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Original Paper

Study on the Development Strategy of China's Health Care Industry from the Perspective of Active Ageing: Based on Public Cognition Survey

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Abstract

With an aging population currently posing a challenge, China must accelerate the construction of a health development model with "prevention as the main focus" from the perspective of active aging. This development requirement is exactly met by the growth of health care industry, which is highly significant strategically to cope with the dual challenges of aging populations and public health issues. The study construct an evaluation index system of influencing factors for the development of health care industry, and further empirically analyse the influencing factors of China's health care industry by using Analytic Hierarchy Process (AHP) and Entropy Weight Method (EWM), and calculate the relative importance weights of 18 influencing factors of perceptual indicators under the four levels of economy, environment, products and individuals. Lastly, countermeasures are made for the superior growth of China's health care industry based on the results of the weighing analysis.

Keywords

active ageing, health care industry, Analytic Hierarchy Process (AHP)

1. Introduction

China has entered an aging society currently, and by 2035, it is expected to enter a severe aging stage. The physical quality of the elderly and the lifestyles of other age groups are facing challenges, and China must accelerate the construction of a health development model with "prevention as the main focus" from the perspective of active aging. This development requirement is exactly met by the growth of health care industry, which is highly significant strategically to cope with the dual challenges

of aging populations and public health issues (Ding, & Xiong, 2020). However, China's health care industry is still in the early exploration stage. According to forecasts, the market capacity of China's health care industry will exceed 10 trillion RMB by the end of the 14th Five-Year Plan, revealing a large amount of unexplored market space. This study explores and analyses how the health care industry develops with high quality and its important supporting role in promoting active ageing.

2. Literature Review

2.1 Health Care Industry

In international research, there is no definition to "Health Care Industry", but to "Health Industry". Definition of "health industry", in the narrow sense, refers to the economic system to provide patients with prevention, treatment, rehabilitation and other services. In the broad sense, it refers to the economic field of providing health products and services for non-sick people, including the medical industry and health care industry. In China, the new concept of "health care industry" was first proposed in December 2014, and it refers to "health and pension service industry", which "includes fitness and health industry, tourism and leisure industry and other related industries, and is an important part of modern service industry". According to Fang et al. (2020), the "health care industry" includes both the "big health industry" and the "old-age industry", which refer to the industries relying on medical and health care, biotechnology and life science research to protect the health of the elderly. life science research, with the goal of safeguarding and improving human health as the collection of commodity production activities, and the provision of products and services needed by the elderly to meet their living requirements. Jing Linbo (2022) proposed that the "health care industry" refers to a the collection of industrial activities including old-age care and health care, with the purpose of bringing people's body and spirit maintaining a healthy state. Since there is no clear and consistent definition of the concept of the "health care industry", the study defines it as an industry that offers products and services to prevent illness, promote health, and take care of a person's body and mind throughout their life cycle in an effort to improve the health and well-being of the nation.

2.2 Active Ageing in the Perspective of the Whole Life Cycle

Incorporating the concept of the whole life cycle into China's national strategy to deal with the problem of aging population is imperative (Gu, 2022). The life-cycle theory states that active ageing occurs throughout an individual's life, including the three stages of early adulthood, adulthood and old age. The functioning level of an individual increases from early adulthood, reaches its peak in adulthood and then begins to decline. Individuals' diversity and differences are not apparent in early adulthood and expand with age from adulthood onwards (Kalache, & Kickbusch, 1997). Greater variability exists between groups in old age. If the human body is able to increase factors favourable to health in early and middle age, it may be possible to delay the probability of inevitable functional decline and chronic

disease in old age, and to maintain a longer and healthier lifespan. According to the active Ageing in the perspective of the whole life cycle, when the risk factors (both behavioural and environmental) for functional decline and chronic disease are reduced, and when the beneficial factors are increasing, people can enjoy a longer and better quality of healthy life. The majority of older people continue to be able to care for themselves and remain in good health for longer, with only a minority requiring care services and medical support from others.

Overall, the current academic research on the health care industry is relatively short and is still in its infancy. In terms of basic theoretical research, Ding et al. (2020) explored the theoretical definition and the dilemma of supply and demand of the health care industry from the perspective of active aging, and proposed a realistic path for the development of China's health care industry. Wu et al. (2022) believe that the research on health care needs to explore the scientific issues of whether to maintain, what to maintain, and how to maintain, and at the same time, construct a cognitive system of health care with Chinese characteristics. In terms of applied research, Yi et al. (2019) suggest that as a new trend in the development of tourism in the new era, health care tourism satisfies consumers' pursuit of healthy quality of life, and also effectively enriches the supply of pension products.

By reviewing and analysing the results of existing research, the following three conclusions can be drawn.

1) From the point of research object, the research on pension real estate, forest recreation projects, recreation town is relatively rich, but less research on the health care industry as a whole. This study enriches the research on the influence factors of the development of the health care industry.

2) From the point of research content, there are more applied studies than theoretical ones and there are few studies on the public's cognition of the health care industry. This study fills this gap.

