**Frontiers in Business, Economics and Management**
ISSN: 2766-824X | Vol. 13, No. 3, 2024

# The Dynamic Evolution of Chinese-style Modernization Level Measurement

**Wenliang Ju***

School of Statistics and Applied Mathematics, Anhui University of Finance and Economics, Bengbu 233000, China
* Corresponding author: Ju Wenliang (Email: 1849076988@qq.com)

**Abstract:** This paper begins with a literature review and then develops an index system through a systematic analysis of the theoretical logic and realistic features of Chinese-style modernization. The study conducts a comprehensive analysis of the panel data of 31 Chinese provinces (municipalities) from 2012 to 2021. The entropy-weighted TOPSIS method is used to calculate the comprehensive evaluation scores of each region in each year and rank them. The study also examines the temporal evolution pattern of the level of Chinese-style modernization in each region, as well as the regional differences, using methods such as Thai Kernel Kernel Density Estimation. The empirical results indicate that the eastern region is leading the country in terms of modernization level. The central region and the three northeastern provinces have similar modernization levels, but the overall level of the central region has increased over the decade, while the northeastern region has shown a decline. The economic modernization construction in the western region faces a contradiction as the region has a relatively small economic scale, a low level of industrial structure, and has not yet transformed its economic construction kinetic energy. This highlights the need for improvement in the region's overall level to keep up with the path of modernization. Based on this, this paper presents policy recommendations aimed at promoting economic development, innovation and entrepreneurship, strengthening social security, and advancing urban-rural integration. The goal is to comprehensively improve China's level of Chinese-style modernization.

**Keywords:** Modernization, Integrated evaluation, Dynamic evolution.

## 1. Introduction

Chinese-style modernization is socialist modernization under the leadership of the Communist Party of China (CPC). It is the fundamental road for realizing the great rejuvenation of the Chinese nation and building a strong nation. Since the 18th CPC National Congress, the theoretical connotation and practical content of Chinese-style modernization have been constantly innovated and improved. The report of the 20th CPC National Congress emphasizes the central task of the CPC to build a strong socialist modernization country in an all-round way and promote the great rejuvenation of the Chinese nation in an all-round way with Chinese-style modernization. Achieving modernization has been a global trend since modern times and a common pursuit of mankind. The Chinese-style modernization path has given modernization a new civilization connotation. Chinese-style modernization is a comprehensive development concept that aims to achieve common prosperity and promote all-round development in the economic, cultural, and ecological fields. It has essential requirements in various aspects.

Undoubtedly, accurately grasping the theoretical connotation, cultural roots, realization paths, and other distinctive features of Chinese-style modernization is a prerequisite for its realization. To build a comprehensive index system of Chinese-style modernization, a deep understanding of its basic features and development requirements is necessary, followed by scientific and effective research and analysis. Several scholars have conducted multi-level theoretical analyses of the connotative purpose, practical logic, and other characteristics of Chinese-style modernization (Zang Fengyu, 2022; Gao Bo, Lv Youjin, 2022) [1, 2]. Scholars have analyzed and developed a scientific, reasonable, and effective evaluation index system for Chinese-style modernization from multiple dimensions (Jiang Yongmu, 2022; Chen Shengli, Wan Zheng, 2023) [3, 4].

Regarding Chinese-style modernization, while there is a wealth of theoretical studies, most of the literature remains at the level of theoretical and qualitative analysis, lacking quantitative research and empirical analysis for the entire country. Therefore, the scientific measurement of Chinese-style modernization is still an open question: what is the degree of modernization in each region of China? How large is the gap in modernization development levels between regions? What is the future direction of the modernization development process in each region? Studying these questions can help measure the process of Chinese-style modernization objectively and comprehensively, identify shortcomings in the modernization process of each region, and provide a scientific basis for promoting the modernization road with Chinese characteristics.

This study focuses on 31 provincial-level administrative regions (excluding Hong Kong, Macao, and Taiwan). This paper constructs a four-dimensional evaluation index system based on a deep understanding of the connotations and interests of Chinese-style modernization, as well as the 'five characteristics' and 'essential requirements' put forward by the 20th National Congress of the CPC, by collecting panel data from 31 provinces and cities between 2012 and 2021. This paper presents a preliminary four-dimensional evaluation index system for Chinese-style modernization based on a deep understanding of its connotation and purpose, as well as the 'five characteristics' and 'essential requirements' outlined by the 20th Party Congress. Using the TOPSIS entropy weighting method, this study scientifically and objectively measures the comprehensive development level of Chinese-style modernization in all provinces and cities of China over the past decade. The Dagum Gini coefficient is employed to reveal the spatial variability of China's regional modernization development level. Finally, the Kernel kernel

density estimation method is used to depict the temporal evolution of the modernization level of all provinces and cities. Policy recommendations are proposed to promote the modernization process in China.

