Research on the Optimization of Resource Allocation for Rural Elderly Care Security Driven by Digital Intelligence in China

Rui Wu[1], Jingyun Li[2], Jingxin Huang[1*], Kexin Tang[1]

[1]*School of Economics and Management, Hubei University of Science and Technology, Xianning, 437100, China*
[2]*Hubei University of Science and Technology Library, Xianning, 437100, China*
[*]*Corresponding author：18671598595@163.com*

Abstract: *With the aging process and accelerated urbanization in China,the issue of elderly care in rural areas has become increasingly prominent.In this context,this article explores the operational mechanism and effective path of digital intelligence technology in optimizing the allocation of rural elderly care security resources in China.Firstly,this article analyzes the current situation of resource allocation for rural elderly care security in China and finds that the development of public elderly care services in rural areas faces prominent difficulties in the allocation of elderly care financial funds,elderly care service resources,and elderly care talent resources;Subsequently, based on the exposition of relevant theories and the analysis of the mechanism of digital intelligence driving the allocation of rural elderly care security resources in China,an OLS model was constructed.Multiple regression analysis was conducted using data obtained from a questionnaire survey.The empirical analysis results showed that the satisfaction of rural elderly people with the government's provision of smart elderly care services had a significant impact on their willingness to participate in smart elderly care and their demand for smart elderly care; Finally,based on empirical analysis conclusions,feasible ideas and relevant policy recommendations were proposed to effectively address the current development dilemma of public elderly care services in rural areas of China.*

Keywords: *Digital intelligence driven; Rural elderly care security; Resource optimization and allocation*

1. Introduction

With the rapid growth of China's elderly population,especially the continuous increase in the number of elderly people in rural areas,the issue of rural elderly care security is increasingly receiving widespread attention.According to the statistics of the National Bureau of Statistics of China,by the end of 2024,the population aged 60 and above has reached 310 million,accounting for 22.0% of the total population of the country,of which 220 million are aged 65 and above, accounting for 15.6% of the total population of the country,marking that China's aging process has entered a period of rapid development.The seventh national population census data shows that the proportion of the elderly aged 60 and above in rural China is 23.81%,higher than 15.82% in urban areas.A quarter of rural areas have entered the super aging society.The aging in rural areas is accompanied by rural "hollowing out" and "empty nest" of families.Big data,blockchain and other digital technologies provide a new path for accurate identification,efficient management, diversified services and sustainable development of rural old-age security.

2. Theoretical Basis

2.1 Theory of Digital Intelligence Economy

The digital intelligent economy refers to economic activities that take data as the key factor, networks as the carrier,and digital technology applications as the driving force,encompassing digital

industrialization and industrial digitization.The foundation and core of the digital intelligent economy lie in digital industrialization.While developing the core industries of the digital intelligent economy,it also provides digital technologies,products,services,infrastructure,and solutions for all sectors.Various industries can leverage digital technologies and data elements to carry out economic activities,forming industrial digitization.The theory of the digital intelligent economy offers innovative ideas and methods for the allocation of elderly care resources.

2.2 Theory of Public Goods

The theory of public goods serves as the foundational theory for properly handling the relationship between the government and the market,transforming government functions, constructing public financial revenue and expenditure,and promoting the marketization of public services.Guided by the theory of public goods,this paper determines the economic attributes of elderly care services.Elderly care services provided by the government exhibit non-excludability and non-rivalry,falling within the category of quasi-public goods.Meanwhile,the theory of public goods also helps clarify that the main bodies for allocating elderly care service resources are the government,enterprises,and third-party organizations.

2.3 Theory of Resource Allocation

Adam Smith(1776)was the first to expound on the role of the market in resource allocation; Marshall's(1890)equilibrium price theory holds that the optimization of resource allocation can be achieved through market equilibrium;Coase's(1937)transaction cost theory believes that the uncertainty of the market leads to risks in transactions,thus raising the question of how to effectively allocate resources;Pareto(1906)proposed the Pareto optimality theory to evaluate the efficiency of resource allocation,and the process of people pursuing Pareto optimality is the process of achieving effective resource allocation;Marxist economics points out three ways of resource allocation,namely planned allocation,market allocation,and mixed allocation.A sound economic system is often an organic combination of the two resource allocation methods of planned allocation and market allocation,that is,mixed allocation.

