Digital Transformation and Upgrading of Elderly Care Industry

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ABSTRACT: In recent years, as the world enters the accelerated development stage of aging society, digital transformation has become an inevitable trend. This paper takes Dalian city as an example to analyze the problems of digital transformation and puts forward solutions. In recent years, Dalian has continued to increase the investment in the digital intelligent elderly care service industry, improve the elderly care service policies and measures, and build a digital intelligent elderly care service system for medical rehabilitation. However, in the process of digital transformation, the elderly care industry involves various institutions, cutting-edge digital information technology and related personnel training and other factors, and it is inevitable to encounter difficulties and bottlenecks in the implementation process. In response to these problems, we carried out research on the development path of digital transformation and upgrading of the elderly care industry in Dalian: how to accelerate the realization of digital transformation and upgrading of the elderly care service system, promote the deep integration of digital and real economy, optimize and efficiently allocate elderly care resources, and reduce the burden of elderly care and the pressure of basic public services. This paper uses the methods of literature research and empirical research to summarize the relevant experience of medical care and aged care at home and abroad, and provides policy suggestions and solutions for the digital transformation of the elderly care industry in Dalian according to local conditions. By building the ecological architecture of the digital elderly care industry, using big data technology to achieve multi-dimensional portrait labels, accurately identify the needs of the elderly care, and propose to focus on the young elderly as the "young team" of aging, with the community as the center, Establish digital smart elderly care service points and other programs to help the development of Dalian's "silver economy".

Keywords: digital transformation, intelligent medical care, ecological system structure of elderly care industry

1. INTRODUCTION

It is estimated that during the "Fourteenth Five-Year Plan" period, the total number of the elderly aged 60 and above will exceed 300 million, accounting for more than 20%, entering the stage of moderate aging. By around 2050, the size and proportion of the elderly population, the elderly dependency ratio and the social dependency ratio in China will reach the peak one after another. The biggest problems facing the aging population are medical care and life care[1]. Aged care and medical care are inseparable. Basic medical security, postoperative

rehabilitation and nursing, and daily maintenance. With the continuous increase of the elderly population and the deepening of the aging of the population, it has brought challenges to the sustainable development of the public service supply and social security system, and the task is very heavy. During the "Fourteenth Five-Year Plan" period, the growth curve of the elderly population in China was relatively flat, and the economy and society continued to develop, which was a valuable window period for actively responding to the aging of the population and preparing for the elderly care service. It has become an inevitable trend to realize the digital transformation of the elderly care industry and build a digital intelligent medical care ecosystem architecture [2].

With the wave of the fourth technological revolution, digital information technology, mainly the Internet, the Internet of Things and big data, is changing the way of production and life of society, driving the continuous expansion of the elderly care industry, which has derived new integration models such as "digital enabling elderly care services" and "smart elderly care". First of all, digital transformation is the need to adapt to the development of the new era[3]. Secondly, the government provides policy support for digital transformation of digital elderly care institutions. The Action Plan for the Development of Intelligent Health and Elderly Care Industry (2021-2025) issued in 2021 clearly pointed out that intelligent health and elderly care products and information management systems should be used to provide intelligent operation services for the elderly. Digital transformation promotes the high-quality development of the elderly care industry, improves the efficiency of elderly care services, and alleviates the pressure of the government. Therefore, in order to achieve high-quality development, we must comply with the development of information technology and promote the digital transformation and transformation of elderly care service institutions. Through modern and efficient platform digital technology, realize the construction of smart "Medical care" industry ecosystem, meet the needs of aged care, and reduce the pressure of aged care and medical system [4].

Compared with the national situation, the trend of population aging in Dalian is more significant. Due to the unique geographical location of Dalian, in addition to the popular local elderly in Dalian, many elderly people in other places have chosen to come to Dalian to provide for the senior citizens, which also aggravates the aging degree and the pressure of elderly care services in Dalian. On the other hand, due to the late start, slow development, shortage and serious loss of talents, and lack of professional knowledge and skills in medical and old-age care in China's aged care industry, problems will continue to exist. Therefore, it has become an urgent problem to study how to quickly and smoothly realize the digital transformation of the elderly care industry, build an integrated ecological management system of intelligent medical care and elderly care, and improve the medical and elderly care talents.