3) From the point of research methodology, Most of the studies use qualitative analysis methods, such as case studies or comparative analysis, while relatively few studies use quantitative analysis methods.

3. Methods

3.1 Selection of Research Methods

The research mainly uses two methods: Analytic Hierarchy Process (AHP) and Entropy Weight Method (EWM). It is divided into two steps: first, in the questionnaire survey, the Likert five-level scale (from "very important" to "very unimportant", respectively assigned to 5, 4, 3, 2, 1) is used to evaluate the impact of various factors on the development of the health care industry. Then, through the comprehensive analysis of analytic hierarchy process and entropy weight method, the various factors and their weights that the public think affect the development of health care industry are determined, and the consistency test is carried out.

3.2 Indicator System Construction

Health care industry started late in China and has not yet formed a complete theoretical system, but many scholars have conducted corresponding research on the development and construction of health care industry. Based on the existing literature and the public's actual cognitive situation, this study divides the evaluation index system of influencing factors for the development of health care industry into four aspects, namely, economic level, environmental level, product level and individual level, and sets up 18 influencing cognition indexes such as the level of economic development, natural ecological environment, etc., and puts forward the following index system.

Table 1. Evaluation Indicator System for Influencing Factors of Health Care Industry Development

Criterion layer	Indicator layer	Sources of indicators
A Economy	A1 Promoted by related industries A2 Level of economic development A3 Infrastructure conditions	Xu, X., Fan, H., Su, Y., & Zheng, Z., 2021; Jing, L., 2022
B Environment	B1 Natural ecosystem (air, water, sunlight, etc.) B2 Natural Landscape and Human Environment B3 Local cultural atmosphere and health care characteristics B4 Security situation B5 Destination brand and popularity B6 Transport conditions	Jing, L., 2022; Gong, J., You, J., & Yue P., 2022
C Product	C1 Product and service supporting facilities C2 Features and diversity of products and services C3 Price level of products/services C4 Professionalism and Service Attitude of Service Personnel C5 level of medical care C6 Leisure and recreation facilities	Li, D., 2022
D Individual	D1 Consciousness of health care D2 Health status D3 Consumption level	Choi, K. S., Cho, W. H., Lee, S., Lee, H., & Kim, C., 2004

4. Empirical Analyses

4.1 Data Source

The sample data used for analysis were collected by issuing questionnaires with the help of online platforms and conducting random interviews in Hangzhou West Lake and Hangzhou Taikang Retirement Community from August 2023 to November 2023, with a total of 336 pieces of sample data.

4.2 The Application AHP and EWM Combination Weight

4.2.1 AHP

Step 1: Establish a judgement matrix between the indicators:

$$a_{ij} = \frac{1}{a_{ji}}$$

Step 2: The hierarchical single sorting and consistency test are carried out for each judgment matrix. When the inspection coefficient CI < 0.1, the consistency is satisfied, and when the inspection coefficient CI ≥ 0.1, the consistency is not satisfied. Consistency metrics are defined:

$$CI = \frac{\lambda - n}{n - 1}$$

At the same time, the random consistency index RI is also introduced:

Table 2. Random Consistency Index

n	3	4	5	6	7	8	9	10
RI	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

Step 3: Hierarchical total ranking and consistency test, consistency is satisfied when the checking coefficient CI < 0.1, and not satisfied when the checking coefficient ≥ 0.1.

Step 4: Derive the results and indicator weights for each consistency$\hat{\partial}_i$.

4.2.2 EWM

Step 1: Normalisation of raw data:

$$y_{ij} = \frac{x_{ij} - min\, x_{ij}}{max\, x_{ij} - min\, x_{ij}}$$

$$Y = (y_{ij})_{m*n}$$

Step 2: Calculate the probability matrix of the evaluation indicators (P_i):

$$P_{ij} = y_{ij} / \sum_{j=1}^{n} y_{ij}$$

Step 3: Find the information entropy (E_i) of each indicator:

$$E_i = -1/\ln n \sum_{j=1}^{n} p_{ij} \ln p_{ij}$$

Step 4: Determine the weighting coefficients (β_i) for each indicator

$$\beta_i = (1 - E_i)/\sum_{i=1}^{m}(1 - E_i)$$

In order to ensure the authenticity of the evaluation results, it is necessary to combine the subjective and objective factors for evaluation, synthesise the advantages of the two methods, and combine the subjective weights of the Analytic Hierarchy Process (AHP), ∂_i ,with the objective weights of the and Entropy Weight Method (EWM), β_i , through the formula:

$$w_i = \theta\partial_i + (1 - \theta)\beta_i$$

Where: θ denotes the subjective preference coefficient. the combination of AHP and entropy weighting method for the determination of indicator weights.