Guided by the theory of resource allocation,this paper clarifies the goal of pension service resource allocation,that is,making full use of limited human,material and financial resources to maximize the satisfaction of different pension service needs of the elderly population.

3. Literature Review

Since entering the 21st century,developed countries such as those in Europe and America have actively utilized information technology to explore the integration of resources related to the existing elderly care service system.Eastman et al.(2004) investigated the smart elderly care needs of the elderly and found that they have a clear willingness to consume on the Internet,expecting opportunities for learning and communication online,and the level of their willingness is proportional to their income;Aneeca Chettri B et al.(2017) studied the needs of elderly patients in remote or rural areas and proposed connecting intensive care doctors with patients in remote intensive care units through intelligent audio-visual communication and computer networks;Karla Munoz Esquivel et al.(2018) proposed that a solution related to elderly care services in rural areas of Northern Europe is to incorporate new technologies to change the rehabilitation model and improve the quality of medical services;Ji-Ae Lee et al.(2022),by analyzing the shortcomings of Internet of Things based medical care for rural elderly people,suggested using the convenience of various sensors,users,and managers to formulate an efficient rural elderly care management plan;Jelena Lucan et al.(2024)recommended creating accessible,user-centered technologies and methods to meet the different needs and wishes of rural elderly people;Naseer et al.(2025) proposed a personalized elderly care system for smart homes supported by the web and Internet of Things.

Chinese scholars have also conducted extensive and in-depth research on smart elderly care in rural areas.Zhang Yingqin and Zhang Ruifang(2017)deeply analyzed the problems encountered in the implementation of rural smart elderly care,such as top-level institutional design and the lagging construction of rural information infrastructure.Yang Juhua(2019)proposed in her research to improve the production and application of intelligent products for rural elderly people through humanized product design.Wei Lanlan(2021)mainly explored the restrictive factors for the development of rural

smart elderly care services and put forward useful suggestions and countermeasures.Li Qiang and Meng Ru(2023) proposed suggestions such as enhancing the digital feedback awareness and ability of children, and strengthening the aging-friendly transformation and application scenario development of smart home-based elderly care.In response to the urgent and difficult elderly care needs in remote mountainous areas,Chen Wei(2024) proposed a smart system for rural elderly care industry featuring"Internet+digital intelligence+professionalism". Wang Jing(2025) suggested strengthening government guidance and support,enterprise innovation, assistance from social organizations,and family support to ensure the sustainable development of rural smart elderly care services.

To sum up,in the research on rural smart elderly care,scholars at home and abroad have paid more attention to the technological innovation of smart elderly care services and the improvement of elderly care service quality.Foreign studies focus more on the elderly care needs of rural elderly population and how to effectively improve rural smart elderly care medical services,while domestic studies mostly focus on how to reasonably and effectively organize and provide rural smart elderly care services,but the research on the needs of rural smart elderly care services is insufficient.However, scholars at home and abroad have insufficient research on the allocation of rural smart elderly care service resources,which provides an opportunity and also poses a challenge for this study.In short, the rich research results at home and abroad provide theoretical reference and practical reference for this study.

In addition,through extensive and in-depth investigations,it has been found that the allocation of rural old-age security resources in China currently mainly faces the following dilemmas.In terms of financial fund guarantee,the level of rural pension is too low.Although the national minimum standard was raised to 123 yuan in 2025,it is still difficult to meet the basic living needs. More than 30% of rural elderly people need financial support from their children,and there is a long-term shortage of investment.The pension is highly dependent on fiscal subsidies,with low personal contributions,and there is great pressure for sustainable growth.By 2035,the level of rural basic pension will still be far lower than the 500-yuan target expected by the public.The system design is mainly urban-oriented,and rural old-age security has always been characterized by"low contribution,low benefit",resulting in low enthusiasm of farmers to participate in insurance.In terms of elderly care service resources,more than 90% of the elderly people with advanced age, disability and other needs in rural areas lack care resources,and the supply of medical services is out of touch with the elderly care needs.In terms of rural old-age care talent resources,there is a large gap in professional nursing staff,the quality of elderly care practitioners is relatively low,and their salaries are meager,making it difficult to attract young people.

