The Smart Elderly Care Service in China in the Age of Big Data

Guangtao Zhou
Shandong Xiehe University, 250100, Jinan, China.
Email: charlie7709@163.com

Abstract. China is just experiencing a period of population aging accelerating. With the approaching of an aging society, elderly care becomes increasingly challenging; however, a variety of disadvantages has been exposed gradually, including unsatisfactory health care, unstable daily care, insufficient emotional comfort, no timely emergency aids, and so forth. The traditional elderly care model has already impeded, to a large extent, the sustainable development of elderly care. As the rapid development and wide application of big data, smart elderly care comes into being, which shows various advantages while comparing with traditional elderly care services. The Chinese government has the responsibility to implement the smart elderly service in its initial stage of development.

1. Introduction
With the rapid arrival of the aging society in China, the demand for elderly care services is increasing day by day. The disadvantages of the traditional elderly care service model are gradually highlighted because of many difficulties, such as the passive concept of elderly care and unsatisfactory medical care, hindering the sustainable development of elderly care services to a large extent. Compared with the traditional pension mode, the smart elderly care service model based on big data has more functions.

1.1 Population Aging in China
China's total population will continue to grow in the next decade, and the elderly population will grow faster than the total population. Much of the recent population growth has come from the baby boom of the 1950s and 1960s. Between 2015 and 2050, the size of China's elderly population (aged 65 and above) will increase from 140 million to about 365 million, and it is expected to reach its peak in 2055-2060 (over 400 million). After that, the aging speed will slow down significantly and enter into the so-called "high plateau period". By 2100, the proportion of elderly population will remain at a high level of about 30%.

The structure of aging population will be highlighted during 2025-2030, and the aging will be growing fastest during the period of 2025-2030, in which it is most volatile and the social dependency ratio is relatively low, the structure of the elderly population is relatively the most "young period". It will appear the temporary phenomenon about weakening “the bottom of the aging population" and "the top of the aging population" at the same time around 2020 (Hu, & Peng, 2018).

1.2 Smart Society in the Era of Big Data
With the rapid development and wide application of big data, artificial intelligence, block chain and other technologies, a solid foundation has been laid for establishing a smart society. Since the new concept of “intelligent earth” was put forward by IBM in 2008, it has been increasingly to explore the
concept and category of smart, and continuously promoting the bundled and embedded development of wisdom and human production, life and learning. So far, the word "smart" has been mentioned and applied in many fields, and has experienced five stages of development from a smart earth, a smart country, a smart society, a smart city to a smart community. With the advent of artificial intelligence (AI), namely the fourth industrial revolution, the integration of intelligence and human society has reached an unprecedented height. The term "smart" is also widely used in terms of social governance and social services. In terms of elderly-care is not exceptional also, with the coming of aging society and elderly-care problem increasingly being highlighted, in order to solve the current our country and the world of "Silver Wave" brought about by a series of consequences, on the basis of the big data and artificial intelligence, the smart elderly care service model has become the focus of the whole society and the hot topic in academic field.

2. Deficiency of Traditional Elderly Care

In the traditional elderly care model, there are inherent difficulties. The old people's own idea of elderly care is not active, which directly or indirectly restricts the quality and efficiency of elderly care service. To a large extent, the inactive concept of providing for the aged constrains the life, work and study of the aged, hinders the aged from actively engaging in the personal career of "having fun for the aged, doing something for the aged and learning for the aged", exerts negative influence on the sense of belonging and self-identity of the aged, and aggravates the psychological anxiety of the aged (Zheng, 2018).

2.1 Medical Care is Not Ideal

The appearance of geriatric disease is caused by the degeneration of body function and the decline of body immunity. From the initial incubation period, to the early stage of medical diagnosis, to the middle stage of treatment services, to the later stage of follow-up services are characterized by a long service cycle, late demand for medical care services and other characteristics, aggravating the contradiction between supply and demand of medical care services. At present, China's aging population base is large, and social medical and health care needs are large, but medical service resources are limited, resulting in the structural gap between supply and demand of medical and health care services.

