Reflection on the "Digital Pension" in Heilongjiang Province from the Perspective of Public Management

Zekun Wang

Department of Finance and Public Administration in Harbin University of Commerce, Harbin, Heilongjiang, China

Keywords: "Digital Pension", Pension Industry Development, Public Administration.

Abstract: Under the general trend of the declining number of new-born population in China, population aging has become a serious problem. As one of the provinces with the most serious problem of population aging in China, Heilongjiang Province, "digital pension" will be an important measure to solve the problems of the times. However, at present, the layout of elderly care service institutions is unreasonable and the brain drain of the industry is serious. After this analysis, it is believed that strengthening the administrative intervention of the public sector in the development of related industries can effectively promote the development of the "digital pension" industry and promote the improvement of the practical ability of public management.

1 INTRODUCTION

With the continuous development of society, Heilongjiang Province has become a province with a relatively prominent aging problem in the country. In the measurement process of population aging, we often define the population aged 60 and over as the elderly population, while the problem of population aging in China is deepening (Figure 1). Based on above elements, in the process of the seventh national census, At present, the population aged 60 and over 65 in Heilongjiang Province has reached 7.3956 million and 4.7918 million respectively, 4.52% and 2.11% higher than the national average level of aging, and the degree of aging has reached the third place in China. However, in some regions of Heilongjiang Province, the unreasonable allocation pattern of pension resources and the imbalance between urban and rural pension supply and demand still exist. With the aging, digital technology has become the trend of the times. Therefore, as the product of the combination of the two trends of the times, "smart elderly care" will inevitably become the main form of the future elderly care industry.

2 RESEARCH STATUS

"digital pension" originated in the UK. In 1987, the British life Trust Association put forward the concept of "fully intelligent elderly care system" and developed a new discipline "gerontechnology". The initial purpose of discipline development was to improve the integration of information technology and elderly care, but the early concept was still limited to "smart home-based elderly care". In 2010, IBM has put forward the development and vision of "smart city", in which "smart elderly care" is an important part of the construction of "smart city". At this time, the concept of "smart elderly care" has gone beyond the boundary of "home-based elderly care" and is developing towards the trend of "IOT based elderly care", "Internet-based elderly care" and "intelligent elderly care", Its core significance is to apply advanced management technology and
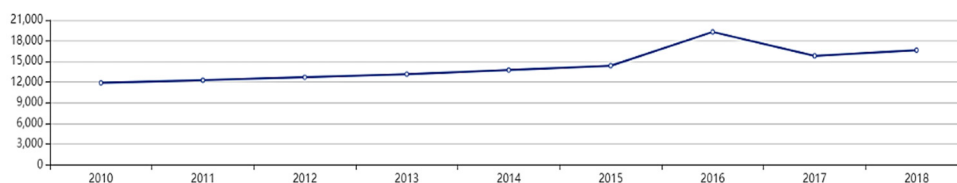

Figure 1: Growth of the elderly population in China.

information technology to closely link the "pension model" with government pension institutions, medical institutions and maintenance personnel. In 2010, the concept of "information-based elderly care" first appeared in Chinese academic circles, followed by new terms such as "science and technology elderly care". Around 2013, scholars represented by *MeiYun Zuo* first promoted the concept of intelligent elderly care, believing that intelligent elderly care is to provide security, medical care, entertainment, leisure, learning and exchange services for the elderly through the Internet, IOT, social networks and mobile networks, At the same time, it analyzes, monitors, uploads and disposes the old information to realize intelligent interaction. Up to now, there has been relatively little research on the management of public administration departments for the "digital elderly care" industry. Therefore, this research hopes to fill the gaps in relevant fields and promote the service practice ability of public administration departments for the development of relevant industries. (Zuo, 2020).

3 DEVELOPMENT ISSUES

This paper believes that the current development of the digital pension system in Heilongjiang Province is slow, which is mainly reflected in two aspects. On the one hand, there is a lack of embedded digital technology application, which is mainly reflected in the construction of public elderly care institutions and private elderly care institutions. The weak awareness of digital development leads to a serious disconnect between the operation of modern elderly care institutions and the application of digital technology. As a result, the development of relevant industries runs counter to the requirements for the modernization of the elderly care system in the *outline of the fourteenth Five-Year Plan for national economic and social development of the people's Republic of Chin*a. On the other hand, it is reflected in the absence of functions for public service institutions with social security as their main function in the development of "digital pension".