# 2. Review of Literature

The literature related to the research content of this paper can be divided into two categories. The first category includes qualitative research on the theoretical discussion and policy interpretation of the concept of Chinese-style modernization. The second category includes research on the construction of quantitative criteria and an evaluation index system for the level of Chinese-style modernization.

Currently, Chinese scholars have conducted extensive research on the theoretical connotation, formation logic, and promotion path of Chinese-style modernization. When Gökalp (1959) coined the term 'modernization', he emphasized that it is not equivalent to 'Europeanization'. Therefore, 'Chinese-style modernization' and 'modernization' cannot be equated and should have distinct Chinese characteristics (Chia Ling, 2016). Gökalp (1959)[5] noted that the terms 'modernization' and 'Europeanization' were not interchangeable. Therefore, 'Chinese-style modernization' should not be equated with 'modernization', and it should have distinct Chinese characteristics (Chia-Ling, 2016)[6]. The theory of socialist modernization with Chinese characteristics should be adapted to national conditions. The theory of socialist modernization with Chinese characteristics must adapt to changes in national conditions and continue to develop (Song Guokai, 2018)[7]. Ren Baoping and Fu Yamei (2018)[8] provided an innovative interpretation of the theory of socialist modernization with Chinese characteristics in the new era, taking into account the current historical characteristics of China. Yin Desheng (2021)[9] analyzed the connotation of Chinese modernization from the perspective of the 'two major layouts', promoting a new leap in theory. Sang Mingxu (2017)[10] argues that the practice of Chinese modernization should play a positive role in the logic of capital by removing clutter and preserving essence. Aiguo (2023)[11] suggests that the formation of a new practical path of Chinese-style modernization should be based on the basic principles of Marxism. Guo Han and Ren Baoping (2022)[12] point out that the promotion path of Chinese-style modernization differs from the Western modernization model, as it aims for common prosperity and prioritizes fairness and justice. Zhang Zhanbin and Fu Xia (2023)[13] argue that to achieve Chinese-style modernization, it is essential to understand not only the universal characteristics of modernization in different countries but also the unique Chinese characteristics, such as the dialectical relationship between people's nature and peacefulness.

Research on evaluating the dimensions and specific indicators of Chinese-style modernization level can be divided into three stages. Liu Rui et al. (2001) [14]and Guo Hongmao, Wang Jianting (2003) [15] constructed a comprehensive index system for modernization to identify later stages. However, historical limitations have resulted in a lack of understanding regarding the development of ecological civilization, coordinated development, and other requirements of the new development stage. Subsequent scholars have built upon previous research and thinking, innovating the Chinese-style modernization evaluation index system by incorporating new development concepts. Li Xuhui et al. (2019)[16] developed a new evaluation index system based on five development concepts. They introduced the quadratic weighted factor analysis method to measure the level of economic and social modernization and development. Xu Yinliang and Wang Huiyan (2020)[17] also developed a regional modernization and high-quality development index system for the new development concept. However, previous research has not effectively integrated the new development concept with the modernization process. The research results mainly focus on the scientific connotation and main measures of the new development concept. In contrast, Jiang Yongmu et al. (2022)[18] constructed a Chinese-style modernization evaluation index system based on the five development concepts. They clarified the theoretical logic of the construction of the Chinese-style modernization evaluation index system. In their 2022 publication, Ren Baoping and Zhang Qian [19] developed an index system consisting of five dimensions of modernization, including economic and ecological civilization modernization.

Currently, there are limited studies on measuring modernization levels in China, and there is no authoritative evaluation index system for Chinese-style modernization. Based on existing research, scholars have multidimensional perspectives on interpretation, resulting in valuable references for the study presented in this paper.

# 3. Measuring the level of Chinese-style modernization

## 3.1. Data Description

This paper uses the 31 provincial-level administrative regions (excluding Hong Kong, Macao, and Taiwan) in China as the objects of measurement. The sample data is primarily sourced from the China Statistical Yearbook, China Science and Technology Statistical Yearbook, China Environmental Statistical Yearbook, and statistical yearbooks of each province from 2013 to 2022. Any missing data is supplemented using the commonly used linear interpolation method.

## 3.2. Static integrated evaluations

The panel data is homotrended to solve the problem of magnitude. Then, the weights corresponding to each secondary index are calculated using the TOPSIS method. The calculation results are presented in Table 2. The index weights range from a minimum of 0.601%, which corresponds to the rate of harmless treatment of domestic garbage, to a maximum of 29.645%, which corresponds to the new product export sales revenue of industrial enterprises above the large-scale (RMB 10,000 yuan). Table 3 shows the static comprehensive evaluation scores of the degree of Chinese-style modernization of 31 Chinese provinces (municipalities) from 2012 to 2021. The scores were obtained by calculating the weight indices of each indicator and ranked by year.

