

The Path, Limit and Optimization of Information Technology-Enabled Wisdom Pension: A Case Study of Haidian District

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Abstract: The demand for pensions is becoming increasingly important as China's population ages, but the outdated pension model has been unable to keep up with the senior population's changing needs. The advancement of science and technology has given China's pension system novel prospects and adjustments, but it has also created specific issues that must be resolved. This paper investigates the feasibility and sustainability of information technology-enabled wisdom pension in Haidian District, Beijing, focusing on development, advantages, disadvantages, and optimization strategies. The research takes the aging crisis of China as the background. It profoundly discusses the emergence of intelligent elderly care and the role of science and technology in reforming elderly care. A comprehensive examination of the development path in the Haidian District reveals government leadership, technological innovation, and community engagement as key drivers. While showcasing the advantages, such as improved quality of life and healthcare services, this study underscores the challenges: privacy concerns, accessibility, and the need for human interaction. At the same time, wisdom pension also needs to be combined with sustainable development to create a green pension model. This paper not only provides a scientific basis for the government, enterprises, and society to formulate relevant policies and strategies to promote the development of this pension model but also provides the future development direction and suggestions of the wisdom pension industry. In this case, the wisdom pension will develop better and comprehensively in China.

Keywords: wisdom pension, elderly care, information technology, Beijing

1. Introduction

The aging of the population is one of the significant issues in China. By the end of 2022, 280 million senior citizens aged 60 or above, accounting for 19.8 percent of the total population, according to the National Health Commission [1]. It is expected that by 2035, the older adults aged 60 and above will exceed 400 million, accounting for more than 30% of the total population, entering the stage of severe aging. The issue of pensions is receiving greater attention as the world's population ages faster than it used to. Yet, the old pension model has struggled to meet the senior population's increasingly diverse demands. Wisdom Pension offers a fresh approach to meeting the varied requirements of older people and raising the standard of elderly care services as a cutting-

edge model fusing information technology with senior care services. Wisdom pension promotes social contact, communication, and collaboration among older people, enabling them to engage in activities, combat loneliness, and integrate through online platforms and virtual communities. It also supports the development of artificial intelligence, big data, and information technology in senior care services. To implement wisdom pension, it is crucial to thoroughly investigate information technology's potential, constraints, and societal benefits.

The area of wisdom pension has recently been under the spotlight of study. Some studies begin at the technical level, based on the growth and development of technology, and examine how technology offers technical support and assistance in addressing population aging, including the use of information technology in elderly care, the creation of smart devices, and the development of novel delivery systems for elderly care. For example, a wisdom pension service platform designed by Gong Ge and Yong Liuyang is based on emerging technologies such as 5G networks, artificial intelligence, and edge computing [2]. Second, it analyzes the current model of wisdom pension or proposes a better model construction, such as Wang Hongyu and Wang Xiaoyu's refined elderly care service system of building innovative communities and smart homes [3]. In addition, Zhuang Yiting and Zhu Xinya proposed a new social resource synergy pension model based on blockchain technology [4]. Moreover, the research on pension products mainly focuses on design, function, advantages, and existing problems. Jamal suggests integrating remote monitoring into senior care offerings. Older adults's lives and health may be continuously tracked using smart home and medical monitoring devices [5]. However, China has rarely conducted a comprehensive and in-depth discussion on the path selection and overall optimization of wisdom pension. Instead, most of the existing research remains at the level of technology application, discussion of opportunities and prospects, or analysis of its development model. As a result, it is essential to begin from a larger perspective and carefully examine the fundamental problems in this area.

In this study, the Beijing Haidian District will be used as the research object, and it will be thoroughly discussed whether or not information technology-wisdom pension is feasible and sustainable from three perspectives: path, limit, and optimization. The report first examines the development process and application route of transmission technology-wisdom pension in this community. Second, it looks at the benefits of an efficient wisdom pension, such as productivity, development promotion, and social engagement. While doing so, it will also consider limitations, such as technological hurdles, privacy protection, and other difficulties, to demonstrate technology's viability in intelligent senior care. Finally, to effectively utilize information technology in elderly care, some strategies to maximize the wisdom pension model will be proposed, including technological advancement, policy support, social engagement, and other plan elements. The research on wisdom pension will help attract the attention of all sectors of society to the aging problem, promote the deep integration of science and technology and elderly care services, and improve the quality of life of older people.

