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Research on the Demand and Satisfaction of the Elderly in Beijing for Assistive Devices and Digital Intelligent Products of Traditional Chinese Medicine under the Background of the Silver Economy

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Abstract

As China accelerates its aging process, the trend of deep aging poses an urgent need for smart elderly care services. The State Council's "14th Five-Year Plan for the Development of National Aging Services" explicitly puts forward the goal of "aging in place", requiring the improvement of community elderly care service capabilities through technological innovation. In this context, this study focuses on the demand and satisfaction of the elderly population in Beijing with assistive devices and digital intelligent products of traditional Chinese medicine, aiming to reveal the contradiction between supply and demand in the market through a hybrid research method (online questionnaire survey and offline field investigation), and to provide basis and improvement suggestions for product optimization, industrial upgrading and publicity channels. The research team covered more than 1,000 elderly people aged 60 and above in Beijing through stratified sampling, combined with questionnaire surveys and field interviews, and used descriptive statistical analysis, K-means cluster analysis, Pearson chi-square test analysis, and variance test to reveal the consumption status, demand differences, product usage pain points, and consumption barriers of the elderly group. The data showed that there were significant differences in demand for the two types of products among the elderly, and preferences and usage varied among the elderly of different ages, genders and health conditions. The core demands were concentrated on functional practicality, age-friendly design and price rationality, but there were significant structural contradictions in the market supply. Through Pearson correlation analysis and multiple linear regression models, it was found that after-sales service is the primary driver of satisfaction with assistive devices, and quality and after-sales service jointly determine satisfaction with digital products of traditional Chinese medicine. Based on the findings, the report proposes market stratification optimization, consumer conversion strategies, and marketing strategies aimed at enhancing the acceptance and satisfaction of elderly people with smart health care products, providing data support for the construction of a smart elderly care ecosystem, and promoting the high-quality development of the health care industry.

Keywords: elderly population, assistive devices, digital products for traditional Chinese medicine, demand analysis, satisfaction survey, age-friendly design

1. Introduction

1.1 Research Background

In the global aging wave, the size of the elderly population in China continues to expand at an accelerating rate. By the end of 2023, the proportion of people aged 60 and above in China had reached 21.1%. Beijing, as a megacity with a deep aging population, had an even higher proportion of the elderly population at 21.3%, ranking among the top in the country. Against this backdrop, The State Council's "14th Five-Year Plan for the Development of National Aging Services" [1] explicitly put forward the goal of "aging in place" and called for enhancing the capacity of community elderly care services through technological innovation. Intelligent rehabilitation assistive devices and digital products of traditional Chinese medicine are emerging as technological breakthroughs in the field of smart elderly care, thanks to their unique value in health monitoring, life assistance, rehabilitation training and TCM syndrome differentiation and treatment.

The current market faces multi-dimensional structural contradictions: On the supply side, online platform data shows that the growth rate of smart product categories is 34.43%, but the homogeneity rate exceeds 60%[2], there are problems of functional redundancy and lack of age-friendly design, such as AR rehabilitation training devices with motion capture technology, 78% of the products do not take into account the joint range of motion limitations

of elderly users; On the demand side, community research shows that the elderly demand for basic functions such as "one-click operation" and "voice interaction" is 2.3 times stronger than that of existing products [3], and digital products of traditional Chinese medicine have a community penetration rate of less than 15% due to problems such as complex operation and broken service chain. The elderly population in Beijing is large and growing, and the health and wellness industry is developing rapidly. How to accurately grasp the needs of the elderly group, optimize the supply of smart health and wellness products, and improve service quality is the key issue currently faced by the development of the health and wellness industry in Beijing.

1.2 Study Objectives and Significance

1.2.1 Study Objectives

Targeting the elderly population aged 60 and above in Beijing communities, focusing on the three dimensions of market supply, user demand and satisfaction of assistive devices and digital intelligent products of traditional Chinese medicine, sorting out the current supply and demand situation, analyzing demand characteristics and pain points, evaluating key influencing factors of satisfaction, and proposing optimization plans to provide a basis for the development of elderly-friendly products and industrial upgrading.

1.2.2 Significance of the Study

1.2.2.1 Theoretical Implications

Analyze the needs and satisfaction of the elderly group from multiple dimensions such as product functions, technology applications, and service models, enrich the market demand theory and user experience research in the field of intelligent products for elderly health care, and fill the gap in this field in Beijing.

1.2.2.2 Practical Significance

Help enterprises develop products that fit the market and enhance their competitiveness; Provide a basis for the government to formulate policies and improve industry norms; Guide social resources towards the elderly care sector, improve the quality of life for the elderly, and promote the construction of an age-friendly society.

1.3 Research Methods

1.3.1 Definition of Core Concepts

Assistive devices: Devices or tools that help the elderly make up for physical deficiencies and improve their ability to take care of themselves through technical means, including walking AIDS, smart wearable devices, etc. The core function is to enhance the independence of the elderly and reduce the burden of care.

Traditional Chinese medicine digital products: refer to intelligent devices or service platforms that use technologies such as artificial intelligence to transform traditional Chinese medicine diagnosis and treatment, health preservation and care methods into quantifiable and interactive ones, such as intelligent pulse diagnosis devices, digital moxibustion devices, etc.

Community-based elderly care model: Based on the family and supported by the community, it integrates medical, housekeeping, cultural and other service resources to provide standardized and diversified elderly care services for the elderly.

1.3.2 The Method of Literature Review

China has achieved certain results in the construction of assistive device service system. However, in the face of the large number of elderly people and the rapid development of aging, the future demand will continue to grow rapidly, and higher requirements will be put forward for the coverage and service quality of the service system. Since the relevant policies were proposed, a number of applications and platforms have emerged, significantly improving the efficiency of teaching, research and clinical work in traditional Chinese medicine. However, there are still problems in the deep integration of technology and traditional Chinese medicine theory, data quality and security. The theoretical basis of consumer satisfaction is Oliver's expectancy confirmation theory proposed in 1980. Satisfaction with assistive devices is influenced by various factors such as pre-sale service satisfaction and after-sale service satisfaction, and is closely related to purchase intention.