2.2 Unstable Life Care

In the care services for the elderly in China's urban areas, there is a common feature in all aspects: the care services for the elderly are mainly derived from the family, with a high degree of dependence on family members. The supplies of care services are mainly provided by the elderly's spouse or children and grandchildren, while the care services outside the family are rarely provided. If the old man's spouse, or the old man's children or grandchildren due to the huge pressure of work, economy, it would lead to that the care service is insufficient, and the elderly care services will fall into the predicament of the vicious circle, and it is difficult to get breakthrough.

2.3 Emergency Assistance is Not Timely

Emergency assistance for the elderly refers to the emergency rescue action taken because of the threat of various sudden factors to the life, property and safety of the elderly, in order to minimize or avoid the harm caused by the existing risks. There are several problems existing in the current emergency assistance for the elderly: inadequate infrastructure, inadequate resources, and inadequate skill.

2.4 Emotional Comfort is Not in Place

Inadequate emotional comfort leads to an increase in negative emotional experience among the elderly. As people grow older, their need for spiritual comfort becomes stronger and stronger. Due to retirement and aging, children are busy with work, study and going abroad, etc., which may easily lead to the old people's sense of loss and loneliness to varying degrees, and they have a strong need for spiritual comfort. The diversity of needs of the elderly leads to the increase of emotional comfort difficulties (Luo, 2017).
3. Smart Elderly Care

3.1 Connotation of Smart Elderly Care

"Smart elderly care" was first proposed by the British Life Trust, then called "completely smart elderly care system", that is, the elderly in daily life cannot be limited by time and geographical environment, but enjoy a high-quality life in their own home. Smart elderly care also refers to the use of advanced information technology means, for the elderly at home to carry out interconnecting care services (Ransing & Rajput, 2015, January). Its core lies in the application of advanced management and information technology to closely connect the elderly with the government, community, medical institutions and medical staff.

"Smart elderly care" highlights flexibility and cleverness. On the basis of meeting the diversified and personalized needs of the elderly, it is necessary to be smart, that is, to realize green care and environmental care with the help of information technology. We should also make good use of the wisdom of the elderly to create a healthy, convenient, happy, dignified and valuable life for the elderly.

Thus, smart elderly care refers to the use of information technology and other modern technology, such as the Internet, social networks, Internet, mobile computing, etc., concerning the aged people’s daily life, safety, health, entertainment, leisure, health, learning and so on, to manage the life in various aspects of the aged (as shown in figure 1). The smart elderly care model can automatically monitor, warn and even actively deal with information related to the elderly, so as to realize friendly, autonomous and personalized intelligent interaction between technology and the elderly. Smart elderly care can not only improve the quality of life of the elderly, but also learn from the experience of the elderly wisdom, so that the smart technology and the elderly complement each other, in this way the elderly can have a happier life, full of dignity.

3.2 Features of the Smart Elderly Care Model

First, to advocate the concept of active aging. To cultivate and inherit the positive aging concept based on big data, it is necessary to take the smart phone client as the carrier, apply the new social media platform in the innovative field of the positive aging concept, and make full use of it in the cultivation and inheritance of the positive aging concept. On giving full play to the advantages and convenience of the big data era, it is expected to implement the concept of active aging accurately, efficiently and conveniently, promote the non-elderly groups to form positive values, and scientifically understand the living characteristics of the elderly groups and the value and contribution of the elderly.

Second, the ideal health care service. Medical care services based on big data platform, while inheriting the advantages of traditional medical care services, make up for the shortcomings of
traditional medical care services with the help of scientific and technological means, greatly improving the personalized, precise and convenient medical care services, and making the elderly medical care services develop to a more ideal level. Medical and health care services based on big data platform mainly use the data acquisition port of intelligent medical and health care products to realize the precise connection between online and offline medical and health care services by providing timely, accurate and personalized medical guidance and health care service.

Third, continuous life care services. The life care service for the elderly based on big data can quickly integrate the life care service resources of family members, neighbors, communities, charity organizations, social workers and other non-governmental organizations and official resources of the government through information feedback from the big data platform. Smart elderly care services can timely and accurately respond to the elderly's needs for life care services, including spiritual needs, companionship needs and other objective needs for life care services, which appropriately promotes the complementary development of formal support services and informal support services for the elderly life care services, and realizes the sustainable development of smart elderly care services.