2. CURRENT SITUATION OF ELDERLY CARE INDUSTRY IN DALIAN

With the increasingly serious problem of population aging, the number of the elderly population has risen sharply. Due to its unique geographical location, many elderly people in other provinces and cities choose to come here to provide for the elderly, which exacerbates the aging degree and pressure on elderly care services in Dalian. According to the results of

the seventh census of Dalian, there are more than 7.45 million residents in Dalian, an increase of 11.36% compared with the sixth census. Among them, the population aged over 60 accounted for 24.71%. The population over 65 years old accounted for 16.87%. Among the 12 regions in Dalian, the proportion of the elderly aged 65 and above in 10 regions is more than 14%. With the growth of the aging population in Dalian, the demand for the elderly care industry has increased. The rapid development of information technology has also created a gap between some elderly people and the lifestyle of the information society, making it more difficult for aged care services to meet the diversified needs of most elderly people.

In order to further improve the quality of elderly care services and meet the multi-level and diversified needs of elderly care services, the Dalian Municipal Government issued Several Opinions on Accelerating the Development of Elderly Care Services, formulated a number of powerful measures to boost the high-quality development of elderly care services in Dalian and release the potential of the elderly care service market in Dalian. The Opinions further open the elderly care service market, and from the perspective of optimizing the development environment, improving the service level, strengthening the factor support, and cultivating the consumer market, put forward the corresponding policy measures around promoting the development of community home-based elderly care and institutional elderly care, ensuring the land supply, talent factor and capital security.

According to the current basic situation of the elderly in Dalian, due to the accelerated aging process, the burden of the elderly and the pressure on basic public services have increased; The quality of the aging population continues to improve, and faces higher service demand; The 60+age groups are still differentiated, and the needs of the aging population are different at different levels. These are the key issues facing the development of the digital transformation elderly care service industry.

2.1 Aging process is accelerating, burden of providing for the aged and pressure on basic public services are increasing

Family aged care, institutional aged care and community aged care are basic aged care models. At present, most of them are "family aged care". 4-2-1 The children of family structure are unable to support the burden of family aged care; Secondly, up to now, Dalian's aged care industry has not formed a sound and mature aged care ecosystem and service mechanism. The information between various institutions and platforms is not interconnected, and the data standards are not unified, resulting in the repeated occupation and waste of resources, adding a lot of pressure to public services. From the perspective of upgrading the digital elderly care industry, it is necessary to integrate the data exchange between the elderly care industry institutions and community services, accelerate the construction of home-based elderly care service network resources, scientifically plan the quality of elderly care industry services and products, and realize the "one-stop" elderly care services and resource sharing for the elderly population in Dalian.

2.2 Quality of aging population continues to improve and higher demand for services

In the case that the aged care mechanism is not yet perfect, the quality of the population of the aging population is constantly improving, which means a higher demand for aged care services [5]. For example: aged care finance, cultural life, health care, medical consultation,

rehabilitation care, physical examination services. These needs may not be fully met in a short time. For example: aged care finance, cultural life, health care, medical consultation, rehabilitation care, physical examination services. These needs may not be fully met in a short time [6].

2.3 Differences between the age groups above 60, needs of the aging population are different at different levels

The aging population in Dalian has the characteristics of multi-level and diversification. There are differences in age and needs. 60-69 years old are called "young people", accounting for 55.83% of the aging population. These young people have certain knowledge, experience and skills, and pay attention to network dynamics, cultural life, health care, and online shopping. The needs of the elderly aged over 70 are more concerned with health, medical care, health care and longevity.