3.1 "Digital Pension" Industry Lacks Development Rules

Due to the lack of standards formulated by the Public Administration for the elderly care industry, the development of the elderly care industry in China is at a standstill in today, and the uneven service quality of the elderly care institutions leads to the old people

doubts about the quality of the elderly care service. From the perspective of intelligent elderly care products, due to the lack of quality supervision system for relevant products, the old people's information security There are doubts about the service quality. Due to the lack of institutional guarantee, it is difficult for the industry to form a virtuous cycle of market development and the birth of incentive mechanism. On the one hand, it is difficult to form a normal industrial chain. On the other hand, the competition ecology within the industry has deteriorated seriously, which is not conducive to the overall development of the industry (Wei, 2021).

3.2 Dilemma in The Supply and Demand Balance of The Elderly Care Service Industry

With the increasing reduction of family resources, the "4-2-1" family model has become the mainstream form of family composition in China, forcing the elderly to change their concept of life. More and more elderly people are willing to change the original home-based elderly care model, especially the elderly at the senior level will choose to stay in elderly care institutions, hoping to get better medical care and companionship. Nevertheless, the willingness of the elderly in China to stay in pension institutions is generally low. According to the latest data from the Civil Affairs Department, there are 4.291 million beds in pension institutions that have been built in China, and only 2.146 million elderly people actually live in. More than half of the public pension resources are idle. From the perspective of regional supply, the problem of uneven distribution of pension resources between urban and rural areas occurs from time to time. In 2021, the proportion of pension resources in rural areas was only one third of that in cities. However, from the perspective of rural demand, due to the large mobility of rural labor, the living care and spiritual comfort of the elderly in rural areas were even less than that in cities. In 2021, the number of *empty-nesters* in rural areas was 27.85 million, while that in cities was 8.96 million. However, in real life, the coverage rate of community elderly care institutions is much higher than that of rural elderly care institutions. As a result, the elderly in areas with actual needs cannot be met. (Hu,2021)

3.3 Fault Between Intelligent Technology and Elderly Care Service

Compared with the development of "intelligent

elderly care" technology in foreign countries, the development of this field in China is relatively slow. Elderly care service institutions lack sufficient attention to the use of intelligent elderly care technology. At present, more than half of the elderly care service institutions in Heilongjiang Province do not have complete software and hardware supporting facilities, relatively few service personnel, and the utilization rate of new technology is generally not high. In the development of intelligent elderly care system. The problem of "emphasizing technology and neglecting service" is common. On the one hand, due to the lack of market guidance from public management departments, public R & D departments and private R & D departments related to pension products blindly improve the information technology content of products, ignoring the actual demand of the times for aging products, resulting in a structural deviation in the supply and demand level. The continuously improved product quality does not meet the market demand. On the other hand, In the process of accepting high-tech products and intelligent elderly care services, the elderly have a relatively low degree of acceptance of intelligent elderly care products due to the impact of traditional concepts and rigid thinking, which leads to the fact that although limited, intelligent service products with practical functions cannot play their due value. (Chen, 2021)

3.4 The Supply of Elderly Care Service Talents Is Seriously Insufficient

At present, there is a relatively large gap in the elderly care service industry in Heilongjiang Province. Nowadays, 1 million of the 7.3956 million old people in Heilongjiang Province are disabled or semi-disabled. However, only 300000 maintenance personnel in Heilongjiang Province can not meet the actual needs of the market. On the one hand, the public's recognition of the elderly care service industry is not very high, which can not attract more high-end talents. At present, the cultural literacy and professional level of the industry personnel have not played a positive role in the development of the industry (Figure 2). On the other hand, since 2015, the number of civilian elderly care service institutions has gradually exceeded the number of public elderly care institutions, but at the operational level of elderly care institutions, Due to the lack of national top-level design, the problems of disordered management and non-standard operation are obvious. Mergers between industries and the sluggish industry prospect force more people to leave the industry. From the source, the current supply of professionals related to

the elderly care service industry can not meet the requirements of the market, and a considerable number of graduates of related majors choose to apply for jobs in industries unrelated to their majors after completing their professional studies, This has led to a large talent gap in the industry.
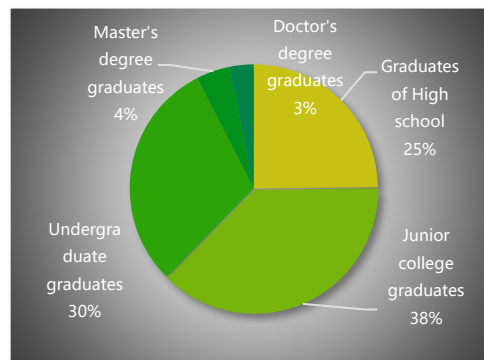

Figure 2: Educational background distribution of talents in the elderly care industry.

