Measurement and Spatial Differences of New Quality Productivity Level in China's Health Industry

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Abstract. In the context of the new era, in order to study the development level and regional characteristics of new quality productivity in China's health industry, this article constructs a comprehensive evaluation index system for new quality productivity in the health industry from three dimensions: "high-quality" workers, "new media" labor materials, and "new material quality" labor objects. The entropy weight TOPSIS method is used to measure the dynamic level of new quality productivity in the health industry in 31 provinces of China from 2014 to 2023, and the Dagum Gini coefficient and Moran's index are combined to further explore regional characteristics. Research has found that the development of new quality productivity in the health industry shows an increasing trend over time, with a development characteristic of eastern>central>northeast>western; The average Gini coefficient of new quality productivity in the health industry is relatively high but the growth is slow. Regional differences mainly come from inter regional differences, with significant differences in the East West and East Northeast regions; The development of new quality productivity in the health industry shows a positive spatial correlation, but the spatial correlation continues to weaken, and the development is gradually approaching saturation.

Keywords: New quality productivity in the health industry, Regional differences, Gini coefficient; Moran's index

1 Introduction

According to the "Healthy China 2030" planning outline issued in 2016, health is the foundation of economic and social development, and is an indispensable important measure for promoting socialist modernization construction. With the continuous improvement of people's living standards, the development of the health industry has begun to become the focus of concern, and the health industry is gradually becoming a new pillar to drive economic development[1]. The new productive forces are in sharp contrast to traditional productive forces, which are driven by technological innovation and form a new set of quality factors through the upgrading of laborers, labor tools, and labor objects[2]. It can be seen that the so-called new productive forces are not only the Marxist concept of productive forces, but also an innovative and developed version of it, representing a higher level of traditional productive forces.

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In this context, this paper combines the health industry with new productive forces and establishes an index system based on the constituent elements of new productive forces to measure and analyze the spatial differences in the development level of China's health industry new productive forces. This study contributes to deepening our understanding of the concept of new productive forces in the health industry and enriching the practical research on new productive forces in the health industry. It also provides a feasible method for measuring the development level of China's health industry new productive forces.

2 Literature Review

Based on the current literature review, domestic scholars' research on the development of new quality productive forces in industries mainly focuses on four aspects: the understanding of theoretical connotations[3], the measurement of new quality productive forces in industries, the influencing mechanisms and the realization paths[4]. Zhou Chuan believes that the development of new quality productive forces in health relies on the significant improvement of total factor productivity. Therefore, new quality productive forces in health can be measured from three aspects: the high-quality of laborers, the high-intelligence of means of labor mainly represented by production tools, and the digitalization of objects of labor[5].Li Bai Xue (2024) defined industrial new quality productivity as a new type of productivity formed through technological innovation, management innovation, institutional innovation, and other means on the basis of existing productivity. Therefore, an evaluation index system is constructed from three aspects: new quality workers, new quality labor objects, and new quality production materials[6]; Song Zhenjiang et al. (2024)understood the iconic representation of agricultural new quality productivity as the improvement of productivity brought about by technological progress, the rise of green productivity driven by the integration of sustainable development ideas, and the introduction and application of digital technology into modern agricultural productivity. Therefore, based on the three aspects of technological productivity, green productivity, and digital productivity, an evaluation index system for agricultural new quality productivity was constructed [7] .

At present, it can be seen from the literature that research on industrial new quality productivity mostly focuses on the theoretical level, lacking empirical research. The measurement of industrial new quality productivity has not yet formed a unified standard, and the evaluation index system and measurement methods are not perfect. Measures to promote the development of industrial new quality productivity urgently need to be explored, and there are relatively few regional differences involved in the process of industrial development. Therefore, based on Marx's theory of productive forces and combined with the formation factors of new quality productive forces, this article constructs an indicator system for the development level of new quality productive forces in the health industry from three aspects: "high-quality" workers, "new media" labor materials, and "new material quality" labor objects. The Dagum Gini coefficient and Moran's index are used to explore regional characteristics and provide policy recommendations for promoting the development of new quality productive forces in the health industry.

3 Indicator System and Construction

3.1 Data Sources

The data for this study mainly come from the China Statistical Yearbook, China Health Statistics Yearbook, China Social Statistics Yearbook, China Environmental Statistics Yearbook, and China High-tech Industry Statistics Yearbook. The original data are processed as follows: To ensure the integrity of the data, the individual missing data are estimated by the interpolation method. Through data collection and subsequent processing, panel data of 31 provinces (autonomous regions, and municipalities directly under the Central Government) in China from 2013 to 2022 are finally obtained.

