advantages and potential of digital integration have not been fully developed. If we ignore the barriers to digital inclusion of the elderly, it will aggravate or even expand many inequalities brought about by technological development, widen the digital divide between groups and generations, and form the "Matthew effect" of digital poverty. As we can see, it is not only challenging but also urgent to make digital dividends available to the elderly. Based on this, focusing on the digital integration of the elderly, promoting the digital integration of the elderly through digital empowerment, allowing the elderly to share the technological convenience brought by the Internet, and integrating and embracing the Internet life, has become the meaning of positive aging.

3. Research Object, Research Method

Based on demographic data, this study adopts literature research method and comparative analysis method to analyze and process the information publicly released by websites of the National Bureau of Statistics, local statistical bureaus, the National Ministry of Human Resources and Social Security and other authoritative institutions to understand the overall status of the digital divide among the elderly in the country under the digital economy.

At the same time, in order to understand more deeply the "digital divide" of the elderly in Henan Province, a survey was conducted on the "access side" and "use side" in the first and fourth tier cities of Henan Province. The total number of samples was 1002, and the actual number of valid samples was 889, with an efficiency rate of 88.9%. 500 males and 502 females were surveyed, and no distinction was made between income, region and type (living alone, empty nest, disabled, semi-disabled and low-income). Considering the special characteristics of the elderly group such as low literacy level, weak comprehension ability and visual impairment, the research was carried out by questionnaire and interview method, of which the interview method was the main method and the questionnaire part was only used to collect the basic information of the respondents. Finally, through comparative analysis, structural analysis, grouping analysis and other statistical analysis to understand the status of the digital divide in the el-

derly group and the plight of digital integration.

4. Research Conclusion: The Digital Divide among the Elderly Groups Is Outstanding

The access side, i.e., the gap between information producers and non-producers in terms of computer and network accessibility and performance, mainly depends on the status of information infrastructure (including computers, cell phones, networks, etc.), economic power and government decisions. The gap between the use side, i.e., the information prolific and the non-prolific in terms of network usage, depends mainly on the friendliness of the technical interface and the digital skills of the users. The following is an analysis of the digital divide performance of the elderly group from the access side and the use side.

4.1. There Is a Gap in the Scale of Internet Access among the Elderly

The survey shows that among 1002 elderly people, the scale of elderly Internet users reaches 93.2% (Figure 1), among which 50.9% are male and 49.1% are female, which shows that with the continuous development of China's economy, the Internet trend, digitalization, networking and intelligent era have accelerated the pace of people's life and continuously changed their lifestyle, and the elderly are no exception. As of December 2021, the size of China's elderly Internet users aged 60 and above reached 119 million, and the Internet penetration rate of the elderly population aged 60 and above reached 43.2%, the level of the research area is higher than the overall level of China, which may be related to the level of urbanization.

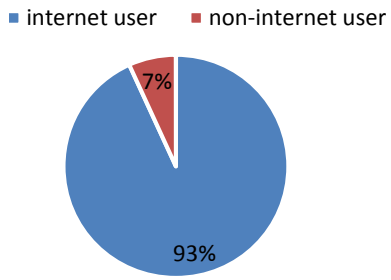

Figure 1. Proportion of people aged 60 and over accessing the internet.

Meanwhile, according to the survey, cell phone is the main tool for the elderly group to access the Internet, with 95.6% of elderly cell phone users, less than 0.2% of television and various computer devices accessing the Internet, and less than 0.2% of smart home and wearable devices accessing the Internet, which is much lower than the overall proportion of Internet users. It shows that 6.8% of the elderly in this group have no experience of touching the Internet and there is a complete divide. The reason is that it is not used to use and not convenient (Figure 2).

Reasons for not using smart phones

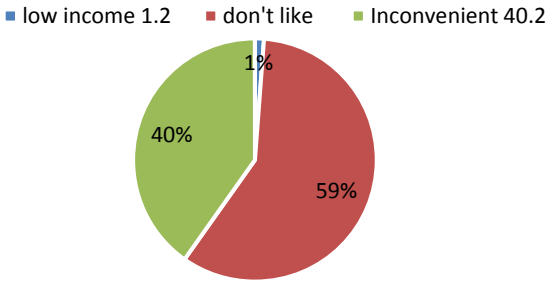

Figure 2. Reasons for not using smart phones.