4 COUNTERMEASURES

4.1 Establish the Data System of "Smart Elderly Care"

Based on *Abraham H. Maslow's* "demand hierarchy" theory, we can strengthen the information exchange between the government and industry from the five levels of self realization, respect demand, belonging demand, security demand and physiological demand. The development of "digital government" in the public sector drives the construction and improvement of the "digital elderly care" system. Therefore, this paper believes that the construction of the platform is based on the SOA framework system, realizes the organic combination of big data technology, cloud computing technology and the elderly care platform, and establishes a platform to help the elderly realize the multi-level combination of elderly care, medical care and reemployment (Figure 3). The elderly are the main service objects of the "smart elderly care" system. Meeting the basic needs of service subjects is the key to the sound development of relevant systems in the future. Only by accurately and comprehensively analyzing the needs of the elderly can we provide strong data support for the improvement of the industrial chain, the construction of the "smart elderly care" social system and the research and development of intelligent elderly care products. On the basis of the platform, Based on cloud computing technology and
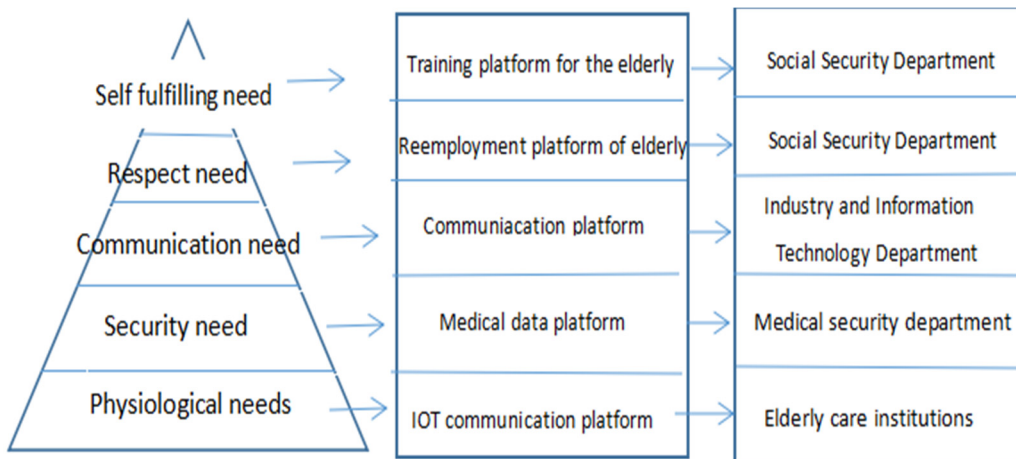
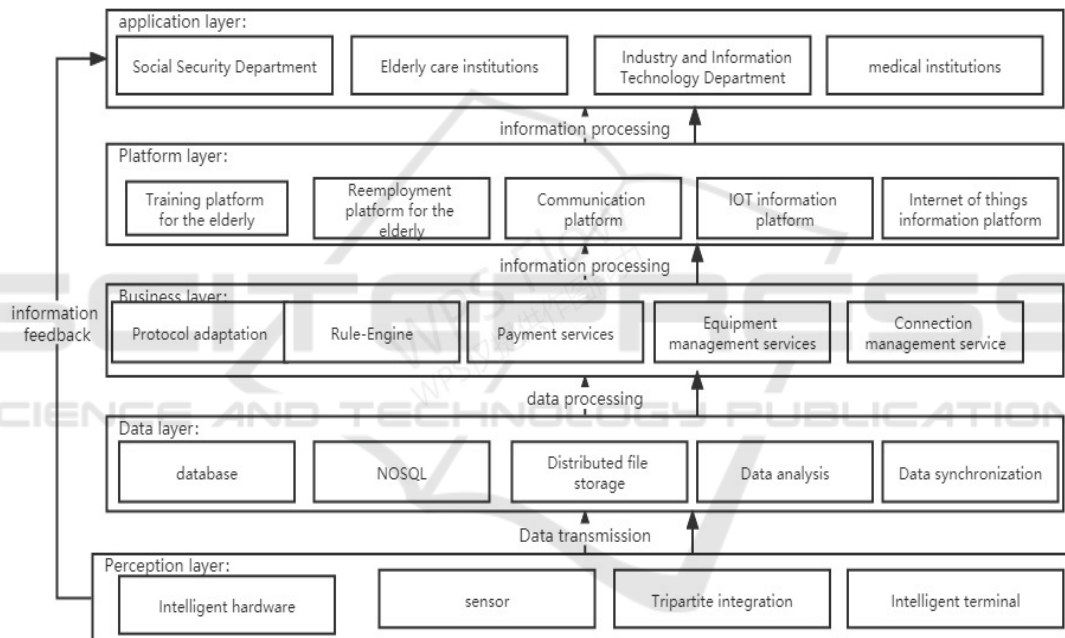Figure 3: platform system of the "digital elderly care".