In summary, the assistive device service system needs to be continuously optimized to meet the growing demand; Digital products of traditional Chinese medicine are developing rapidly but still have room for improvement; Consumer satisfaction with assistive devices is influenced by a variety of factors, providing directions for the improvement of related products and services. Future research could focus on how to further improve the assistive device service system, deepen the application of digital technology in traditional Chinese medicine, enhance

consumer satisfaction, and explore the interrelationships and synergistic development paths among these three aspects.

2. Current Situation Analysis

To understand the current market situation, 20 types of products (covering price ranges from 200 yuan to over 2,000 yuan), including crutches, walking AIDS, physiotherapy devices, etc. were surveyed on platforms such as Taobao.

2.1 Price range and Market Institution Analysis

Table 1. Price Range and Market Organization Analysis

Price range	Quantity share	Typical products	Efficiency characteristics	After-sales service features
Under 200 yuan	19%	Medical position pads, folding crutches, waist guards	Low price, high sales volume (15 yuan products sold over 10,000 units)	37% have no after-sales service, 42% offer warranty
200-500 yuan	34%	Blood pressure monitor, positioning wristband, physiotherapy device	Mid-range products are selling well (9 models sold over 1,000 +)	90% offer "seven-day no-reason return and exchange", 60% come with additional warranty
500-1000 yuan	23%	Smart lift mattress, transfer machine, medium frequency physiotherapy device	High-price product differentiation (with some selling over 10,000 units)	Emphasizing "lifetime warranty" and "long trial period"
1,000-2,000 yuan	16%	Electric nursing beds, oxygen generators, transfer machines	Top products explode (Haier oxygen generators sold for over 50,000)	Lifetime warranty is the main feature, and some offer an extended return and exchange period
More than 2,000 yuan	8%	Electric stair-climbing wheelchairs, high-end physiotherapy devices	Ultra-high-priced products have low sales (mostly under 1000)	Extended warranty (3 to 5 years) + lifetime technical support

2.1.1 The Product Pyramid Structure is Significant

Low-price products (under 200 yuan) : Traffic entry point, mainly crutches and belts, the 15-yuan price range accounts for 42% of sales, but 37% have no after-sales service, low user trust.

Mid-waist (200-1000 yuan) : Contributing 70% of profits, with the rise of categories such as blood pressure monitors and physiotherapy devices, accounting for more than 50% of sales. Consumers pay attention to "seven-day no-reason return and exchange" and "lifetime warranty", and intelligent products are growing significantly.

High-end (over 1,000 yuan) : Explosive demand for essential equipment such as electric nursing beds and oxygen generators; Sales of ultra-high-priced products (such as electric stair-climbing wheelchairs) are sluggish, relying on brands and extended warranties (3-5 years).

2.1.2 Price Sensitivity Stratification

Table 2. Price Sensitivity stratification table

Price range	Decision Core	NPS value	Notes
Less than 200 yuan	Price-driven	35	The lack of after-sales service significantly lowers the recommendation rate
200-1000 yuan	Services + Features	65	"Seven-day return and exchange" and "intelligentization" as growth engines
> 1,000 yuan	Brand + After-sales	75	Market education is costly and relies on word-of-mouth

2.3 Category Market Performance and Competitive Landscape

Table 3. TOP5 Best-selling Categories and Competition Dynamics

Categories	Representative products	Market size (billion yuan)	Annual growth rate	Core Competitive Strategy	Top merchants
Crutches/walkers	Folding crutches, senior walkers	8.5	15%	Low price for volume + basic warranty	Kangpai Medical, Ali Health Pharmacy
Blood pressure monitor/physiotherapy device	Omron blood pressure monitor, medium frequency physiotherapy device	12.3	22%	Brand premium + long period warranty	Omron, Yuyue, Kefu Medical
Nursing bed/transfer machine	Electric nursing beds, paralysis transfer machines	6.8	35%	Omni-channel coverage + customized services	Omron, Yuyue, Kefu Medical
Location/anti-loss devices	GPS location wristbands, senior alarm devices	4.2	18%	Iot technology upgrade + joint insurance service	Newman Pryor, True Artisan Flagship Store
Rehabilitation trainers	Upper and lower limb rehabilitation machine, swallowing trainer	3.1	10%	Medical institution cooperation + installment payment	Mid-volume flagship store, YOHOS Rehabilitation factory

Table 4. Comparison of Competitive strategies between Top and Long-tail merchants

Dimensions	**Top merchants (Alibaba Health, Yuyue, Omron)**	**Long-tail merchants (Duwang, Kangle Medical)**
Product layout	Full category coverage, with a focus on mid-to-high-end (200- 2,000 yuan)	Focus on low prices (<200 yuan) or ultra-segmented devices (such as swallowing trainers)
Post-sale policy	Standardized service (7-day return and exchange + lifetime warranty), nationwide warranty	Missing after-sales service or ambiguous terms (such as "parts not covered")
Marketing channels	Cooperation between e-commerce platforms, offline pharmacies and hospitals	Relying on low-price promotions through e-commerce and lacking brand exposure
User stickiness	High repurchase rate (40%), dependent on brand trust	Low repurchase rate (<10%), price-sensitive users are prone to churn

Top merchants (such as Alibaba Health, Yuyue) : Full category coverage of mid-to-high end (200-2000 yuan), providing standardized after-sales service (7-day return and exchange + lifetime warranty), multi-channel marketing, user repurchase rate 40%.

Long-tail merchants (such as Duwang and Kangle Medical) : Focus on low prices (<200 yuan) or segmented devices, lack of after-sales service, rely on e-commerce low price promotions, repurchase rate < 10%.

2.4 User Behavior and Market Pain Points

2.4.1 Key Factors for User Decision-Making

Low price market (<200 yuan) : The decision path is price ranking → sales ranking → order placement. The pain point is that 37% of users give up repurchase due to the lack of after-sales service. The negative review keywords are "poor quality" and "customer service ignoring people".