Fourth, expedite emergency relief channels. The elderly emergency assistance system based on big data mainly conveys the data of the aged people's emergency assistance needs to the smart elderly care service providers timely, accurately and completely by means of service terminals and big data platforms, such as mobile phones, monitoring devices, smart wearable devices, artificial intelligence machines and emergency help pagers. The providers of elderly care service then links the nearest, optimal and most appropriate emergency relief resources around the elderly by integrating resource to provide relief services for the elderly according to the actual needs through the comprehensive analysis of the degree of emergency needs, which can realize the big data service platform that provides emergency relief services through online and offline cooperation.

Fifth, to enrich people's emotional experience. The construction of a smart elderly care service platform based on big data can fully consider the family relationship and peer relationship of the elderly and combine online and offline services. Smart elderly care services provide the elderly with positive, personalized and convenient emotional comfort service projects, enhancing the positive emotional experience of the elderly, and promoting the physical and mental health development of the elderly. At the same time, the smart elderly care service can also use big data platform to integrate the emotional comfort channels of the elderly and make up for the deficiency of emotional comfort of the elderly through smart regulation.

4. The Role and Responsibility of the Government in Promoting the Smart Elderly Care Services

As the unique organizational structure of government in the world, the Chinese government is powerful to lead the market. At the initial stage of development, smart elderly care model finds it hard to grow faster without government’s interference (Gupta & Rehman, 2017). The following is about the role and responsibility of Chinese government in developing smart elderly care in China.

4.1 To Encourage Diversified Investment and Strengthen Technical Investment in Smart Endowment

On the basis of strengthening financial allocation, the government is expected to encourage social enterprises and organizations to strengthen cooperation with communities, and to promote the influx of multi-channel funds into the community home smart elderly care service system. At the same time, the government is supposed to provide economic policy help to the smart elderly care service. Through this way it is easy to attract the participation of private capital to comprehensively promote the development of community smart elderly care. The government should increase fiscal expenditure on the purchase of services, and formulate daily policies on the purchase of services such as daily living, medical care, communication, legal consultation and temporary assistance to meet the needs of aged people.

4.2 To Build a Smart Elderly Care Service Platform

The core of smart elderly care service is to build a comprehensive online service platform with the help of the highly developed Internet technology and information technology. Through the collection of users’ information and timely feedback of users’ needs, big data can be formed to summarize the
various needs of the elderly and makes reasonable plans for elderly care services based on these data.

The government is supposed to advocate the elderly care organizations invest in the construction of a comprehensive platform for smart elderly care, and to advocate other social subjects to assist in basic elderly care service facilities. The government should timely communicate and adjust the symposium and exchange meeting held according to the development situation of smart elderly care services, and introduce a third-party evaluation institution for evaluation. Besides, it is suggested to build a cross-platform social service network by inviting professionals to help.

4.3 To Improve the Top-Level Design of the Smart Elderly Care Service Platform
After the launch of home smart elderly care service platform, it is necessary to pay attention to the operation status of the platform and to avoid failures. According to the operation data of the online platform, the needs of the elderly are sorted out and analyzed, so as to establish a complete set of scientific system of collection, solution, feedback and improvement. On the one hand, the functions and conditions of the online platform are adjusted in real time to make it more perfect. On the other hand, according to the opinions of the elderly, the service quality of elderly care should be improved correspondingly, and the results improved should be summarized and reported regularly.

Evaluating and recording online and offline services can be done respectively based on big data. Problems that arise during service, whether resolved or not, should be documented for later analysis and improvement.

4.4 To Improve the Working Mechanism
The government should give top priority to opening up the market of smart elderly care service and improving the quality of smart elderly care services. It is necessary to make clear the responsibilities, stepping up policy implementation, further improving the organizational mechanism, speeding up the formulation of action plans, and improving the methods for testing the results. Other departments related to smart elderly care should further communicate and coordinate to accelerate the implementation of targeted policies, establishing a form of joint management, overall linkage and mutual promotion at an early date, so as to achieve the purpose of improving the quality and efficiency of smart elderly care services.