2. Literature Review

The British Life Trust was the first to advocate for a "wisdom pension," also known as the "brilliant elderly system" at the time, which would allow seniors to remain in their homes with dignity and enjoyment, unrestricted by time or location. It also refers to employing cutting-edge information technology to provide networked, intelligent aged care services for older people at home. This practice is called "intelligent home care." Its essential component is using cutting-edge management and information technology to link more senior people with the government, communities, healthcare facilities, medical professionals, and other entities [6].

Intelligent personalization, socialization, specialization, scientific, institutionalization, industrialization, etc., are a few of the features of wisdom pension. It rebuilt the conventional aged

care service regarding action mode, fundamental structure, and overall mode. The wisdom pension, a new sophisticated form, demonstrates the modernity of China's senior care system [7].

Some domestic scholars have also defined the connotation of wisdom pension. According to Zuo Meiyun, "wisdom pension" is the use of information technology to support elderly life services and management to achieve positive interaction between the Internet, social networks, the Internet of Things, mobile computing, and other technologies with older people. This can enhance older people's quality of life while highlighting their experience and wisdom [6]. Zhang Shue et al. concluded that "wisdom pension" specifically refers to a new model of elderly care service in which various subjects use scientific and technological products as service media and means to provide all-around, full-service project coverage for different elderly groups and care about "holistic people" [8]. To sum up, information technology-enabled wisdom pension is based on information technology, which applies intelligence, data, and specialization to the field of elderly care, aiming to provide more comprehensive, efficient, humanized, and personalized elderly care solutions and improve the quality of life and happiness of older people.

The significant technological environment change drives the transition of aged care services from technicalization and digitalization to intelligence. In light of this, Zhou Lingyi et al. contend that wisdom pension presents the core attributes and evolution logic from fragmentation to unrestricted collaboration, from vague and extensive to clear and precise, from one-way provision to two-way interaction, and from technical validity to technical temperature [9]. Through in-depth research, Gao Peng Yang Cuiying gave the logic of the accurate supply system of Shanghai wisdom pension services: "target positioning - consolidating top-level design - environment construction - market development - publicity" [10]. Wu Yuxia and Wu Ninglu proposed that competent elderly care needs a collaborative mechanism of multiple subjects to form a diversified cooperative governance model between the government, the private sector, and civil organizations [11]. In the "White Paper on the Smart Pension Industry (2019)", it is mentioned that the mainstream smart pension logic system in the United States is "family + pension information platform + medical institutions + insurance companies;" UK: "Government + community service station + elderly care information platform;" Japan: "Government + Enterprise + information platform" [12]. In summary, whether at home or abroad, the core logic of competent elderly care is people-oriented, and all services are based on the actual situation of older people. Modern superb technology builds an information platform, a multi-party collaborative service for older people, as far as possible to meet the individual needs of older people. In addition, national governments play a central role.

The development process of intelligent elderly care in China can be roughly divided into four stages. The first is the embryonic stage (2012-2013). In 2012, the National Office for Aging proposed the concept of "wisdom pension" for the first time. It carried out time exploration in the form of wisdom pension experimental bases nationwide. In 2013, The State Council issued the "Several Opinions on Accelerating the Development of Elderly Care Service Industry," the National Aging Committee established the "National Intelligent Elderly Care Expert Committee" to set goals and guide the development of China's intelligent elderly care industry⁸. The second is the phase of vigorous development (2014-2016). In 2015, the "Guiding Opinions on Actively promoting 'Internet+' Action" issued by The State Council pointed out that it is necessary to "promote the development of smart and healthy elderly care industry." In 2016, The State Council issued the "Guiding Opinions on Promoting and Regulating the Development of Big Data Application in Health Care," aiming to promote the integration, sharing, and open application of big data in health care. At the same time, the People's Bank of China, the Ministry of Civil Affairs, the Banking Regulatory Commission, and other departments have also issued the "Guiding Opinions on Financial Support for the Accelerated Development of the Elderly Care Service Industry," increasing credit support for the elderly care field. During this period, the national government