3.2 Research Methods

3.2.1 Entropy Weight TOPSIS Method.
This study uses the Entropy Weight TOPSIS method to measure the high-quality development level of the health industry. Compared with other measurement methods, the Entropy Weight TOPSIS method can fully consider the importance of each indicator, has relatively strong objectivity, and improves the accuracy of decision-making. Suppose Xij is the observed value of the jth indicator of the ith sample. The specific steps are as follows.

(1) Use the range method to standardize the data.

For positive indicators:

$$X^* = \frac{X - min(X)}{max(X) - min(X)} \tag{1}$$

For negative indicators:

$$X^* = \frac{max(X) - X}{max(X) - min(X)} \tag{2}$$

(2) Calculate the proportion p of the indicator value of the ith scheme under the jth indicator.

$$p_{ij} = \frac{X^*}{\sum_{i=1}^{n} X_{ij}^*}, (j = 1,2, \ \ , m) \tag{3}$$

(3) Calculate the information entropy redundancy degree of the jth indicator.

$$d_j = 1 + k \sum_{n=0}^{n} P_{ij} * lnP_{ij} \tag{4}$$

(4) Calculate the weights of the health industry measurement indicators.

$$w_j = \frac{d_j}{\sum_{j=1}^{n} d_j}, (1 \leq j \leq m) \tag{5}$$

(5) Construct the weighted decision matrix.

$$R = (r_{ij})_{mn} = (w_j^* X^*)_{mn}, (i = 1,2,\dots,m; j = 1,2,\dots,n) \tag{6}$$

(6) Determine the positive and negative ideal values.

$$R^+ = max(r_{1j}, r_{2j} \dots r_{ij}), R^- = min(r_{1j}, r_{2j} \dots r_{ij}) \tag{7}$$

(7)Calculate the Euclidean distances between each scheme and the optimal solution and the worst solution.

$$D_i^+ = \sqrt{\sum_{j=1}^{n} (r_{ij} - R_j^+)^2}, D_i^- = \sqrt{\sum_{j=1}^{n} (r_{ij} - R_j^-)^2} \tag{8}$$

(8) Calculate the comprehensive evaluation index of the high-quality development of the health industry.

$$C_i = \frac{D_i^-}{D_i^+ + D_i^-}, C_i \in [0,1] \tag{9}$$

3.2.2 Dagum Gini Coefficient.

This paper uses the Dagum Gini coefficient method to measure the overall regional differences, which can decompose the regional differences into three parts and further identify the sources of the overall differences[8] .

The calculation method of the Dagum Gini coefficient is as follows:

$$G = \frac{\sum_{j=1}^{K} \sum_{h=1}^{k} \sum_{i=1}^{n_j} \sum_{r=1}^{n_h} |y_{ji} - y_{hr}|}{2n^2 \mu} \tag{10}$$

3.2.3 Moran's Index.

This paper uses Moran's Index to further analyze the spatial correlation and aggregation characteristics of the new quality productivity of the national health industry, which is divided into the global Moran's Index and the local Moran's Index.

(1)The global Moran's Index reveals the spatial correlation degree of the development of China's large health industry:

$$Moran's\ I = \sum_{i=1}^{n} \sum_{j\neq 1}^{n} W_{ij} (X_i - \bar{X})(X_j - \bar{X}) / S^2 \sum_{i=1}^{n} \sum_{i=j}^{n} W_{ij} \tag{11}$$

(2)The local Moran's Index analyzes the spatial aggregation degree among regions:

$$Moran's\ I = (X_i - \bar{X}) \sum_{j\neq i}^{n} W_{ij} (X_j - \bar{X}) \tag{12}$$

In the formula, X_i and X_j are the regional attribute values, X is the mean value of the research region, S^2 is the sample variance, and W_{ij} is the standardized spatial weight matrix.

3.3 Indicator Selection

According to Marxist theory, productivity can be measured from three aspects, namely laborers, objects of labor, and means of labor. However, the new quality productivity is not a simple copy of the traditional theory, but an advanced form of productivity in the new era under the changes of industries and social science and technology [9]. Therefore, this paper takes "high-quality" laborers, "new medium" means of labor, and "new material quality" objects of labor as the first-level indicators, and finally selects 7 second-level indicators and 22 third-level indicators to construct the evaluation indicator system for the development of the new quality productivity of the health industry(Table 1).

3.3.1 'High quality' workers.

