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Research Paper

Wisdom Pension from the Perspective of Big Data

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ABSTRACT: *China, as the world 's most populous country, the trend of population aging is becoming more and more serious, and the problem of old-age care is prominent. In the new era, with the rapid development of the Internet, the ability of computer storage and computing has been continuously improved, and the wisdom of data has been opened. Big data has opened up the road to a happy and beautiful life for human beings, making old-age care simpler, more convenient, more intelligent and more warm. It is of great significance to explore the important role of big data in wisdom pension, to put forward feasible schemes for further promoting the full coverage of wisdom pension, to solve a series of problems brought by old-age care, to let more elderly people enjoy the better life brought by new technology, and to enhance the happiness and sense of acquisition of the elderly population.*

KEYWORDS: *Wisdom Pension ; Big Data ; The Elderly*

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I. INTRODUCTION

According to the data provided by the National Health Commission, by the end of 2021, the number of people over the age of 65 in China was as high as 267 million, accounting for 18.9 % of the total population of the country, which has a large increase compared with the 13.5 % of the population over the age of 65 according to the data of the seventh census in 2020. China 's population aging speed has been pressed to accelerate the key, China 's aging level into the growth of the " fast lane " [1], the future pension problem will become extremely serious. The traditional way of old-age care such as family pension, community pension and institutional pension are overwhelmed with obvious defects. Although the family pension method can give the elderly the greatest family care and has the advantage of less expenditure, it is not easy to detect when the elderly in the family have problems due to the lack of professional medical knowledge of the elderly and their children, which is easy to cause the problem of poor care for the elderly [2].The community pension allows the elderly to enjoy services in the community, which greatly facilitates the elderly. However, the lack of social capital, the unclear definition of multiple subjects, and the cognitive bias of social pension have led to many problems in China 's community home care services [3]. The institutional pension mode is easy to manage and serve, but there are also limitations such as the lack of precision of service content and the low degree of integration of medical care [4].The traditional way of old-age care is unsustainable and cannot meet the needs of the elderly population. The rapid development of the new generation of information technology such as big data, Internet and cloud computing provides a new choice for solving the problem of the elderly population, which has given birth to the rise and vigorous development of the wisdom pension, and has become the policy guidance and realistic path for China to solve the pension problem.

The issue of old-age care is a major social issue related to the national economy and people 's livelihood, which has aroused widespread concern and discussion. Many scholars have focused their research on the field of wisdom pension.The focus of domestic scholars ' research is to explore the wisdom pension and its service system from different perspectives[5-7], the current dilemma faced by China 's wisdom pension and its promotion path[8-10], the attitude and willingness of the elderly population to use wisdom pension [11-12]. Wisdom medical service system design [13-14], wisdom pension network infrastructure construction and technology application [15-16], elderly health activity detection system design [17-18] and so on are the focus of foreign scholars. On the whole, the existing research has provided theoretical and practical support for the development of wisdom pension in China to a certain extent, but there is still room and value for research in the perspective and level of research. Domestic scholars mostly discuss the development status, difficulties and solutions of wisdom pension in a certain area from the micro level, lacking macro-level research. The research

of foreign scholars mostly discusses the intelligent system of wisdom pension supporting services from the technical perspective. However, it is of great practical significance to explore the meaning, content and characteristics of wisdom pension from the perspective of big data, to analyze the implementation status of China 's wisdom pension pilot and to explore the shortcomings of the wisdom pension from the macro level, and to put forward targeted suggestions to promote the development of China 's wisdom pension, effectively protect the quality of life of the elderly population, and achieve the strategic goal of actively responding to the aging of the population. At the same time, it can further enrich the research of scholars at home and abroad.

II. SUMMARIZATION OF WISDOM PENSION

2.1 Meaning

The concept of wisdom pension first came from the British Life Trust Foundation, also known as " smart home care, " " wisdom pension system " and " fully intelligent old-age care system. " It refers to relying on big data, Internet, sensors and other technologies to provide life care, safety management, health management and humanistic care for the elderly population, aiming to improve the quality of life of the elderly in their later years [19-20]. Wisdom pension is the combination of " wisdom " and " old-age care. " " Wisdom " is the means and " old-age care " is the purpose. It emphasizes the important role of modern information technology in the process of old-age care for the elderly. At the same time, the big data platform, family, service enterprises and community service stations are closely linked to create a healthy, comfortable, safe and convenient new old-age care model for the elderly [21].