**Table 1.** China's system for measuring modernization levels

| fundamental dimension | sub-dimension | Basic indicators | Direction of Indicators |
|---|---|---|---|
| Modernization of social processes | Share of value added of services | Share of third sector in GDP (%) | + |
| | Integrated human resources capacity | Average number of students enrolled in higher education per 100,000 population (persons) | + |
| | population growth rate | natural population growth rate | + |
| | Population distribution | Share of urban population (&) | + |
| Modernization of science and technology | Enterprise Innovation Achievements | The export sales revenue of new products from industrial enterprises above a designated size was ten thousand yuan. | + |
| | Scientific and technological research and development capabilities | R&D investment in GDP (%) | + |
| | Science and Technology Innovation Capacity | Number of enterprises in high-tech industries (units) | + |
| | Degree of Development of Informatization | Internet penetration (%) | + |
| Modernization of material and spiritual culture | Population's wealth | GDP per capita ($/person) | + |
| | Consumption of the population | Per capita disposable income of urban residents (yuan per person) | + |
| | Employment of the population | Employment in urban units (persons) | + |
| | Medical and health conditions of the population | Health technicians per 10,000 population (persons) | + |
| Modernization of Ecological Civilization | Environmental governance situation | Non-hazardous treatment rate of domestic waste (%) | + |
| | Greening level | Forest cover (%) | + |
| | Energy costs | Electricity consumption per 10,000 yuan of GDP (kWh/ Ten thousand yuan) | - |
| | | Energy consumption per 10,000 Yuan of GDP (tons of standard coal per 10,000 yuan) | - |

**Table 2.** The value of each secondary weighting indicator calculated by the TOPSIS entropy weighting method

| Secondary indicators | The information entropy value e | Information utility value d | Weight (%) |
|---|---|---|---|
| **GDP per capita (yuan/person)** | 0.960 | 0.040 | 5.854 |
| **Share of tertiary sector in GDP (%)** | 0.976 | 0.024 | 3.467 |
| **Sales revenue from export of new products of industrial enterprises above designated size (Ten thousand yuan)** | 0.799 | 0.201 | 29.645 |
| **Number of enterprises in high-tech industries (units)** | 0.868 | 0.132 | 19.424 |
| **R&D investment intensity (%)** | 0.957 | 0.043 | 6.290 |
| **Average number of students enrolled in higher education per 100,000 population (persons)** | 0.977 | 0.023 | 3.353 |
| **Natural population growth rate (%)** | 0.989 | 0.011 | 1.664 |
| **Share of urban population (%)** | 0.988 | 0.012 | 1.701 |
| **Internet penetration (%)** | 0.978 | 0.022 | 3.291 |
| **Per capita disposable income of urban residents (yuan per person)** | 0.959 | 0.041 | 6.052 |
| **Employment in urban units (10,000 persons)** | 0.953 | 0.047 | 6.969 |
| **Number of health technicians per 10,000 population (persons)** | 0.983 | 0.017 | 2.534 |
| **Non-hazardous treatment rate of domestic waste (%)** | 0.996 | 0.004 | 0.601 |
| **Forest cover (%)** | 0.962 | 0.038 | 5.605 |
| **Electricity consumption per 10,000 yuan of GDP (kWh/ 10000 yuan)** | 0.990 | 0.010 | 1.452 |
| **Energy consumption per 10,000 yuan of GDP (tons of standard coal per 10,000 yuan)** | 0.986 | 0.014 | 2.099 |

As can be seen from Table 3, in the decade 2012-2021, the modernization level of the eastern regions such as Guangdong, Beijing, Jiangsu, Zhejiang, Shanghai, Fujian, Tianjin and Shandong has always been at the forefront of the country, while the modernization level of the western regions such as Qinghai, Ningxia, Xinjiang and Tibet has been lower. Among them, the modernization level of Guangdong Province has consistently ranked first over the past decade, which also reflects that since the reform and opening up, Guangdong Province, as the first batch of open coastal areas, has explored the path of Chinese-style modernization, and has gradually become one of the most economically developed, dynamic and open provinces in the country, and has deservedly become the frontrunner of China's modernization, leading the development of the times; Jiangsu Province and Zhejiang Province Jiangsu Province and Zhejiang Province have always made steady progress in the process of modernization, and will surpass Beijing in 2014 and 2020 respectively,

leaping into the top three of the national modernization level. In addition, the modernization level of Anhui Province ranks first in the country in terms of the increase of modernization over the past ten years, from the middle to lower reaches of the country in 2012 to the middle to upper reaches of the country in 2021, which highlights the efforts made by Anhui Province in the modernization process to catch up with the country and constantly strive for development.

