| RESEARCH ARTICLE

Research and Innovation of a Community Intelligent Pension Service System: Taking Longhua District, Shenzhen, China, as an Example

Shan Guo[1a] ✉ and Shiyu Dong[1b]

[1a]*Computer Science and Technology, Guangxi University of Science and Technology, Liuzhou 545000, China*
[1b]*Medical Faculty, Hangzhou City University, Hangzhou 310000, China*
Corresponding Author: Shan Guo, **E-mail**: 3092303170@qq.com

| ABSTRACT

With the aging of China's population, as a new model combining information technology and high-quality elderly care services, the topic of smart elderly care continues to warm up and has immediately attracted widespread attention. With the innovation of Internet technology, elderly people and families are in demand of the smart pension industry, and national policies have issued a series of policies and plans to encourage the development of smart pensions, allowing the innovation and design of China's smart elderly service system to fully expand. However, the research shows that from the perspective of the macro development of China's smart pension industry, the overall operation system is not mature, the talent gap is more accurate, there are fewer services, and it is still in the market development stage. This paper focuses on the Shenzhen Longhua District, which is a local part of the community wisdom endowment service industry chain investigation. The analysis of the current pension service system development is not mature enough, and it does not completely combine Internet technology and wisdom endowment. Additionally, because the economic strength and cultural level limit of wisdom endowment service acceptance are not high, the policy support for community wisdom endowment is not large enough. On this basis, this paper draws on the excellent successful experience at home and abroad. From the perspective of three aspects and put forward opinions for innovation, first, the innovation of community smart elderly care service technology, which combines Internet information technology and elderly care services organically, improves the quality of life and the happiness index of elderly people. Second, the innovation of community smart elderly care services, including the full use of medical institutions to provide 24-hour rehabilitation monitoring, remote monitoring services, and personalized and differentiated services, are tailored for elderly people. Third, the national policy innovation of community elderly care services, through policy guidance and support, promotes the healthy development of community elderly care services to provide better quality and convenient pension services for elderly people. The author believes that in the future, community elderly care services will be more professional and standardized, and a set of digital systems and service standards with scientific standards and rules will be established to ensure the quality of service and personalized demand.

1. Analysis of the Status quo of the Smart Elderly Care Service Industry in China
1.1 Research Background
Since the 1990s, China has been facing an increasingly aging society. According to the data collected by the National Bureau of Statistics, the elderly population aged 65 and above in China increased from 62.99 million in 1990 to 88.11 million in 2000, accounting for 6.96% of the total population from 5.57%. It is expected that by 2023, the elderly population in China will exceed 400 million, accounting for one-third of the total population. In addition, the "Notice of The State Council on the issuance of the" 14th Five-Year Plan "National Aging Cause Development and elderly care Service Planning System", issued in 2022, clearly proposes

to "increase the application of intelligent prosthetics, robots and other products, and establish a number of smart and healthy elderly care industry ecological incubators and accelerators." By 2025, the scientific and technological support capacity of the smart health pension industry should be significantly strengthened, and the supply capacity of products and services should be significantly improved. With the encouragement and support of the policy, China's smart pension industry may usher in a golden age of development.

1.2 Literature Review

In this context, Qu Wei and others proposed in the "Smart Pension Community System based on the Internet of Things" that the call for modern elderly care reform is growing now, proposed in the "Intelligent Elderly Care Community System based on the Internet of Things" at a time when there is a growing voice for the reform of modern elderly care and medical care, they proposed a smart elderly care community system based on the Internet of Things with the concept of "Internet + Internet of Things + community elderly care", and precisely designed and improved the existing elderly care mechanism of modern Chinese communities from various subsystems. With respect to technological innovation in community elderly care services, the author did not pay attention to community elderly care services themselves. Standing on the shoulders of previous studies, the author deeply realizes that the traditional community elderly care model can no longer meet the diverse individual needs of the elderly population. Therefore, on the basis of the innovation of national policy on community elderly care, the use of information systems to improve service efficiency and improve the standards and quality of community elderly care services so that elderly people in more regions can meet the diverse needs of elderly people is highly important for achieving the goal of old-age care.