4. An Empirical Analysis of Digital-Intelligence-Driven Resource Allocation for Rural Old-Age Security in China

4.1 Questionnaire Survey and Reliability Validity Analysis of Rural Smart Elderly Care

In view of the limited reading, writing and internet access capabilities of rural elderly people, this paper designs two sets of questionnaires.One set is for rural elderly people to fill out by themselves,and the other is for their children,relatives and friends who have the above-mentioned capabilities to fill out.The questionnaire consists of 16 questions,mainly about the basic information and living conditions of rural elderly people in China.The survey scope involves issues such as gender,age,marital status,educational background,health status,self-care ability, number of children,living style,income situation,participation in rural endowment insurance,etc., and mainly explores the perception of rural elderly people on intelligent elderly care services,such as their satisfaction with the current rural elderly care status,the degree of anxiety about their own old-age life,the demand for intelligent elderly care services,the satisfaction with the intelligent elderly care services provided by the government,the use of intelligent elderly care equipment,etc.

4.1.1 Reliability analysis

This paper selects the internal consistency reliability method to conduct reliability testing on the measurement items used in the questionnaire.The commonly used Cronbach’s Alpha coefficient is adopted as the measurement index,and its specific testing criteria are as follows: when $\alpha>0.9$,it indicates that the questionnaire has extremely high reliability;when $0.7<\alpha<0.9$,it indicates that the questionnaire has relatively high reliability;when $\alpha<0.6$,the questionnaire should be re-set or compiled.Therefore,this paper believes that the acceptable standard for the items of the questionnaire is $\alpha>0.6$.Based on the above testing criteria,the reliability test results are shown in Table 1 below.

Table1: *Reliability Test of the Questionnaire*

Category	Observations	Correlation coefficient	Covariance	Alpha value
Gender	346	-0.0110	.1201778	0.6837
Age	346	0.1759	.1124385	0.6720
Educational level	346	0.0013	.1197741	0.6961
Marital status	346	0.0342	.1172024	0.7050
Health status	346	0.2039	.108522	0.6706
Details of offspring	346	0.0303	.1187401	0.6830
Mode of living	346	0.1712	.1150587	0.6725
Monthly income level	346	0.1480	.1111674	0.6784
Your participation in the rural old-age insurance situation	346	0.1783	.1146486	0.6720
Regarding your self-care ability situation	346	0.2036	.1097151	0.6698
Your satisfaction with the current situation of rural elderly care	346	0.7867	.0769408	0.5847
How much do you worry about your life in old age?	346	0.4075	.0914139	0.6412
Your willingness to participate in smart elderly care	346	0.8203	.0694322	0.7814
Your demand level for smart elderly care services	346	0.8019	.0714054	0.7713
Your usage situation of intelligent elderly care devices	346	0.0958	.1170497	0.6771
Your satisfaction with the government's provision of smart elderly care services	346	0.2253	.1042291	0.5654
Test scale			.1048697	0.6758

This study used Cronbach's Alpha coefficient as an indicator to measure the internal consistency of the questionnaire.The results in Table 1 show that the Cronbach's Alpha coefficient of the overall questionnaire was 0.6758,which was within the acceptable range,indicating that the overall questionnaire had good reliability.Specifically,for each item,except that the reliability coefficients of the two items"Your satisfaction with the current situation of rural elderly care"and "Your satisfaction with the smart elderly care services provided by the government"were slightly lower than 0.6,the rest of the items met or exceeded the standard of 0.6,showing high internal consistency.

4.1.2 Validity analysis

This study employed SPSS 26.0 data analysis software to conduct exploratory factor analysis. Validity analysis was performed using principal component factor analysis and maximum variance rotation, with measurements taken via KMO test,Bartlett's spherical test,and cumulative variance contribution rate.The specific criteria are as follows:When $KMO \geq 0.9$,it indicates that the data is highly suitable for factor analysis;when $0.8 \leq KMO < 0.9$,it suggests moderate suitability;when $0.7 \leq KMO < 0.8$,it implies average suitability;when $0.6 \leq KMO < 0.7$,it shows marginal suitability; when $KMO < 0.6$,it indicates unsuitability for factor analysis.Additionally,in Bartlett's test of sphericity,the significance level must be less than 0.01.Meeting the above conditions suggests good structural validity of the questionnaire,indicating that the variables in the study have passed the validity test.The results of the overall validity test of the questionnaire are shown in Table 2 below.