**Table 3.** Ranking of Chinese path to modernization levels by province from 2012 to 2021

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Beijing** | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 |
| **Tianjin** | 7 | 7 | 7 | 7 | 8 | 7 | 7 | 9 | 10 | 9 |
| **Hebei** | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 22 | 22 | 23 |
| **Shanxi** | 27 | 25 | 26 | 24 | 24 | 26 | 26 | 26 | 26 | 27 |
| **Inner Mongolia** | 25 | 24 | 25 | 26 | 26 | 25 | 25 | 25 | 25 | 25 |
| **Liaoning** | 11 | 9 | 11 | 11 | 14 | 16 | 17 | 16 | 18 | 16 |
| **Jilin** | 19 | 19 | 20 | 21 | 22 | 19 | 19 | 18 | 19 | 18 |
| **Heilongjiang** | 17 | 20 | 21 | 22 | 21 | 22 | 22 | 23 | 23 | 21 |
| **Shanghai** | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| **Jiangsu** | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| **Zhejiang** | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 |
| **Anhui** | 21 | 22 | 22 | 18 | 18 | 18 | 16 | 15 | 15 | 14 |
| **Fujian** | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| **Jiangxi** | 9 | 10 | 9 | 9 | 9 | 9 | 8 | 7 | 7 | 7 |
| **Shandong** | 8 | 8 | 8 | 8 | 7 | 8 | 9 | 11 | 8 | 8 |
| **Henan** | 22 | 17 | 17 | 13 | 11 | 12 | 13 | 19 | 13 | 13 |
| **Hubei** | 15 | 14 | 14 | 16 | 15 | 14 | 10 | 8 | 9 | 10 |
| **Hunan** | 14 | 13 | 13 | 15 | 16 | 15 | 15 | 12 | 14 | 15 |
| **Guangdong** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Guangxi** | 12 | 15 | 15 | 17 | 17 | 17 | 18 | 17 | 16 | 17 |
| **Hainan** | 10 | 11 | 10 | 10 | 10 | 11 | 12 | 13 | 17 | 19 |
| **Chongqing** | 16 | 16 | 16 | 14 | 13 | 13 | 14 | 14 | 12 | 11 |
| **Sichuan** | 20 | 18 | 19 | 19 | 19 | 20 | 20 | 20 | 20 | 20 |
| **Guizhou** | 24 | 26 | 24 | 25 | 25 | 24 | 24 | 24 | 24 | 24 |
| **Yunnan** | 18 | 21 | 18 | 20 | 20 | 21 | 21 | 21 | 21 | 22 |
| **Xizang** | 26 | 28 | 28 | 28 | 28 | 28 | 27 | 27 | 27 | 26 |
| **Shaanxi** | 13 | 12 | 12 | 12 | 12 | 10 | 11 | 10 | 11 | 12 |
| **Gansu** | 29 | 30 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 29 |
| **Qinghai** | 31 | 31 | 29 | 30 | 30 | 31 | 31 | 31 | 31 | 31 |
| **Ningxia** | 30 | 29 | 30 | 29 | 29 | 29 | 28 | 28 | 28 | 28 |
| **Xinjiang** | 28 | 27 | 27 | 27 | 27 | 27 | 29 | 29 | 29 | 30 |

However, the ranking in Table 3 also intuitively reflects that there are obvious differences in the modernization levels of China's four major regions, which can be more intuitively reflected in Figures 1-4. The vast majority of provinces in the eastern region have a level of Chinese-style modernization that is at the forefront of the country, but Hebei Province has a relatively low level of modernization; The modernization levels of the central region and the three northeastern provinces are relatively similar, but the difference is that the overall level of the central region has increased in the period 2012-2021, while the northeastern region has a downward trend; the overall level of the western region is low, with more provinces in the middle and lower ranks of the country's modernization level. The overall level of the western region is on the low side, with more provinces ranking in the middle and lower ranks of the country's modernization level, which also highlights the contradictions of the economic modernization of the western region in terms of the small size of its economy, the low level of its industrial structure, and the fact that the kinetic energy of its economic modernization has yet to be transformed.

