International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 06 Issue 08 August 2023
DOI: 10.47191/ijcsrr/V6-i8-50, Impact Factor: 6.789
IJCSRR @ 2023

Research on the Measurement of the Modernization Level and Efficiency Changes of the Economic System

Limin Xu[1], Diping Zhang[2], Jianya Gu[3]

[1,2] School of Science, Zhejiang University of Science and Technology, Hangzhou, China

[3] School of Marxism, Zhejiang University of Science and Technology, Hangzhou, China

ABSTRACT: The modernization of the economic system stands as a crucial strategic initiative within the comprehensive construction of a socialist modernized nation. This paper establishes a comprehensive evaluation index system for economic system modernization. Utilizing the entropy-weighted-TOPSIS method, the economic system modernization levels for the years 2012-2021 are computed, taking the province of Zhejiang as a case study. Additionally, an efficiency input-output index system for economic system modernization is constructed. Employing the super-efficiency DEA-Malmquist model, the super-efficiency values and the dynamic changes in efficiency for various municipalities within Zhejiang Province are ascertained. The study reveals that the developmental level of Zhejiang Province's economic system modernization has exhibited a consistent annual advancement. While the overall modernization efficiency values of each municipality have risen, regional disparities persist. Notably, technological progress efficiency emerges as the principal determinant influencing the fluctuations in total factor productivity. Consequently, the process of advancing economic system modernization warrants an emphasis on high-tech industries and educational investments, the enhancement of fundamental circulation infrastructure, a dedicated focus on technological progress, and the strengthening of interregional linkages.

KEYWORDS: Comprehensive evaluation, Entropy-weighted-TOPSIS, Modernized economic system, Super-efficiency DEA-Malmquist.

I. INTRODUCTION

The concept of "constructing a modernized economic system," explicitly put forth for the first time in the 19th National Congress Report of the Communist Party of China (CPC), represents a strategic initiative grounded in the pursuit of the twin centenary goals and aligned with the new era of socialism with Chinese characteristics. Zhejiang Province, as a prominent economic powerhouse in China, stands at the forefront of domestic economic dynamism. During the 15th Party Congress of Zhejiang Province held on June 20, 2022, Yuan Jiajun, the then Secretary of the Provincial Party Committee, advocated for the "high-level construction of a modernized economic system" and the establishment of a "high-quality development hub." This vision serves as a significant endeavor for Zhejiang Province's future development and construction. It underscores the consensus in China, particularly in Zhejiang Province, on the imperative of constructing a modernized economic system. As such, the pursuit of a high-level and high-quality modernization of the economic system will undoubtedly emerge as a pivotal agenda item for Zhejiang Province throughout the "14th Five-Year Plan" period and in the "2035 Vision Plan".

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 06 Issue 08 August 2023
DOI: 10.47191/ijcsrr/V6-i8-50, Impact Factor: 6.789
IJCSRR @ 2023

II. LITERATURE REVIEW

Research on advancing the modernization of the economic system has been widely conducted both domestically and internationally. It is evident that China's unique national conditions and ideological factors have shaped distinct research perspectives on economic system modernization among Chinese scholars, differing from those of overseas scholars. Nevertheless, valuable insights can be gleaned from their respective cases. Barro (2002) posited that economic development cannot be solely measured through the fluctuations of economic development indicators such as GDP. Instead, a comprehensive assessment should encompass a range of factors influencing the quality of economic development. Notably, fertility rate, income disparity, social production systems, and environmental preservation hold particular significance. Thomas et al. (2001) introduced a novel understanding of economic growth, contending that while pursuing growth velocity, equal emphasis should be placed on enhancing growth quality, thereby maintaining a trajectory of stable and sustained economic expansion. Fabio (2008) attributed the embodiment of economic growth quality to the elevation of the workforce's skill set, the fostering of equitable social strata, and the promotion of ecologically sustainable development. These dimensions were assessed through the lens of human resources, the assurance of social public services, and the urban living environment. David (2009) underscored that the purpose of economic growth is to serve the societal needs of individuals, entailing a tangible elevation of living standards and harmonious coexistence between humanity and nature. This perspective aligns with China's advocacy of sustainable development and the New Development Concept, reflecting shared conceptual underpinnings. In summary, while the approach to studying economic system modernization varies between Chinese and overseas scholars due to contextual disparities, noteworthy methodologies and insights from scholars such as Barro, Thomas, Fabio, and David can be leveraged to inform our understanding of this complex endeavor.

