Research on the Design of "New Elderly" Household Products Under the Smart Pension Model

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ABSTRACT

Scientific and technological innovation has brought great changes to the lives of the elderly. Against this background, this paper summarizes several common types of smart pension models, focuses on the home-based smart pension model, and finds out the problems in the application of this model. Take the "new elderly" group as the research object, point out their adaptability and advantages to the smart pension model, and analyze the demand classification of smart products in the "new elderly" family life through data collection and interview survey. From the perspective of the needs of the "new elderly" and different home life scenarios, combined with the characteristics of existing smart products, the product configuration suitable for the "new elderly" group home smart elderly care mode is summarized. Combined with the characteristics of the new elderly and the problems of the application of the home smart elderly care model, the design strategy of the "new elderly" smart home product is put forward pertinently, and the design case is supplemented to provide a certain direction and reference for the design of smart elderly care products.

Keywords: Home-based smart pension, New elderly, Household product design, Introduction.

1. INTRODUCTION

In recent years, the proportion of the elderly in China has been rising, which has brought many challenges to social development. However, with the development of the times and the progress of society, science and technology have changed and enriched people's lives. These emerging science and technology have also brought great changes to the lives of the elderly, making them gradually move towards the intelligent elderly care model, especially the "new elderly" group with stronger ability to accept new things. According to the relevant data survey, at present, the elderly in China are mainly home-based elderly care, supplemented by community elderly care and institutional elderly care. Most of the elderly are more willing to choose home-based elderly care. It can be seen that a good home environment is conducive to promoting the quality of life of the elderly, and suitable high-quality home products are of great significance for ensuring the physical and mental health of the elderly and improving the happiness index of life.

2. EXPLORATION OF SMART PENSION MODEL

Smart pension mode has brought great changes to the life of the elderly. It is of guiding significance to clarify the problems in the development of smart pension mode for the design of elderly products.

2.1 Smart Pension Model and Its Types

The term "smart pension" was first proposed by the British Life Trust Fund, which is a sensor network system and information platform for home-based pension, community pension and pension institutions [1].The smart pension model is supported by the information and Internet era of technological development and transformation, and is also an important part of the construction and operation of smart cities. The smart pension model has great development prospects, and all sectors of society have high expectations for the wide application of the smart pension model. At present, there are three main ways of providing for the aged in China, namely, home care, community care and

institutional care. Most of these areas are based on the home-based elderly care model. In developed cities such as Shanghai, Guangdong and Hangzhou, the community elderly care and institutional elderly care have a wide range of popularization, a large scale, more independent innovation and more mature development.

According to relevant theoretical research, there are three common smart pension models at present. First, Liu Yi believes that the smart pension model reflects the interaction between the elderly and other social subjects. With the balance of supply and demand as the final value orientation, it constructs an analytical framework that includes the matching of "subject - method - content - object" (as shown in "Figure 1"), and refines each dimension to cover the relevant elements necessary for a "model" [2].Second, based on big data, Niu Xuanqi has built a community smart elderly care service platform (as shown in "Figure 2"). The operation of the platform requires both online information management and offline physical services. The evaluation and feedback of community elderly care services are then transmitted to the service platform. All links are closely linked to form an effective connection between online and offline community elderly care services [3]. Thirdly, Xu Lan proposed a community home-based elderly care service model based on the O2O concept (as shown in "Figure 3"), and proposed to establish a three-dimensional maintenance mechanism "based on the family, assisted by the community, and effectively supplemented by external market-oriented medical resources" [4]. All these reflect that the smart pension model is a new model that integrates the traditional home-based pension, community pension and institutional pension, in which the home-based pension and community pension are particularly closely linked, and the home-based pension to a certain extent depends on the technology and services provided by the community pension.
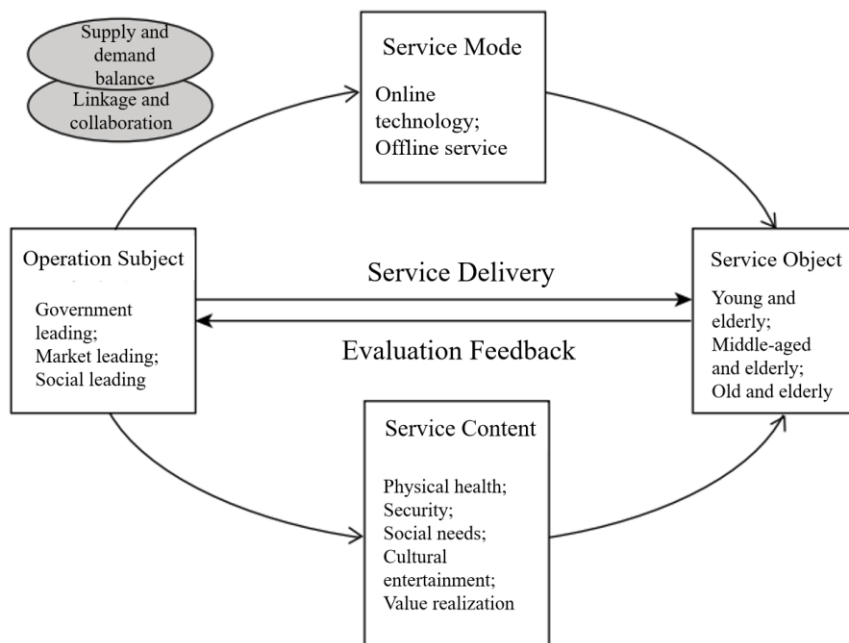