When seniors have smartphones and surf freely in the digital tide as they wish, the research shows that 78.1% of seniors spend more than 3 hours online, of which 23.6% spend more than 4 hours online and continue to actively embrace digital life.

4.2. Concentration of Internet Access Areas for the Elderly

The most commonly used applications by the elderly Internet users are instant communication social (88.2%), online video (78.9%), Internet government services (64.5%), online news (63.6%) and online payment (63.9%) are the five most commonly used applications by the elderly Internet users (Figure 3). Instant communication is mainly WeChat and SMS, online video includes Jitterbug, Watermelon small video, Volcano small video, etc. Internet government services are mainly in the fields of identity verification, health code, trip code, etc. for medical treatment, consumption and travel, online news are Today's Headlines, Tencent News, etc., and online payment is mainly on WeChat, Alipay and other platforms.

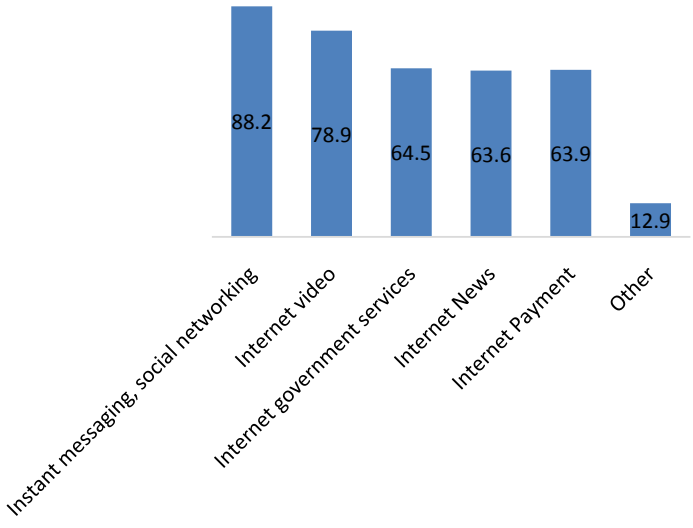

Figure 3. Frequently used apps.

From the research results, family relationship and acquaintance social circle maintenance is the main motivation of the elderly online social networking,

more than 80% of the elderly often through social software (77.1% of which is WeChat) and children contact. More than half of the elderly people often watch videos and listen to songs online. With the popularity of short videos, it has become one of the main leisure and entertainment ways for the elderly to spend their time.

At the same time, the elderly who participated in this study showed their subjectivity and active learning ability in the process of using cell phones, learning square dance, learning Tai Chi and other learning behaviors appeared in high frequency.

Combined with the interview results, the use of smartphones by the elderly presents the following characteristics: first, the elderly mostly use smartphones for practical and social needs; second, they pay less attention to the information released by the People's Daily, Xinhua News Agency and other mainstream media on new media platforms, and rely on platforms that produce news content based on algorithmic gate-keeping mechanisms; third, the main purpose of using entertainment platforms by the elderly is to spend time and relieve Third, the main purpose of using entertainment platforms is to spend time and relieve loneliness.

4.3. Low Percentage of Smart Applications Use

The usage gap refers to the differences in the way, degree and skills of different social groups in using digital technology, and is the key issue that needs to be addressed in the governance of the digital divide among the elderly in China at present.

At the use end, there are relatively more elderly Internet users who can independently complete online activities such as presenting health codes/travel cards, online shopping and information confirmation, accounting for 52%, 45% and 43.2% respectively. Due to the shortage of digital skills, relatively few elderly Internet users can independently complete online activities such as taxi hailing, ticket booking, registration and engine search, accounting for 2.3%, 8%, 7.1%, and 4.2%, respectively. The number of mobile APPs per senior citizen is 22, and only 33.2% of them can use them (Figure 4).