Figure 4: The platform of Service architecture model of "digital elderly care".

Internet of things technology, this paper establishes an elderly care service architecture model (Figure 4) (Zhang,2020).

4.2 Strengthen the Construction of "Digital Pension" Team

In view of the current insufficient supply of elderly care talents in the industry, the public management departments need to start from the aspects of talent training and career development, start from the aspects of talent training, accurately position talent training, improve the professionalism, professionalism and standardization of elderly care service staff from the source, enhance the development awareness of "smart elderly care" within the industry, and actively promote the industrial integration of the elderly care service industry and the intelligent field, Ensure that the service personnel can adapt to the era transformation from the traditional elderly care level to the "smart elderly care" level, strengthen the training of compound talents in the industry, improve the treatment level and social security of elderly care service personnel from the perspective of career development, especially the welfare treatment of staff with intelligent technical ability, encourage

professionals in the field to start their own businesses, and give certain preferential policies, While encouraging graduates of this major to engage in relevant work, attracting talents of better levels has laid a solid foundation for the development of the cause of "digital pension"(Jia,2022).

4.3 Strengthen the Integration of "Smart Elderly Care" Resources

At present, there are y different elderly care institutions in a region, and f elderly people choose to provide for the aged in the elderly care institutions. However, when the elderly choose the elderly care institutions, there may be a situation of replacement, which stipulates that each elderly person can only choose k elderly care institutions. When y is large, it means that there are many elderly care institutions in the region, but excessive demand will inevitably lead to a waste of social resources. When y is small, it means that the number of elderly care institutions in the region is small, and the needs of the elderly may not be met. At this time, the number of elderly care institutions established by the government in the region must be several times. Assuming that each institution has at least m elderly people to choose, it can maximize social benefits. At this time, when the public management department needs to establish y institutions, it can not only ensure the maximization of social benefits, but also ensure that it will not cause waste of resources. Due to the service quality of the elderly care institutions and other factors, the probability of each institution being selected is different, It is called preference probability. At this time, each institution can be scored. The most selected institution will be scored y points, followed by y-1 points, and so on. The least selected institution will be scored 1 point. As the needs of the elderly may change, k institutions are randomly selected from y institutions for combination. The score of a combination is defined as the sum of the scores of each institution in the combination. We know that there are c_y^k combinations of k institutions randomly selected from y institutional commodities. If all combinations are marked as l, the score of L is marked as f (L), so:

$$f(1) = c_y^k \left(\frac{1+2+\cdots+y}{y} k \right) = c_{y-1}^{k-1} \left(\frac{y(y+1)}{2} \right)$$

If all combinations containing sub institutions I are recorded as hi, the score of hi is recorded as f(Hi), so:

$$f(H_i) = c_{y-1}^{k-1} \left(\frac{1+2+\cdots(i-1)+(i+1)+\cdots+y}{y-1} (k-1) + i \right) =$$

$$c_{y-1}^{k-1} = \left(\frac{y(y+1)(k-1)+2i(y-k)}{2(y-1)} \right).$$

Thus, the preference probability p (Hi) of branch I being selected is:

$$p(H_i) = \frac{f(H_i)}{f(1)} = \frac{y(y+1)(k-1)+2i(y-k)}{y(y+1)(y-1)}.$$

In particular, when i=1 $p(H_i) = \frac{2k+y(k-1)}{y(y+1)}$, and $p(H_1) < p(H_2 < \ldots < p(H_y)$. Assume that the random variable x is the number of people in the selected institution that gets 1 point. Since the process of selecting institutions for the elderly is independent of each other, x ~ B (n, P). According to the Demoivre-Laplace central limit theorem, when n is large, x ~ n (np, np (1-p)),so, $P(X \geq m) = \Phi(\frac{np-m}{\sqrt{np(1-p)}})$, due to $p(H_1) < p(H_2 < \ldots < p(H_y)$. Therefore, if the probability that an organization will be selected by at least m individuals is not less than a, social benefits will be generated. So we can build the model:

$$\Phi\left(\frac{np-m}{\sqrt{npq}}\right) \geq \alpha, \quad p = p(H_i) = \frac{2k+y(k-1)}{y(y+1)} \quad (p+q=1),$$

according to $\Phi\left(\frac{np-m}{\sqrt{npq}}\right) \geq \alpha$. According to the standard normal distribution table: $\frac{np-m}{\sqrt{npq}} = r$, p^2 ($n^2 + nr^2$)-p(2mn+ nr^2)+ m^2 =0, so,

$$p = \frac{n(2m+r^2)+\sqrt{n[2m+r^2]^2-4m^2n(n+r^2)}}{2n(n+r)^2}.$$

Due to $p = p(H_i) = \frac{2k+y(k-1)}{y(y+1)}$, we can know that,

$y^2 p - y(k-1-p) - 2k = 0$, so, $y = \frac{(k-1-p)+\sqrt{(k-1-p)^2+8kp}}{2p}$.