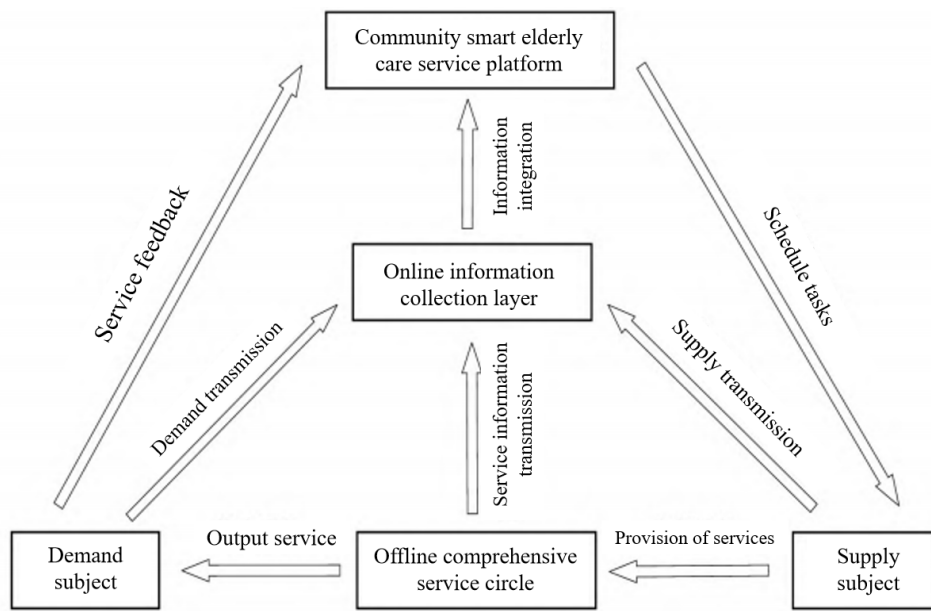Figure 1 Community smart pension model proposed by Liu Yi.