2.4 Quality demand of employees in the digital elderly care industry has improved

The core premise of the digital elderly care industry is to have a professional team with complete and excellent structure. The digital transformation of old-age care has reduced the pressure and burden of grass-roots nursing staff to a certain extent, but the demand for high-level professionals has increased. According to statistics, in the four districts of Dalian, together with Jinpu New Area, Pulandian, Wafangdian and Zhuanghe, the elderly group is mainly represented by community home-based elderly care, while the family elderly care function is increasingly weakened. At present, there are few medical maintenance supporting talents and digital technology professionals in Dalian. The overall age structure of service personnel engaged in the elderly care industry is relatively large, and there is a lack of medical care professionals with digital technology [7].

3. DIGITAL TRANSFORMATION AND UPGRADING PATH OF ELDERLY CARE INDUSTRY

At present, Dalian is actively promoting the development of elderly care services. In view of the fact that the functions of family elderly care services are increasingly weakening, and the needs of the elderly groups for multi-level and diversified services are increasing, the informatization of elderly care services will be strengthened through the development of digital transformation to meet the needs of elderly care in the digital era.

First, build the ecological architecture of digital elderly care industry, realize the platform elderly care data collection and efficient resource allocation, and improve the quality of elderly care services. It includes many subsystems, such as basic database, health management, medical management, supervision and evaluation, risk prevention and control, emergency call, elderly care institution management, etc. Realize data transmission through health intelligent terminal equipment and intelligent service cloud platform, platform aged care data summary, telemedicine technical support, and patient electronic medical record data sharing and intercommunication. The concept of the ecosystem architecture of the digital transformation pension industry is shown in Figure 1. At the same time:

(1) The implementation of the government provides guidance and policy support for the digital transformation of elderly care. The government needs to play a leading role in the digital transformation of aged care institutions, guide the direction of digital transformation, and provide important support in terms of funds and policies. Such as the implementation of preferential policies and systems, and the supervision system of the aged care industry ecosystem. Encourage active application for smart elderly care institutions and provide convenience in the application process. The government invests in the purchase of elderly care service products, promotes the construction of the elderly care health information platform, and accelerates the realization of the digital transformation of the elderly care industry. Promote the construction of telemedicine at the grass-roots level, improve the supporting mechanism of big data, promote data communication and sharing among various departments and fields, and connect the elderly care service demand with the elderly care service supply, so as to achieve accurate elderly care. Supervise the data security of the data platform to avoid data leakage.

(2) Establish standards for elderly care products and services. We will implement the national old-age service standards and formulate the industry's old-age service standards. At present, Dalian has basically formed a complete set of old-age service standards, and on this basis, further improve the standardization system of old-age service in Dalian.
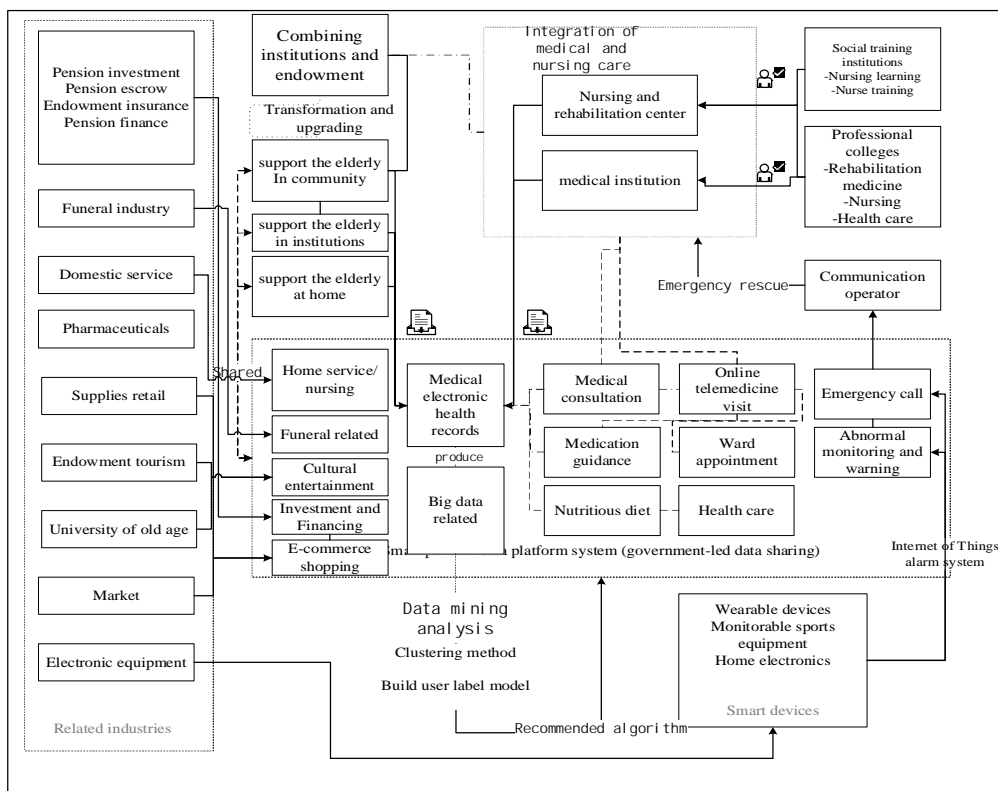

