

# *A Study on the Willingness of Elderly People to Adopt Smart Elderly Care Services and Products*

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**Abstract:** China is now facing a trend of rapid population aging while traditional elderly care models cannot meet the needs to realize effective elderly care. The emergence of smart elderly care could alleviate the situation. However, the adoption of smart elderly care services and the use of smart elderly care products by the elderly are not widespread, and there also exists a situation where elderly individuals lack an understanding of smart elderly care services and products or are unwilling to choose or utilize them. This article conducts a comprehensive review of the adoption of smart elderly care products among China's aging population. Based on a large amount of literature, the analysis delves into various influencing factors, including individual differences, subjective perceptions, and objective elements. Finally, to enhance the adoption of smart elderly care services and products among China's elderly people, some proper measures are recommended from the perspective of improving smart elderly care services and encouraging related product use.

**Keywords:** elderly people, smart elderly care, smart aged-care products, willingness to use

## 1. Introduction

China is currently dealing with the significant challenge of a large-scale, rapidly aging population [1]. The proportion of people aged 65 and above will reach 14% in 2024 [2]. Meanwhile, a number of drawbacks to the traditional elderly care model have been increasingly revealed, including the “digital divide,” low-quality elderly care services, and outdated information platform architecture [3], which has already impeded, to a large extent, the sustainable development of elderly care. With the conceptualization of smart elderly care and the appearance of smart elderly care services, serious problems could be better solved. Smart elderly care services have the potential to help elderly people in many aspects, ranging from monitoring and maintaining their health to managing health conditions and diseases [4]. However, the intelligent elderly care system in China is still in its initial stages [5]. There is relatively limited recognition and promotion of artificial intelligence products, and the willingness to choose smart elderly care is not strong.

This article, based on an extensive review of existing literature, conducts an analysis of topics related to the elderly group's adoption of smart elderly care products in China, so as to achieve a more comprehensive and profound understanding of the current aged-care situation, as well as exploring the affecting factors of elderly people's willingness to adopt smart elderly care services and products. This article aims to help promote elderly people's adoption of smart elderly care services, especially their willingness to use smart aged-care products.

## **2. Current Situation of Smart Elderly Care in China**

### **2.1. Connotation of Smart Elderly Care**

Smart senior care was initially called the “completely smart senior care system”, which was first proposed by British Life Trust [6]. It enables seniors to live a high-quality and enjoyable life within their own residences, free from constraints imposed by time and geographical limitations on their daily activities [3]. Smart elderly care highlights its flexibility and cleverness that traditional elderly care lacks. Being smart, that is, using information technology to implement green care and environmental care, is essential to satisfy the diverse and individual needs of the elderly. Thus, smart elderly care refers to the application of current technologies, including computer technology (the Internet, social networking, cloud computing, etc.), through automatic monitoring, early warning, and even proactive intervention in elder-related information, to provide elderly individuals with various life services and management, including daily life, safety and security, healthcare, entertainment, leisure, learning, and sharing [7]. It facilitates friendly, autonomous, and individualized intelligent interactions between technology and the old, as well as managing life in numerous aspects for the elderly.

Smart Elderly Care consists of three major components: intelligent devices (smart care products), online service platforms, and offline service networks [8]. Smart devices, which are the significant foundation of smart elderly care, refer to technologically advanced elderly care products developed using technologies such as the Internet and sensors. They are mainly categorized into two major types: wearables and intelligent terminal devices. Wearable smart terminal devices include smart wristbands, health management service devices, and various other terminal devices. The second category includes smart home devices that offer elderly care services, encompassing smart appliances, intelligent home management systems, one-touch emergency call devices, smart landlines, companion robots, home intrusion detection through infrared, gas detection equipment, and more.

### **2.2. Elderly People’s Willingness to Adopt Smart Elderly Care Products**

A large number of studies have shown that most elderly people have a positive attitude toward the use of smart elderly care products, but the actual usage and acceptance rates are not very high [9]. Based on the 51st Statistical Report on the Development Status of the Internet in China published by the China Internet Network Information Center (CNNIC), the percentage of Internet users in China who are 60 years old and above stood at 14.3% in December 2022 [10]. Although this percentage has been rising each year, it is still relatively low, indicating that the bulk of senior people may face difficulties adopting smart devices due to their lack of knowledge of current technology. Furthermore, previous research has indicated that elderly individuals often experience concerns and reservations when it comes to utilizing healthcare information technology, potentially impeding the acceptance and adoption of such technology [11]. Jeng et al. found in their study that the aged are worried about smart technology and discouraged from adopting it [12]. In fact, lots of factors affect elderly people’s willingness to adopt smart aged-care products. Many researchers have researched them and conducted theoretical models before.