Mid-to-high-end market (200-2000 yuan) : The decision path is brand search → feature comparison → service terms review → order. The pain point is that 50% of users give negative reviews due to "parts not covered by warranty", and the keywords are "high repair costs" and "clause tricks".

Ultra-premium market (>2000 yuan): The decision path is professional review → offline experience → institutional purchase. The pain point is that 60% of users consider it "complicated to use", with the key words being "difficult to operate" and "insufficient training".

2.4.2 Summary of Core Market Pain Points

Table 5. Summary of Core Market Pain Points

Price range	Product pain points	Service pain points	Channel pain points
<200 yuan	Poor quality (25% complaint rate)	No after-sales service or slow response (45% complaint rate)	Lower market coverage is less than 30%
200-1,000 yuan	Feature homogeneity (60% product similarity)	Complex terms (such as "Battery only for 3 months")	Missing offline experience (only 10% support trial)
>1000 yuan	High technical threshold (dependent on imported components)	High maintenance costs (2,000 + per year)	Long B-end procurement cycle (averaging 3 months)

2.5 External Environment and Trend Insights

2.5.1 Policy and Technology-Driven

Policy benefits: Subsidies for household medical equipment: It is expected to cover 30% of elderly families by 2025, promoting a 40% increase in the sales of nursing beds and oxygen generators. Simplified approval for Class II medical devices: 50% shorter time-to-market cycle for intelligent products (from 12 months to 6 months).

Technology upgrade: AI+ Internet of Things: The penetration rate of dynamic health monitoring devices (such as blood glucose meters) increases by 40 percent annually. G Remote services: Cloud-based management of physiotherapy device data boosts user retention by 25%.

2.5.2 Aging and Evolving Needs

Explosive growth in essential categories: Nursing beds and oxygen generators have a 50% demand gap in second - and third-tier cities, with an annual growth rate of over 35%. The penetration rate of rehabilitation trainers in postoperative home care scenarios rose to 28 percent.

Consumption upgrade trend: Mid-to-high-end users are willing to pay a premium for "service + experience" (such as a 20% premium rate for lifetime warranty products). The proportion of online shopping among the silver-haired group rose from 15% in 2020 to 35% in 2023.

3. Analysis of Consumption Status

3.1 Consumer Profiling Analysis

3.1.1 Basic Information

Gender: 55.6% female, 44.4% male.

Age distribution: 60-65-25.4 percent, 66-70-24.6 percent, 71-75-22.8 percent, 76-80-17.0 percent, over 80-10.2 percent.

Living with spouses: 40.1%, living with children: 30.1%, living alone: 16.1%, living in a nursing home: 13.7%.

Health: 50.5% suffer from chronic diseases such as hypertension and diabetes, 47% have difficulty moving due to joint problems or physical disabilities, and 38% have visual and auditory impairments.

Occupational background: Workers, farmers and civil servants were 142, 113 and 92 respectively, accounting for 13%, 11% and 9.1% of the total.

3.1.2 Descriptive Statistical Analysis [11]

The data in different dimensions showed diverse distribution characteristics: slightly more females than males in terms of gender; The age range is concentrated between 60 and 70; The living situation is mainly cohabiting with spouse or children, with family support; In terms of health, chronic diseases and mobility issues are common, and there is a high demand for health monitoring and assistive devices; Occupations are diverse, with a high proportion

of workers, farmers and civil servants, and there may be differences in the demand for smart products among different occupations.

3.1.3 Cluster Analysis [12]

Cluster variable selection: including gender, age, living conditions, health status, occupational background, frequency of use of smart products, motivation for use, problems encountered, expectations for the products, etc.

Clustering results: Respondents were divided into four categories using the K-Means clustering algorithm.

Technology and novelty (about 20%) : Predominantly 60-65 years old men, in good health, highly educated and well-paid; High acceptance of smart products, demand for sports assistance and health monitoring devices, expecting intelligence and personalization.

Health demand type (about 30%) : Predominantly female, aged 66-75, with a high proportion of chronic diseases and moderate income; Demand for health monitoring devices, focus on price and quality, with problems of complex operation and unstable quality.

Assistive dependent (about 25%) : Predominantly female over 76 years old, with mobility issues, hearing and hearing impairments, and low income; Dependent on assistive devices that are easy to operate, inexpensive and reliable.

Integrated service type (about 25%) : available for all age groups, with a high proportion of residents in elderly care institutions and complex health conditions; Diverse demands (health monitoring, assistive devices, entertainment and social activities) require personalized services.

3.2 Product Consumption

3.2.1 Usage

Assistive products: Overall usage rate 73.1%. Smart wheelchairs (51.2%), smart crutches (46.6%), smart walkers (39.6%) have higher usage rates, while smart nursing beds (28.5%) have lower usage rates.

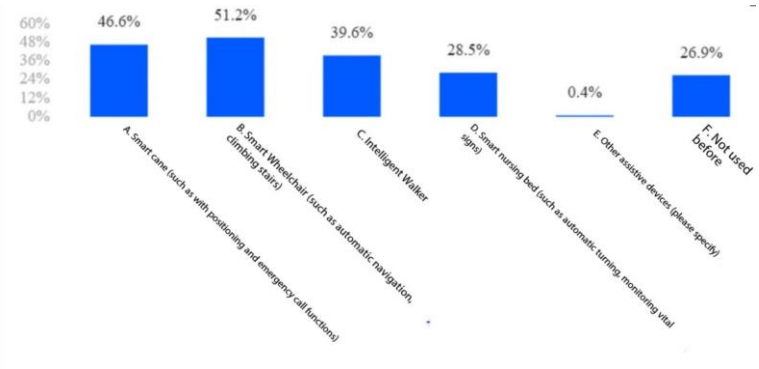

Figure 1. Use of assistive devices

Digital products of traditional Chinese medicine: The overall usage rate was 81.8%, with digital meridian massage devices (52.1%), moxibustion equipment (49.0%), and traditional Chinese medicine constitution identification devices (45.2%) being the most popular.