Table2: *KMO Test of Variables*

Variables	Value of KMO
Gender	0.447
Age	0.655
Educational level	0.665
Marital status	0.64
Health status	0.746
Details of offspring	0.62
Mode of living	0.741
Monthly income level	0.626
Your participation in the rural old-age insurance situation	0.664
Regarding your self-care ability situation	0.763
Your satisfaction with the current situation of rural elderly care	0.906

How much do you worry about your life in old age?	0.931
Your willingness to participate in smart elderly care	0.744
Your demand level for smart elderly care services	0.783
Your usage situation of intelligent elderly care devices	0.64
Your satisfaction with the government's provision of smart elderly care services	0.659
Overall Situation	0.732

The KMO value is used to test the partial correlation between variables,with a range of 0-1. The closer it is to 1,the stronger the correlation between variables,and the more suitable it is for factor analysis.In Table 2,the overall KMO value tested is 0.732,indicating that the variables as a whole have good correlation.Among the sub-item variables,the KMO value of "worries about one's own old-age life" is the highest,at 0.931,indicating an extremely strong correlation between this variable and other variables;the KMO value of "gender" is the lowest, at 0.447,indicating that its correlation with other variables is relatively weak.The KMO values of other variables such as "physical condition", "living style",and "monthly income level"are all above 0.6,showing a certain degree of correlation.

Table3: *Bartlett's Test of Sphericity for the Questionnaire*

Bartlett's Test of Sphericity	Approximate Chi-square Value	942.770
	Degree of Freedom	10
	Significance Level	.005

Table 3 above shows the results of the Bartlett's test of sphericity for the questionnaire.From the data in the table,the approximate chi-square value is 942.770,the degrees of freedom are 10, and the significance level is 0.005,indicating that there is a significant correlation between variables,which is suitable for factor analysis,thus providing an important prerequisite for revealing the internal connections between variables.

4.2 The Sources of Rural Smart Elderly Care Data and Descriptive Statistical Analysis of the Data

4.2.1 Data source

This paper mainly uses the Wenjuanxing survey platform to carry out online questionnaire surveys to obtain first-hand data.More than 400 online questionnaires were distributed in this paper,and 374 questionnaires were recovered.After screening and removing invalid questionnaires, 346 valid questionnaires were obtained.

4.2.2 Descriptive statistical analysis of data

The basic situation of the surveyed rural elderly people is shown in Table 4 below.

Table4: *Descriptive Statistical Analysis of the Basic Situation of the Surveyed Elderly(N=346)*

Variables	Item	number of times	frequency（%）
Gender	male	151	43.6
	female	195	56.4
Age	55-69 years old	168	48.6
	70-79 years old	127	36.7
	over 80 years old	51	14.7
Educational level	primary school and below	97	28.0
	junior high school	136	39.3
	high school	65	18.8
	university and above	48	13.9
Marital status	unmarried	14	4.0
	first marriage	185	53.5
	divorce	19	5.5
	remarry	48	13.9
	widowed	80	23.1
Health status	very poor	66	19.1
	poor	96	27.7
	good	132	38.2
	very good	52	15.0

Details of offspring	0	37	10.7
	1 to 2	201	58.1
	3 or more	108	31.2
Mode of living	live alone	117	33.8
	live with others	229	66.2
Monthly income level	1000 yuan and below	87	25.1
	1,001 to 3,000 yuan	132	38.2
	3,001-5,000 yuan	71	20.5
	5,000 yuan and above	56	16.2

The cognitive situation of the surveyed rural elderly people on smart elderly care services is shown in Table 5 below.

Table5: *Descriptive Statistical Analysis of Respondents' Cognition of Smart Elderly Care Services（N=346）*

Variables	Item	number of times	frequency（%）
What is your usage situation of intelligent elderly care devices?	know	141	40.8
	don't know	205	59.2
Your participation in the rural old-age insurance situation	participate in	200	57.8
	didn't participate in	146	42.2
How is your self-care ability?	incapable of self-care	28	8.1
	need multiple help from others	48	13.9
	occasionally need the help of others	174	50.3
	be fully self-care capable	96	27.7
What is your satisfaction with the current situation of rural elderly care?	very dissatisfied	36	10.4
	relatively dissatisfied	83	24.0
	satisfied	120	34.7
	relatively satisfied	90	26.0
	very satisfied	17	4.9
What is your level of concern about your later life?	extremely worried	48	13.9
	considerable worry	46	13.3
	medium	103	29.8
	a little worried	80	23.1
	not worried at all	69	19.9
Your demand level for intelligent elderly care services	no need at all	33	9.5
	need very little	41	11.8
	medium	94	27.2
	need a lot	93	26.9
	greatly need	85	24.6
What is your satisfaction with the smart elderly care services provided by the government?	very dissatisfied	43	12.4
	relatively dissatisfied	85	24.6
	satisfied	101	29.2
	relatively satisfied	66	19.1
	very satisfied	51	14.7

The willingness of the surveyed rural elderly to participate in intelligent elderly care is shown in Table 6 below.

