

# Research on Innovative Path of Smart Elderly Care Services Based on the "Internet plus" Background

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## Abstract

In the 21st century, China's economy has developed rapidly, but at present, the pace of population aging is constantly accelerating, and social problems are becoming increasingly prominent. With the development of high-tech information technology such as the Internet, "Internet plus" has gradually become an important driving force for the development of a new round of industrial revolution. As far as the elderly care service industry is concerned, only by integrating the "Internet plus" and traditional elderly care service model, and upgrading the traditional elderly care service model, can more elderly people enjoy intelligent services in their later years, and promote the sustainable development of the elderly care service industry. This article reviews the current research status of smart elderly care services at home and abroad, the challenges faced by smart elderly care in China, and the innovative path of smart elderly care service models through literature analysis and other research methods. It points out the practical path of smart elderly care services and provides reference for the formulation of practical and sustainable smart elderly care service plans for the elderly.

## Keywords

"Internet plus", Smart elderly care services, Innovative path.

## 1. Introduction

### 1.1. Research background and significance

#### 1.1.1. Research background

Since the 21st century, China's population structure has undergone significant changes. According to data from the National Bureau of Statistics, as of the end of 2021, the population of elderly people aged 60 and above in China reached 267 million, accounting for 18.9% of the total population. The population of elderly people aged 65 and above reached over 200 million, accounting for 14.2% of the total population. China is one of the countries with a relatively high degree of aging, and problems such as the increasing number of elderly people and the accelerating pace of population aging have become increasingly severe. With the increasing number of elderly people, empty nesters, and those who cannot take care of themselves, the demand for elderly care is also growing rapidly, and the social burden of elderly care is becoming heavier. At present, China's elderly care service model has gradually shifted from the exploration stage to the steady development stage. With the continuous progress of society, the concept of elderly care is also constantly changing, and the traditional single elderly care model can no longer meet social needs. The rapid development of Internet technology has constantly changed people's lifestyle and behavior habits. "Internet plus" appeared after the government work report, accelerating the development and application of the Internet in all walks of life.

Adding "Internet plus" high-tech technology to the traditional elderly care service model will make it easier to transform and upgrade the traditional elderly care service model, deeply integrate Internet thinking, artificial intelligence and other technologies with elderly care services, optimize the allocation of various elderly care resources, and enable the elderly to enjoy personalized and intelligent elderly care services.

### **1.1.2. Research meaning**

Firstly, it is conducive to promoting the improvement of the quality of elderly care services. More in-depth integration of "Internet plus" and traditional elderly care service model can attract more social forces to participate in elderly care services, promote more optimized allocation of various resources, and improve the quality and efficiency of elderly care services. The establishment of a corresponding service platform for smart elderly care through Internet technology can not only meet the needs of elderly care, but also make the elderly care service more simple and convenient, the elderly care service content more comprehensive and applicable, further improve the quality of life of the elderly, and enhance their sense of happiness and belonging.

Secondly, it is conducive to further promoting policy optimization. At present, relevant government departments are paying increasing attention to the issue of elderly care, continuously simplifying the approval process, improving the details and standardization of subsidies, and expanding supervision and management channels. This article explores new models of elderly care and provides suggestions for policy scientific regulation, which to some extent reduces obstacles for elderly care institutions to carry out innovative elderly care services.

Finally, it is conducive to promoting the modernization of governance in an aging society. This article studies the smart elderly care service model supported by big data. By collecting, analyzing and processing information about the elderly, and efficiently connecting supply and demand, it will stimulate the innovative vitality of multiple entities in the elderly care market. It has a certain practical role in reducing the cost of governance in an aging society, improving governance efficiency, and promoting modernization of governance in an aging society.

## **1.2. Current research status at home and abroad**

### **1.2.1. Current research status abroad**

"Smart pension" is "Internet plus+pension", which applies Internet information technology to pension to make it more convenient. The country that first proposed the concept of "smart pension" is the United Kingdom. The British Life Trust Fund believes that the Internet information technology will be applied to pension, change the traditional pension mode, break through the limitation of pension time and space, and create a comprehensive intelligent pension. As early as 2010, foreign countries began to study the application of smart home sensor technology in chronic diseases, cognitive impairment, and disabled elderly [1]. Smart products have gradually been developed specifically for elderly people with different diseases and functional states [2]. The overall literature volume is also on the rise, and research on smart elderly care is becoming increasingly mature.