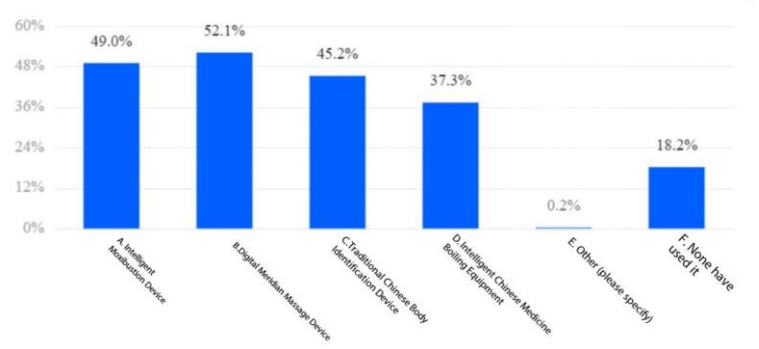

Figure 2. Use of digital products in Traditional Chinese medicine

3.2.2 Purchase Considerations

Auxiliary: Quality is the top priority (66.4%), followed by price advantage (60.8%), frequency of use (59.8%), and functionality (44.0%).

Digital products of traditional Chinese medicine: Similar to assistive devices, mainly "no demand" (80.5%/81.3%), high price (15.9%/16.0%), complex operation (15.9%/17.1%).

3.2.3 Purchase Channels

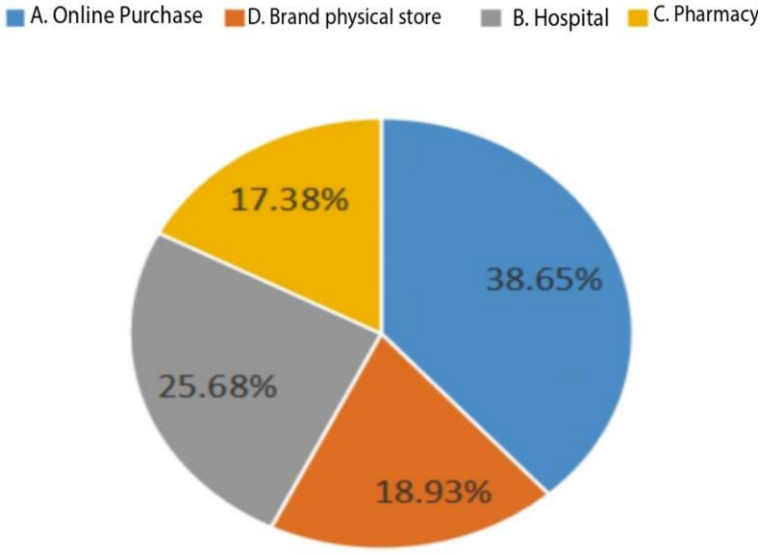

Figure 3. Purchase Channels for smart Products for the Elderly

Two types of smart products, namely assistive devices and digital products of traditional Chinese medicine, are mainly purchased online (38.65%), followed by hospitals (25.68%), brand brick-and-mortar stores (18.93%), and pharmacies (17.38%).

4. Influencing Factors of Willingness and User Research

4.1 Basic Analysis Calculation of Product Attributes

Summarize and describe[13] the basic characteristics, attributes, and statistical information of the dataset to obtain the following data:

Table 6. Statistical description of product attributes based on the data in the master table

Statistics	**Q8**	**Q9**	**Q10**	**Q11**	**Q16**	**Q17**	**Q18**	**Q19**
Mean	7.044	6.971	6.957	6.875	6.990	6.951	6.939	7.039
Median	7	7	7	7	7	7	7	7
Variance	3.951	3.584	4.383	4.565	4.583	4.158	4.602	3.838
Standard deviation	1.988	1.893	2.094	2.137	2.141	2.039	2.145	1.959
Coefficient of variation	0.282	0.272	0.301	0.311	0.306	0.293	0.309	0.278

In the survey of smart products for health care, the central tendency (median) for quality (Q8 and Q16), utility (Q10 and Q17), price (Q9 and Q18), and after-sales service (Q11 and Q19) were all 7 points.

Dispersion: The price of digital products of traditional Chinese medicine (Q18) has a variance of 4.602 and a standard deviation of 2.145, with the most significant difference; The quality (Q16) has a standard deviation of 2.141 and a large perceived difference.

Relative dispersion: After-sales service for assistive devices (Q11) coefficient of variation 0.311, score fluctuation; The coefficient of variation in quality (0.282-0.306) is higher than that in price (0.272-0.293), and there is greater individual variation in quality acceptance.

4.2 Research on the Relationship Between Product Attributes and Satisfaction Based on Pearson Correlation Analysis

4.2.1 The Concept of Proxy Variables

Satisfaction proxy variables refer to the use of the average of observable specific indicators (such as quality, price scores) in a study to indirectly measure abstract concepts (such as overall satisfaction) that are difficult to measure directly. In this study, the mean scores of Q8-Q11 were used as the satisfaction proxy variable for assistive devices, and the mean scores of Q16-Q19 were used as the satisfaction proxy variable for digital intelligent products of traditional Chinese medicine.

4.2.2 Pearson Correlation Analysis [14]

Using Pearson correlation analysis for data analysis of Q8-Q11 and Q16-19, the following results were obtained:

Table 7. Correlation Table of Smart Products for Assistive Devices

Variables	Q8 Quality Score (1-10)	Q9 Price Score (1-10)	Q10 Practicality Score (1-10)	Q11 After-sales Service Score (1-10)	Assistive device satisfaction proxy variable
Q8 Quality Score (1-10)	1	0.182 (0.000***)	0.204 (0.000***)	0.28 (0.000***)	0.636 (0.000***)
Q9 Price Score (1-10)	0.182 (0.000***)	1	0.224 (0.000***)	0.249 (0.000***)	0.616 (0.000***)
Q10 practicality score (1-10)	0.204 (0.000***)	0.224 (0.000***)	1	0.242 (0.000***)	0.651 (0.000***)
Q11 After-sales Service Score (1-10)	0.28 (0.000***)	0.249 (0.000***)	0.242 (0.000***)	1	0.695 (0.000***)
Assistive device satisfaction proxy variable	0.636 (0.000***	0.616 (0.000***)	0.651 (0.000***)	0.695 (0.000***)	1

Note: ***, **, * represent significance levels of 1%, 5%, and 10% respectively, with p values in parentheses.