2.2 Functions

Provide Life Care Services

The application of big data in the wisdom pension model breaks the limitation of traditional service time and space, and provides convenient and high-quality life services for the elderly. Relying on information technology such as big data and cloud computing, we can subdivide and mine the economic level, interests and hobbies of the elderly, so that service enterprises can provide targeted services for the elderly. The life care service system of wisdom pension emphasizes the provision of one-to-one and one-to-many life care services based on smart home, health products, family interaction and social services [22]. For example, the elderly can wear electronic bracelets to remind them to take medicine. Through the mobile client, the elderly can freely choose elderly products, sign up for elderly tours, participate in elderly universities and socialize online. And services can be purchased through online ordering, allowing elderly people to enjoy various life services without leaving their homes. The wisdom pension life care service makes the life of the elderly with physical function decline more secure and more quality in their later years.

Provide Security Management Services

According to the results of the fourth sample survey on the living conditions of the elderly in urban and rural areas in China, the number of empty nest and solitary elderly in China has reached 118 million in 2020. At the same time, nearly 60 % of the elderly in urban and rural areas believe that there is a problem of ' discomfort ' in housing. As the number of elderly population continues to rise, when more and more elderly people choose to live alone, whether their living environment is safe, and whether they can be found and rescued in time when an accident occurs is crucial. The wisdom pension security management service effectively solves the security problem of the elderly living alone. By installing sensors in the elderly 's home, the data of door magnetism, smoke, temperature, infrared, electricity and so on are collected, and the data are aggregated to the big data platform. Through data accumulation, the elderly 's usual living habits are analyzed, such as the time required from the bedroom to the living room, or from the kitchen to the dining room, and the approximate early warning value is calculated. When the time required by the elderly exceeds the early warning value, the big data platform will send a signal, and then the special personnel will go to the door to check the situation to ensure the safety of the elderly at home. And through the collection of information on the electricity consumption of the elderly, when the electricity consumption in the home of the elderly has not changed for more than a certain period of time, the big data platform will issue an abnormal warning of electricity consumption at the first time, and then verify the situation by community workers. All in all, safety management services not only effectively solve the safety problems of the elderly, but also reduce the time cost and labor cost of caring for the elderly anytime and anywhere.

Provide Health Management Services

'Internet + medical health ' focuses on opening up the last kilometer of medical treatment for the elderly, which is also the core content of the wisdom pension service function. The management of wisdom pension health service is based on big data and cloud computing. It collects information of the elderly through mobile terminals, creates health records for the elderly, and provides personalized health care services. For example,

installing a mattress with sensors in an elderly person's home, collecting data on vital signs such as heart rate, blood pressure, respiratory rate, and blood oxygen using the mattress, and connecting it with data collected from other parts of the elderly person's room. Visualize various data through data storage, filtering, statistics, analysis, and calculation to achieve intelligent monitoring and alarm, providing data support for elderly health and safety management. The data is continuously transmitted to the platform, and the accumulated data records can effectively grasp the life and rest rules and health index of the elderly. In case of any abnormality, the Big data platform will send an alarm in real time. Health service management realizes the information interaction of big data platform, family monitoring APP and doctor monitoring APP, and provides timely and comprehensive medical security for the elderly.