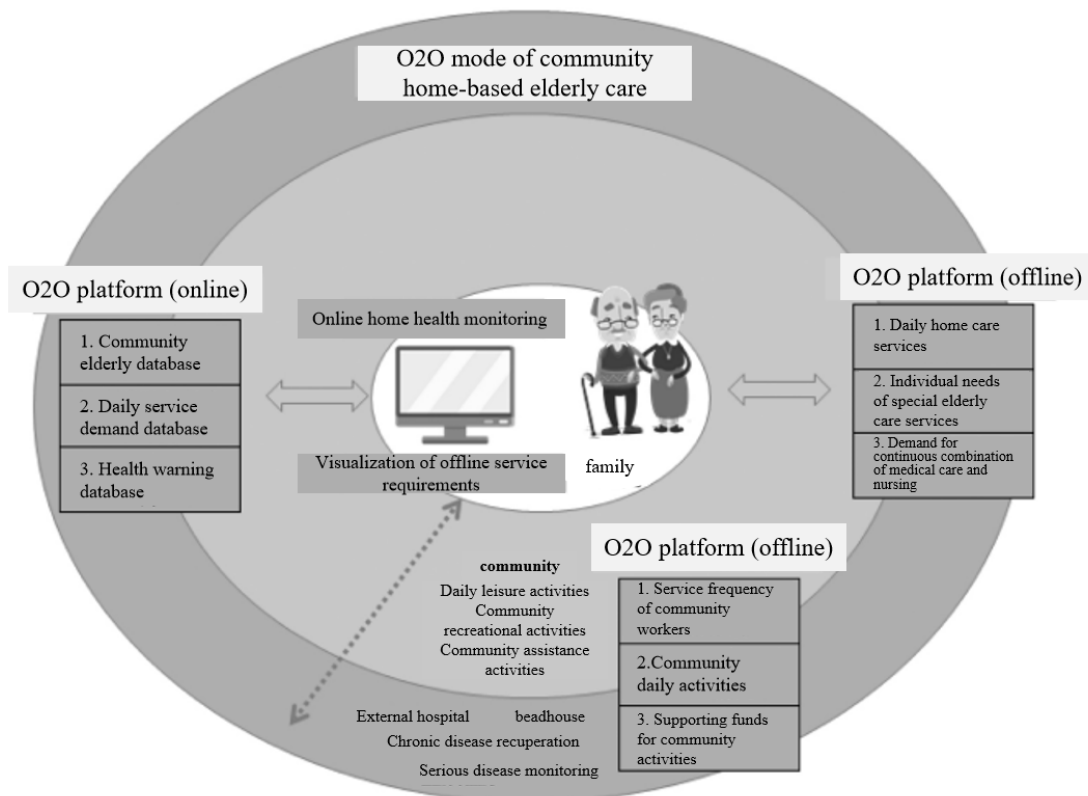Figure 2 The community smart elderly care service model built by Niu Xuanqi.

Figure 3 The community home-based elderly care service model proposed by Xu Lan -- the structural framework of O2O model for community home-based elderly care.

In addition, in the field of practical application, the domestic influential smart elderly care service platform "Lewan Cloud" is also an elderly care service system based on continuous improvement of home-based elderly care, supported by communities, supplemented by institutions, combined with medical care, and supervised by the upper level, relying on core technologies such as

"Internet of Things, Internet, cloud computing, big data, and artificial intelligence", Build a closed-loop ecological open platform for the whole life cycle of the elderly care industry (as shown in "Figure 4"). Among them, the home-based smart elderly care system (as shown in "Figure 5") connects social elderly care service resources, the elderly and the government, forms a closed loop of home-based elderly care service scenarios, provides

an overall solution covering the capacity assessment of the elderly at home, home-based monitoring of the elderly, service scheduling, logistics management, catering management, medical services, data analysis and other businesses, and ensures service quality through service evaluation, data analysis and other methods, So that the elderly can enjoy better home-based elderly care services.
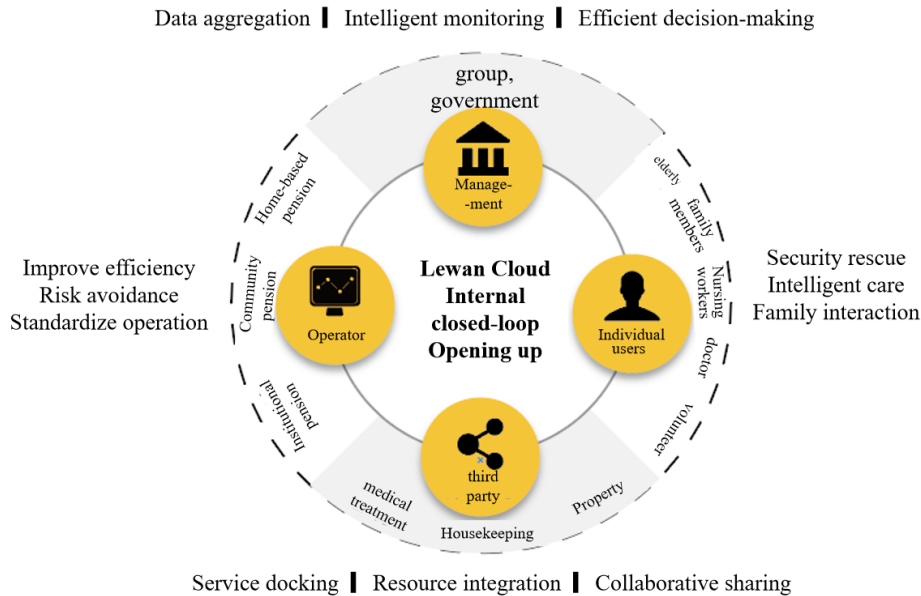