Table6: *Descriptive Statistics on the Willingness of Respondents to Participate in Smart Elderly Care（N=346）*

Variables	Item	number of times	frequency（%）
The willingness of the respondents to participate in smart elderly care	extremely reluctant	33	9.5
	unwilling	43	12.4
	willing	88	25.4
	more willing	95	27.5
	very willing	87	25.2

4.2.3 Analysis of supply and demand for smart elderly care in rural areas

It can be seen from the above survey data that more than 78% of the surveyed rural elderly are willing to accept smart elderly care,and the demand for smart elderly care services among rural elderly reaches 78.7%.However, the satisfaction of the surveyed rural elderly with the smart elderly care services provided by the government is only 63%,and the supply-demand gap of rural smart elderly care is nearly 16%.The survey also shows that rural elderly live scattered,with many children working outside, lacking company.Nearly 30% of rural elderly live alone,the empty-nest phenomenon is relatively serious,and the sense of spiritual loneliness is strong,so there is a strong demand for smart elderly care services such as intelligent companionship that can meet emotional communication and provide spiritual comfort.Although progress has been made in the construction of rural Internet infrastructure,compared with cities,the Internet coverage rate,and the popularity of smartphones and other smart devices in rural areas are still low,which affects the development of smart elderly care services.In short,there is an obvious supply-demand contradiction in the current smart elderly care in rural China,and the most prominent contradiction is the strong demand but insufficient supply and poor adaptability.

4.3 Empirical Analysis of Influencing Factors of Farmers' Participation in Smart Elderly Care

4.3.1 Variable selection

The dependent variables,independent variables,variable symbols and their assignments selected in this paper are shown in Table 7 below.

Table7: *Willingness to Participate in Smart Elderly Care, Influencing Factors, Variable Symbols and Assignments*

Variable	Variables	Variable Symbol	Variable Assignment
Dependent Variable	The willingness to participate in intelligent elderly care	Y	1=extremely reluctant；2=unwilling；3=willing；4=more willing；5=very willing
Independent Variable	Gender	X_1	1=male；2=female
	Age	X_2	1=55-69 years old；2=70-79 years old；3=over 80 years old
	Educational level	X_3	1=very poor；2=poor；3=good；4=very good
	Marital status	X_4	1=live alone；2=live with others
	Health status	X_5	1=1000 yuan and below；2=1,001 to 3,000 yuan；3=3,001-5,000 yuan；4=5,000 yuan and above
	Your usage situation of intelligent elderly care devices	X_6	1=know；2=don't know
	Your participation in the rural old-age insurance situation	X_7	1=participate in；2=didn't participate in
	How is your self-care ability?	X_8	1=incapable of self-care；2=need multiple help from others；3=occasionally need the help of others；4=be fully self-care capable
	What is your satisfaction with the smart elderly care services provided by the government?	X_9	1=very dissatisfied；2=relatively dissatisfied；3=satisfied；4=relatively satisfied；5=very satisfied

4.3.2 Model construction

To examine the influencing factors of the willingness of the elderly to participate in smart elderly care,this paper uses the OLS model for analysis.When the model is reasonably specified, there is no significant difference between the OLS model and the Logit model in terms of advantages and disadvantages.At this time,the explained variable can be regarded as a specific numerical value for estimation.Therefore,this paper constructs the following multiple regression model：

$$Y = \beta_0 + \sum_{i=1}^{9} (\beta_i X_i) + \varepsilon \qquad (1)$$

In equation (1),$\beta_0$is the intercept term,$\beta_i$is the influence coefficient of each explanatory variable, and ε is the disturbance term.

4.3.3 Regression analysis

This paper uses the SPSS 26.0 analysis software and the data obtained from the survey.The benchmark regression results obtained from the analysis are shown in Table 8 below.