Assistive devices: Quality, price, utility, after-sales service and satisfaction were all significantly positively correlated, with after-sales service having the highest correlation with satisfaction (0.695), highlighting its importance.

Table 8. Correlation table of Smart Products for Digitalization of Traditional Chinese Medicine

Variables	Q16 Quality Score (1-10)	Q17 Price Score (1-10)	Q18 After-sales Service Score (1-10)	Q19 Practicality Score (1-10)	Proxy variables for satisfaction with traditional Chinese medicine
Q16 Quality score (1-10)	1 (0.000***)	0.217 (0.000***)	0.322 (0.000***	0.285 (0.000***)	0.688 (0.000***)
Q17 Price Score (1-10)	0.217 (0.000***)	1 (0.000***)	0.258 (0.000***)	0.28 (0.000***)	0.648 (0.000***)
Q18 After-sales Service score (1-10)	0.322 (0.000***)	0.258 (0.000***)	1 (0.000***)	0.246 (0.000***)	0.69 (0.000***)
Q19 Practicality score (1-10)	0.285 (0.000***	0.28 (0.000***)	0.246 (0.000***)	1 (0.000***)	0.659 (0.000***)
Proxy variable for satisfaction with traditional Chinese medicine	0.688 (0.000***)	0.648 (0.000***)	0.69 (0.000***)	0.659 (0.000***)	1 (0.000***)

Digital products of traditional Chinese medicine: Quality, price, after-sales service, practicality and satisfaction were all significantly positively correlated, with quality (0.688) and after-sales service (0.69) being the core drivers.

4.3 Differences in the Use and Demand of Smart Products Among Different Populations

4.3.1 Comparison of Consumption Between Different Genders

Pearson chi-square test results showed that the association between gender and the use of assistive devices, as well as the choice of smart wheelchairs (such as those that can navigate automatically and climb stairs) and smart nursing beds (such as those that can turn over automatically and monitor vital signs) was statistically significant ($P<0.05$); There was a significant association ($P<0.05$) between gender and the use of digital intelligent products of traditional Chinese medicine, as well as the selection of traditional Chinese medicine constitution identification devices. Women had a higher demand for health monitoring (64.51%) than men (59.52%); Men have a higher need for social communication (27.13%) than women (23.43%).

4.3.2 Comparison of Consumption by Age Group

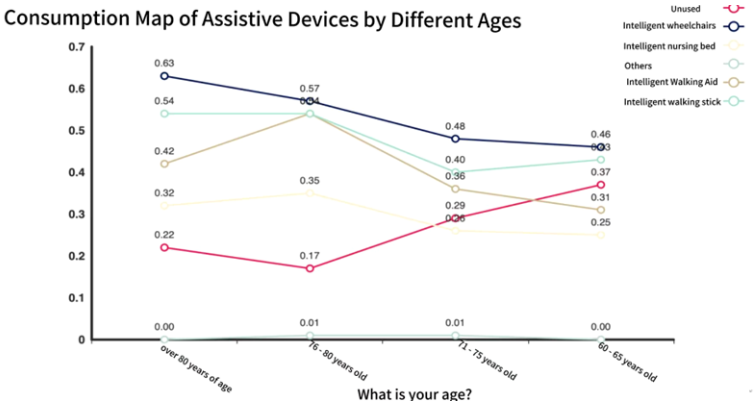

Figure 4. Consumption Chart of assistive Devices for Different Ages

The use of assistive devices among the elderly in Beijing varied significantly by age ($P<0.05$). Those over 80 years old had the highest demand for mobility AIDS (56.19%), and those between 60 and 65 years old had the highest demand for health monitoring (66.67%); The 76-80 age group had the highest demand for social communication (31.43%).

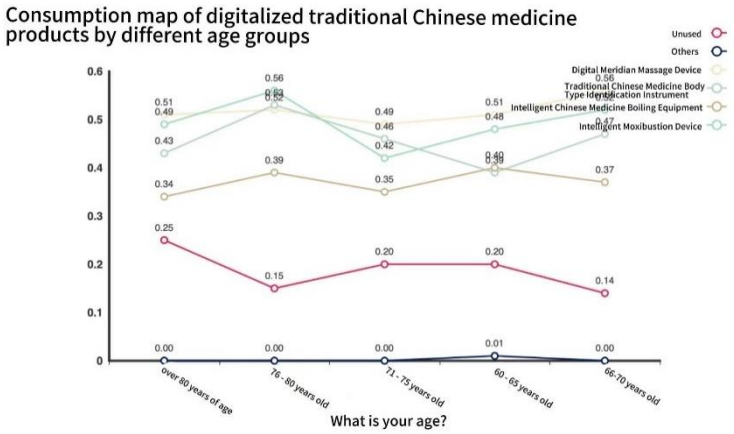

Figure 5. Consumption Chart of digital products of Traditional Chinese Medicine at different ages

Age has a limited impact on the use of digital products in traditional Chinese medicine. Only the smart moxibustion device ($F=2.2$, $P=0.058$) and the Traditional Chinese medicine constitution identification device ($F=2.36$, $P=0.051$) have marginal significant differences, with a slightly higher usage rate among the elderly group. Functional requirements and health awareness are the main drivers.