Provide Humanistic Care Services

According to the " Blue Book on Elderly Health : China 's Elderly Health Research Report (2018), " 63 % of the elderly often feel lonely [23]. Therefore, paying attention to the mental health of the elderly is very important for healthy aging. Big data plays an important role in monitoring, testing and tracking the mental health of the elderly. For example, using smart mattresses to collect the number of times an elderly person sleeps and turns over, and summarizing the patterns. When the elderly person sleeps and turns over too frequently, sometimes not only due to physical reasons, but also due to psychological longing for their children, the platform will provide feedback to relevant personnel and ask them to come and check the situation. After the relevant personnel understand the situation, they will provide feedback to the elderly family members and provide timely care to the elderly. If the elderly have psychological problems, the platform can establish records for elderly people with psychological disorders, conduct regular testing and tracking services, and solve their psychological problems. Humanistic care services based on Big data connect the elderly and their children's families, solve the psychological anxiety that children cannot live together with the elderly or cannot take personal care in a different place, and enable the elderly to obtain emotional needs while reducing the physical and psychological impact on them.

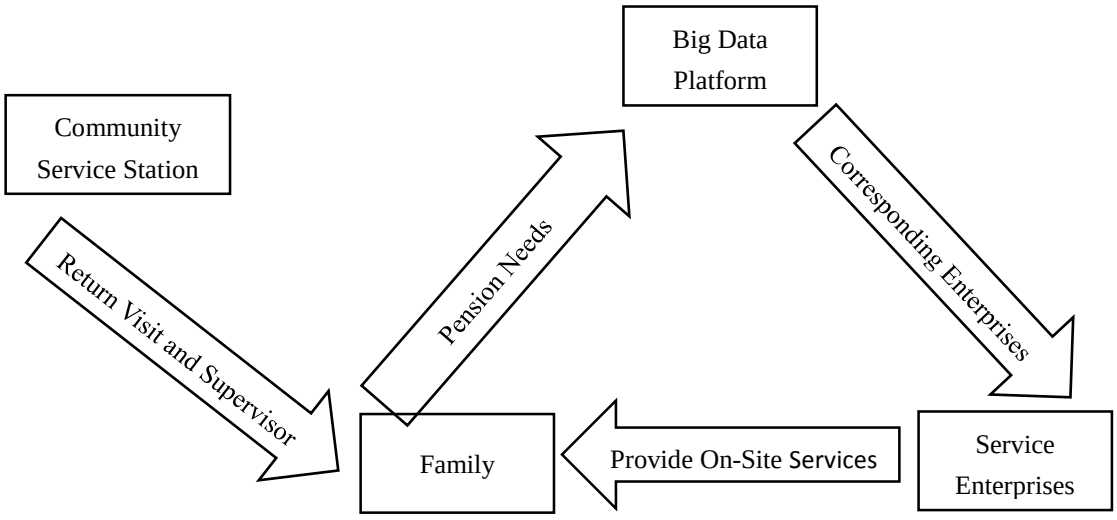

Figure1: wisdom pension operation mode

2.3 Features

Big Data Collection and Storage Data

An important prerequisite for the operation of the wisdom pension model is the application of big data. As an emerging technology, big data has the advantages of information collection, processing and sharing [23]. By using intelligent software and hardware products and equipment, we can quantify, continuously and intelligently collect a number of physiological indicators and behavioral data of the elderly, transmit them to the cloud in real time, and use big data to mine, refine and analyze information, so as to establish information files for the elderly and provide data basis for alarms.

Timely Discovery

The wisdom pension based on big data makes up for the problem of insufficient supervision of traditional old-age care methods, and has the advantages of openness, transparency, real-time supervision and

timely detection [24]. Health monitoring and activity safety data can be provided in real time through wearable devices, smart homes, sensors, etc. When the data is abnormal, the platform 's abnormal response mechanism will issue an alarm at the first time, and the abnormal situation will be fed back to the community platform and the doctor 's monitoring terminal. The online and offline two-way linkage avoids the problem that the treatment of the elderly is not timely when an accident occurs.

Precise Delivery

With the continuous improvement of living standards and changes in living concepts, the needs of the elderly have also changed from ' quantity ' and ' survival ' to ' quality ' and ' comfort '. This not only requires a standardized pension model, but also to provide personalized and accurate services. In the era of uncertainty, big data provides the possibility for the dynamic matching, precise control and future expectation of pension services [25]. Big data visualizes the massive data collected, further excavates the service needs and potential consumption points of the elderly, helps service enterprises to provide accurate service matching, realizes online information flow, timely delivery of offline services, and continuously improves the accuracy of pension services. At the same time, the matching of supply and demand realizes the effective integration of social resources and reduces the large amount of idle or waste of pension service resources [26].