1.3 Problem Statement and Objective

With the improvement of people's living standards, some elderly people may lack the ability to accept and use new technologies, resulting in the low popularity of community elderly care service technologies. Smart elderly care also needs to meet the spiritual and cultural needs of elderly people at different levels more humanely. The quality of some community elderly care services is uneven, and there are problems such as low service level and single service content. On the one hand, enterprises are reluctant to spend large amounts of funds and resources developing and introducing new technologies for the sake of profit. On the other hand, due to the path dependence of the bureaucracy itself, the government system's response to new technologies and new equipment lags behind (Zhang, 2020). The author discusses the aspects of community aged care technology, community aged care service and community aged care policy and discusses how elderly people can obtain more comprehensive care and love. A sound community elderly care service system can promote the rational allocation of social resources, enhance social cohesion and happiness, and promote the harmonious and stable development of society. Therefore, to achieve the optimization and model upgrade of the elderly service system, the whole society must invest energy in smart elderly care, and there is a long way to go.

Table 1. Policies and primary coverage

Policy name	primary coverage
"The 14th Five-Year National Health Plan"	We will support the deep integration of health management for elderly individuals, prevention and intervention, elderly care, fitness, leisure, culture and entertainment, travel and elderly care, and innovate and development of smart health and elderly care services such as health consultation, emergency rescue, chronic disease management, and living passport.
"Opinions on Comprehensively Promoting the Standardization Work of Civil Affairs in the New Era"	To implement the national strategy of actively responding to the aging population, we will launch a special campaign to standardize elderly care services. We will promote the development of a basic old-age service system in areas such as smart elderly care, facilitate the development of the old-age service system, and facilitate the high-quality and standardized development of old-age care services.
"The Report on the Progress of Strengthening and Promoting the Work on the Aging"	Accelerate the construction of the elderly care service system, rely on and integrate existing resources, and develop them into street regional elderly care service centers or service complexes. By 2025, the total number of beds for the elderly will reach more than 9 million, and the proportion of nursing beds for the elderly will account for 55 percent.

2. Information Technology Boosts Smart Communities

Community wisdom refers to elderly people who still live at home, do not need to change their living environment, use the Internet of Things, cloud computing, big data, intelligent hardware, or a new generation of information technology products, can realize effective docking and optimal configuration of individuals, families, communities, institutions and health pensions; can promote improvements in health pension service wisdom; and can improve the quality of health pension service efficiency.

In 2017, Longhua District introduced social capital, adopted the form of government guidance, enterprise research and development of "building instead of rent",; and used the Internet, Internet of Things, cloud computing and big data technologies. Among them, the Longhua District smart elderly care service platform and many intelligent terminals are the core content. In 2020, Longhua District incorporated the smart elderly care service platform into the district-level information plan, optimized and improved 66 functional modules, moved to the big data platform of the district, and successively provided hardware transformation, intelligent equipment and auxiliary devices for 53 disabled and elderly households. At home, elderly people can not only realize active alarms for help at home but also support intelligent equipment through passive help through activity track monitoring. According to the living habits of the elderly individuals, no activity tracks were reported. Even if elderly people do not actively touch the emergency help device, the intelligent device sends warning information to the mobile phones of the staff and the elderly family to realize the 24-hour dynamic safety monitoring of elderly people living alone. (See Figure 1,2). A smart community makes the life and safety of elderly people more secure but also greatly saves manpower, realizing the integration of new and old people in service and the collision of science and technology with tradition. In addition, QuWei scholars, using the "Internet + iot + community endowment" concept as an instruction, proposed a kind of wisdom endowment community system based on the Internet of Things, namely, the wisdom endowment medical subsystem, the wisdom endowment entertainment subsystem, the wisdom endowment restaurant subsystem, and the wisdom endowment shopping subsystem, which effectively improved the quality of life of elderly people (Qu et al., 2017).
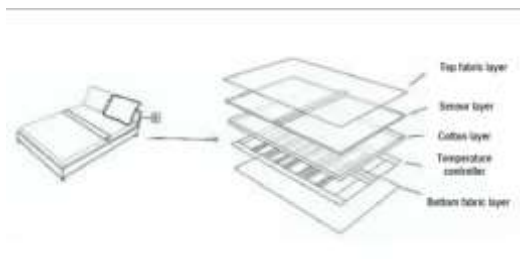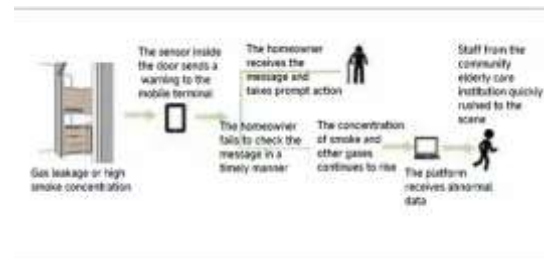