Table8: *Benchmark Regression Analysis of Willingness to Participate in Smart Elderly Care*

Dependent Variable：Y									
Independent Variables	Unstandardized Coefficients		standardized Coefficients	t	Significance	The 95.0% confidence interval for B		Collinearity Statistics	
	B	SE	Beta			low	up	tolerance	VIF
β_0	1.637*	.470	1.552*	1.743	.000	1.127	1.977		
X_1	-.175	.111	-.071	-1.579	.115	-.392	.043	.973	1.028
X_2	-.208**	.081	-.122**	-2.569	.011	-.367	-.049	.961	1.041
X_3	.185***	.058	.146***	3.179	.002	.070	.299	.928	1.077
X_4	-.371***	.118	-.143***	-3.156	.002	-.602	-.140	.946	1.057
X_5	.170***	.054	.140***	3.121	.002	.063	.277	.962	1.039
X_6	-.246**	.112	-.099**	-2.191	.029	-.467	-.025	.963	1.039
X_7	-.314***	.114	-.126***	-2.742	.006	-.538	-.089	.918	1.089
X_8	.409***	.065	.287***	6.319	.000	.282	.537	.943	1.060
X_9	.358***	.045	.359***	7.915	.000	.269	.447	.944	1.059
	R^2=0.846, Adjusted R^2= 0.828, F=19.721, D-W=1.853								

Note: **, **, and *** represent significance levels of 10%, 5%, and 1% respectively.*

As can be seen from Table 8,among the 9 independent variables in the preliminary selection, the final 8 explanatory variables including age,health status,living style,monthly income,smart device usage,participation in rural endowment insurance,self-care ability,and satisfaction with the smart elderly care services provided by the government have a significant correlation with the willingness to participate in smart elderly care services.The adjusted R2 value of 0.828 indicates that the main independent variables well explain the willingness of rural elderly people to participate in smart elderly care.

In the ANOVA analysis,F(19.721)is significant at the significance level of P≤0.001. Therefore,except for gender,other variables have a certain explanatory power for the willingness to participate in smart elderly care.Thus,the model constructed in this paper is reasonable and effective,and the following regression equation is obtained:

$$Y = 1.552 - 0.122X_2 + 0.146X_3 - 0.143X_4 + 0.140X_5 - 0.099X_6 - 0.126X_7 + 0.287X_8 + 0.359X_9 \qquad (2)$$

4.3.4 Robustness test

To test the robustness of the regression results,this paper uses the variable substitution method,replacing the explained variable (Y) in the original model with the"degree of farmers' demand for smart elderly care"(Z)for robustness testing to verify the reliability of the research conclusions.

The SPSS 26.0 analysis software and the survey data are then used to analyze and obtain the robustness test results,as shown in Table 9 below.

Table9: *Robustness Test of Smart Elderly Care Demand*

Dependent Variable：Z									
Independent Variables	Unstandardized Coefficients		standardized Coefficients	t	Significance	The 95.0% confidence interval for B		Collinearity Statistics	
	B	SE	Beta			low	up	tolerance	VIF

β_0	1.577*	.461	1.549*	1.674	.000	1.471	2.283		
X_1	-.159	.108	-.066	-1.468	.143	-.372	.054	.973	1.028
X_2	-.166**	.079	-.100**	-2.096	.037	-.322	-.010	.951	1.161
X_3	.200***	.057	.162***	3.513	.001	.088	.312	.928	1.077
X_4	-.370***	.115	-.147***	-3.217	.001	-.597	-.144	.946	1.057
X_5	.125**	.053	.106**	2.344	.020	.020	.230	.962	1.039
X_6	-.295***	.110	-.122***	-2.687	.008	-.512	-.079	.969	1.032
X_7	-.382***	.112	-.158***	-3.411	.001	-.602	-.162	.918	1.089
X_8	.361***	.063	.260***	5.688	.000	.236	.486	.943	1.060
X_9	.350***	.044	.360***	7.896	.000	.263	.437	.944	1.059
	R^2=0.839, Adjusted R^2= 0.821, F=19.121, D-W=1.734								

***Note:** *, **, and *** represent significance levels of 10%, 5%, and 1% respectively.*

From the adjusted R2 value of 0.821,it can be seen that age, health status,living style,monthly income level,smart device usage, participation in rural endowment insurance,self-care ability, and satisfaction with the smart elderly care services provided by the government can well explain the demand for smart elderly care among rural elderly people.