Laborers are the most important and active factor in productivity, and the source of innovation. Based on the limitations of data and the availability of information, this article divides "high-quality" workers into three parts: professional skills, education and culture, and physical fitness. The physical fitness status of residents indirectly reflects the development of the health industry and is the fundamental driving force for the development of new quality productivity in the health industry. Measured by the mortality rate and the number of fitness equipment owned per 100 households, it not only reflects the health status of residents, but also reflects their high requirements and standards for physical fitness.

3.3.2 "New Media" Labor Materials.

The means of labor are the primary basis for dividing the development of human social productive forces into different stages. The labor materials under the new quality productivity have broken through traditional labor materials, involving innovation, intelligence and other fields, and are a new development model after the continuous transformation and upgrading of industries. In the health industry, "new media" labor mostly focuses on intelligent production tools, including health manufacturing and healthcare industries.

3.3.3 "New Material Quality" Labor Object.

With the rapid development of technology and industrial transformation in the new era, for the health industry, the focus of "new material quality" labor objects should not only be on the positive interaction between the industry and nature, but also on the digital trend of labor objects. For the health industry, the "new material" labor objects are mainly embodied in the health service industry, so this article is divided into the health environment service industry and the medical service industry to describe. Among them, the Internet health education service is the combination of health industry information and the Internet, and the information is transmitted to people through the network, which is a new way of communication in the era of big data.

Table 1. Indicator System for the Development Level of New Quality Productivity in the Health Industry

First level indicators	Second level indicators	Hird level indicators
High quality workers	professional skill level	per thousand health technicians
		Annual average number of R&D personnel in the pharmaceutical manufacturing industry
		Equivalent full-time equivalent of R&D personnel in the pharmaceutical manufacturing industry
		Annual average number of R&D personnel in the medical equipment and instrument manufacturing industry
	cultural backgrounds	Number of graduates from higher medical colleges with educational
		Research expenditure of higher medical colleges and universities
	Physical fitness status	mortality rate
		The number of fitness equipment owned by residents per hundred households
New media "labor materials	health and medical high standard facilities	tertiary Grade A hospitals in areas
		Number of beds per thousand medical health institutions
		R&D capability of health manufacturing industry
	number of invention patents owned by pharmaceutical manufacturing industry	Number of research and development institutions in the pharmaceutical manufacturing industry
		Internal expenditure of R&D funds in the pharmaceutical manufacturing industry
		Internal expenditure on new product development funds in the pharmaceutical manufacturing industry
		Number of research and development institutions in the medical equipment and instrument manufacturing industry
		Manufacturing transaction volume of intelligent devices with health functions
Labor Objects with "New Material Quality"	Standardization of Health and Environmental Services	Urban Sewage Treatment Rate
		Harmless treatment rate of household waste
		Number of environmental protection system institutions
	Digital intelligent medical service	Internet health education service
		New Rural Cooperative Medical Scheme
		Number of people undergoing health check ups in hospitals

4 Conclusions

4.1 Measurement of the Development Level of New Quality Productivity in the Health Industry

4.1.1 Development level of Health Industry in China and the four Major Regions.

According to Table 2, the trend of the development level of the new quality productive forces in the health industry in the four regions from 2014 to 2023 is shown in Figure 1. During the measurement period, the development level of the health industry from the perspective of new quality productive forces in the national and four regions increased overall. Among them, the eastern region was in the leading position, with a development level higher than the national average, with a mean value of 0.2. The central region was second, with a development level and the national average nearly equal. The western and northeastern regions had a similar overall trend. The northeastern region had a slightly higher development level at the beginning, and the two regions were in a catch-up mode. In 2019, their development levels were both 0.69, and The Gini coefficients in the West-Northeast and West-Central regions both show a downward trend, but the Gini coefficients and the degree of reduction are different. The average reduction rate in the West-Northeast region is over 2%, and the average Gini coefficient in the region is 0.23. In contrast, the average Gini coefficient in the West-Central region is 0.33, and the average reduction rate is 0.5%. This indicates that the development gap between the two regions is narrowing, especially in the West-Northeast region. The Gini coefficients in the East-Central and North-East-Central regions both show an upward trend, with average Gini coefficients of 0.36 and 0.27, respectively. This suggests that the level of development between the regions is not significantly different, but the gap is widening over time.