4.3.3 Comparison of Consumption in Different Living Situations

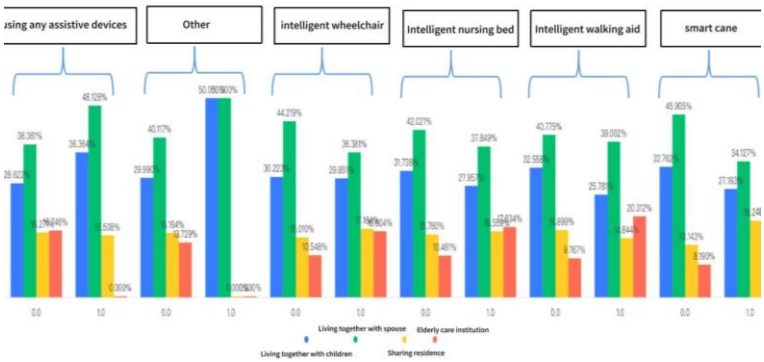

Figure 7. Cross-diagrams of assistive devices for elderly people in different living situations (1: Yes; 0: no)

Assistive: Smart care beds in elderly care institutions have the highest usage rate (22.18%), and those living with spouses have the highest unused rate (51.26%).

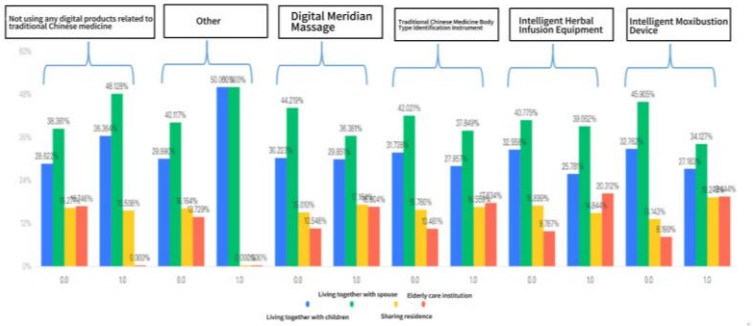

Figure 8. Cross-graph of digital products of Traditional Chinese medicine for elderly people with different living conditions (1: Yes; 0: No)

Digitalization of traditional Chinese medicine: 0% unused in elderly care institutions, the highest proportion (48.13%) among those living with spouses.

4.3.4 Comparison of Consumption at Different Levels of Health

In terms of assistive devices, the mobility impairment group had the highest proportion of using smart wheelchairs, reaching 30.06%, significantly higher than other groups; Cognitive decline groups have the highest demand for smart nursing beds, at 18.87%; All groups generally have higher usage rates for smart crutches and smart walkers, both exceeding 20%.

Among digital products in traditional Chinese medicine, the chronic disease group had the highest usage rate of smart moxibustion devices (27.95%); Visually or hearing impaired people prefer digital meridian massage devices, with a proportion of 27.49%; Cognitive decline groups have a higher usage rate of TCM constitution identification devices (24.89%).

Table 9. Cross-analysis table of multiple response frequencies for different health conditions and assistive devices

Grouping items	Not used	Others	Intelligent nursing bed (such as automatically turning over and monitoring vital signs)	Smart wheelchairs (such as those that can navigate automatically, climb stairs)	Smart walkers	Smart crutches (such as those with location and emergency call functions)	Total number	X^2	P

Good health, no obvious illness	144 (21.114%)	1 (0.147%)	83 (12.17%)	165 (24.194%)	127 (18.622%)	162 (23.754%)	682	191.504	0
Suffering from chronic diseases (such as high blood pressure, diabetes, heart disease, etc.)	94 (8.53%)	3 (0.272%)	174 (15.789%)	298 (27.042%)	240 (21.779%)	293 (26.588%)	1102	191.504	0
Visual or hearing impairments	43 (4.909%)	0 (0%)	139 (15.868%)	258 (29.452%)	206 (23.516%)	230 (26.256%)	876	191.504	0
Cognitive decline (such as memory loss, etc.)	35 (5.327%)	1 (0.152%)	124 (18.874%)	184 (28.006%)	149 (22.679%)	164 (24.962%)	657	191.504	0
Have mobility impairments (such as joint pain, physical disability, etc.)	54 (5.056%)	1 (0.094%)	189 (17.697%)	321 (30.056%)	235 (22.004%)	268 (25.094%)	1068	190.001	0
Total	370	6	709	1226	957	1117	4385		0

Table 10. Cross-analysis table of multiple response frequencies for different health conditions and digital products of Traditional Chinese medicine

Grouping of items	15. None of them have been used	15. Others	15. Digital Meridian calculator	15. TCM Constitution Identification instrument	15. Smart Chinese medicine decoction equipment	15. Smart moxibustion device	Total	X^2	P
Good health, no obvious illness	99 (13.808%)	1 (0.139%)	182 (25.384%)	146 (20.363%)	121 (16.876%)	168 (23.431%)	717	122.225	0
Suffering from chronic diseases (such as high blood pressure, diabetes, heart disease, etc.)	60 (5.24%)	1 (0.087%)	307 (26.812%)	248 (21.659%)	209 (18.253%)	320 (27.948%)	1145	122.225	0
Visual or hearing impairments	31 (3.507%)	0 (0%)	243 (27.489%)	206 (23.303%)	165 (18.665%)	239 (27.036%)	884	122.225	0
Cognitive decline (such as memory loss, etc.)	21 (3.075%)	0 (0%)	171 (25.037%)	170 (24.89%)	145 (21.23%)	176 (25.769%)	683	122.225	0
Have mobility impairments (such as joint pain, physical disability, etc.)	43 (4%)	0 (0%)	290 (26.977%)	260 (24.186%)	205 (19.07%)	277 (25.767%)	1075	122.225	0
In total	254	2	1193	1030	845	1180	4504		0

4.3.5 Differences in Needs Among Different Populations

Table 11. Combined Table of Gender, Age and Health Status

Demand side	Over all	Gender		Age					Health status				
		Female (A)	Male (B)	Over 80 years old (A)	76-80 (B)	71-75 (C)	66-70 (D)	60-65 years old (E)	Have A chronic illness (A)	Have mobility issues (B)	Visual/hearing impairment (C)	Cognitive decline (D)	Others (E)
	%	%	%	%	%	%	%	%	%	%	%	%	%
A. Mobility issues (such as	51.31	50	52.74	56.19	52.57	48.94	54.41	47.04	56.73	57.02	54.99	59.06	100

walking, going up and down stairs)													
B Health monitoring (such as blood pressure, blood sugar, heart rate, etc.)	62.41	64.51	59.52	59.05	53.71	60.85	66.67	66.4	61.35	57.85	57.29	60.4	100
C Rehabilitation training	43.14	43.53	42.45	39.05	41.71	43.83	42.15	45.85	43.85	44.83	43.22	46.31	100
D Daily care (such as bathing and dressing)	36.81	37.94	35.23	38.1	33.14	39.57	36.02	36.76	36.35	36.36	36.32	40.27	-
E. Recreation	29.8	30.59	28.67	29.52	29.71	32.34	29.12	28.06	30.19	28.72	29.67	30.2	-
F. Social communication	25.12	23.43	27.13	28.57	31.43	25.53	24.9	18.97	28.65	26.86	26.09	26.17	-
Total	248.59	250	245.73	250.48	242.29	251.06	253.26	243.08	257.12	251.65	247.57	262.42	300