In terms of both concept and technology, some developed countries in foreign countries are leading the way in intelligent elderly care. These countries have very perfect elderly care mechanisms, and the infrastructure of elderly care institutions, elderly care communities and medical institutions is also very perfect, which lays the foundation for the development of "Internet plus+elderly care". At present, foreign scholars' research on "Internet plus endowment" mainly focuses on technology research and development, that is, how to develop more high-tech intelligent products to serve "Internet plus+endowment". There is relatively little research on social security for elderly care. The focus of foreign research is on science and

technology, detached from the level of social security itself as the research object. By studying the research content of "Internet plus Pension" in some foreign countries, it also gives some inspiration to China on how to apply intelligence to pension. China has a large population base, weak social basic pension security foundation, and insufficient development in science and technology, which makes it difficult for China to develop smart elderly care.

### **1.2.2. Current research status in China**

Smart elderly care in China started relatively late. Through literature search, it was found that the concept of "digital elderly care" was first proposed by Hu Liming in his 2007 publication "New Digital Home style Elderly Care Community Solution". Subsequently, the academic community began to use the concept of "information elderly care" in 2010. In 2011, the concept of "technological elderly care" emerged, and in 2012, the concept of "networked elderly care" was proposed, which further developed into "intelligent elderly care" and "smart elderly care". In 2014, Zuo Meiyun published "The Connotation, Models, and Opportunities of Smart Elderly Care". Based on a discussion of historical evolution, smart elderly care was defined as the use of modern information science and technology to provide various services and management for the elderly, thereby achieving autonomous and personalized intelligent interaction between technology and the elderly. Regarding the research on the concept of "smart elderly care", Zhang Yuqiong believes that China has a large population base and a large number of elderly people. China needs to support the development of "smart elderly care" from two aspects: information technology and social support. Especially in terms of social support, China should continuously improve its social elderly care security system, fully consider various elderly care needs, especially those of disabled elderly people. In terms of the development of intelligent elderly care industry, Li Xiaoshan listed several intelligent elderly care products suitable for intelligent elderly care in China based on the development model of elderly care, including smart home products for elderly care services, mobile application products for elderly users, and wearable intelligent products for elderly users.

Although the development process of the "Internet plus endowment" model in China is relatively backward compared with some developed countries abroad, domestic scholars have been very rich in their research. It can be seen that the integration of Internet plus and the pension industry is the development trend of the pension industry in the future. The research of domestic scholars provides a rich theoretical basis for the development of "smart elderly care" in China, and also plays a certain reference role for this study. However, the research on "smart elderly care" by most domestic scholars is still in its early stages, mainly focusing on the concept of "smart elderly care" and the significance of developing it. There is still a lack of theoretical support for deeper research.

## **2. The Concept of Smart Elderly Care Service Model**

### **2.1. The concept of "Internet plus"**

The connotation of "Internet plus" is extremely rich. Specifically, it is to use the Internet to transform and upgrade traditional industries, transform or integrate the allocation of production factors in traditional industries, and realize the economic transformation and upgrading of traditional industries by optimizing production factors, updating business systems, restructuring business models and other means. "Internet plus" has prominent features: first, cross-border integration can be carried out. Traditional industries can be transformed by using the thinking concept and technology of the Internet, and the whole industry can achieve transformation and integration; Secondly, it can innovate the driving force. Traditional industries can use Internet thinking to replace simple resource driving force; Thirdly, the industry structure can be reshaped. Internet technology can break the fixed economic structure of traditional industries. After the economic structure changes, the business

model will also change, which requires the traditional industry to put the satisfaction of consumer demand first; Finally, respecting human nature is also the root of the Internet. Internet technology not only respects the experience of each user, but also can maintain the maximum respect for human nature.

## **2.2. The concept of "smart elderly care"**

The service mode of smart elderly care is to combine Internet information technology with elderly care, make full use of information technology in the traditional business field of elderly care, take advantage of the advantages of Internet information in big data, and provide a series of elderly care services such as life care, medical care, spiritual care, emergency relief, etc. for the elderly through computer, mobile terminal equipment and other Internet high-tech information technology. With the development and progress of society, the elderly have increasingly high demands for quality of life, so how to improve the service level of the elderly care service industry is crucial. On the basis of improving service level and quality, the goal of the elderly care service industry is not only to meet the needs of the elderly in various services, but also to ensure that the elderly can have smooth access to elderly care services, and to ensure that the process of obtaining services is simple and of high quality. How to improve the service level and service quality of the current domestic elderly care service, we need to optimize our elderly care service model, use the "Internet plus" information technology to explore a more conducive domestic elderly care service model, and more effectively provide elderly care services for the elderly. The combination of "Internet plus" and pension service mode is likely to achieve the above two goals. Smart elderly care, an intelligent elderly care service mode, makes full use of Internet information technology, fully integrates social resources, improves the management level of elderly care service institutions, and solves various problems existing in the current elderly care service mode. The smart elderly care service model can not only fully utilize the convenience brought by high-tech, but also optimize social elderly care resources, avoid the drawbacks of traditional family and community elderly care. Therefore, the integration and development of "Internet plus" and elderly care services is of great practical significance.