Subsequent to the formal proposition of economic system modernization, domestic experts and scholars have conducted meticulous analyses. Scholars have examined the concept from a holistic perspective of the economy's overall operation. Feng Bai et al.(2018), as well as Hong (2019), assert that the construction of a modernized economic system constitutes the pivotal juncture for embarking upon a comprehensive journey toward modernization. This necessitates addressing aspects such as economic system structure, growth dynamics, and a scientifically efficient national governance system. Cai (2020) emphasizes that the modernized economic system should be rooted in China's fundamental national conditions. While drawing from the development experiences of Western developed nations, it must be tailored to the socialist market economy system with Chinese characteristics. Zhang, Fang, and Tang (2021) take a structural perspective on the modernized economic system and propose the exploration of domestic market potential. They also aim to surmount structural issues like supply-demand imbalances, market bottlenecks, irrational income distribution systems, and domestic market segmentation. Duan and Wang (2022), among others, contend that the modernized economic system is an objective requirement for effectively addressing the transformation of societal contradictions in China's current stage. Accordingly, rational adjustments to the economic system should span multiple dimensions, encompassing industrial systems, market systems, distribution systems, regional development systems, green development systems, open systems, and economic institutional systems. Zhang (2022) amalgamates the construction of a modernized economic system with the new development paradigm, highlighting the fundamental congruence between the key issues addressed by the two. Both avenues prioritize multifaceted approaches concerning the real economy, innovation-driven strategies, the enhancement of market mechanisms, and the pursuit of shared prosperity.

The existing literature offers a wealth of qualitative research on the modernization of economic systems, predominantly analyzing and discussing from a macro-global perspective. However, quantitative empirical studies are relatively scarce. The cohesive and

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 06 Issue 08 August 2023
DOI: 10.47191/ijcsrr/V6-i8-50, Impact Factor: 6.789
IJCSRR @ 2023

stable operation of a modernized economic system necessitates a foundation grounded in China's objective and fundamental national conditions, emphasizing a comprehensive approach to development. This harmonizes well with the concept of high-quality economic development. Drawing insights from both domestic and international research on economic system modernization, this paper takes Zhejiang Province as a case study. In alignment with its actual developmental context, the study aims to provide a comprehensive evaluation of Zhejiang Province's economic system development from 2012 to 2021. Furthermore, it conducts an efficiency assessment and analysis of the modernization of economic systems across various municipalities within the province. Through this endeavor, the paper endeavors to offer insights and recommendations that could serve as a reference not only for the high-level construction of a modernized economic system in Zhejiang Province but also for expediting the transformation of economic systems towards modernization in other provinces across China.

III. CONSTRUCTION OF RESEARCH INDICATOR SYSTEM

A. Comprehensive Evaluation Indicator System for Economic System Modernization

In this study, a comprehensive evaluation of economic system modernization in Zhejiang Province is conducted, necessitating a targeted construction of an indicator system aligned with its unique economic development level and system characteristics. Therefore, the design of evaluation indicators should adhere to the following principles: (1) The Principle of Scientific Rigor, (2) The Principle of Systematic Integration, (3) The Principle of Feasibility, and (4) The Principle of Representativeness.

Viewed from the goals of economic system modernization and the metrics used to assess China's economic system modernization, the essence of economic system modernization shares continuity with the concepts of high-quality economic development and the New Development Ideas. Hence, building upon relevant research on high-quality development and the New Development Ideas, we maintain the aforementioned principles for constructing the indicator system. Grounded in the principles of economic system construction, Zhejiang Province's future development plans, and the "2035 Vision Goal," we design a comprehensive evaluation indicator system for Zhejiang's economic system modernization. This system evaluates four key dimensions: growth dynamics, resource allocation, industrial systems, and societal harmony.