By gender, women have a higher need for health monitoring (64.51%) than men (59.52%), and men have a higher need for social communication (27.13%) than women (23.43%).

In terms of age, those over 80 have the highest need for mobility assistance (56.19%), while those between 66 and 70 have the lowest (47.04%); Those aged 60-65 have the highest demand for health monitoring (66.67%), and those aged 76-80 have the lowest demand (53.71%); The 71-75 age group had the highest demand for daily life (39.57%) and recreation (32.34%), the 76-80 age group had the lowest demand for daily life (33.13%), and the 66-70 age group had the lowest demand for recreation (28.06%); The 76-80 age group had the highest need for social communication (31.43%).

In terms of health status, those with mobility impairments have the highest need for mobility assistance (59.06%), those with chronic diseases have the highest need for health monitoring (66.4%), and those with cognitive decline have the highest need for daily care (40.27%).

4.4 Analysis of Key Factors Influencing Satisfaction and Purchase Intention Based on Multiple Linear Regression Models

Linear regression [16] is a statistical analysis method that uses regression analysis in mathematical statistics to determine the quantitative relationship of interdependence between two or more variables. The expression is y = w'x+e, where e is the error following a normal distribution with a mean of 0. If the regression analysis includes two or more independent variables and there is a linear relationship between the dependent variable and the independent variables, it is called multiple linear regression analysis.

The multiple linear regression model verified the strong correlation between product attributes and satisfaction:

Assistive devices: Adjusted R^2=1, after-sales service (Beta=0.405) had the greatest impact on satisfaction, followed by utility (0.396), quality (0.376), and price (0.358), with good variable independence (VIF=1.11-1.166).

Digital products of Traditional Chinese medicine: Adjusted R^2=1, quality (Beta=0.385) and after-sales service (0.385) have the greatest impact, followed by price (0.366), utility (0.352), and no multicollinearity (VIF=1.143-1.187).

Overall, the satisfaction of both types of products was affected by the four key dimensions of quality, price, utility and after-sales service, and the model fit was high and significant overall, with good independence of each dimension.

4.5 Research on Obstructive Factors of Consumer Behavior

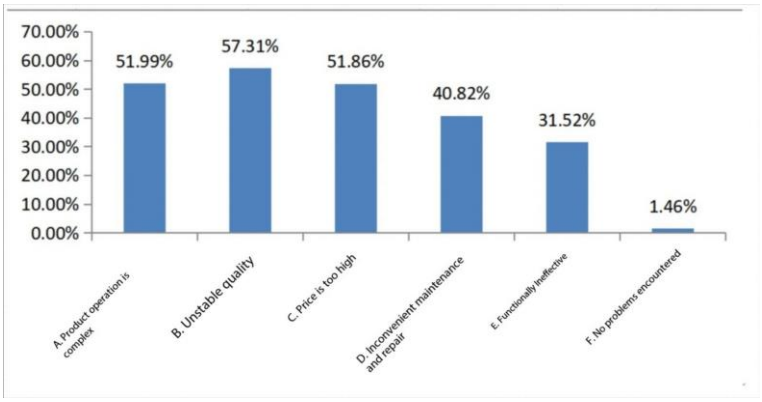

Figure 9. Diagram of the main problems of assistive smart products

Assistive devices: Unstable quality (57.31%), complex operation (51.99%), high price (51.86%) are the main problems, and only 1.46% of users have no feedback.

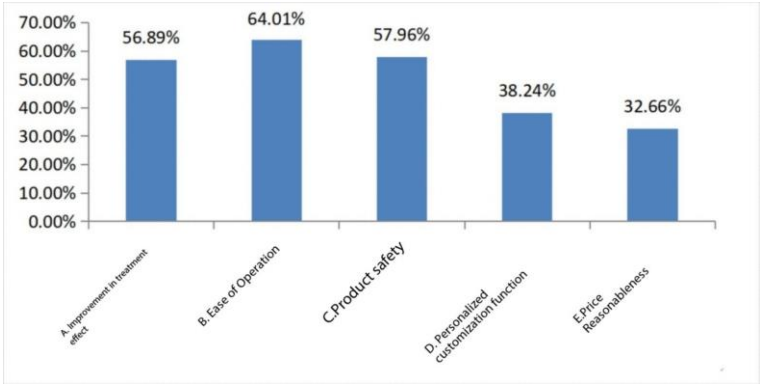

Figure 10. Improvement diagram of digital smart products for Traditional Chinese Medicine

Digitalization of traditional Chinese medicine: The core improvement requirements are ease of operation (64.01%), safety (57.96%), therapeutic effect (56.89%), and the requirements for personalization and price are relatively low.

5. Problems, Countermeasures and Suggestions

5.1 Problem Countermeasures

Market supply and demand contradictions: Lack of after-sales service for low-priced products, ambiguous service terms for mid-to-high-end products, and complex operations for ultra-high-end products; There is a significant gap between top and long-tail merchants.

Group demand differences: Four consumer groups differ significantly in demand, frequency of use, and focus of attention.

Satisfaction factors: Quality and after-sales service at the core, after-sales service has the greatest impact on assistive devices, quality and after-sales jointly determine the satisfaction of digital products of traditional Chinese medicine.

Consumer barriers: Quality, operation, price, maintenance and other issues are prominent, improvement needs focus on basic experience.