## **3. The Challenges Faced by Smart Elderly Care Services in China**

### **3.1. Insufficient cognition leads to low demand for smart elderly care services**

The elderly have a poor awareness of smart elderly care, which directly leads to a low demand for smart elderly care services [3]. A field study on elderly people in Qingdao found that 93% of respondents have never heard of smart elderly care services. However, when they understood the characteristics of smart elderly care services, 63% of respondents believed that smart elderly care services could help them improve their quality of life [4], indicating the need to enhance the awareness of smart elderly care services among elderly people in China. The cost of smart elderly care services is higher than traditional in hospital services. Currently, elderly people do not have the habit of consuming expensive products and caring services. Therefore, the promotion and application of smart elderly care nationwide still require some time.

### **3.2. Insufficient information technology literacy makes it difficult to promote smart elderly care services**

Elderly caregivers are personnel engaged in elderly care and nursing services, serving as the main provider of elderly care services, an important support and guarantee for the elderly care service system, and an important force in solving family problems, alleviating social problems, and promoting social harmony. Internet and intelligent technology were invented at the end of the 20th century and became popular in the 21st century. At present, most elderly care workers

are unemployed people aged 45 to 60 years old [6]. Their low education level and less contact with the Internet and intelligent products lead to the lack of Internet skills among most elderly care workers, which hinders the promotion of intelligent elderly care service mode [7]. Therefore, increasing the education and training of elderly care workers is of utmost importance. At the same time, vocational colleges and universities should offer courses on elderly service and management, so that more young people are willing to engage in the elderly service industry and inject fresh blood into the industry.

### **3.3. Lack of industry technical standards leads to disorderly development**

The lack of industry technical standards for smart elderly care services in our country has always been an important factor in technological compatibility, which limits the popularization of smart elderly care services. Multiple smart elderly care service platforms have their own equipment and technical standards. Correspondingly, the products and services provided by different platforms are incompatible with each other, which will lead to the disorderly development of smart elderly care services in China. In many cities, smart elderly care service platforms do not provide nursing services for the elderly, leading to waste of public resources. In response to the national proposal to apply the "Internet plus nursing service" plan to elderly care services, many local governments across the country have established smart elderly care service platforms. However, in the context of low demand for smart elderly care services, some government funded platforms have not truly played a role, leading to waste of public resources.

## **4. Exploring the Path of Innovative Development of Smart Elderly Care**

### **4.1. Leading the development of smart elderly care with innovative concepts**

#### **4.1.1. Establishing the concept of co construction and sharing of elderly care and health information resources**

Smart elderly care, as a relatively emerging industry, is still in the process of exploration. In its development, it will face various problems and challenges, such as how to start from people's actual needs and create an elderly care product that meets the needs of the elderly; How to take effective measures to ensure the interconnection of big data and provide more targeted services for the elderly. Among them, ensuring the interconnection of data plays a very important role, and it also has a very important impact on ensuring the resource sharing of elderly health information. It is directly related to ensuring the implementation of intelligent elderly care. In fact, many intelligent health and elderly care services are closely related to big data. By taking effective measures and actively and reasonably analyzing data, a highly personalized and customized product can be developed, and resources can be more efficiently utilized. Regarding the efficient use of information, the Ministry of Industry and Information Technology has put forward clear requirements that it is necessary to make maximum use of the current information platform, establish a more efficient and standardized elderly care information sharing system, actively take effective measures, increase the construction of smart health elderly care service networks, and ensure the security and stability of the entire network. However, in practical implementation, there is still a problem of insufficient information exchange to ensure the efficient utilization of the entire information.

Therefore, this article believes that in the interconnection of information, the next step may be to make breakthroughs in two aspects. Firstly, plan and promote at the national level. In terms of policies, clear information sharing lists or regulations are actively introduced to provide regulations for the interconnection and exchange of elderly care information. Only through comprehensive, meticulous, and strong planning and promotion at the national level can we reduce or even eliminate barriers to resource sharing among government departments. On the other hand, due to the current division of information resources among government

departments, part of it is due to the division of administrative system departments into functional blocks, and information resources can be said to be the interests of various departments. Therefore, while carrying out administrative system reform, various government departments should also change their ways of thinking, break the cage of "data fragmentation", and actively promote information resource sharing.