promoted a series of policies on elderly care, which made it develop rapidly. Then there is the demonstration and advanced phase (2017-2019). In February 2017, the Ministry of Industry and Information Technology, the Ministry of Civil Affairs, and the National Health and Family Planning Commission issued the “Action Plan for the Development of the Smart and Healthy Elderly Care Industry (2017-2020),” marking the introduction of the first national industrial plan for the intelligent elderly care. This was followed by a series of complementary and support programs released in 2017. From the end of 2017 to 2019, the national government has frantically carried out pilot demonstration work of wise elderly care and established bases across the country. Finally, in the maturity and optimization phase (2021 -), after the COVID-19 outbreak, telemedicine and health monitoring have become a significant trend. At the same time, with the development of AI technology, artificial intelligence plays a role in diagnosis, prediction, and assisted decision-making, providing more personalized and accurate medical treatment and health management for older people. In 2021, the three departments of the Ministry of Industry and Information Technology, the Ministry of Civil Affairs, and the National Health and Health Commission jointly issued the “Action Plan for the Development of the Smart and Healthy Elderly Care Industry (2021-2025),” to further promote the development of the intelligent and healthy elderly care industry.

3. The Development Path of Wisdom Pension in Haidian District

3.1. The Main Body of the Wisdom Pension Industry in the Haidian District

The wisdom pension service industry in the Haidian District of Beijing is mainly led and guided by the government, which provides policy and financial support for developing the wisdom pension industry. The government cooperates with significant technology enterprises and nursing homes to provide intelligent, scientific, standardized, and personalized elderly care services for the local elderly. With the goal of “scientific layout, functional differentiation, service standardization, team specialization, and intelligent operation,” the Haidian District government adheres to the guidance of the Party, strengthens top-level design, strengthens departmental planning and resource integration, innovates service mechanisms, and strives to solve prominent problems and bottlenecks restricting the development of home and community wisdom pension services. To achieve a breakthrough in the construction of a wisdom pension service system.

3.2. Lifecare

Because many older adults have trouble moving, the community provides them with intelligent food delivery machines for older people. Residents can enjoy healthy and assured meals by ordering meals one day in advance and swiping the “Smart Elderly Care Service card” to take feeds on the day of eating.

The government introduced home intelligent service terminal equipment, including intelligent service robots and rope alarms, and took the lead in free delivery to residents in the area. Intelligent robots can have barrier-free conversations with older people, providing them with more convenient and targeted advice and services. At the same time, the robot also has a one-click help function: directly press the phone button on the robot screen, dial the phone of the community service center, and seek a variety of required services. Rope alarms can pull the rope or press the emergency call button when older people feel unwell or have another emergency. The device uses the NB-IOT Internet of Things to notify the family crisis.

Some communities have also started to help the elderly taxi warm heart stations. The Friendly Heart Station combines the advantages of mobile phone-hailing and taxi-hailing stations, simplifies the process of ordering, expands the scope of hailing, and supports cash payment with the Warm Heart station as the meeting point to facilitate older people to call a car and take a taxi.

3.3. Medical Treatment, Physical Health and Monitor

In 2014, Haidian District's first intelligent community residents' "medical, old-age care, health management" comprehensive service platform landed in the community health service center. The platform uses information technology to meet the needs of residents for self-detection, contract file management, online health consultation, health education, chronic disease monitoring, and guidance before the first diagnosis through mobile Internet, cloud computing, Internet of Things, and other information technologies.

The hospital builds a "combination of medical care and family doctor telemedicine support system." Through the hospital Internet technology, the patient's medical information can be shared and effectively used between the elderly care institution and the hospital. The combination of medical care, hierarchical diagnosis and treatment, and continuous medical service can be realized.

The government has provided free "e with filial piety core" smart terminals to elderly residents in the region. The project, a home-based service, is jointly offered by the street and "Yi Ban" (Beijing) Information Technology Co., LTD. The terminals provide real-time dynamic reminders, automatic greetings, voice interaction, track positioning, and one-click alarms to provide care for empty nests, let alone older adults. As long as the elderly wear "e with filial piety core," family members or guardians can understand older people's life status at any time through the mobile app, timely detect the abnormal behavior of the elderly, enhance communication and interaction with older people, and help busy children protect more senior people. The street also connects the 53 elderly living alone with community staff, ensuring they understand their needs, respond quickly to emergencies, and arrive at the scene for rescue to reduce security risks and avoid significant accidents and tragedies caused by delays.