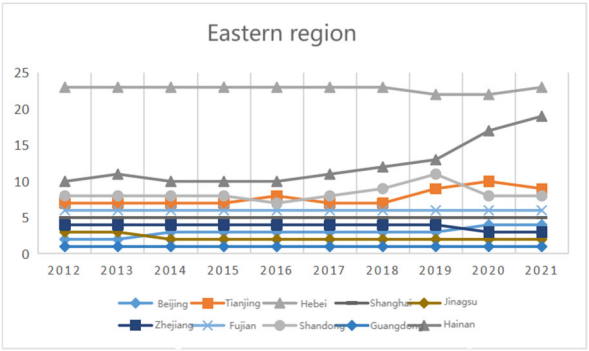


**Figure 1.** The level evolution process of Chinese path to modernization in the eastern region.

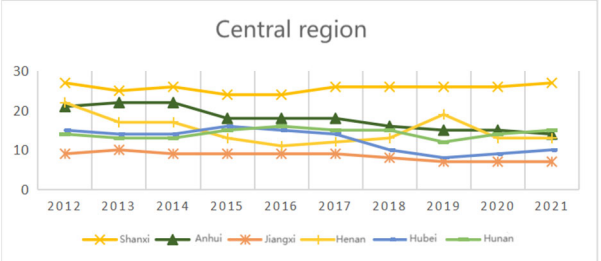


**Figure 2.** The evolution process of Chinese path to modernization in central China.

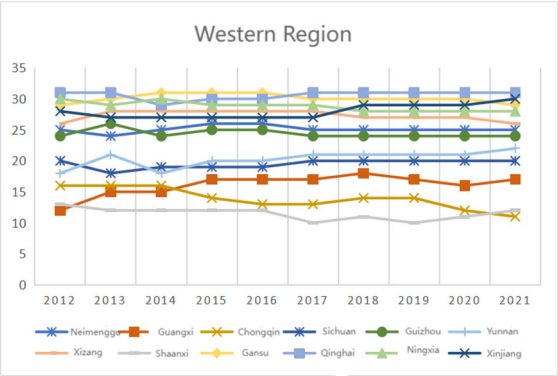


**Figure 3.** The evolution process of Chinese path to modernization in western China.

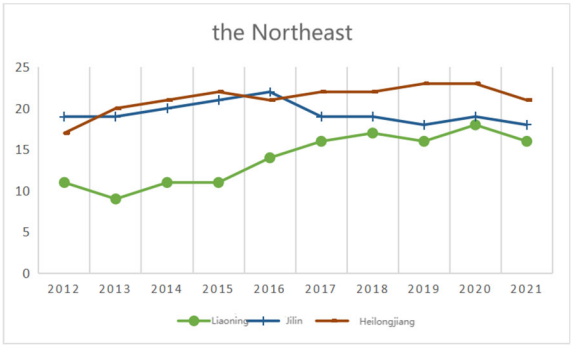


**Figure 4.** The Evolution of Chinese path to modernization in Northeast China.

## 3.3. Dynamic integrated evaluation

The static comprehensive evaluation results indicate an imbalanced development in the modernization levels of China's four major regions, both among and within them. The static comprehensive evaluation demonstrates the level of each region's evolution. However, it does not consider the value of time fully. Therefore, the time weight vector is introduced based on the static comprehensive evaluation. The minimum variance method is then applied to carry out the dynamic comprehensive evaluation, which solves the nonlinear planning problem.

$$\begin{cases} \min\left(\dfrac{\sum_{k=1}^{p}\omega_k^2}{p}-\dfrac{1}{p^2}\right) \\ s.t.\lambda=\sum_{k=1}^{p}\dfrac{p-k}{p-1}\omega_k \\ \sum_{k=1}^{p}\omega_k=1,\ \omega_k\in[0,1],\ k=1,2,\cdots,p. \end{cases} \tag{1}$$

The time weight coefficient is represented by $\omega_k$, the number of moments by $p$, and the 'degree of time' by $\lambda$. If $\lambda \to 1$, the evaluator focuses on recent data, while if $\lambda = 0.1$, the evaluator focuses on long-term data. This paper determines that a 'degree of time' $\lambda = 0.1$ is the most appropriate choice, based on relevant literature. The equation (1) is solved using LINGO 18.0 software to obtain the time weight vector as $W = (0, 0, 0, 0, 0, 0, 0.070, 0.190, 0.310, 0.430)^T$. The data is then weighted using a quadratic weighting set. The dynamic comprehensive evaluation value and ranking of the modernization level of 31 provinces (cities) in China are obtained by weighting the data twice, as shown in Figure 5.

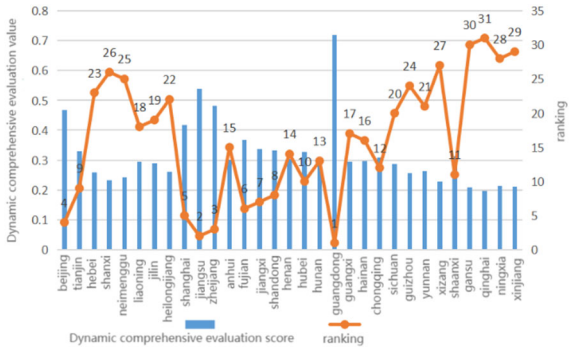


**Figure 5.** Dynamic comprehensive evaluation score and ranking of Chinese path to modernization level in various regions.