4.5 To Play a Pilot Role
Selecting some cities as pilot cities aids to develop the smart elderly care reform of China's elderly care service industry. In such an environment, it is expected to deepen institutional reform to guarantee the coordinated development and common progress of smart elderly care and market economy. As the vanguard of the national reform, the pilot reform should be brave to try, and eventually to form an industrial chain of linkage, sustainable development, harmony and standardization, so as to drive the accelerated development of the smart elderly care service industry.

4.6 To Value Propaganda Publicly
The development of smart elderly care cannot be separated from propaganda publicly, carrying forward the traditional virtues of respecting the elderly in China. The publicity of loving and respecting the elderly is carried out through posters, small video, micro films and other forms, so as to form the social atmosphere of aiding the elderly and improve the elderly care awareness of the whole people from the ideological consciousnes. It is time to strengthen publicity of the advantages of providing elderly care with wisdom, deepen the public's awareness of providing elderly care with wisdom, help the elderly establish correct consumption habits, set up a green channel for the elderly to safeguard their rights, and punish crimes that cause illegal infringement on the elderly in accordance with the law.

4.7 To Promote Multi-Party Win-Win Situation
smart elderly care platform should jointly establish industry associations, federations and other organizations, and build a cross-platform social service network by inviting professional assistance. All parties should jointly work out smart elderly care standards in line with social conditions, unify
service procedures and quality evaluation standards, and standardize and streamline smart elderly care services.

4.8 To Strengthen Credit Construction
It is expected to strengthen the credit system of elderly care service industry, establishing a special information collection and sorting mechanism through the smart elderly care service platform, and regularly doing the feedback to the corresponding website.

For organizations with good credit ratings, the government should give priority to them when purchasing services, and it is also suggested to open the green channel to expedite the processing of business for the to enjoy the preferential policies of the government at the same time. For those with poor credit ratings, the government will punish them or restrict their access to the pension service market.

5. Conclusion
The aging of the population brings challenges as well as opportunities to Chinese society. Different from western developed countries, China is in an era of information and network under the background of aging society, and the western developed countries into the era of aging society is very different. China's coping with aging provides unprecedented opportunities and resources. Today, it makes the traditional system and the policy of operating space is more and more small, so it essential to deepen reform and innovation which will further excavate and make use of the potential opportunities of aging society (Hultin, Olsson, Carli & Gunningberg, 2017).

With the advent of the era of big data, the continuous development of big data, artificial intelligence, Internet of things, block chain and other technologies, the construction of the elderly care service based on the new generation of information technology and artificial intelligence technology has largely broken through the disadvantages of the traditional elderly care model. Compared with the traditional elderly care model, the smart elderly care model has various advantages. It can make full use of big data and other technologies to provide one-stop services such as elderly care consultation, application, evaluation, prediction, rescue, classification and transfer. Transforming online information flow into offline professional services, The smart elderly care effectively promotes the development of online and offline services together, and finally realizes the goals of optimal allocation of resources, improvement of resource utilization efficiency.

6. Acknowledgement
The work described in this paper was fully supported by a grant from the following R&D projects:
1. Humanities and Social Sciences Research programme in Universities and Colleges of Shandong Province (No. J16WE08); 2. Shandong Soft Sciences programme (No. 2016RKB01408); 3. Social Sciences of SXU (No. XHXY201613); 4. Social Sciences of SXU (No. XHXY201705).

References
[1] Hu, Z. & Peng, Z. (2018). Governnace choices in dealing with Chinese aging population. Chinese Social Sciences, (12), 134-155.
[2] Zheng, Q. (2018). Study on countermeasures of spiritual consolation for the elderly. Shenyang normal University.
[3] Luo, X. (2017). The structural dilemma and optimization path of home care service. Urban Problems, (2), 83-89.
[4] Ransing, R. S., & Rajput, M. (2015, January). Smart home for elderly care, based on wireless sensor network. In Nascent Technologies in the Engineering Field (ICNTE), 2015 International Conference on (pp. 1-5). IEEE.
[5] Gupta, A., & Rehman, A. (2017). Measurement scales used in elderly care. CRC Press.
[6] Hultin, L., Olsson, E., Carli, C., & Gunningberg, L. (2017). Pressure Mapping in Elderly Care. Journal of Wound, Ostomy and Continence Nursing, 44(2), 142-147.