The MMwave radar intelligent scheme developed by Qinglei Technology has been used. An accurate perception of sports and life goals can be achieved through edge and cloud computing. Through data mining, various functions needed in intelligent elderly care and competent medical care can be finally realized. It has realized the functions of human position detection and tracking, breathing and heartbeat monitoring, human posture recognition, and so on.

Haidian District also creatively launched the community comprehensive health index evaluated from the three dimensions of "physical fitness, brain fitness, and emotional fitness," built a health care service system management system platform, used information technology to quantify health level, and built a virtuous cycle of "assessment - training - improvement - re-evaluation" health service system.

3.4. Humanitarian Care

The community has held a series of intelligent product training courses, such as smartphone training courses for the elderly and computer training courses for the elderly, many times, providing opportunities and platforms for the elderly to learn and narrowing the "digital divide" between the elderly and the young.

Relying on Baidu's artificial intelligence products such as "Xiaodu at Home," the needs of community elderly care are connected with the services of elderly care institutions, and elderly groups can enjoy the aging intelligent life and the fun brought by rich audio and video content. For example, if older people say, "small degree, I want to learn regular script techniques," they can enter video teaching.

AI intelligent voice fully interactive robot "Xiaolian," with entertainment, reminder, service, dialogue, and eight other functions, built-in several elderly care service projects and a voice knowledge base. "Little United" will remind older people to take medicine on time, chat with older people, and sing. When the elderly need to accompany the hospital, car travel, and other services, as

long as the mouth is called “small,” the professional service staff in the background will receive instructions and immediately arrange door-to-door service.

4. Advantages and Disadvantages of Wisdom Pension in Haidian District

4.1. Advantages

Beijing was one of the first cities to start the intelligent pension project industry as the capital of the People’s Republic of China and the center of politics, culture, science and technology, education, and international exchanges. The primary advantage of intelligent elderly care in the Haidian District is that the district government actively leads and guides the development of the intelligent elderly care industry. This demonstrates the Government’s commitment to addressing the needs of the elderly population. The government provides policy and financial support, which is crucial for developing the intelligent elderly care industry. This support can lead to innovative solutions to better care for older people.

There are many colleges and universities in Haidian District. Peking University and Tsinghua University are located here. Therefore, the Haidian District is undoubtedly far ahead in the scientific and technological support of the intelligent pension industry. In cooperation with the government, several technology companies have innovatively integrated intelligent robots, intelligent terminals, intelligent medical monitoring, and protection technologies into the lives of older people and improved the quality of life of the elderly by providing convenient and personalized services. The government attaches great importance to the physical health of older people, so it has introduced many intelligent systems to deal with emergencies and nip safety risks in the bud.

Due to the improvement of intelligence in elderly care communities, the government has launched several community projects, such as smartphone training courses for the elderly and computer training courses for older people. This can promote social interaction and learning, bridge the “digital divide,” help elderly people feel less lonely, and improve their mental health.

4.2. Disadvantages

The first is the issue of privacy. With the collection of health and personal data, there may be concerns about the privacy and security of elderly residents’ information. The disclosure of personal information may also attract telecom fraud, explicitly targeting older people. The second is cost and accessibility. While these services are innovative and convenient, a high price can make it difficult for low-income seniors to access them. Even with government subsidies, the distribution of intelligent robots and high-tech pension products is limited to some notable families or older adults with relatively large difficulties and cannot do full coverage.

While technology can enhance elder care in many ways, it cannot completely replace the need for human interaction and companionship. Over-reliance on technology can lead to social isolation for some older people.

Lack of unified standards and shared platforms. The development of the intelligent elderly care industry relies on platform construction. At present, the innovative elderly care service platform in the Haidian District involves many departments and complex inter-departmental relations. Each block and each department have its platform system, which lacks effective coordination and docking. Different departments also have different standards for statistical data, so the integration of resources is limited. It is difficult for the government to give more targeted policies and solutions.

To sum up, the development of intelligent elderly care services in the Haidian District of Beijing shows a promising prospect in improving the quality of life and health of the elderly population. However, it also raises concerns about issues related to technology dependency, privacy, and accessibility, which need to be addressed for more inclusive and effective implementation.