According to Figure 5, Guangdong, Jiangsu, Zhejiang, Beijing, and Shanghai are among the top five provinces in China in terms of modernization levels. Meanwhile, Fujian, Jiangxi, Shandong, Tianjin, and Hubei are in the upper reaches of the country. The modernization levels of Shaanxi, Chongqing, Hunan, Henan, Anhui, Hainan, Guangxi, Liaoning, Jilin, Sichuan, and Yunnan are in the middle reaches, while the modernization levels of Heilongjiang, Hebei, Guizhou, Inner Mongolia, Shanxi, Tibet, Ningxia, Xinjiang, Gansu, and Qinghai are in the lower reaches of the country. The evaluation scores for the modernization level of the top five provinces and cities are significantly higher than those of other provinces, indicating significant disparities in modernization between regions. Based on the four major regions of China, the majority of provinces and cities in the eastern region have higher levels of modernization. In the central and northeast regions, most are at midstream levels. In the western region, most provinces and cities are at the middle and lower levels, with significant internal differences. Shaanxi Province has the highest level of modernization, ranking 11th in the country, while Qinghai Province has the lowest level, ranking 31st. Overall, the results of both the dynamic and static comprehensive evaluations, as well as the current reality, confirm each other and accurately reflect the level and evolution of modernization in various regions of China over the past decade.

# 4. Dynamic Evolution of the Level of Chinese-style Modernization

The Kernel Density Estimation (KKDE) method can be used to explore the spatio-temporal pattern and dynamic evolution trend of the modernization level at both national and subregional levels. This method can reveal the characteristics of the distribution of Chinese-style modernization level as a whole and locally, and analyze the dynamic changes in the modernization level. This method can reveal the characteristics of the distribution of Chinese-style modernization level as a whole and locally, and analyze the dynamic changes in the modernization level. This method can reveal the characteristics of the distribution of Chinese-style modernization level as a whole and locally, and analyze the dynamic changes in the modernization level. It provides important references for policy formulation.

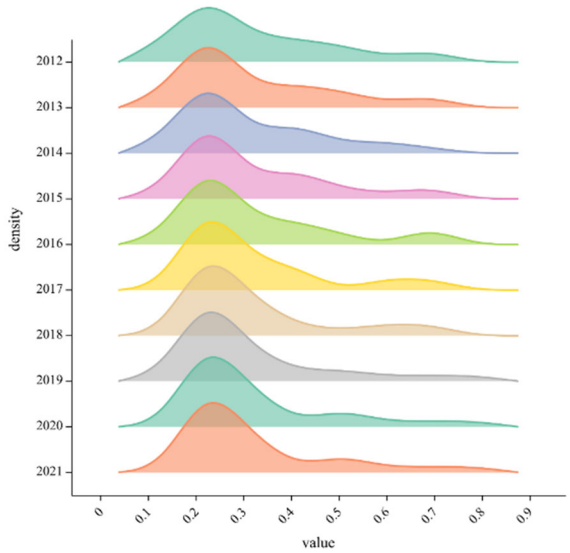


**Figure 6.** Distribution of kernel density at the national modernization level from 2012 to 2021.

Observation of China's national kernel density distribution map from 2012 to 2021 reveals an overall trend of shifting to the right. The kernel density curve has a prominent peak at around 0.2 and is gradually moving closer to 0.3, indicating an increase in China's modernization level. Since 2016, the level of modernization has shown small peaks in certain regions and has increased year by year. This indicates that the level of modernization in some regions is significantly higher than in others, leading to greater regional differences and increased imbalance.