#### **4.1.2. Exploring the establishment of a statistical method system for health and elderly care information assets**

In the innovative service model of smart elderly care, the level of information construction directly determines and reflects the development level and work efficiency of the entire system. In elderly care services, the statistics, concentration, processing, and distribution of information generated by various parties are crucial. Establishing a statistical method system for health and elderly care information assets is to utilize modern information technology and continuously improve the efficiency and level of planning, operation, and management of smart elderly care services through the deep development and extensive utilization of elderly care information resources. This article explores the construction of relevant network platforms as follows:

(1) Platform layer. With the innovation of current business models and the comprehensive improvement of production efficiency, cloud computing, big data, and other resources have become low-cost and easy to use. Elderly care information, data, processing, storage, and analysis can all be placed in the cloud. In the process of providing services in the new model of smart elderly care, management departments need to consider how to better process information, how to design service projects, and how elderly and family members can choose elderly care service models, all of which require the support of a large amount of data. Therefore, the current main task is to build a database platform. To establish a basic database platform, it is necessary to adhere to big data as the key, and then have relevant enterprises develop and complete a large amount of software development work. Finally, the country will provide support and guidance through policies. The personal information of each elderly person and the information of social elderly care services need to be promoted and visited at home in order to achieve various tasks. When maintaining the data system, it is necessary to ensure that enterprises, institutions, and individuals can obtain this information in a timely manner. In addition, the development of the network is not only limited to the Internet, but also gradually extends to the field of the Internet of Things. The Internet of Things needs to install sensors and other devices on the basis of various actual objects. These devices are interconnected by means of interfaces and the Internet. During the operation of some programs, objects are transformed into more intelligent objects, so as to achieve the interconnection and control between people and things, and between things and things. Under the constraint of the new model of "Internet plus+elderly care", we can consider installing GPS sensors at home to understand their body and environment at the first time, and then transmit these information through communication networks and the Internet.

(2) Terminal layer. There are mainly two types of terminal devices that can be used by the elderly: one is that it can actively associate with the outside world, such as platform apps, elderly smartphones, and so on. When elderly people encounter sudden problems or difficulties in life, they can use one click calling devices to call the service center in a timely manner. Elderly people must have a smartphone that maintains a simple and easy to operate interface, and provides all the necessary functions for the elderly. At the same time, the elderly care information service platform can also design its own APP for the elderly to access and utilize this information. The second is related equipment such as intelligent detection and GPS positioning. With these devices, the safety status of various devices such as physical sign data of the elderly can be directly transmitted to their families and elderly care service platform terminals through terminal devices. This information can be processed through the platform

and transmitted directly to the devices in the first time. In addition, to ensure the integration of online and offline, physical storefronts can be set up in the community to provide activity venues for the elderly in the community, as well as service venues for them. The elderly living in the surrounding area can test their physical condition and physiological parameters.

(3) System layer. The government should also support and guide enterprises to build home-based elderly care service information systems, connect with the service needs of the elderly and the supply of various social entities, and provide elderly people with emergency calls, household appointments, health consultations, item purchases, service payments and other suitable service items. On the basis of regularly collecting various elderly care data, the civil affairs department applies modern information technology and through the smart elderly care platform, comprehensively processes information related to the elderly, deeply explores the effectiveness of data information, and provides more reliable data support and solutions for the smart elderly care industry. The deep mining of big data on elderly care information can also provide clear directions for the needs and services of the smart elderly care industry, provide accurate entry points for social capital to enter the elderly care industry, make it effective in the field of smart elderly care, and promote the continuous development of the entire elderly care industry. Of course, in the collection and processing of information related to the elderly, attention should also be paid to information confidentiality and prevention of private information leakage [8].

## **4.2. Explore the realistic path of innovative development of "Internet plus endowment"**

### **4.2.1. Improve regulations and policies on population and health and medical information management, and effectively unleash the "institutional dividend"**

Health and medical big data is a crucial foundational strategic resource in China. In recent years, China has continuously accelerated the development of health and medical big data, both at the macro and micro levels, actively taking effective measures to promote the effective integration of health and medical big data. In terms of research and application, the industrial system of big data has taken shape to a certain extent, and its specific service models and development formats have also begun to be established. In the future, it will also develop into an important force in the health and medical industry. However, there are still certain deficiencies in the current laws and regulations related to health and medical big data, as well as specific operating rules, which need to be continuously supplemented and improved. Although there are many policy documents as important guidance, the implementation of relevant systems still needs to be vigorously promoted by relevant departments, which to some extent hinders market vitality. When formulating relevant laws and policies, it is recommended that the national level provide macro guidance policies, and each region can formulate targeted regulations and policies based on its own characteristics. For the same city, different districts and counties can also formulate support policies that are in line with their own development based on their specific circumstances. The development of smart elderly care involves participating entities such as government, communities, enterprises, hospitals, institutions, platforms, and families. The material support behind these requires not only strong financial support, but also diversified injection of private capital. Therefore, in this process, the government must accelerate the legislative process of smart elderly care service models based on the characteristics of smart elderly care service forms and integrated models. Adjust and improve the current laws and policies that are not suitable for social development, and accelerate the construction of laws such as Internet information management and e-commerce for the elderly.