4.1.2 Development level of Health Industry in Each Province.

During the measurement period, the development level of the health industry in 31 provinces has been increasing year by year, with occasional fluctuations in the development process, but overall it is on the rise. The top three provinces in terms of the average development level of the new quality productivity of the health industry are Jiangsu Province, Guangdong Province and Zhejiang Province. The regions at a disadvantage are Xizang Autonomous Region, Ningxia Hui Autonomous Region and Hainan Province. It can be observed that the top three in terms of development level are all located in the eastern region, but Hainan, one of the last three, is also located in the eastern region. This indicates that the development of new quality productivity in the health industry not only relies on its own economy and geographical location, but also on other factors.

Table 2. Measurement of the Development Level of New Quality Productivity in the Health Industry

Province	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	average
beijing	0.101	0.106	0.112	0.119	0.127	0.141	0.149	0.178	0.194	0.213	0.144
tianjin	0.060	0.064	0.066	0.064	0.061	0.060	0.068	0.077	0.079	0.082	0.068
hebei	0.106	0.106	0.110	0.114	0.115	0.118	0.126	0.139	0.161	0.183	0.128
shanxi	0.233	0.246	0.257	0.261	0.259	0.253	0.276	0.311	0.342	0.374	0.281
neimenggu	0.197	0.213	0.232	0.280	0.334	0.359	0.399	0.444	0.581	0.719	0.376
liaoning	0.021	0.022	0.023	0.024	0.025	0.027	0.029	0.031	0.032	0.033	0.027
jilin	0.103	0.109	0.113	0.120	0.127	0.143	0.157	0.174	0.190	0.214	0.145
heilongjiang	0.369	0.374	0.384	0.399	0.411	0.431	0.478	0.537	0.574	0.614	0.457
shanghai	0.224	0.234	0.256	0.247	0.259	0.286	0.315	0.353	0.391	0.437	0.300
jiangsu	0.069	0.069	0.073	0.076	0.081	0.086	0.094	0.106	0.113	0.120	0.089

zhejiang	0.040	0.042	0.044	0.043	0.049	0.049	0.056	0.060	0.066	0.073	0.052
anhui	0.057	0.062	0.062	0.067	0.067	0.069	0.074	0.081	0.089	0.097	0.072
fujian	0.089	0.088	0.091	0.094	0.098	0.102	0.111	0.117	0.125	0.134	0.105
jiangxi	0.121	0.120	0.117	0.125	0.139	0.157	0.181	0.194	0.208	0.223	0.158
shandong	0.064	0.069	0.064	0.070	0.083	0.097	0.100	0.103	0.108	0.113	0.087
henan	0.084	0.074	0.061	0.070	0.078	0.077	0.086	0.095	0.104	0.113	0.084
hubei	0.012	0.011	0.012	0.014	0.018	0.018	0.021	0.025	0.029	0.033	0.019
hunan	0.071	0.066	0.070	0.074	0.081	0.083	0.089	0.092	0.099	0.105	0.083
guangdong	0.037	0.044	0.046	0.045	0.052	0.057	0.063	0.072	0.079	0.087	0.058
guangxi	0.022	0.027	0.032	0.038	0.043	0.051	0.057	0.063	0.069	0.075	0.048
hainan	0.015	0.016	0.018	0.020	0.021	0.023	0.023	0.024	0.025	0.026	0.021
chongqing	0.031	0.035	0.039	0.040	0.046	0.046	0.047	0.051	0.054	0.058	0.045
sichuan	0.055	0.057	0.061	0.057	0.058	0.071	0.080	0.086	0.093	0.101	0.072
guizhou	0.076	0.077	0.080	0.088	0.098	0.106	0.115	0.121	0.125	0.129	0.102
yunnan	0.091	0.093	0.103	0.110	0.116	0.119	0.135	0.146	0.155	0.164	0.123
xizang	0.144	0.153	0.158	0.158	0.160	0.167	0.182	0.199	0.213	0.228	0.176
shaanxi	0.111	0.113	0.115	0.120	0.127	0.132	0.153	0.169	0.186	0.205	0.143
gansu	0.103	0.108	0.110	0.113	0.124	0.127	0.140	0.155	0.173	0.188	0.134
qinghai	0.085	0.085	0.085	0.089	0.092	0.093	0.099	0.108	0.113	0.122	0.097
ningxia	0.053	0.054	0.055	0.053	0.051	0.051	0.059	0.068	0.070	0.074	0.059
xinjiang	0.061	0.062	0.061	0.061	0.063	0.063	0.069	0.075	0.080	0.086	0.068
Eastern	0.148	0.154	0.163	0.17	0.18	0.19	0.209	0.235	0.266	0.299	0.201
Western	0.054	0.054	0.055	0.058	0.064	0.069	0.076	0.081	0.088	0.095	0.069
Central	0.097	0.1	0.105	0.108	0.114	0.12	0.134	0.146	0.158	0.169	0.125
Northeastern	0.066	0.067	0.067	0.068	0.069	0.069	0.076	0.084	0.088	0.094	0.075
China	0.101	0.106	0.112	0.119	0.127	0.141	0.149	0.178	0.194	0.213	0.144