Figure 1. Ecological system structure of the digital transformation aged care industry

(3) Ensure the security of data and clarify the responsibility of data security. The access to system information shall be recorded in a log, the laws and regulations on data privacy protection shall be implemented, the use rights shall be clearly defined when calling the electronic health archives of the elderly, the responsibility system shall be established through the third-party evaluation and supervision mechanism, and the relevant liability consequences shall be borne for the malicious disclosure of the elderly information and resulting losses.

(4) Optimize the allocation of endowment service resources and medical service resources. We will use information technology to deeply integrate the human and material resources of the elderly care and medical rehabilitation, and create a new development model for the elderly care service resources and medical care.

Second, use big data technology to realize multi-dimensional portrait labels and accurately identify the needs of the elderly. Use hierarchical labels to form portraits to predict accurate user needs. Genetic algorithm, fuzzy c-means clustering algorithm (FCM algorithm) and association rule method are used to mine the differences of behavior rules of different user groups and analyze the preferences of the elderly at different ages. In medical treatment, the user's health information behavior is extracted, and a portrait model is built to predict the user's future health status, so as to achieve accurate health services [8].

Third, we should establish a human resource pool around the digital elderly care industry, realize continuous education for industrial service personnel, and build a training program for interdisciplinary technical talents in colleges and universities. We will encourage the training and reform of high-quality professionals, and encourage and guide employment. We will accelerate the transformation of social awareness of the medical and nursing industry. Take the young and old people as the "young team" of aging, and increase the publicity efforts aimed at this part of the population, so as to make them play their residual heat and role potential.

4. SUGGESTIONS

(1) Give full play to the leading role of the government in the digital transformation of the elderly care industry

In the process of digital transformation, we will provide important support such as funds and policies for the digital transformation of various aged care institutions. Purchase digital elderly care service products, promote the construction of intelligent elderly care information service platform for the elderly, supervise the data security of the data platform, and avoid data leakage. Realize data communication and sharing, and efficiently connect the demand and supply of elderly care services for the elderly.

(2) Build the ecological framework of digital elderly care industry and improve the quality of elderly care services

Build the ecological architecture of the digital elderly care industry, and realize the platform elderly care data collection and efficient resource allocation. Improve the construction of data technology infrastructure and establish accurate information database for the elderly. Build an elderly care service information platform, provide daily medical care, elderly care, online and

offline medical services in Internet hospitals, and establish a unified digital elderly care industry ecosystem architecture [9].