Figure 1 Smart mattress (Wang & He, 2020)

Figure 2. Smoke intelligent sensing door (Wang & He, 2020)

3. The Disadvantages of the Smart Pension Industry at this Stage

Most of the elderly people living in Longhua District are more traditional. Faced with this group, intelligent products are opposed to different degrees, some elderly people even refuse to learn to use them, and elderly people have a certain threshold to use unfamiliar equipment, so the aging of smart homes needs to be improved. In addition, with the improvement of people's living standards, intelligent pensions, such as chess robots and companion robots, need to be developed to meet the spiritual and cultural needs of elderly people at different levels. The phenomenon that the demand for smart pensions is increasing at multiple levels and of multiple types reflects that there is (Zhang, 2019) mismatch between the supply and demand of products and services. Although many smart pension products and platforms have been developed, the problems of technological development obstacles and equipment isolation urgently need to be solved. The development and application of intelligent equipment for modern information technology is still in the initial stage with respect to the integration and processing of data collection, effective analysis, integration and sharing. Intelligent pension products are too simple, generally only portable bracelets or smartphones, which cannot meet the diverse and personalized needs of elderly people; moreover, information data and intelligent equipment development often lag behind the development of elderly services and cannot realize effective connections with elderly services, and it is difficult to meet the actual needs of elderly people. At the same time, most of the staff of the Longhua Pension Community are less professional, and the intelligent pension industry lacks compound talents who understand technology and industry. The fact that Longhua District is the pioneer of smart pensions also reflects the insufficient policy refinement and implementation of smart pensions in other regions of China. This is because, on the one hand, the scale of community pensions is small, and the demand for smart pension products is not large; on the other hand, the low degree of customization of smart pension products and the lack of breakthrough technology development cannot increase economic income.

4. Aiming at Innovation in the Community Intelligent Elderly Care Service Industry and the Prospects for the Future

"The young Shenzhen is rapidly entering an aging society. That is the most deadly thing." Chen Kaimeng, president of the Shenzhen Elderly Service Association, said: "Shenzhen is falling on a cliff. Pension does not seem to be urgent, but it is actually facing much pressure. The number of families with high pension demand is increasing rapidly, and the smart pension service industry is undergoing rapid development in China. China's pension industry market has a large amount of open space, and future smart pension innovation will lead to a broad future.

4.1 Community Smart Pension Technology Innovation

With artificial intelligence, the Internet of Things and the progress of big data technology, community wisdom pension services will be more intelligent and efficient, relying on mobile Internet technology, building "a cloud multiterminal" integrated service

information platform, and making full use of Internet sensing technology for comprehensive information mining for elderly people and their children to provide real-time pension consultation, voice communication, emergency calls, etc. Through cross-platform data interconnection and synchronization, all departments will form a complete intelligent management closed loop, realizing real-time information interaction between families and, service management personnel and medical staff (Chen, 2022). Based on the community system, a one-in-one pension system is built, using the latest research and development of the Beidou navigation system to position the location through information monitoring technology at the same time, real-time monitoring of the old man's heart rate, blood pressure blood glucose index body health monitoring, Internet information and pension services together, fully integrated use of basic pension information and pension business information, active promotion of pension big data trends such as technology, and improvement of the quality of the old man's life and happiness.