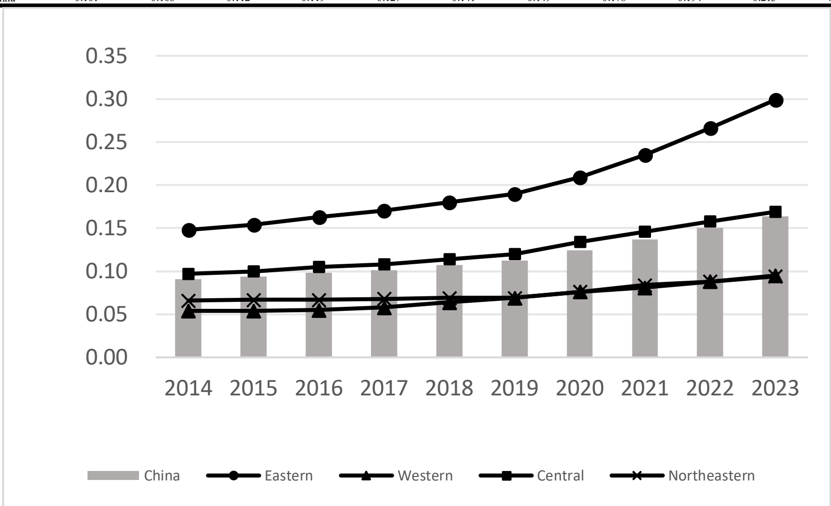

Fig. 1. Trends in the Development Level of New Quality Productivity in the Health Industry of the Four Major Regions from 2014 to 2023

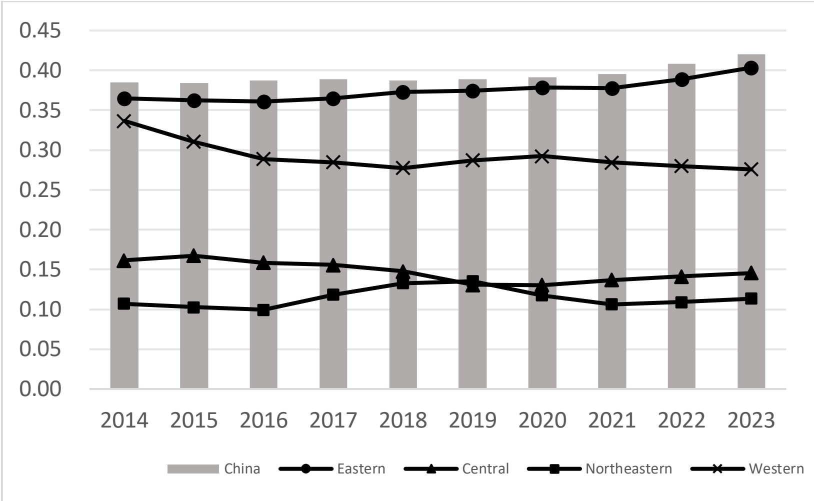

Fig. 2. Trends in Regional Differences between the Four Major Regions and the National Region from 2014 to 2023

4.2 Regional Differences Analysis

In order to reveal the regional characteristics and sources of differences in the development level of new quality productivity in China's health industry, this article uses MATLAB software to calculate the Gini coefficient of the development of new quality productivity in China's health industry from 2014 to 2023, which is developed from the following four aspects.

4.2.1 Overall Relative Differences.

As shown in Table 3, from a national perspective, the Gini coefficient has been slowly increasing year by year with occasional fluctuations, with an average growth rate of 1%, reaching its highest point of 0.42 in 2023, indicating that the overall difference in the development level of new quality productivity in China's health industry is gradually increasing.