## **3. Reasons for the Low Usage of Smart Elderly Care Products among Elderly People**

### **3.1. Individual Differences**

Research has found that individual differences can affect elderly people’s adoption of smart elderly services and products. Factors such as gender, age, marital status, education level, monthly income, and frequency of participating in community activities, as well as awareness and advertising, were

significantly associated with their willingness to choose artificial intelligent care products [13]. Based on empirical analysis, women are more willing to buy smart elderly service products while men are less willing to buy them [14]. From the perspective of the elderly themselves, their own health condition and cognitive abilities will affect their acceptance of technological products [15]. The higher the level of health, the lower the demand for elderly care technology, while stronger cognitive abilities may lead to a higher demand for elderly care technology. As age increases, the elderly's capacity to accept new things gradually diminishes [16]. Additionally, older individuals, due to the accumulation of years of life experience, have developed more habitual ways of living in their senior years. This, to a certain extent, can also reduce their demand for and acceptance of elderly care technology products. Due to the loss or partial loss of self-care abilities, elderly individuals with disabilities should ideally require greater external support from elderly care technology products or services. However, in reality, the weakening of self-care abilities also leads to a diminished understanding and utilization of technological products. Consequently, this reduces the level of acceptance of elderly care technology. Besides, high purchasing ability provides people with more opportunities to access elderly care technology products, which in turn increases the acceptance level of such products.

### 3.2. Subjective Perceptions

Subjective factors will also affect elderly people's willingness to adopt smart aged-care products. Numerous studies show that older people's propensity to employ smart senior care goods is partially influenced by their opinion on product quality [17]. A considerable positive influence on older people's propensity to employ smart aged-care items is also exerted by their emotional attachment to these products [17]. The self-inflation theory defines emotional attachment as a strong bond between individuals or between entities, which can lead to significant motivation and behavioral outcomes [18]. According to studies, older individuals are more likely to utilize smart aged-care items if they feel an emotional connection to them. Older adults who have a more positive view of aging and are more health-conscious will be more engaged in learning about their health, which will increase their desire to adopt smart aged-care goods [19]. Additionally, older people's perceptions of technology's usability and omnipresence may be severely impacted by technology anxiety due to their lack of familiarity with cutting-edge technology [20]. Personality traits are another factor that has an impact on elderly people's willingness and adoption of smart aged care. Ajzen and Fishbein [21] mentioned that personality traits regarded as the user factor will affect users' behavioral intention which means that users' personality traits would affect their willingness to accept new technology. Jeng et al. found that users with higher technology willingness show higher perceived ease of use and perceived usefulness, promoting users' positive attitudes to enhance the intention to use smart elderly care products [12]. Elderly users with higher technology interactivity present higher perceived ease of use and perceived usefulness, promoting users' positive attitudes to further increase the intention to use. Additionally, due to privacy and information security concerns, elderly individuals might refuse to share personal information about their daily life, work, health, and other aspects online, which can affect their willingness [22]. Factors influencing elderly individuals' choices of smart elderly care services and products also include subjective perception factors such as service prices, usability, permeability, trustworthiness, service quality, and security. In other words, the level of awareness and approval that elderly individuals have towards internet-based elderly care services determines whether they purchase and use such services [23].

### 3.3. Objective Factors

The objective factors part mainly comprises senior people's health condition, product factors, family offspring factors, and cognition of smart elderly care. Health condition is a crucial factor influencing the acceptance and utilization of smart aged-care products among elderly individuals [24]. The lower the health level of the elderly, such as those in need of care or suffering from malnutrition, the higher their acceptance of smart elderly care products. Elderly individuals with poorer health conditions are more concerned about their own health issues and are inclined to proactively adopt measures that promote well-being. For instance, elderly individuals with mobility issues might opt for relevant walking assistance products, and they might actively use intelligent devices to measure physiological indicators such as heart rate, blood pressure, and sleep quality to better understand their own conditions [25]. The functionality of the product significantly affects the acceptance of elderly care technology by the elderly, especially those products that do not meet practical needs and have lower appeal to the elderly, for the elderly consumer group is cautious. Research indicates that older adults receive a greater amount of information and product exposure through their children. While the younger generation continues to adopt new and high-tech products, they also pass on new technologies and ways of life to their parents, making it easier for the elderly to accept technological products. In addition, elderly people's cognition of smart elderly care also affects their choice. People who have little knowledge about it tend to refuse to use it. Meanwhile, the level of senior people's cognition is related to the caregiver's awareness of them. Ahn and Aghvami indicated that both caregivers and older adults lack knowledge of smart care services [26], which hinders them from learning about them. However, from a macro perspective, the initiatives and policies promoted by government agencies to advance smart elderly care will directly impact willingness to choose and accept behavior [13]. With the continuous decline in the physical and memory capabilities of elderly individuals, their ability to learn new things diminishes. This perception of difficulty in using intelligent elderly care products leads them to adopt a conservative attitude toward smart products [27].