(3) Use big data technology to realize multi-dimensional portrait labels and accurately identify the needs of the elderly

Create portrait labels to accurately identify the real needs of the elderly at different levels. The tag structure method of big data is used to build user portraits of the elderly, analyze and predict the real needs of the elderly. Collect and analyze online user data, and mine the behavior rules and differences of different user groups. By extracting the user's health information behavior, a model is established to predict the health status. Identify multi-dimensional personalized portrait labels for the elderly, help promote the promotion of products in the precision elderly care industry, and promote the development of the real economy of relevant retail industry, medical equipment and pharmaceutical enterprises [10].

(4) Ensure data security and clarify data security responsibility

While sharing data for the elderly, clarify the responsibility of data security. Implement laws and regulations on data privacy protection, protect the privacy of the elderly's health electronic archives, and maintain the personal information security of the elderly. When calling the electronic health archives of the elderly, it is necessary to clarify the use rights and ensure the security of personal information. Establish a responsibility system through the third-party evaluation and supervision mechanism, and bear relevant responsibility consequences for malicious disclosure of information of the elderly and causing losses.

(5) Improve the quality level of intelligent medical elderly care service personnel

Establish a human resource pool around the digital elderly care industry, enrich the supply of human resources, realize continuous education for industrial service personnel, and continuously improve the quality of elderly care service employees. Improve the digital medical care concept and operation management level of middle and senior service managers in medical and old-age care related institutions.

(6) Pay attention to the young elderly as "young team" of aging

When aging and digitalization overlap, due to the influence of age, intelligence, education level, traditional concepts and other factors, the elderly's acceptance of various intelligent devices and the Internet has certain limitations. The young people, aged 60-69, are the main drivers and participants of the "silver economy". Utilize the strong digital adaptability of the young elderly and the high acceptance of the digital data platform to drive the elderly to realize a new experience of digital elderly care.

(7) Taking the community as the center, establish a digital smart elderly care service point

Establish digital smart elderly care service points in the community to provide diversified and fast elderly care services for the elderly. A working group is formed by the staff of various institutions to provide relevant services and guidance for the elderly, and help the elderly transition smoothly from the traditional aged care mode to the digital aged care mode.

5. CONCLUSIONS

With the superposition of the digital era and the aging population, the digital transformation of the aged care industry is an inevitable trend. The digital transformation of the elderly care industry in Dalian is not achieved overnight, and may face many bottlenecks, but this is both a challenge and an opportunity. At present, the main problems we are facing are the accelerated aging process, the increasing burden of old-age care and the pressure of basic public services. The old-age care industry in Dalian has not yet formed a sound and mature old-age care ecosystem and service mechanism. The information and data standards among aged care institutions, medical platforms and communities are not interconnected, resulting in the repeated occupation and waste of resources, which can not fully meet the higher demand for aged care services in a short time. The aging population has different levels and needs. The quality demand of employees in the digital elderly care industry has increased, and the demand for high-level professionals has increased. Therefore, in view of the current problems, from the perspective of upgrading the digital elderly care industry, it is necessary to accelerate the construction of community-based home-based elderly care service network resources and scientifically plan the elderly care industry services and products by integrating the elderly care industry institutions, medical institutions and community services. Establish a multi-module subsystem platform to realize information sharing between hospitals and elderly care institutions, and open up the data sharing channel between Internet hospitals and elderly care institutions. Ensure the security of platform data and clarify the responsibility of data security. We will implement the national old-age service standards and further improve the standardization system of old-age service in Dalian. Use big data technology to realize multi-dimensional portrait labels and accurately identify the needs of the elderly. Establish a human resource pool around the digital elderly care industry, enrich the supply of human resources, and realize continuous education for the quality of industrial service personnel. Actively advocate and encourage the training and reform of high-quality professionals, and encourage and guide employment to meet the growing demand of elderly care services.

Although the digital transformation is facing many challenges such as low maturity and high demand for resource allocation, as long as we adhere to the demand-orientation of the aging population and continue to improve the precise supply and demand matching of the digital elderly care services, we can gradually form a new digital elderly care ecosystem and make the "one-stop" intelligent medical elderly care of the elderly population a reality.

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