III. CURRENT SITUATION OF WISDOM PENSION IMPLEMENTATION IN CHINA

3.1 The Number of Pilot Implementation Status

The development of wisdom pension in China can be traced back to the beginning of the 21 st century [27]. Compared with foreign countries, the development of wisdom pension in China started late, but under the background of national policy support and increasingly severe population aging, China 's wisdom pension model has also been rapidly promoted. In 2017, China began to implement the pilot work of wisdom pension. The Ministry of Industry and Information Technology, the Ministry of Civil Affairs and the National Health Commission have published the pilot demonstration list for five consecutive years. Up to now, there are 632 pilot applications of wisdom pension in China, including 86 wisdom health pension demonstration bases, 342 wisdom health pension demonstration streets (towns) and 204 wisdom health pension demonstration enterprises.

3.2 The Distribution Status of Pilot Projects

According to the list of wisdom pension application pilots issued by the three departments in the past five years, Pycharm software is used to visualize it. It can be seen from the map that there are two obvious characteristics in the distribution of wisdom pension pilots. First of all, most of the pilot areas are distributed in the more economically developed eastern regions. The number of distribution gradually decreases from the central region to the north and south regions. The western region is less distributed, and individual provinces do not even have a pilot. The imbalance of economic development in the eastern, central and western regions is an important factor leading to the uneven distribution of wisdom pension pilots. The operation of the wisdom pension model needs to be equipped with more expensive hardware and software equipment, and the cost of investment and manpower is relatively large. Compared with the western region, the eastern and central regions have more developed economy, more adequate pension funds, better scientific and technological development, and more adequate big data talents. Secondly, provinces with a high degree of aging are the first to implement the wisdom pension model. According to the data of the seventh national census, the provinces with the largest aging population are distributed in the most populous provinces, namely Shandong Province, Sichuan Province, Hebei Province, Henan Province, Jiangsu Province and Guangdong Province, with an aging population of more than 10 million at the age of 65. Shandong Province, Zhejiang Province, Sichuan Province and Shanghai City are the four provinces with the largest number of wisdom pension pilots. The number of pilots is 65,73,50 and 57, respectively. This overlaps with the provinces with a large distribution of aging population, indicating that the provinces with serious aging are more urgent for the wisdom pension model.

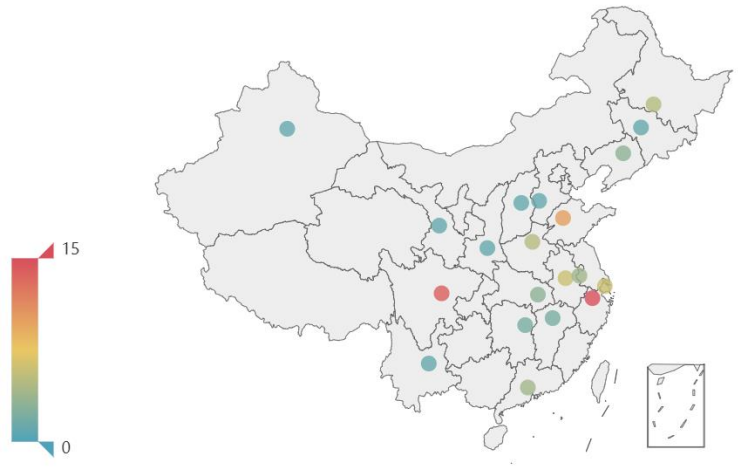

Figure2: The number distribution of wisdom pension demonstration bases from 2017 to 2021