## 4. Measures to Promote the Usage of Smart Elderly Care Products among Elderly People

### 4.1. The Improvement in Smart Elderly Care Products

First, there is a need to minimize the time required for learning, expenses associated with purchasing, and efforts needed to use smart elderly care products. For instance, devices should have an easy-to-use operation interface that gives people the impression that using the gadget is simple. To increase users' reliance on product features and further influence their intention to use them, businesses and product developers should offer services for customers' actual demands. Challenges faced by seniors such as the digital gap and health issues should be taken into consideration.

Second, it is essential to address apprehensions about the potential risks (like personal privacy) related to using smart aged-care products and enhance the trust of elderly people. Through mobile software, senior people now can easily manage their diseases through mobile software. However, how to set the shared contents or objects would involve personal privacy. For this reason, it is necessary to reduce the risk of information exposure [12]. Otherwise, the use of technological products might have undesirable impacts.

### 4.2. Promotion and Encouragement of Product Use

First, publicity should be strengthened [6]. For reason that technology is strange for most senior individuals, their attitudes towards new products will be conservative. Nonetheless, through proper instruction and encouragement, the attitude would become positive. Publicity can increase the use

and need of both seniors and caregivers for smart elderly care. For instance, target groups can be segmented according to users' willingness to adopt smart elderly care, and innovative products can be promoted to those senior people who are optimistic about the products through various marketing channels. For the elderly who feel uncomfortable and are skeptical or anxious about the products, the product demonstration can be reinforced before purchase to allow users to rapidly adapt to new products.

Second, some researchers have applied the Technology Acceptance Model (UTAUT) to analyze the factors influencing the willingness of disabled elderly individuals to use smart elderly care products. They found that non-governmental organizations play a positive role in willingness to use, whereas government, community, and market support have no significant impacts [28]. Non-governmental organizations provide short-term, relief-oriented support. To enhance the elderly population's willingness to choose, government departments should intensify the promotion of technological concepts in smart elderly care, disseminate measures and policies for smart elderly care, and capitalize on the high satisfaction of the elderly with their communities to guide and encourage their adaptation and use of intelligence products. Government-enterprise collaboration drives the technological advancement of the smart elderly care industry and accelerates efforts in cultivating and reserving related talents.

## 5. Conclusion

In conclusion, as China encounters the challenges posed by rapid population aging, the need for effective and comprehensive elderly care solutions becomes paramount. This fact necessitates innovative approaches to address the evolving demands of senior citizens. As traditional elderly care models have revealed limitations, hindering the progression of elderly care services, the advent of Smart Elderly Care Services offers a promising avenue to overcome these challenges. By harnessing the potential of technology, particularly Artificial Intelligence and the Internet of Things, the elderly can receive tailored, efficient, and holistic care. However, the journey towards widespread adoption of these technologies is not without hurdles. The current state of the intelligent elderly care system in China is in its infancy, with limited recognition and promotion of Artificial Intelligence products and relatively modest willingness among the elderly to embrace these advancements. The factors influencing elderly people's adoption of smart elderly care are multifaceted and include individual differences, subjective perceptions, and objective elements. To bolster the acceptance and utilization of Smart Elderly Care, several measures can be undertaken. Simplifying the user experience, addressing privacy concerns, and reinforcing the benefits of these products through targeted publicity campaigns can bridge the gap between senior individuals and technological innovation. Moreover, collaboration between government entities and enterprises is crucial in driving technological development and cultivating the talent needed to navigate the intricacies of this evolving industry.

In essence, Smart Elderly Care holds the potential to redefine how senior citizens experience aging by empowering them with advanced technology. By understanding the complex interplay of factors influencing their adoption and taking proactive steps to address these factors, China can usher in an era of enhanced elderly care, providing seniors with a higher quality of life and improved well-being in their golden years.

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