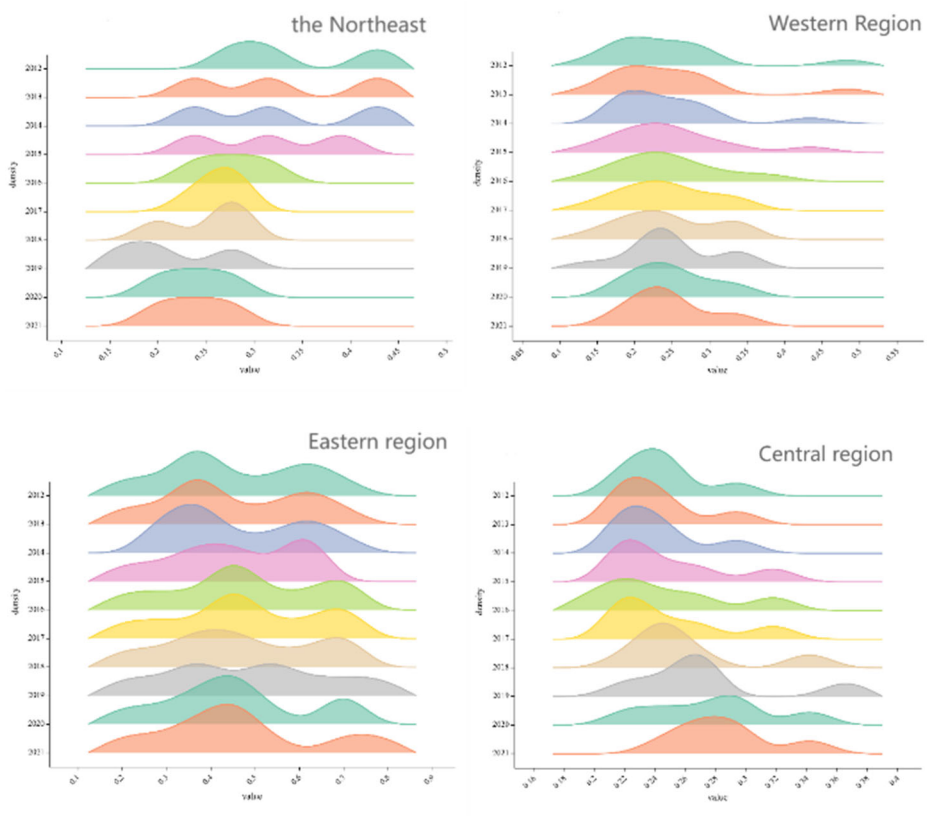


**Figure 7.** Nuclear density distribution in four major regions.

Based on the nuclear density distribution map of the four regions, it is evident that the curve of nuclear density in the eastern region has a gentler slope, indicating a more stable and consistent level of modernization with a clear peak. From 2012 to 2016, the peak in the eastern region shifted to the right, while the small peak on the right moved closer to the center. After 2016, the wealth value began to average out, with the average level reaching its peak in 2018. These trends suggest an increase in modernization in the eastern region. In the Northeast region, the peak tends to shift leftward. Several small peaks merged during this process, culminating in a large peak in 2016. This suggests a concentration of wealth in a particular area and a slight imbalance in the region's level of modernization. The kernel density curve for the central region shows a process of peaking, gradual flattening, peaking again, and gradual flattening again. Additionally, the center point

tends to move to the right. Intra-regional differences decrease, indicating that the modernization level of the central region is not yet stable enough, but there is a tendency to improve. The kernel density curve in the western region has evolved from a smooth development to the emergence of a peak. The peak has a tendency to move to the right, but the range of movement is slightly smaller. The small peak on the right disappeared in 2016. This indicates that the modernization level of the western region has a tendency to improve. However, attention should be paid to the problem of increasing intra-regional disparities.

In summary, the distribution map of nuclear density in the four major regions reveals differences in the levels of modernization across China. The government should take measures to address the issue of excessive disparities in modernization levels among different regions.

# 5. Conclusion

This paper evaluates the level of Chinese-style modernization of all provinces and cities in the country from 2012-2021 using a corresponding index system based on the connotation of Chinese-style modernization. The evaluation is done from static and dynamic multi-dimensional perspectives through the entropy-weighted TOPSIS method. The study utilizes the Terre index, Dagum's Gini coefficient, and Kernel's kernel density estimation method to analyze the temporal evolution pattern of the modernization level of China's 31 provinces and municipalities. The study also examines regional differences, leading to conclusions and recommendations that may aid in comprehending the concept of modernization level and how to attain it.

Chinese-style modernization is a significant aspect of global modernization. Analyzing China's relative level and international position in the world system can provide a broad understanding of the basic situation of Chinese modernization. China initiated its modernization efforts around 1840, approximately a century after the pioneering Western countries. China has undergone various stages of modernization, from partial to complete modernization, and now aims to build a moderately prosperous society. However, the level of modernization varies significantly across different regions of the country. However, the level of modernization varies significantly across different regions of the country. However, the level of modernization varies significantly across different regions of the country. Most provinces in the eastern region have high levels of modernization, with Hebei Province being an exception. The central region and the three northeastern provinces have similar levels of modernization, but the overall level in the central region has increased between 2012-2021, while the northeastern region has experienced a decline. The western region's overall modernization level is relatively low, with many provinces ranking in the middle and lower tiers compared to the rest of the country. This highlights the contradictions that exist in the region's journey towards economic modernization, including a relatively small economy, a low level of industrial structure, and a lack of transformation in the kinetic energy of economic modernization.

The results of the dynamic evolution analysis indicate that China's modernization level has been increasing from 2012 to 2021. Additionally, the difference in modernization level across the country has significantly decreased since 2016. The kernel density distribution map provides a better understanding of the changes in modernization levels across different regions. Based on the changes in the kernel density curve, it is evident that the modernization level of the eastern, central, and western regions has improved, while the northeastern region is slightly lagging behind in terms of equilibrium.

The modernization level is a crucial development goal set forth by the Communist Party of China (CPC). Its aim is to enable all individuals to share in the benefits of development and achieve a moderately prosperous society in all aspects. Achieving the modernization level is a long-term and complex process that requires the joint efforts of the government, enterprises, and all sectors of society. This paper presents four recommendations to improve the level of Chinese-style modernization in China based on empirical findings:

Promoting economic development is key to improving modernization. Promoting economic development is key to improving modernization. Promoting economic development is key to improving modernization. Economic growth leads to more employment opportunities and wealth accumulation. The government can encourage business investment and entrepreneurship by providing preferential policies, such as tax reductions and low-interest loans. At the same time, the government can increase its investment in social infrastructure, such as education and healthcare, to enhance the productivity and competitiveness of society.