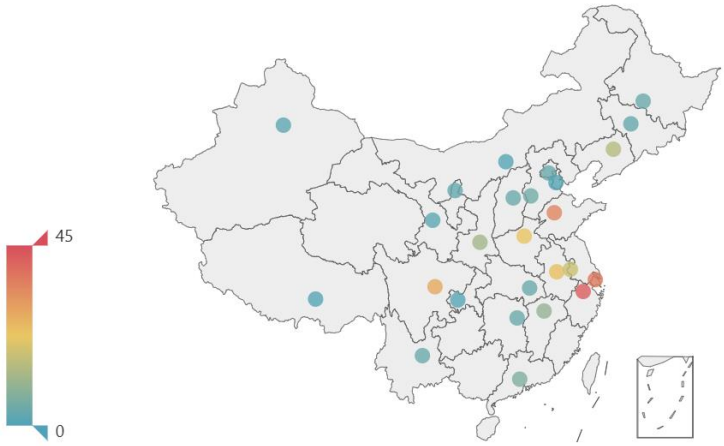

Figure3: The number distribution of wisdom pension demonstration streets (townships) from 2017 to 2021

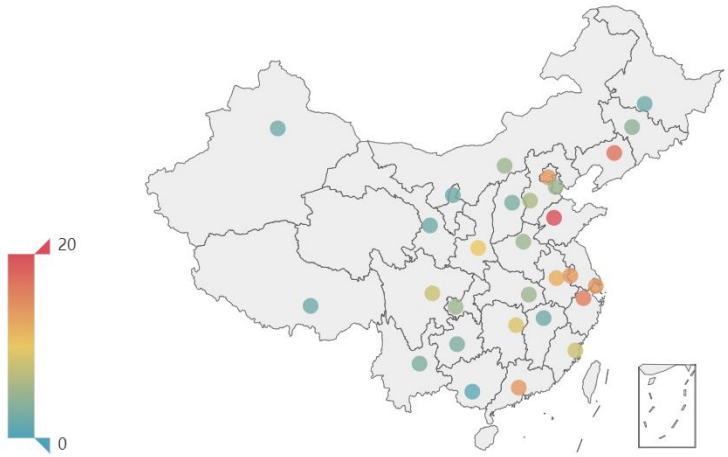

Figure4: The number distribution of wisdom pension demonstration enterprises from 2017 to 2021

IV. THE OPERATION DILEMMA OF WISDOM PENSION

4.1 The Cost Remains High

The wisdom pension system relies on new technologies such as Big data, Internet and cloud computing, and the facilities and equipment used are expensive. In situations where operating costs are high, enterprises can

only raise the prices of products and services to avoid losses, which puts higher demands on consumers' economic conditions and leads to the loss of some consumers. In addition, due to the inherent defects of the wisdom pension service industry, such as large investment in the early stage, long recovery cycle and unstable return rate, as well as the imperfect market exit mechanism [28], some enterprises are hindered from entering the market, which restricts the improvement and further development of the quality of the wisdom pension industry.

4.2 Large Professional Talent Gap

Intelligent, personalized, precise, timely and warm wisdom pension is inseparable from the support of professional talents. Although the wisdom pension model reduces a lot of manpower investment, there is a great demand for technical talents. The wisdom pension system from the perspective of big data involves data collection, processing and platform operation. Nonetheless, there is a large gap in compound talents with certain professional skills and rapid integration of information resources in China [29]. With the increasing number of elderly people, the demand for physical therapy, health management and other aspects of the elderly population is also increasing. However, the existing personnel engaged in intelligent elderly care services are not high in level and low in service quality, so it is difficult to improve the quality of wisdom pension services. In addition, some young people have a stereotype of the old-age service industry and are reluctant to engage in related work, resulting in an increasingly serious shortage of talents [30].

4.3 The Elderly Population Faces the Digital Divide

Wisdom pension is an innovation of traditional pension mode under the background of big data, which is of great significance in making the elderly 's later life more valuable and dignified. Nonetheless, the derivative products of the wisdom pension support have increased the richness of life for the elderly, but also led to the difficulty of using electronic products for the elderly [31]. The low ability of the elderly to use information, the lack of hardware equipment, and the lack of information needs are important reasons for the silver-haired digital divide [32]. The wearing and use of hardware and software equipment is the key to monitoring the vital signs and activity data of the elderly. The existence of the silver-haired digital divide hinders the advancement of the wisdom pension model.