4.2 Innovation of Community Smart Elderly Care Services

Through research and the literature, the author found that in the future, community intelligent elderly care services will pay more attention to personalized needs and differentiated services. Customized service modes and personalized elderly service plans can be introduced to meet the diverse health needs of elderly people. The service center can customize the comprehensive scheme of the basic personal and family information of the elderly and the history of medical service through intelligent matching and can form an integrated intelligent pension service process from service consultation to registration and from service evaluation to service return visits. With the development of modern technology and improvements in elderly demand and consumption ability, pension enterprises in intelligent home health monitoring, emergency calls, etc., need more intelligent development and make full use of medical institutions to provide 24 hours of rehabilitation monitoring and remote monitoring services.

4.3 National Policy Innovation for Community Elderly Care Service

Future communities should pay more attention to the construction of wisdom pension services and support; the government should further increase community wisdom endowment service industry policy support and investment; encourage social forces, enterprises and other diversified subjects to participate in community endowment services; promote the development of community endowment services to diversify; support social organizations to carry out voluntary services; and promote private capital to participate in the pension service industry. The government should also strengthen the management and supervision of community elderly care services and promote the establishment of sound service standards and evaluation systems. The relevant specifications and documents should be formulated to improve the service quality and level (Song, 2022). In general, the Chinese government's policy innovation for community elderly care services is mainly reflected in the aspects of policy support, diversified service, intelligent service, service standardization and talent support. Through policy guidance and support, we can promote the healthy development of community pension services and provide better and more convenient pension services for elderly people.

5. Conclusion

At present, there are four development trends in the smart health care industry: humanization, aging, offline and medical and nursing care. However, at present, some products and services in China cannot meet the diverse needs of elderly people, so future research should focus on demand customization and targeted problems and strive to solve the problem of equipment isolation. The importance of smart elderly care services is mainly reflected in improving the quality of elderly care services, promoting the technological innovation of elderly care services, alleviating the pressure of elderly care services, and promoting the innovation of elderly care services. (Liu,2023)This paper puts forward relevant deficiencies and suggestions, aiming to promote the integration of pensions, services and systems with wisdom, but this research lacks first-hand survey data and more detailed practical suggestions. With the continuous progress of science and technology and the deepening of the aging population, smart elderly care services will gradually become the mainstream community elderly care service in the future, providing better quality and convenient elderly care services for elderly people. In addition, the state should introduce relevant detailed policies to promote the construction of the elderly talent team, implement the construction of the elderly service system, and maintain the most beautiful "sunset red".

Conflicts of Interest: The authors declare no conflict of interest.
Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers.

References

[1] Chen, Y. W. (2022). *Research on the problem and optimization path of smart home care service in shanghai* [Master's thesis, Shanghai Ocean University]. CNKI. https://link.cnki.net/doi/10.27314/d.cnki.gsscu.2022.000044

[2] Liu, D. (2023, April 3). *Background information: Current status and trends of population aging in china*. CCTV. https://www.cctv.com/.special/1017/-1/86774.html

[3] Qu, W., Jiao, P. Y., & Li, H. (2017). The smart pension community system based on the internet of things. *Journal of Shenyang Normal University, 35*(1), 93-97.

[4] Song, Y. S. (2022). *Research on the development status, dilemma and countermeasures of intelligent elderly care service—— take zibo city, shandong province as an example* [Master's thesis, Guizhou University of Finance and Economics]. CNKI. https://link.cnki.net/doi/10.27731/d.cnki.ggzcj.2022.000340

[5] Wang, Y. X., & He, J. (2020). Luoyang city historical neighborhood of community wisdom endowment exploration. *Real Estate World,* (18), 31-32.

[6] Zhang, B. (2019). The development dilemma and way out of smart health care industry: Based on the perspective of effective supply. *Lanzhou Academic Journal,* (11), 179-188.

[7] Zhang, H. (2020). *Research on the optimization path of China's pension service system under the perspective of smart pension* [Doctoral dissertation, Jilin University]. CNKI. https://link.cnki.net/doi/10.27162/d.cnki.gjlin.2020.007403