From the above, we can get the solution

$$y = \frac{(k-1-p)+\sqrt{(k-1-p)^2+8kp}}{2p},$$

$$p = \frac{n(2m+r^2)+\sqrt{n[2m+r^2]^2-4m^2n(n+r^2)}}{2n(n+r)^2}. \quad \text{In}$$

practical application, the public administration department can determine the actual number of elderly care institutions in a region according to the number of f in a region, and allocate the corresponding actual resource demanding. (wang, 2009)

4.4 Strengthen the Service Innovation of "Smart Elderly Care"

From the perspective of public management, we will strengthen the incubation of industry related R & D enterprises and the cultivation of innovative markets,

and break the traditional product R & D concept of "only technology". On the one hand, taking the public R & D department as the main body and cooperating with the private institutions in the process of R & D of elderly care intelligent products, according to the actual demand structure of the elderly, accurately grasp the actual needs of the elderly at different levels in physiology, safety, emotion, respect and self realization, and constantly adjust the R & D direction to avoid the redundancy and loss of R & D resources. On the other hand. The publicity department has strengthened the promotion of intelligent elderly care industry and products, helped the elderly understand the general environment of "digital pension", and improved the recognition of intelligent home-based elderly care products and intelligent institutional elderly care products from the two aspects of improving product quality and product cognition. However, at this stage, due to the limitations of hardware conditions and the cognitive ability of the elderly group, intelligent elderly care cannot completely replace the traditional elderly care model. The development of intelligent elderly care also requires the gradual penetration of "Internet +" and other technologies into the lives of the elderly, the formation of a complete "digital elderly care" industrial chain, the fundamental purpose of which is to meet the needs of the elderly for intelligent elderly care with high quality, gradually promote the development of various fields of the intelligent elderly care industry, emancipate the mind, update ideas, innovate technologies, and steadily promote the high-quality and all-round development of the "digital elderly care" industry.(zong,2021)

5 CONCLUSIONS

As a large province with an aging population, Heilongjiang Province has many construction highlights at the level of the traditional elderly care service supply system. If it can be supported by the construction of the "digital pension" system, it will have greater development space. Therefore, Heilongjiang Province should strengthen the establishment of the elderly information database with the intervention of the public management department, promote the deep integration of information technology and the elderly care system, and improve the reserve and supply of talent teams, Promote the development of digital elderly care industry in Heilongjiang Province. With the continuous improvement of the "digital elderly care" service system, exploring the evaluation path of the

"digital elderly care" social governance and the management mode of the digital elderly care platform will be a new problem for the new integration of public management and the "digital pension" industry in the future.

REFERENCES

Fengying Wang. (2009). Mathematical model analysis of customer selection problem.J. Scientific Consultation (Decision Management).93.

Jian Hu. (2021). Uses digital technology to promote the development of the elderly care industry. J. Hangzhou, 24.

Meiyun Zuo (2020). Opportunities and challenges for smart elderly care.J. China's Social Work,20.

Qiang Wei & Jing Lu. (2021). Research on the digital pension in the context of rapid aging.J.Journal of Hebei University (PHILOSOPHY AND SOCIAL SCIENCES), 99-107.

Ruixi Zhang & Hao Zhang. (2020). Digital pension to promote the optimization of elderly care service system: ideas and approaches.J. Administrative Forum, 139-145.

Ruixue Zong & DanYu Chan & Shuai Zhang. analysis on the current situation and Countermeasures of digital elderly care in Chuzhou.J. Economic Research Guide, 53-55.

Xue Wu. (2021). smart elderly care industry development trend, practical dilemma and optimization path.J.East China Economic Management, 1-9.

Xijie Jia (2022). Research on the problems and Countermeasures of the elderly care service system in Hebei Province. Journal of Shijiazhuang University. 27-30+83.

[Yinghua Lu & Qi Miao. (2020). Research on key issues of Digital Pension based on artificial intelligence.J. Welfare Research, 1-6.

Youhua Chen & Wenjun Shao. (2021). connotation, Dilemma and suggestions. J. JiangHuai Forum, 139-145-193.