In the ANOVA analysis,F=19.121,and it reaches significance at the significance level of P≤0.001.Therefore,except for gender,other explanatory variables also have a certain explanatory power for the demand for smart elderly care,further confirming that the model constructed in this paper is reasonable and effective.Thus,the following regression equation is obtained:

$$Z = 1.549 - 0.100X_2 + 0.162X_3 - 0.147X_4 + 0.106X_5 - 0.122X_6 - 0.158X_7 + 0.260X_8 + 0.360X_9 \quad (3)$$

By comparing Equation(2)and Equation(3),it is found that after replacing the explained variable"willingness to participate in smart elderly care"in the original model with"rural residents' demand for smart elderly care",the regression analysis shows that the influence coefficients of each main independent variable on the dependent variable have the same sign,and the corresponding statistical significance also differs slightly.That is,the conclusion of the original model still holds,indicating that the robustness test is passed.Therefore,the above research conclusions have strong robustness.

5. Policy Recommendations for the Optimal Allocation of Rural Elderly Care Resources Driven by Digital and Intelligent Technologies in China

5.1 Improve the Long-term Mechanism for Financial Investment in Rural Smart Elderly Care

The government is the main provider of public services for smart elderly care in rural areas and bears the leading responsibility in this field.Therefore,it is necessary to continuously improve the stable growth mechanism for fiscal investment in rural smart elderly care,ensuring that the proportion of fiscal funds invested in rural smart elderly care gradually increases with economic development and the deepening of aging.Each rural area can formulate an annual fiscal investment plan based on the growth rate of the local rural elderly population and changes in the demand for elderly care services to ensure that the fiscal funds for smart elderly care are fully in place.

In addition,the government can also guide and encourage social capital to enter the field of rural smart elderly care through policy tools such as fiscal subsidies and tax incentives.It should actively explore and continuously improve the PPP model of cooperation between the government and social capital to attract more social funds to invest in the construction of rural smart elderly care facilities and smart elderly care service projects.

5.2 Improve the Intelligent Scheduling System for Rural Smart Elderly Care Resources

To narrow the nearly 16% supply-demand gap in rural smart elderly care as soon as possible, it is

particularly urgent to optimize the intelligent scheduling system for rural smart elderly care resources with the help of digital and intelligent technologies.Local governments at all levels should actively gather diversified elderly care service information,build a comprehensive digital elderly care service platform integrating information collection,data analysis,service support,and business supervision,integrate resources from government agencies,social organizations, volunteer teams,and elderly care service providers,and strive to promote the rapid convergence and sharing of smart elderly care service data and information with data and information from market supervision,medical and health care,social assistance,etc.across regions,departments,and levels,so as to unblock the elderly care information transmission channels at the provincial,municipal,and county(city,district) levels.

In addition,a three-level emergency scheduling network for elderly care resources at the "village-town-county"levels should be established and improved,and the emergency response and allocation mechanism for rural elderly care resources should be optimized.A perfect rural elderly care intelligent scheduling system can,through real-time monitoring and prediction,timely adjust the allocation of rural elderly care resources to better cope with emergencies or seasonal demand changes.

5.3 Increase the quantity and quality of talent resources for smart elderly care in rural areas

Smart elderly care cannot be separated from the support of professional elderly care talents. One of the main reasons why the satisfaction of China's rural elderly with the smart elderly care services provided by the government is not high is the insufficient quantity and low quality of smart elderly care professionals,and most practitioners lack systematic vocational skill training. Therefore,the government can closely cooperate with institutions such as colleges and universities and scientific research institutes,and adopt order-based and customized methods to carry out professional digital literacy training for rural elderly care service personnel,so as to improve their digital thinking and application governance capabilities,and enable them to skillfully use intelligent devices and information platforms to provide services for rural elderly.

At the same time, through policy measures such as subsidies and rewards,the treatment of front-line personnel in rural smart elderly care services should be improved to enhance their professional identity and sense of belonging.In addition,means such as digital recruitment platforms should be used to attract external professional elderly care talents to flow into rural areas,and graduates from relevant college majors should be encouraged to devote themselves to the cause of rural smart elderly care,so as to inject fresh blood into the rural smart elderly care service industry.

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