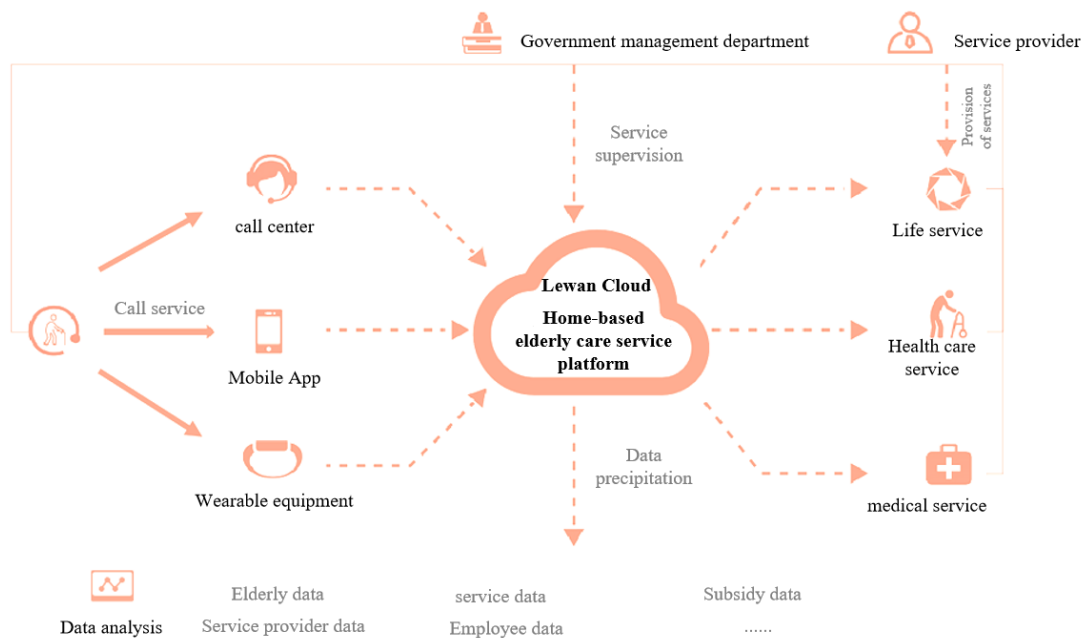Figure 4 "Lewan Cloud" closed-loop ecological open platform.

Figure 5 "Lewan Cloud" smart home care system.

2.2 Analysis on the Application of Smart Pension Model

Based on the above exploration of smart pension model, we can find that the composition of smart pension model is inseparable from the four key elements of information management system, intelligent hardware equipment, service operation platform, and service personnel. As a comprehensive service platform for information integration, the smart home-based elderly care model provides the elderly with door-to-door services, online visits, assistance in ordering meals, humanistic care, emergency assistance, home monitoring and other services. However, due to the current unsound smart pension system in China and the inaccurate service objects, most of them are divided by age: young and old, middle-aged and old. However, some of these elderly people at different age levels lack the correct understanding of intelligent elderly care equipment and technology products or have resistance. Secondly, they are affected to some extent by physical conditions, lifestyle and cultural level, which hinders the popularity of intelligent elderly care products. In addition, most of the smart elderly care products are expensive, and the price factor is also one of the reasons why it is difficult to popularize smart elderly care products for the elderly at all levels. From this point of view, the application and promotion of smart pension model still faces certain challenges.

3. CHARACTERISTICS AND NEEDS OF THE "NEW ELDERLY" GROUP

The concept of "new elderly" comes from Italy, which has more connotations in the context of China's fast-moving information age. With the progress and development of the times, the demand for "new and old people" is also growing.