4.2.2 Relative Differences Within Regions.

From a regional perspective, the average Gini coefficient ranges from high to low in the eastern, western, central, and northeastern regions. According to Table 3, trend charts of regional differences in the four major regions have been drawn. From Figure 2, it can be seen that the Gini coefficient in the eastern region has been steadily increasing with occasional fluctuations. The Gini coefficient is similar to the overall development level of the country, but much higher than the other three regions, indicating that there are significant differences in the development level of new quality productivity in the health industry in the eastern region and uneven development within the region; The Gini coefficient in the western region has decreased by an average of 2.1%, reaching its lowest value of 0.276 in 2023. The overall Gini coefficient level is second only to the eastern region, indicating that there is still a gap in the development level of new quality productivity in the health industry within the western region, but the gap is narrowing year by year; The Gini coefficient in the central region shows an overall trend of a "V" shape, reaching the bottom of the "V" shape in 2019 with a Gini coefficient of 0.131; The overall Gini coefficient in Northeast China is the lowest among the four major regions, showing an inverted "U" trend. From 2014 to 2016, the Gini coefficient fluctuated around 0.103, and then steadily increased until reaching its peak in 2019, with a Gini coefficient of 0.135.

4.2.3 Relative Differences Between Regions.

Based on the Gini coefficient values between regions in Table 3, a comparison of regional differences between the four major regions in two years was plotted (Figures 3 and 4), and a cluster analysis was conducted on the mean regional differences among the four major regions (Table 4). From the graph, it can be seen that the average Gini coefficient between the eastern and western regions is the highest, exceeding 0.5, belonging to the fourth category of regions. This indicates that there is a significant disparity in the development of the health industry between the eastern and western regions, and the regional balance is weak; Next is the East Northeast region, where the Gini coefficient has been increasing year by year, with an average growth rate of 2.8%, reaching its highest point of 0.56 in 2023. This indicates that there is a growing gap in the development of the health industry between the eastern and northeastern regions, and regional control needs to be strengthened; The Gini coefficient between the West Northeast and West Central regions has shown a decreasing trend, but the Gini coefficient and decrease are different. The West Northeast region has an average decrease of over 2%, with an average Gini coefficient of 0.23 between regions, while the West Central region has an average Gini coefficient of 0.33 and an average decrease of 0.5%, indicating that the development differences between the two regions are becoming smaller and smaller, especially in the West Northeast region; The Gini coefficient between the eastern, central, and northeastern regions shows an upward trend, with the mean Gini coefficient being in the second and third categories respectively, indicating that there is not much difference in development level between regions, but the difference is gradually widening over time.

4.2.4 Source and Size of Differences.

This article further calculates the contribution rates of intra regional differences, inter regional differences, and hypervariable density based on the Gini coefficient. The results show that the main source of regional differences is inter regional differences, with an average of 62.41%, and the average of super variable density is only 13.59%. This indicates that the differences in the development level of China's health industry are mainly caused by inter regional differences.

Table 3. Overall and intergroup Gini coefficients of new quality productivity in the health industry

year	Gt	Gw				Gjh					
		East-ern	Central	Northe astern	West-ern	East-ern-W estern	East-ern-Ce ntral	East-ern-Nort heastern	West-ern-Ce ntral	West-ern-Nort heastern	Cen-tral-Nor theast-ern
2014	0.385	0.365	0.161	0.107	0.337	0.525	0.348	0.437	0.339	0.260	0.217
2015	0.384	0.362	0.167	0.103	0.310	0.527	0.351	0.446	0.338	0.240	0.226
2016	0.387	0.361	0.159	0.100	0.289	0.539	0.352	0.464	0.343	0.226	0.237
2017	0.389	0.365	0.156	0.118	0.285	0.536	0.358	0.479	0.336	0.231	0.252
2018	0.387	0.373	0.148	0.133	0.278	0.526	0.362	0.494	0.321	0.223	0.271
2019	0.389	0.375	0.131	0.135	0.287	0.526	0.361	0.511	0.315	0.228	0.284
2020	0.391	0.379	0.130	0.117	0.292	0.529	0.359	0.510	0.325	0.225	0.289
2021	0.396	0.378	0.137	0.106	0.284	0.515	0.367	0.515	0.327	0.217	0.282
2022	0.408	0.389	0.141	0.109	0.280	0.556	0.385	0.542	0.326	0.214	0.294
2023	0.420	0.403	0.146	0.113	0.276	0.570	0.402	0.560	0.323	0.213	0.294