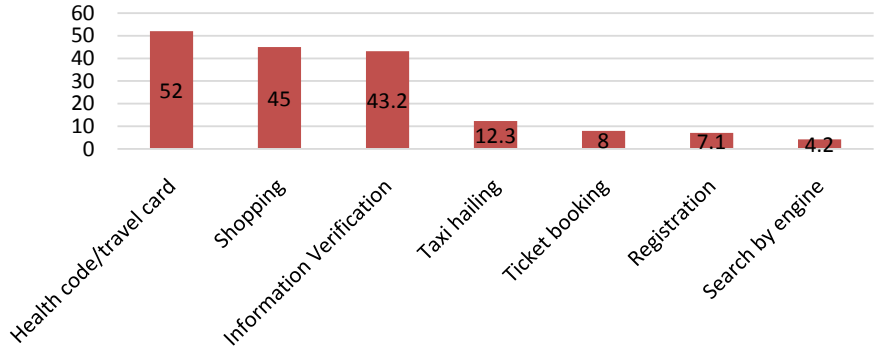

Figure 4. Internet users are able to independently complete online activities.

4.4. Difficulty in Operating Some Smart Applications

For most of the elderly, the operation threshold of information technology services makes them sigh with disappointment, and many of them encounter inconvenience in daily life such as travel, medical treatment and consumption, and cannot fully enjoy the convenience brought by intelligent services.

Instant communication is the main reason for the elderly to use smart phones. According to the survey, 30.88% of the elderly still can't answer or make phone calls, and 68% of the group has not mastered the SMS function, which shows that the elderly have a certain degree of obstacle in the basic function of communication.

Socialization refers to the network activities of older people using social apps of smartphones to communicate and contact others. The resulting social barrier is the condition of not mastering smartphone network social software apps, including WeChat, QQ and Weibo. The survey shows that 77.1% of the elderly tend to use WeChat for social communication, but the use of more complex social software such as QQ, Jitterbug and Weibo accounts for a smaller percentage, indicating that there is a certain degree of barrier in social software.

Entertainment is the entertainment app that gives users fun on smartphones, including short video apps, music apps, game apps and so on. The results show that the more mechanical and simple functions of swiping videos and taking photos account for a larger proportion, 73.5% and 61.3% respectively, while other entertainment functions with more complicated operations, such as listening to music, taking videos and playing games, account for a lower proportion, indicating that there is a certain degree of obstacle in entertainment functions.

Consumption refers to the use of smart phones for online shopping, sweeping code payment, including Taobao, Jindo, Vipshop, Jingdong, live with goods, Alipay sweeping code, WeChat sweeping code, etc. The survey shows that less than 30% of the elderly use online shopping, while the simpler sweep code payment is 63.9%, indicating that there is a certain degree of obstacle in consumer function. "If there are goods they fancy, they also transfer money to others and do not make purchases, too much trouble, or they feel they are not capable enough and are afraid of being fooled."

4.5. High Risk of Digital Divide among the Elderly

Due to the shortage of digital skills and the uneven network information, the network risks are fancy and some elderly people are very easy to become victims. The research shows that the risks encountered by the elderly Internet user group with the highest proportion include false advertising (62.5%) and online fraud (38.1%).

Among them, the research results about online fraud show that elderly Internet users think their ability to screen online risks is low, and they do not know about online pyramid schemes, illegal fund raising, fake public prosecutors and

law enforcement, food and medicine and general knowledge rumors. 30.4% of elderly Internet users have encountered health care fraud, 34.2% have encountered lottery fraud, online pyramid schemes (20.9%), financial fraud/illegal fund raising (17%), fake (16.3%), online shopping scams (12%), marriage scams (8.9%), etc. (Figure 5).

Of course, the older Internet users who have been online for a longer time are more aware of the need to improve their online safety. The younger generation is more worried about the ability of their elders in screening online risks.