3.1 Research on the Characteristics of the "New Elderly" Group

According to the "Blue Book on Aging: Survey Report on the Living Conditions of the Elderly in China's Urban and Rural Areas (2018)" [5] of the China Research Center on Aging, the age structure of the elderly population in China is relatively young, among which the young (aged 60 to 69) account for 56.1% of the total elderly population, the middle-aged (aged 70 to 79) account for 30.0%, and the elderly (aged 80 and above) account for 13.9%, It can be found that the proportion of the total number of young people is higher than that of the elderly. The old people who are still young both physically and psychologically are called "new old people" [6]. Zhang Ping pointed out in the article "Research on the needs and product design of China's" new elderly "group [7] that China's" new elderly "group has the characteristics of the new era, and has great differences from the traditional elderly in terms of physiology, psychology, cultural level, social status, etc. Teng Yilin mentioned in the Research on the Design Trend of "new elderly" Products from the Perspective of Successful Aging [8] that the era of "new elderly" is accompanied by the development process of China's modernization, and influenced by the development of market economy after reform and opening up, the spread of western ideology and the Internet era, tradition and modernity are integrated in them. He believed that the definition of "new and old" people should not be based on age alone. Even if they are over 70 years old, they can be defined as "new elderly" as long as they have the characteristics of relatively open minds, are willing to accept new things, are willing to learn actively, are eager to participate in society, attach importance to social interaction and communication, and think they are still young.

The research object of this paper is the "new elderly" group, which refers to an old group with strong ability to accept new things and self-care ability. Generally speaking, "new elderly" are not limited by age, have high educational background, strong economic strength, and have high pursuit of material life and spiritual life. The "new elderly" group has stronger adaptability and acceptance in the face of smart pension model.

3.2 Exploration of the Needs of the "New Elderly" Group

The biggest difference between the "new elderly" group and the traditional old group is their ability to accept and adapt to new things, and their needs for home life are also intelligent and diversified. In addition to the basic physiological needs, the needs of the "new and old" group also include safety needs, spiritual needs and development needs, as shown in "Table 1".

Table 1. The needs of the "new elderly" group

Requirements classification	Requirements	Demand content segmentation
Physiological requirements	Life support requirements	Intelligent devices assist daily activities, household activities, etc
	Quality of life requirements	Good living environment; Intelligent equipment provides convenient operation, etc; Comfort of intelligent products
Security requirements	Safety monitoring requirements	The new elderly are also accompanied by forgetfulness, physical function decline and other characteristics. Intelligent systems and equipment are needed to monitor physical condition and home activity safety in real time
	Safety warning requirements	When the new and old fall, they can use the intelligent monitoring camera to monitor the fall and alarm the mobile phone
Spiritual requirements	Mental health requirements	In addition to paying attention to physical health, new and old people also pay attention to mental health and mental health
	Spiritual enrichment requirements	The new elderly's need for culture, active learning, active exploration of new things, and self-improvement
	Requirements for spiritual entertainment	The new elderly are less dependent on their children, more independent in spirit, have their own hobbies, such as fitness, tourism, dancing, and are willing to raise flowers, fish, and read books at home
Development requirements	Social circle building requirements	The new elderly are more willing to make friends and expand social circle; Willing to deal with young people; At the same time, it also needs to be recognized, recognized, needed and seen
	Self-fulfilling requirements	The new elderly are willing to participate in work, social activities, play their potential and realize themselves

It is of positive significance to clarify the needs and classification of new and elderly groups under the home smart elderly care model to promote the configuration and innovation of elderly home products and improve the organic integration of smart elderly care model and elderly home product design.

4. DESIGN ANALYSIS OF SMART HOUSEHOLD PRODUCTS FOR THE ELDERLY

According to the survey, there are many kinds of smart home products for the elderly in the market at present. It is positive to analyze the characteristics of smart home products and configure product models in different home scenes for product selection and use.

4.1 Design Features of Smart Household Products for the Elderly

Smart home products refer to products that can adjust personalized functions according to users' needs and habits and adapt to daily home life. At present, there are many smart home products for the elderly on the market, such as smart bracelet, smart sphygmomanometer, smart speaker, smart TV, smart clothes rack, smart sweeping robot, smart nursing bed, smart massage chair, etc. Its characteristics are as follows: (1) networking can realize information integration and sharing; (2) Intelligent operation, remote control or voice operation; (3) Branded, there are countless smart home products on the market, and products with positive brand reputation are more likely to be favored by consumers. However, these smart

household products for the elderly are mostly substitutes. They are not based on the needs of the elderly and lack of special design research for the elderly by transforming other household home products and providing them to the elderly [9]. In other words, the current smart home products for the elderly are not targeted, specific, and innovative. Smart products have not been widely used in the elderly. Many elderly people do not use or set smart home products, resulting in their becoming furnishings.