5. The Optimization Path of Competent Elderly Care in Haidian District

First of all, it is necessary to strengthen the pertinence of policies, formulate clear policies and regulations, and standardize the operation of the intelligent elderly care industry. The government should actively promote the establishment of an innovative elderly care system and industry standards, protect the rights and interests of older people, and provide a stable legal environment for the development of the industry. Competent elderly care needs to monitor all aspects of the elderly data, such as physical conditions, living habits, etc., to develop personalized service programs. Therefore, the protection of the personal privacy of older people should be in the first place. Relevant legal provisions need to be introduced to strengthen the safety of the confidentiality of information and data security of older people and their relatives in the brilliant elderly care service to reduce and eliminate the risk of older people being defrauded.

At the same time, the government also needs to improve the supervision and evaluation mechanism for the intelligent elderly care industry and regularly evaluate the quality and effect of innovative elderly care services, including the inspection and maintenance of intelligent elderly care infrastructure. Adopt more feedback from older people and make adjustments and improvements.

Although the current intelligent robot is very advanced and can have barrier-free dialogue and interaction with older people, it cannot replace human beings. So governments and tech companies need to further integrate technology with social interaction to encourage older people to interact with family, friends, and community. Provide online social platforms and virtual social events to reduce social isolation. In addition, high-tech enterprises can consider using VR and AR technology to provide entertainment and cognitive support for older people, such as virtual tourism, cultural experiences, and memory training. This can help older people stay active and optimistic.

Multi-party cooperation, mainly government subsidies and support, will reduce the price of some innovative pension products so that most older adults can afford them. High-tech enterprises to increase the innovation of intelligent pension products, research and development efforts, the pursuit of raw materials, and efficiency to reduce product costs.

In addition, scientific research institutions, think tanks, and social organizations should actively take on roles in the development of the intelligent elderly care sector, provide governance support for technological innovation in the industry, actively conduct industry-university research cooperation, and optimize the organization to make up for the shortcomings of enterprise-only research and development. It is possible to supply the intelligent senior care sector with more realistic routes by conducting multi-topic research, development, and brainstorming sessions.

The innovative senior care business is a comprehensive, cross-departmental service initiative that requires the active participation and assistance of several government agencies and communities to succeed. To accomplish information exchange and resource integration, it is crucial to establish communication between various departments to enhance the creation of the fundamental pension database.

Competent care institutions must strive to build a sustainable care ecosystem and promote sustainable development to reduce the environmental impact of care institutions and communities. Environmental protection and energy conservation principles should be adopted in designing and constructing elderly care institutions and communities. This includes using renewable energy sources, adopting energy-efficient lamps and equipment, and improving thermal and acoustic insulation materials to reduce energy consumption and environmental impact. Promote organic food and local ingredients to reduce food transportation and packaging waste. Elderly care institutions can also be encouraged to grow their vegetables and herbs for consumption, promoting sustainable agriculture. Finally, intelligent care institutions establish monitoring and reporting mechanisms to

track and evaluate the effectiveness of sustainable practices and provide transparent information to communities and stakeholders.

6. Conclusions

In conclusion, the development of wisdom pension services in Haidian District, Beijing, reflects a promising pathway towards improving the well-being of the elderly population. Significant strides have been made in enhancing senior citizens' quality of life and healthcare through government leadership, technological innovation, and community engagement. The government's commitment to policy support and financial investment has propelled the industry's growth, making Haidian District a prime example of how technology can be harnessed to address the evolving needs of an aging demographic.

However, this journey is not without its challenges. Privacy and data security concerns persist, necessitating robust legal safeguards and regulatory frameworks. The cost and accessibility of high-tech solutions remain obstacles, demanding more inclusive strategies to ensure that all elderly residents can benefit. Moreover, while technology can enrich elderly care, it should complement, not replace, human interaction and companionship. Social isolation remains a critical issue that needs to be mitigated through innovative approaches.

In terms of theoretical significance, this study provides a comprehensive overview of the development of wisdom pension services, offering insights into the advantages, disadvantages, and optimization strategies in a specific geographic context. It highlights the critical role of government leadership, technological innovation, and community involvement in shaping the intelligent elderly care landscape. Future research should delve deeper into the intricacies of privacy protection, cost-effective models, and practical strategies for promoting social interaction among older people. Pursuing a sustainable care ecosystem and aligning wisdom pension with sustainable development principles should also be explored further. This paper sets the stage for continued exploration of how technology can be harnessed to support and improve the lives of senior citizens in an aging world.

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