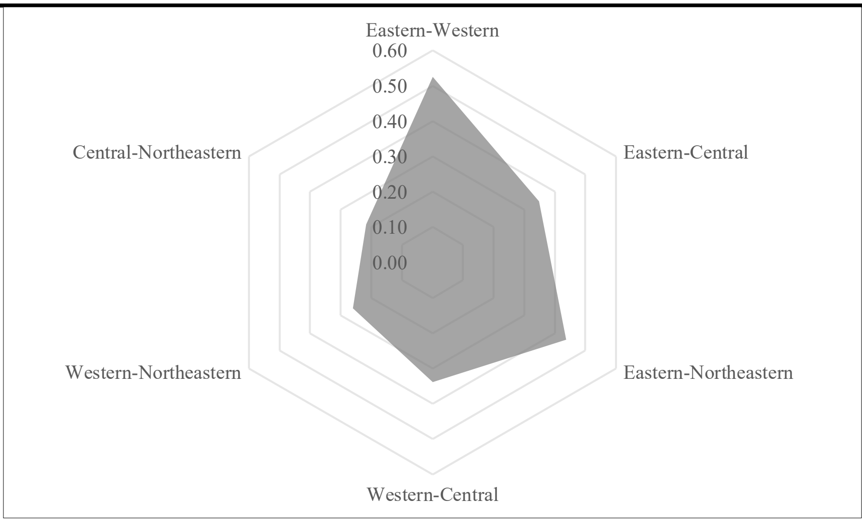

Fig. 3. Comparison of Regional Differences among the Four Major Regions in China in 2014

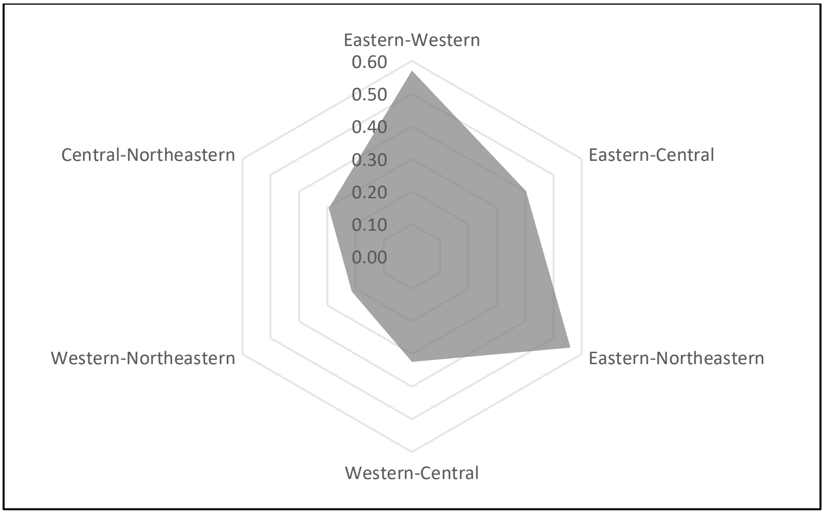

Fig. 4. Comparison of Regional Differences among the Four Major Regions in China in 2023

Table 4. Clustering results of Gini coefficient mean between regions for the development of new quality productivity in the health industry

Category	Mean Gini coefficient between groups	Region
Class 1	Gjh<0.3	Central-Northeastern, Western-Northeastern
Class 2	0.3<Gjh<0.4	Eastern-Central, Western-Central
Class 3	0.4<Gjh<0.5	Eastern-Northeastern
Class 4	Gjh>0.5	Eastern-Western

4.3 Spatial Correlation Analysis

4.3.1 Global Autocorrelation.

To further explore the spatial characteristics of the development of new quality productive forces in the health industry, this paper uses Stata 16.0 to calculate the global Moran's I and related indicators for the development of productivity in the health industry from 2014 to 2023. The results (as shown in Table 5) indicate that the global Moran's I values are all positive during the inspection period, and except for 2022 and 2023, the results are all significant, suggesting that the spatial distribution of the development of new quality productive forces in China's health industry is not random, having a positive spatial autocorrelation and showing clustering. From a temporal perspective, the Moran's I showed an overall upward trend from 2014 to 2016, indicating that the differences in the development levels among various regions gradually increased and there was obvious spatial agglomeration. Since then, the Moran's I has slowly declined, indicating that the spatial autocorrelation has been continuously weakened and the high-quality development of the health industry has gradually tended to a saturated state.

4.3.2 Local Autocorrelation Analysis.

Based on the examination of the global Moran's index, this paper uses the scatter plot of the local Moran's index to divide the results into four spatial agglomeration types: H-H, L-H, L-L, and H-L. According to Table 6, the new quality productive forces in China's health industry show an agglomeration phenomenon and have a relatively strong spatial dependence. Specifically, nearly half of the provinces in the country are in the L-L agglomeration type. The provinces in the L-L and H-L agglomeration types are relatively evenly distributed, and the number of provinces in the H-H agglomeration type has a gradually increasing trend. Among them, the western and northeastern regions are mainly concentrated in the L-L agglomeration type, indicating that the regions themselves are relatively backward in development and the surrounding provinces are also not developing well, unable to effectively drive regional development, and there is an unbalanced development phenomenon.