4.2.3 AHP and EWM combination weight

After synthesising the subjective weights determined by AHP and the objective weights determined by the entropy weighting method, the combination weights can be obtained.

$$w_j = (w_j^z + w_j^k)/\sum(w_j^z + w_j^k)$$

Where W_j denotes the synthetic weight of the jth indicator, W_j^z denotes the subjective weight of the jth indicator, and W^k_j denotes the objective weight of the jth indicator (j=1,2,.....n)

4.3 Empirical Results

In the questionnaire, “very important” (5 points) to "not important at all" (1 point) are used to judge the degree of influencing factors for the development of health care industry in the public’s opinion. The questionnaire was statistically analysed using Excel software and the pairwise comparison matrix was assigned based on the arithmetic mean of the data to obtain the pairwise comparison matrix. Matlab software was used to complete the consistency test, and the maximum eigenvalue of each matrix corresponded to the eigenvector. The corresponding matrix is obtained, and then the subjective weights and objective weights are determined, and the combination weights can be obtained after the subjective weights determined by AHP and the objective weights determined by EWM are synthesised.

On the whole, the factors affecting the development of the health care industry can be divided into three classes:

Table 3. Results of Relative Importance Weight

Grade	Indicator	Combination weight	Conclusion
First level (The combination weight is above 0.080)	C1 Product and service supporting facilities	0.121	The most important factors affecting the development of the health care industry from a public cognition perspective.
	C2 Features and diversity of products and services	0.085	
	C3 Price level of products/services	0.088	
Second level (The combination weight is between 0.050 and 0.080)	C4 Professionalism and service attitude of service personnel	0.069	Secondary factors affecting the development of the health care industry from a public cognition perspective.
	A1 Promoted by related industries	0.064	
	D1 Consciousness of health care	0.064	
	B3 Local cultural atmosphere and health care characteristics	0.060	
	B1 Natural ecosystem (air, water, sunlight, etc.)	0.059	
	C6 Leisure and recreation facilities	0.053	

The combination weight of the third level is below 0.050, including nine indicators such as C6 leisure and recreation facilities, C5 level of medical care, D3 consumption level, etc. The influence of these nine indicators from the perspective of public cognition is relatively small. Meanwhile, through data analysis, it can be concluded that among the factors affecting the development of the health care industry based on the perspective of old-age problems, the influence of the product level is the strongest, reaching 0.450, which is far more than the total of the other three types of influence cognition.

5. Discussion

This study constructs an evaluation indicator system of influencing factors for the development of the health care industry and calculates the combination weight of the corresponding indexes based on the Analytic Hierarchy Process (AHP) and Entropy Weight Method (EWM). Firstly, from the construction of the indicator system itself, this study believes that the economy, environment, product and individual

of the health care industry are closely related and need to be paid attention to; secondly, the public's perceived importance of the evaluation indicators of the influencing factors presents the characteristic of "product layer>environmental layer>individual layer>economics layer". It can be seen that the public is most concerned about the product itself, which is also the most direct aspect of the evaluation of the health care industry; finally, from the results of analysis, the public's cognition of the destination brand and popularity, the level of economic development, the natural landscape and humanistic environment, and other indicators is relatively low. Based on the above analysis, this study puts forward the following suggestions for the high-quality development of the health care industry.

5.1 Strengthening Industrial Integration

From the analysis, the combination weight of the product layer is higher than that of the environmental level. In addition, it can also be seen that the related industry-driven indicator is located in the second level (the combination weight is between 0.050 and 0.080). Thus, the development of the health care industry needs to jump out of the traditional thinking of relying solely on the advantages of natural resources (Li, 2022), and expand the scope of the care industry to cover the whole life cycle by providing products and services for disease prevention, health promotion, and physical and mental health care in the context of the aging population. This study argues that the development of the health care industry needs to strengthen the exchange and integration with related industries, develop diversified and characteristic recreation products, and at the same time, continuously improve the supporting facilities of the health care industry to provide convenient, efficient, and diversified recreation services. For example, combining the health care industry with the medical industry, medical and health products will drive the development of the health care industry and create new consumption hotspots for the health care industry.

5.2 Reasonably Formulate Product Pricing Strategy

The combination weight of price level of products/services is located in the first level(the combination weight is above 0.080). The health care industry should conduct thorough market research and analysis, and set fair prices for products, so that more people have the ability and willingness to choose to experience recreation products and services.

5.3 Strengthening Talent Team Construction

The combination weight of professionalism and service attitude of service personnel have a high combination weight. The health care industry needs to strengthen the requirements for the staff in the recreation service, improving the business skills and professional level of the personnel.

5.4 Cultivate the Public's Concept of Health Care

The consciousness of health care is the indicator with the highest combination weight at the individual level. When formulating plans for the health care industry, it is necessary to take into account the role of the health care industry in supporting the construction of a "prevention-oriented" health development

model. And in addition to improving the level of recreation services for the elderly, sub-healthy people and other key populations, it is also necessary to pay attention to the supply of services for other age groups, such as the young and the strong and children. In order to achieve this goal, the concepts of health care can be conveyed to the public through advertisements, lectures and other means of publicity using a combination of online and offline means, so as to increase the public cognition and acceptance of health care, and thus stimulate consumers' willingness to consume on recreation products and services.

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