5.2 Recommendations

5.2.1 Market Stratification Optimization Strategy

Low price market (<200 yuan) : Build “regionalized quick repair points” with 72-hour response service; Promote trade-in to lower the threshold for decision-making.

Mid-to-high-end market (200-1000 yuan) : Publicize the warranty coverage and warranty process of accessories; Introduce “membership-based extended warranties” to ease the problem of high repair costs.

Ultra-premium market (over 1,000 yuan) : Embed “one-click mode” with video instructions; Join forces with top-tier hospitals for “clinical trial certification” to strengthen trust.

5.2.2 Directions for Breaking the Competitive Landscape

Top merchants: Modularize the after-sales system, offer “after-sales management” to small and medium-sized dealers, and expand the ecological advantage.

Long-tail merchants: Focus on “niche essentials” and adopt the “pre-sale + customization” model; Jointly build “shared repair stations” to enhance service coverage.

5.2.3 Supply and Demand Mismatch Solutions

Assistive devices: Push “basic smart wheelchairs” (retain core functions to reduce costs); Work with senior universities to optimize age-friendly details.

Digitalization of Traditional Chinese medicine: Designing a “three-step operation method” with acupoint stickers; Work with community TCM clinics on “equipment rental + physician home visit” packages.

5.2.4 Capture of external environment dividends

Policy: Priority application for smart oxygen generators, etc. to be included in the “Home Medical Equipment Subsidy” directory, with subsidy information and application instructions marked on the details page.

Technology: Add “abnormal data warning” to the physiotherapy device; Set up “smart rehabilitation experience points” in second – and third-tier cities to drive the transformation of essential needs.

5.2.5 Consumer Conversion Strategies

Table 14. Consumer Conversion Strategy Table

Groups	**Core pain point**	**Strategy**	**Case**
Technology Tastes New	Complex to operate and redundant in function	Open up product beta testing and push modular products to support customization	Huawei's "Senior Mode" physiotherapy device offers lifetime firmware updates to beta users
Health Needs type	Price-sensitive, difficult to operate	Community clinics bind equipment rental to simplify the operation process	Omron Community "Blood Pressure Monitoring Station", get a 20-yuan coupon after blood pressure measurement
Assisted dependent	Expensive, distrustful online	The community has a "test ride week" with family training	Yuyue "Accessibility Station", buy a wheelchair and get installation plus one month of free repair
Integrated Service type	The solutions are scattered and the services are disconnected	Work with nursing homes on "smart care packages" and open a "one-click repair" channel	Haier customizes "health data dashboards" for nursing homes, allowing family members to check equipment reports

5.2.6 Publicity and Marketing Strategies

Emotional resonance: Make short videos such as "Elderly people living alone buy groceries with smart crutches" and share them in the Silver-haired section of Douyin; Launch the "Silver-haired Health Care Program" and donate 1 yuan for each unit sold to the community elderly care center.

Online and offline collaboration: Open a "Silver-haired Smart zone" online (large font, voice customer service, children pay on behalf), and use AI for targeted push; Offline, set up "experience corners" (scan the code to try

out and get a 50-yuan coupon) at community stations, and work with hospitals and pharmacies to promote compatible products.

6. Conclusions and Prospects

6.1 Conclusions

This study systematically analyzed the demand characteristics, usage status and satisfaction factors of assistive devices and digital intelligent products of traditional Chinese medicine among more than 1,000 elderly people aged 60 and above in Beijing through a mixed-method survey, and reached the following main conclusions:

There are significant structural contradictions in market demand: there is a serious lack of after-sales service in the low-price market (<200 yuan), opaque service terms in the mid-to-high-end market (200-1000 yuan), and complex operation in the ultra-high-end market (>1000 yuan), which restricts the popularization of products and user experience.

The demand of the elderly group shows distinct stratified characteristics: through K-means clustering analysis, four groups of people were identified as technology and novelty, health demand, auxiliary dependence, and comprehensive service, and there were significant differences among them in terms of product functionality, price sensitivity, and service demands.

Product quality and after-sales service are the core factors influencing satisfaction: multiple linear regression analysis shows that satisfaction with assistive devices is primarily driven by after-sales service (Beta=0.405), while for digital products of traditional Chinese medicine, both quality and after-sales service are determined (Beta=0.385). Practicality and reasonableness of price are also important influencing factors.

Consumption barriers are mainly at the basic experience level: unstable quality, complex operation, high price, and difficult maintenance are the main factors hindering elderly users from purchasing and using, and improvement demands are highly concentrated in basic dimensions such as ease of operation, safety, and therapeutic effect.

6.2 Outlook

Product optimization should focus more on age-friendly and functional simplification: It is recommended that enterprises focus on the development of core functions, avoid functional redundancy, strengthen age-friendly designs such as "one-click operation" and "voice interaction", and lower the usage threshold.

Build a tiered, precise service and marketing system: Develop differentiated strategies for different groups, such as providing modular customization for technology users and community experience and family training for assistive dependent users to enhance conversion rates and user stickiness.

Strengthen the after-sales service system and policy coordination: Promote the establishment of a regional rapid repair network and transparent quality guarantee terms, actively connect with the subsidy policy for home medical equipment, and enhance the accessibility and trustworthiness of products.

Promote the integration of digitalization of traditional Chinese medicine and smart assistive devices: Explore integrated solutions of "equipment + service + data", such as equipment leasing and door-to-door services in collaboration with community traditional Chinese medicine clinics, to enhance the integrity of the service chain and the user experience.

Strengthen interdisciplinary research and data-driven iteration: Encourage industry-university-research cooperation, deepen the integration of geriatric behavior, rehabilitation medicine and intelligent technology, and continuously optimize product design and service models based on user data to promote the development of the health and wellness industry towards high quality, humanization and sustainability.

In the future, with the continuous maturation of technologies such as artificial intelligence and the Internet of Things and the continuous release of policy dividends, smart elderly care products are expected to play a greater role in improving the quality of life of the elderly and alleviating the pressure of care, providing solid support for building an age-friendly society.

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