Table 5. Moran Index of the Development Level of New Quality Productivity in the Health Industry

Moran's I			
year	I	z	p-value*
2014	0.271	2.810	0.002
2015	0.273	2.806	0.003
2016	0.280	2.845	0.002
2017	0.243	2.495	0.006
2018	0.186	1.970	0.024
2019	0.178	1.902	0.029
2020	0.173	1.857	0.032
2021	0.174	1.869	0.031
2022	0.110	1.294	0.098
2023	0.067	0.918	0.179

Table 6. Regional Distribution of Local Moran Index for the Development Level of New Quality Productivity in the Health Industry

year	H-H(High High Agglomeration Type)	L-H(Low High Agglomeration Type)	L-L(Low Low Agglomeration Type)	H-L(High Low Agglomeration Type)
2014	shandong, jiangsu, hebei, henan, shanghai, zhejiang	jiangxi, anhui, fujian, hainan, tianjin, guangxi	hunan, heilongjiang, shanxi, neimenggu, xinjiang, jilin, ningxia, gansu, xizang, shaanxi, qinghai, guizhou, yunnan, liaoning	hubei, beijing, guangdong, sichuan
2017	hebei, shanghai, hunan, zhejiang, shandong, jiangsu, henan, anhui	jiangxi, tianjin, hainan, guangxi, fujian	chongqing, heilongjiang, neimenggu, xinjiang, shanxi, ningxia, qinghai, xizang, gansu, jilin, shaanxi, guizhou, yunnan, liaoning	hubei, guangdong, sichuan, beijing
2020	zhejiang, shanghai, shandong, jiangsu, henan, anhui, hunan	jiangxi, fujian, hainan, guangxi	hebei, chongqing, xinjiang, shanxi, neimenggu, ningxia, qinghai, xizang, gansu, heilongjiang, jilin, shaanxi, guizhou, yunnan, liaoning, tianjin	hubei, guangdong, beijing, sichuan
2023	henan, anhui, shanghai, shandong, jiangsu, zhejiang, hunan	jiangxi, fujian, tianjin, hainan, guangxi	chongqing, shanxi, neimenggu, ningxia, qinghai, xizang, gansu, heilongjiang, jilin, shaanxi, guizhou, yunnan, liaoning, xinjiang	hebei, hubei, guangdong, sichuan, beijing

5 Policy Recommendations

This paper constructs an evaluation index system for the development level of new quality productive forces in China's health industry from three aspects: "high-quality" laborers, "new medium" means of labor, and "new material quality" objects of labor, measures the development level of China's health industry from 2014 to 2023, and on this basis, uses the Dagum Gini coefficient and Moran's index to analyze the characteristics of spatial differences. Based on the above empirical results, the following suggestions are put forward.

1. Achieve innovation leapfrogging and realize the emerging development of the industry

Realize the innovative role of science and technology in the health industry, strengthen cooperation with universities and scientific research institutions, promote the transformation of scientific and technological achievements, and the government should increase innovation investment, optimize the allocation of innovation resources, and support the development of innovative enterprises, especially in the eastern regions such as Hainan and Tianjin that have a development foundation but are slightly backward in development; promote the upgrading of the traditional health industry, use new technologies and new management models to transform and upgrade the traditional health industry, realize the intelligence and automation of the production process, and improve production efficiency and product quality, especially in the eastern and central regions where the traditional health industry is basically complete. On this basis, it is necessary to promote industrial upgrading and realize the efficient development of the industry.

2. Promote regional exchanges and strengthen the cultivation of "high-quality" talents

Relevant educational institutions should strengthen the cultivation of "high-quality" talents, set up cutting-edge high-tech-related majors and courses, pay attention to the combination of basic theories and practice, further improve the cooperation mechanism between enterprises and institutions of higher learning and scientific research institutes, introduce enterprise technical experts to campuses, explore and establish multiple cooperative innovation models, promote the flow of talents and resource sharing; the government should relax the introduction of talents, strengthen the flow of "high-quality" talents, and increase the funding for scientific research projects; ensure the balanced distribution of educational resources, guide the eastern and central regions to tilt high-quality educational resources to the western and northeastern regions to narrow the regional talent differences.

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