4.2 Product Configuration of Smart Home-based Elderly Care Model for "New Elderly" Groups

According to the home-based elderly care needs of the "new elderly", we can summarize them into five types, namely, life assistance, health monitoring, safety warning, leisure and entertainment, and self-improvement. According to the real needs and home life scenarios of the "new

elderly" group, the product configurations suitable for the "new elderly" group's home smart elderly care are proposed from different perspectives, and the product types corresponding to different needs are defined.

From the product configuration in "Table 2", it can be found that the corresponding household products of life assistance, leisure and entertainment and self-improvement are more conducive to the emotional sustenance of the elderly. For example, the elderly learn yoga through the intelligent yoga mirror, which not only exercises their body, but also closes the distance with the young. Let the elderly think that they are not divorced from the society, but increase the common language with their families, actively integrate into the modern society, accept the convenience of intelligent technology, and improve the sense of happiness in life. The household product design of "new elderly" can take into account the psychological and spiritual emotional needs of the elderly.

Table 2. Product configuration of home-based smart elderly care model for the needs of "new elderly" groups

Requirements	Product configuration
(1) Assisted living	① Housework: intelligent sweeping robot; Intelligent clothes hanger; Intelligent dishwasher; Intelligent washing machine. ② Activity: Smart night light; Intelligent switch; Intelligent speaker; Intelligent crutches; Smart phone washing; Smart toilet and armrest.
(2) Health monitoring	① Physical care and rehabilitation: intelligent nursing bed; Intelligent hand physiotherapy rehabilitation trainer. ② Body condition monitoring: intelligent bracelet; Intelligent sphygmomanometer. ③ Life monitoring: intelligent surveillance camera.
(3) Safety warning	① Intelligent anti-theft: intelligent door lock; Smart door and window sensor. ② Intelligent alarm: intelligent kitchen and bathroom safety alarm (smoke, gas, etc.).
(4) Leisure and entertainment	① Simple leisure: intelligent massage chair; Intelligent speaker; Smart screen. ② Entertainment activities: intelligent voice chess and cards; Smart yoga mirror.
(5) Self-improvement	① Learning improvement: smart screen; Smart speaker.

In addition, a good home environment is the guarantee to improve the quality of life of the elderly. According to the author's survey, most elderly people spend more than 15 hours at home on average every day. Therefore, it is of great significance to explore the configuration of smart home products from different home life scenarios for the elderly. As shown in "Table 3", the product configuration of home-based smart elderly care model corresponding to different home life

scenarios is presented, providing a certain direction for the design of smart elderly care products.

Table 3. Product configuration of smart home care model for different home life scenarios

Home life scene	Mainly corresponding to home space	Product configuration
(1) Physiological activity scene	Toilet, dining room, bedroom	Smart night light; Intelligent crutches; Smart phone washing; Intelligent toilet and handrail; Intelligent switch; Intelligent speaker; Intelligent surveillance camera, etc.
(2) Domestic activity scene	Kitchen, dining room, bedroom, etc.	Intelligent sweeping robot; Intelligent clothes hanger; Intelligent dishwasher; Intelligent washing machine, etc.
(3) Rest scene	bedroom	Intelligent monitoring sleep pillow; Intelligent sleep instrument; Optical fiber intelligent sleep health monitor; Ai intelligent sleep monitoring belt, etc.
(4) Leisure scene	Living room, balcony, multi-function room, tea room, mahjong room, flower room, etc.	Intelligent massage chair; Intelligent speaker; Intelligent voice chess and card; Intelligent yoga mirror, etc.
(5) Learning scenario	Study	Smart screen; Special tablet for the elderly; Ai intelligent painting book.
(6) Rehabilitation scene	Rehabilitation room, gym, bedroom, living room	Intelligent nursing bed; Intelligent hand physiotherapy rehabilitation trainer; Smart bracelet; Intelligent sphygmomanometer; Intelligent surveillance camera.

5. DESIGN STRATEGY AND CASE DISPLAY OF "NEW ELDERLY" HOUSEHOLD PRODUCTS UNDER SMART PENSION MODEL

According to the results of investigation and analysis, this paper puts forward the design strategy of "new and old people" household products under the smart pension model, and applies it to the design case.