#### 4.2.2. Promote the modernization of the smart elderly care governance system and governance capacity

Strengthen government leadership and improve institutional planning. Firstly, the government must establish an elderly care information platform in the process of promotion, establish and gradually improve the evaluation system for elderly care needs and social evaluation, actively guide the improvement of relevant systems, promote the unified construction of service quality and various standards, and actively carry out technical cooperation with elderly care companies and comprehensive expansion of their external markets. Secondly, the government needs to build an open and inclusive environment for the development of smart elderly care service models, in order to stimulate the initiative of other social entities to participate in elderly care services. By integrating with other products and expanding service mechanisms, it can achieve alignment with various industries and technical standards. At the same time, because data resources are the main infrastructure of the smart elderly care service model, many elderly care service work can only be formed on the basis of data improvement. Therefore, the government should increase the possibility of utilizing these data resources and introduce social forces in this process to provide assistance for the updating of smart elderly care service models. Finally, the government should increase its financial support for smart elderly care and focus on cultivating talents in the field of smart elderly care services. The government can increase the proportion of elderly care talents by establishing higher education institutions or offering related majors to achieve a balance between market supply and demand, in order to ensure the connection between the government, community, and talents.

Highlighting market cultivation and improving business models. Social innovation should be centered around carriers. The market is the most important carrier, which plays a vital role in the Internet environment and in the field of intelligent elderly care services. Faced with a social and economic environment of survival of the fittest, the market needs to pursue economic benefits through competitive means, use relatively commercialized models to increase service projects, optimize service quality, and enhance comprehensive capabilities. At the same time, in the construction of the smart elderly care model, attention should also be paid to the following aspects: firstly, a more scientific market survey should be conducted and the market should be clearly positioned. The elderly population itself is a group with significant differences, and differences in age, economy, and culture directly lead to a large number and diverse structure of the elderly population. At the same time, it is necessary to understand the market positioning of the product and truly adhere to the principle of putting elderly people at the root in order to develop elderly products with accurate positioning and in line with market demand. Secondly, it is necessary to design and build a basic database and platform for elderly care services, as well as develop a large number of intelligent elderly care products. In the process of software development, it is necessary to develop elderly care service system management software and software that can be applied to end users. In the research and development of elderly care functional devices, products that meet the needs of the elderly should be developed. Thirdly, attention should be paid to the supply of elderly care services. There are already many mature online platforms in the current elderly care industry market, but there are clearly not many products designed based on the characteristics of the elderly themselves. Specialized elderly care services can be developed for the elderly. Only by ensuring service effectiveness and quality, can the elderly accept this model and achieve the goals of profitability and elderly care. Finally, we need to cultivate new and mature business models. In addition to meeting demand, mature business models can also have an important impact on the continuous promotion of smart elderly care service models. We can draw on the experience of some successful elderly care service platforms and introduce an O2O business model that integrates online and offline in the provision of elderly care services. By acquiring a large number of users, we can make profits on the basis of carrying out elderly care services.



Strengthen the service team and encourage social organizations to participate. Firstly, it is necessary to attract a large number of volunteer groups to join the elderly care information platform. Volunteers can obtain the basic needs of the elderly through the elderly care information platform, and the elderly can also select and evaluate volunteers on the platform to build a "time bank" volunteer elderly care model. Therefore, the rapid development of Internet technology is also very helpful to the development of this mutual help elderly care service model. Secondly, social welfare organizations should be encouraged to participate in elderly care service platforms, such as the Elderly Painting Association, Dance Association, etc. Through these activities, the spiritual and cultural life of the elderly can be enriched. These social welfare organizations can optimize the elderly care service mode with the help of Internet technology, find the required elderly care services independently through the Internet, and then connect with these services. Thirdly, elderly care services should ensure deeper integration and optimize various elements. The establishment of an elderly care information service platform can facilitate the connection between service providers and the elderly, achieve supply-demand balance, and ultimately achieve reasonable resource allocation. At the same time, it can also provide the elderly with more convenient and diverse options for elderly care services, so that they can actively obtain services.

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