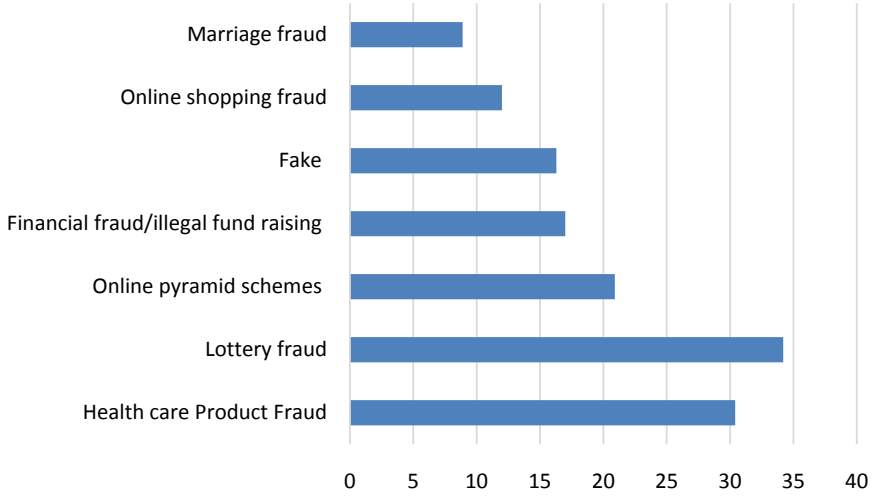

Figure 5. Types of cyber risks encountered by older adults.

5. Solutions

Global strategic thinking: change from a group perspective to a structural perspective, break out of the misconception of talking about the problems of the elderly and think from a strategic and global perspective.

5.1. Government-Led Top-Level Design and System Innovation

The government plays the role of "helmsman" in this process and plays a leading role in the governance of digital poverty among the elderly. Improve the policies and regulations for the digital survival of the elderly. The government needs to improve relevant policies and regulations on digital poverty among the elderly and strengthen regulation to support the digital poverty management of the elderly. In order to solve the difficult and blocking problems encountered by the elderly in digital life and actively promote aging, the country has issued the 14th Five-Year Plan for National Economic and Social Development of the People's Republic of China and the Outline of Vision 2035, the 14th Five-Year Plan for the Development of National Aging Career and Senior Care Service System, the National Active Medium and Long-term Plan for Coping with Population Aging", "Opinions of the State Council of the Central Committee of the Communist Party of China on Strengthening the Work of Aging in the New Era", "Implementation Plan for Effectively Solving the Difficulties of Using Smart Tech-

nologies for the Elderly", "14th Five-Year Plan for the Implementation of the Project of Actively Coping with Population Aging and the Construction of Child Care", and other policies and measures.

The State Council issued the "14th Five-Year Plan for the Development of the National Aging Project and Senior Care Service System", which clearly proposes to implement the national strategy of actively coping with population aging and accelerate the in-depth application of information technology and smart hardware such as Internet, big data and 5G in the field of senior care to help the elderly better cross the "digital divide".

The current construction of relevant intelligent infrastructure is still inadequate, and the government should accelerate the construction of information infrastructure, promote the popularization of broadband networks, and increase the investment in policy formulation, funding and human resources for network security supervision. The government realizes cross-level, cross-regional and cross-departmental collaborative management services through technology integration, business integration and data integration.

5.2. Build Family Digital Bridge

Infrastructure system family members, especially children's education feedbacks can provide the most direct and effective support for elderly parents, and children can teach the experience of using new media through face-to-face communication and interaction with elderly parents. Parents need to adapt to the state of their children being away from home, understand the new family relationship, and adapt to the communication methods popularly used by young children in addition to telephone communication; at the same time, children are changing from material support for their parents to a combination of material and spiritual support, and from buying smartphones for their parents to buying and teaching them to use smartphones. When elderly people encounter problems, they will seek help from their family members and children. Therefore, family members should be patient and understanding enough to teach elderly people to learn how to scan and pay, transfer money, clean memory, and register for medical appointments, so that they can also "surf" the Internet. Friends and neighbors, especially peer groups, can provide a more direct experience for the elderly (mutual learning among peer groups will be more conducive to communication), thus improving their learning efficiency.

5.3. Technology Helps Digital Products for the Elderly

"Use technology to care for the health of the elderly", and explore a series of smart technologies to help the elderly cross the "digital divide". In view of the shortage of nursing staff for the elderly, we should accelerate the transformation of the achievements of recreational robots and play a greater role in rehabilitation training and safety monitoring. The smartphone industry can design a senior citizen model that meets the physical and mental characteristics of mid-

dle-aged and elderly people, and promote "helping middle-aged and elderly people to enjoy a digital new life".