4.4 Lack of Unified Standards and Platform Sharing

The wisdom pension industry in China started relatively late and is still in the macro planning stage. Although there are policy guarantees, a complete and unified wisdom pension service system standard has not yet been formed [5]. The lack of top-level design, insufficient overall planning, and the lack of communication and exchange in the construction of wisdom pension in various regions have led to the non-uniformity of standards among regions, and the substandard service quality in some regions, which has hindered the further development of the smart elderly care industry.

4.5 Imbalance of Development

According to the list of pilots issued by the three ministries and commissions in the past five years, the application of the wisdom pension system is mainly concentrated in areas with more population and more developed economy. Some remote areas have fewer pilots, and the elderly in the region cannot enjoy the results of technological development, and the development is unbalanced.

V. THE PROMOTION PATH OF WISDOM PENSION MODE

5.1 The Government Supports the Development of Wisdom Pension Industry from Policy and Economy

In terms of policy, the government should introduce a series of relevant laws, regulations and policy support, strengthen the top-level design, implement the policy in detail, standardize the management of the wisdom pension industry, and create a good atmosphere for the development of the industry. Economically, the government should increase fiscal expenditure, reduce the entry cost of enterprises, increase subsidies for the elderly population, and effectively allow the elderly population to enjoy the dividends of big data development.

5.2 Colleges and Universities Should Increase the Training of Professional Talents

The trend of China 's entry into an aging society is irreversible in a short time. The pension industry is bound to have considerable development prospects in the future, and the cultivation of talents in the pension service industry can be described as forward-looking. Colleges and universities should play an important role in training specialized talents. Relevant departments can promulgate policies to encourage colleges and universities to set up related majors of intelligent pension services, so as to lay a good foundation for the cultivation of wisdom pension talents. According to the actual needs, colleges and universities improve the education and training system, provide a combination of online and offline learning platform, and improve students '

information and technical level. At the same time, colleges and universities should guide students to pay attention to the current situation of the national population, popularize relevant policies and knowledge, break the traditional concept of young people, change their attitude towards the pension service industry, and enhance their sense of identity with the industry. In addition, enterprises should also play an important role in the incentive and retention of professional and technical personnel, and give preference to salary and treatment.

5.3 Improve the Recognition of the Elderly Population for Wisdom Pension

Ideas are the forerunner of action. Due to the lack of awareness of new technologies and the weak ability to operate science and technology, the elderly inevitably conflict with the wisdom pension model. Therefore, the government and society should increase the intensity of publicity, promote the functions and advantages of the wisdom pension model, increase the elderly 's experience of the wisdom pension system, and encourage the elderly 's families to deepen the elderly 's understanding of the wisdom pension model by learning first and then preaching, so as to deepen the acceptance and recognition of the wisdom pension system.

5.4 Promote the Standardization and Systematization of the Wisdom Pension System

The establishment of industry standards is of great significance for the sustainable development of the wisdom pension industry. Relevant departments should establish industry standards that are suitable for the development of China's wisdom pension industry, improve the relevant systems of wisdom pension, and adjust the system according to local conditions in each province. In addition, communication and cooperation between provinces, communities, and enterprises should be strengthened to timely identify and improve the shortcomings of the system, and further promote the system to better serve the elderly population.

5.5 Coordinate the Development of Smart Elderly Care in Various Regions

Due to the backward economy in some areas and the low level of scientific and technological development, it is not suitable for the implementation of wisdom pension, which leads to the unbalanced development of wisdom pension in China. As the leading force, the government should give corresponding technical and economic support, coordinate the development of smart old-age care in various regions, further promote the full coverage of smart old-age care, so that the elderly can enjoy it and share the development results of reform and opening up.

VI. CONCLUSION

The wisdom pension model under big data is a new way to actively respond to the aging of the population and help the elderly to have more dignity, value and significance in their later years, which can continuously improve the sense of gain, happiness and security of the elderly. In order to promote the sustainable development of the wisdom pension industry, it is necessary for the government, enterprises, society, the elderly group and universities to work together to break the bottleneck of the development of wisdom pension and achieve high-quality development of old-age care services.

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