5.1 The Design Strategy of "New Elderly" Household Products Under the Smart Pension Model

The design strategy of "new and old people" household products under the mode of intelligent pension mainly includes ase of use design, user-friendly design, emotional design and innovative design.

5.1.1 Ease of Use Design

For the "new elderly", the usability design of smart home products needs to be considered based on their emotional factors, behavior habits and other aspects, mainly from the aspects of easy to see, easy to read, easy to learn and other aspects of the product optimization design, of course, also includes the human-machine size, appearance and shape of the product. The ease of use design of the control terminal allows users to operate the smart home conveniently through the terminal, which is particularly important for the elderly [10]. Smart home products need to reduce users' repeated operation and unnecessary physical consumption in the operation mode, make the function operation as simple as possible, and present the control device and control information in a reasonable and appropriate way; The design of the interactive interface should be as simple and understandable as possible, and the information should be presented in a variety of annotation methods, such as text and image tactile, so as to improve the readability and reduce the time for the elderly to learn and become familiar.

5.1.2 User-friendly Design

First of all, the humanized design of smart home products for the elderly is reflected in meeting and adapting to the physiological characteristics of the elderly, human-machine size and function settings, etc., to improve practicality and safety. Secondly, consider the lifestyle and thinking mode of the "new elderly", optimize the product design, integrate the understandable graphic information of the new and old, and make the product adapt to people, not people.

5.1.3 Emotional Design

From the perspective of emotional design, the elderly can enjoy home leisure and entertainment through smart home products. The "new elderly" people are less dependent on their children and pay attention to social interaction. Some smart home products, such as playing mahjong, singing, dancing, etc., which can enable the elderly to participate in social entertainment activities at home, allow the elderly to obtain some sense of participation, achievement, and satisfaction from these smart home products, all belong to the emotional sustenance of the elderly. Smart home products for the elderly should strive to improve the technical temperature so that the elderly can feel the product temperature while enjoying the convenience brought by technology.

5.1.4 Innovative Design

From the characteristics and needs of the "new elderly" people, we can find that smart home products not only meet the necessary functions of the demand, but also pay attention to the innovation, culture, anti-aging, quality and other aspects of the product. The smart home products for the new and old should not only be controlled intelligently, but also need to improve the innovative design of the products, improve the product quality and meet their psychological and spiritual needs.

5.2 "New Elderly" Household Product Design Case Display

As shown in "Figure 6", the smart and interesting elderly leisure chair design is displayed, which can be mainly used for leisure activities such as daily home reading, nap, waist massage, finger exercise, leg exercise, etc. The height of the chair is higher than that of the ordinary leisure chair, which makes it easier for the elderly to sit down and get

up. The armrest is equipped with a pinion to play with and move fingers. In particular, the leisure chair combines the waist massage function with leg exercise, and designs two control modes. The terminals are integrated on the remote control. Each button has voice prompts, which can be flexibly operated by both the new and old people and the old people who are completely unfamiliar with intelligent devices. Mode 2 - After the task of sports massage at each gear is completed, there is also corresponding voice encouragement to increase the technical temperature and give the elderly a sense of achievement and satisfaction. This case is designed in combination with the physiological and psychological characteristics of the elderly, aiming to help the elderly to be able to handle smart home products and improve the adaptability of the smart home care model.

Figure 6 Case display: intelligent and interesting elderly leisure chair design and remote control panel design.

6. CONCLUSION

With the rapid development of the information age, people have gradually opened the smart life model, and the smart pension model has also become the trend of the times. Affected by the economic prosperity, educational reform and other big environment, people's lives are becoming richer and more open, which also promotes the youth and vitality of the elderly. People's lives have been inseparable from the support of intelligent devices, and more and more intelligent products for the elderly have come into sight. The demand of the "new elderly" group for household products in the contemporary era presents the characteristics of diversification, personalization and quality, but they still have many problems when facing intelligent products, such as complex terminal structure, unclear image and text recognition, and various functions, which have become the factors impeding the integration of the "new elderly" group into the development of modern society. Therefore, the design and development of intelligent elderly home

products must comply with the real needs of the elderly, analyze the pain points encountered in different life scenarios, and expand the product category configuration. We should also take into account their emotional needs and development needs, improve the quality of life and well-being of the "new elderly" group, and promote the open, innovative and normalized life of the "new elderly" group.

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