Additionally, promoting innovation and entrepreneurship can drive economic development, creating new industries and employment opportunities. The government can enhance its support for science, technology, culture, and the arts to encourage innovation, business startups, and job creation. Additionally, the government can strengthen the protection of intellectual property rights to safeguard the interests of innovators and motivate more people to invest in innovation.

Thirdly, the government should strengthen social security to improve the living standards and sense of access of disadvantaged groups. A comprehensive social security system, including medical insurance, pension insurance, unemployment insurance, and housing security, should be established so that everyone can enjoy basic social security benefits. At the same time, the government can raise the minimum wage to protect the basic living standards of workers.

Finally, promoting urban-rural integration can help bridge the gap between urban and rural areas, which is one of the main reasons for the current low level of modernization. The government can promote urban-rural integration to break the dual structure of urban and rural areas, balance the allocation and optimize the use of urban and rural resources, improve rural infrastructure and public services, and increase farmers' income. Simultaneously, the government can promote urbanization and increase support for small towns, central, and western regions. This will provide more people with the opportunity to access better living conditions and development in cities.

# References


[1] Gao Bo, Lv Youjin. Chinese-style modernization road: theoretical logic, realistic characteristics and promotion path[J]. Hebei Journal,2022(06):110-118.

[2] Zang, F.Y. Marx's modernity thought and the practical logic of Chinese-style modernization [J]. Chinese Social Science, 2022, (07): 39-55+204-205.

[3] CHEN Shengli,WAN Zheng. Chinese-style modernization level measurement, regional differences and distributional dynamics [J]. Journal of Chongqing University of Technology (Social Science), 2023 (01): 1-22.

[4] JIANG Yongmu,LI Xiang,TANG Yong. The construction of evaluation index system of Chinese-style modernization[J]. Reform,2022,(12):22-35.

[5] Ziya Gökalp. Turkish nationalism and western civilization:selected essays of Ziya Gökalp [M]. New York: Columbia University Press,1959:71-72.

[6] QI Ling. The four comprehensives:The latest achievement of China's modernization theory[J]. Theory and Modernization, 2016 (01): 15-21.

[7] Song Guokai. Imminent research on major theories of socialist modernization with Chinese characteristics:research significance, relationship, theme and outlook[J]. Journal of Beijing Institute of Technology (Social Science Edition), 2018 (02): 17-25.

[8] Ren Baoping,Fu Yamei. Innovation of socialist modernization theory and practice with Chinese characteristics in the new era[J]. Economic Issues,2018(09):1-7.

[9] Yin Desheng. The "two major layouts" promote a new leap in Chinese modernization theory [J]. Shanghai Economic Research, 2021(12):5-13.

[10] Sang, Mingxu. Capital logic, fairness and justice and modernization of national governance:Practical and theoretical exploration of socialism with Chinese characteristics[J]. Seeking,2017(03):81-88.

[11] He Aiguo. Formation logic of the new road of Chinese-style modernization in the changing situation[J]. Journal of Shanghai Jiao Tong University (Philosophy and Social Science Edition),2023,31(02):112-120+142.

[12] GUO Han,REN Baoping. Common wealth in the process of Chinese-style modernization:The course of practice and the choice of path[J]. Reform,2022(7):16-25.

[13] ZHANG Zhanbin,FU Xia. The universality of modernization and the distinctive features of Chinese-style modernization[J]. Theoretical Perspectives,2023,(03):54-61.

[14] LI Liu-Rui,CHENG Wei-Ping,ZHOU Zhi-Wen. Discussion on China's modernization standard[J]. Macroeconomic Research,2001(06):27-31.

[15] GUO Hongmao,WANG Jianting. Reflections on the Design of Standards and Evaluation Indicators for Modernization in China[J]. City,2003,(01):37-39.

[16] LI Xuhui,ZHU Qigui,XIA Wanjun et al. Research on economic and social development evaluation system based on five development concepts:based on quadratic weighted factor analysis[J]. Mathematical Statistics and Management, 2019 (03): 506-518.

[17] XU Yinliang,WANG Huiyan. Construction and empirical evidence of regional high-quality development index system based on five development concepts[J]. Statistics and Decision Making,2020(14):98-102.

[18] JIANG Yongmu,LI Xiang,TANG Yong. The construction of evaluation index system of Chinese-style modernization[J]. Reform,2022,(12):22-35.

[19] Ren Baoping,Zhang Qian. Constructing a Scientific and Reasonable Evaluation Indicator System for Chinese-style Modernization[J]. Academia,2022(06):33-42.