The app should be developed in the direction of aging suitability and accessibility, including news and information products such as Tencent News and Sina Weibo, social communication tools such as WeChat and QQ, and life shopping products such as Taobao, Jingdong, Jitterbug and Baidu, which should be equipped with basic functions such as easy mode, large font display, sound enhancement, long-lasting battery life, anti-network fraud, one-click direct access and accessibility mode. When visualizing the App interface, bold characters with high recognition rate, suitable large font size and relatively large text spacing should be used to enhance the recognition of text. Aging will cause color vision and color sensitivity to decline, and overly bright colors will overpower and distract the elderly, so overly bright colors should be avoided. Popularize the screen sharing function, so that "screen sharing" can share the cell phone screen in a second, so that children who are thousands of miles away can help their parents operate their cell phones.

For example, KDDI, together with the Hefei Public Security Bureau, has launched a smart and safe community management system. On the system, community workers can simply click on the "Widowed Elderly Alert" section of the system, and information of elderly people over 80 years old living alone will be listed in it. The user's daily access time at each entrance and exit of the district will be displayed, and his or her action route will be clear at a glance. At the same time, the aging-friendly transformation websites and APPs are launched on the basis of existing products and services, such as caring version, elder mode and senior mode, covering various scenarios such as news and information, social communication, search engine, life shopping, financial service, travel and medical health, etc., which are closer to the Internet needs of senior groups and effectively promote the positive interaction and coordinated development of senior groups and digital society. KDDI is exploring the use of artificial intelligence technology to enhance the ability to care for the elderly, using intelligent early warning models to achieve a "7 × 24" hour closed-loop security guard for the elderly, helping the elderly to share the fruits of information technology development more closely and enjoy a higher quality of life in old age. For example, in 2019, Alipay really developed a "care version" of the small program for the elderly groups online. Unlike traditional Alipay, the "Care Edition" interface is clear and concise, and the live online customer service makes the operation simple and convenient, and the content of the program is oriented to the elderly groups, including the health care knowledge provided by Ali Health, which fully demonstrates the care for the elderly groups.

5.4. Improve Information Skills and Digital Literacy of the Elderly

Improving digital literacy is one of the important ways to narrow the digital divide, and it is necessary and feasible to promote the use of information technol-

ogy among the elderly and their integration into the digital society. In addition to advocating younger members of families to teach older members to use IT, society should also provide various IT training for older people.

Geriatric education institutions, geriatric service institutions, and information. Industry organizations need to link up and form educational synergy, innovate teaching forms, expand the coverage of digital literacy education for the elderly, and promote the refinement, diversification and modernity of the content of digital literacy education. Therefore, on the basis of vigorously carrying out research and development of hardware and software and innovation of management mode of smart senior care, it is urgent to strengthen the research of digital literacy assessment index system and education and training strategy, and take effective intervention measures to improve the digital literacy level of the elderly. With the joint efforts of the elderly, their relatives and friends, senior care service providers and all sectors of society, digital literacy of the elderly should be made to better contribute to the development of smart senior care, so as to realize the digital divide of China's positive aging strategy.

6. Conclusion

The study found that elderly people in some parts of Henan province felt more in control of their lives after using smartphones, which they believed to build a bridge to communicate with their children and save them from "wandering" to isolated islands of Internet information. However, the digital divide problem of the elderly group is prominent; especially in the user side, there are low applications of smart programs, some difficult operation, and high application risks, which not only affects the daily life of the elderly, hinders the elderly to participate in society fairly, but also hinders the transition from demographic dividend to aging dividend. This also fully shows that in the context of population aging and social digitalization, digital integration of the elderly is a new demand of the elderly in the digital society.

China has included active aging in its social development strategy, and implemented aged-friendly digital strategy to build a digital divide governance pattern dominated by the government, with the participation of family society and the active participation of individuals, so as to give full play to the role of family members' intergenerational information feedback and promote the digital integration of the elderly. At the same time, the development of new technologies will be utilized to further promote China's digital process, innovate the working mechanism, explore more paths, and help more elderly people to cross the digital divide, enjoy the digital dividend and enjoy a peaceful life in their later years.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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