Based on the above analysis, this paper establishes the Comprehensive Evaluation Indicator System for Economic System Modernization (Table 1). The primary data sources include statistical yearbooks from Zhejiang Province and its municipalities, as well as the "China Science and Technology Statistics Yearbook".Calculation method using entropy-weight-Topsis.

Table 1. Comprehensive Evaluation Index System for Economic System Modernization

Primary indicators	secondary indicators	indicator meaning
Growth Momentum	Proportion of scientific research funding investment	R&D expenditure/GDP
	Number of patent authorizations per 10000 people	Current year's patent authorization volume/permanent population
	Provincial road network density	Density of transportation routes (railways, inland rivers, etc.)

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 06 Issue 08 August 2023
DOI: 10.47191/ijcsrr/V6-i8-50, Impact Factor: 6.789
IJCSRR @ 2023

	educational benefits	Average length of education
	High tech innovation technology profitability	High tech industry business income/GDP
resource allocation	Degree of marketization of labor factors	Private individual employment/total number of employees
	Technology market activity	Technology Market Turnover/GDP
	Government investment activity	Budget funds/total social investment
	Perfection of circulation facilities	Total area of urban logistics and warehousing land/constructed land
	Advanced industrial structure	Advanced Industrial Structure Index
industrial system	Proportion of tertiary industry	Gross Domestic Product/GDP of the Third Industry
	overall labor productivity	Total Labor Force/GDP
	Energy Productivity	Annual power generation/GDP
	agricultural mechanization level	Comprehensive mechanization rate of main crops
	Differences in urban and rural consumption	Per capita consumption ratio in urban and rural areas
	air quality	air quality index
	product quality	Product Quality Index
social harmony	Dependence on domestic trade	Total retail sales of social consumer goods/GDP
	Fair secondary distribution	Social Security and Employment Expenditure/GDP
	income	Per Capita Disposable Income
	Medical and health benefits	Number of beds in medical and health institutions for thousands of people

B. Economic System Modernization Efficiency Index System

Building upon the developmental objectives elucidated in the preceding sections, this study adopts per capita regional gross domestic product (GDP) and the proportion of the tertiary industry as output indicators. Additionally, research and development expenditure as a proportion of GDP, investment in high-tech service industries, and the level of government investment activity are selected as input variables. Through this selection, we establish the Economic System Modernization Efficiency Input-Output Index System for Zhejiang Province (Table 2). The data employed in this analysis are sourced from statistical yearbooks of various municipalities and relevant governmental reports.

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 06 Issue 08 August 2023
DOI: 10.47191/ijcsrr/V6-i8-50, Impact Factor: 6.789
IJCSRR @ 2023

Table 2. Input Output Indicator System for Modernization Efficiency of Economic System

Indicator type	Indicator Name (Unit)	Indicator symbol
Input variables	Research funding investment (100 million yuan)	I_1
	Investment in high-tech service industry (100 million yuan)	I_2
	Total government investment (100 million yuan)	I_3
output variables	Per capita Gross Regional Product (10000 yuan)	O_1
	Proportion of tertiary industry (%)	O_2

The approach for calculating efficiency values is outlined as follows:

The Data Envelopment Analysis (DEA) is a non-parametric model that employs linear programming as a tool to compute the relative efficiency among different Decision Making Units (DMUs). A significant advantage of DEA over other parametric models lies in its avoidance of weight assumptions, making it immune to the influence of dimensionality and researcher subjectivity in the chosen indicators. Moreover, it is notably suitable for small sample sizes (Yang and Wei, 2022). Nonetheless, the conventional DEA model, despite its effectiveness, exhibits limitations in estimating the efficiency values of effective DMUs. This signifies that while DEA is efficient, it fails to estimate the efficiency values of efficient DMUs adequately. In this study, we employ the super-efficiency DEA model, which aims to address the deficiencies of the standard efficiency DEA model. The specific formulation is presented as follows:

$$\min[\theta - \varepsilon(\sum_{i=1}^{m} s_i^- + \sum_{r=1}^{s} s_r^+)]$$
$$s.t.\sum_{j=1,j\neq k}^{m} x_{ij}\lambda_j + s_i^- = \theta x_0, j = 1,2,\ldots,m, \quad (1)$$
$$\sum_{j=1,j\neq k}^{n} y_{rj}\lambda_j - s_r^+ = y_0, r = 1,2,\ldots,s,$$
$$\lambda_j \geq 0, j = 1,2,\ldots,n, s_r^+ \geq 0, s_i^- \geq 0.$$

In Formula (1), the variable "n" signifies the number of decision-making units (DMU), with each DMU having "m" input variables and "s" output variables, denoted by "x_{ij}" and "y_{rj}" respectively. The parameter "θ" represents the target value of the optimization, signifying the efficiency of the modernization construction of an economic system within a specific municipality. A value of θ=1 indicates that the efficiency of the modernization construction of the economic system in that particular city has reached relative effectiveness. "λ" stands as a decision variable in the optimization, "and" acts as a slack variable, while "ϵ" represents a non-Archimedean infinitesimal quantity. In the context of the super-efficiency DEA model, the exclusion of evaluated units from the set of decision-making units ($j\neq k$) ensures that the super-efficiency value of DMU with ineffective DEA remains unchanged, while the super-efficiency value of effective DMU is greater than or equal to 1.

To delve further into the dynamic aspects of the efficiency of economic system modernization construction, this paper incorporates the Malmquist index as a complementary component of the super-efficiency DEA model. The specific decomposition is presented as follows:

$$\boldsymbol{tfpch = effech \times techch = pech \times sech \times techch} \quad (2)$$

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 06 Issue 08 August 2023
DOI: 10.47191/ijcsrr/V6-i8-50, Impact Factor: 6.789
IJCSRR @ 2023

IV. EMPIRICAL RESULTS ANALYSIS

A. Comprehensive Evaluation of Economic System Modernization

In accordance with the preceding exposition on the entropy-weighted-TOPSIS method and in conjunction with the comprehensive evaluation index system constructed within this study for Zhejiang Province's economic system modernization, the computation of entropy weight, coefficient of variation, and composite weight for each requisite indicator for the years 2012-2021 is executed (refer to Table 3). Furthermore, drawing upon the relative entropy-based TOPSIS method, the comprehensive evaluation index for Zhejiang Province's economic system modernization is computed. Subsequently, this study proceeds to depict the developmental trajectory of Zhejiang Province's economic system modernization by generating a graph illustrating the levels of modernization (refer to Figure 1).

Table 3. Entropy, coefficient of difference, and weight of various indicators

Index	Entropy	diversity factor	comprehensive weight	Index	Entropy	diversity factor	comprehensive weight
X_1	0.643	0.357	0.066	X_{12}	0.782	0.218	0.040
X_2	0.585	0.415	0.077	X_{13}	0.835	0.165	0.031
X_3	0.501	0.499	0.091	X_{14}	0.707	0.293	0.054
X_4	0.480	0.520	0.096	X_{15}	0.784	0.216	0.040
X_5	0.792	0.208	0.035	X_{16}	0.772	0.228	0.042
X_6	0.863	0.137	0.025	X_{17}	0.804	0.196	0.036
X_7	0.809	0.191	0.035	X_{18}	0.717	0.283	0.052
X_8	0.833	0.167	0.031	X_{19}	0.932	0.068	0.013
X_9	0.564	0.436	0.080	X_{20}	0.699	0.301	0.056
X_{10}	0.916	0.084	0.016	X_{21}	0.791	0.209	0.039
X_{11}	0.787	0.213	0.039				

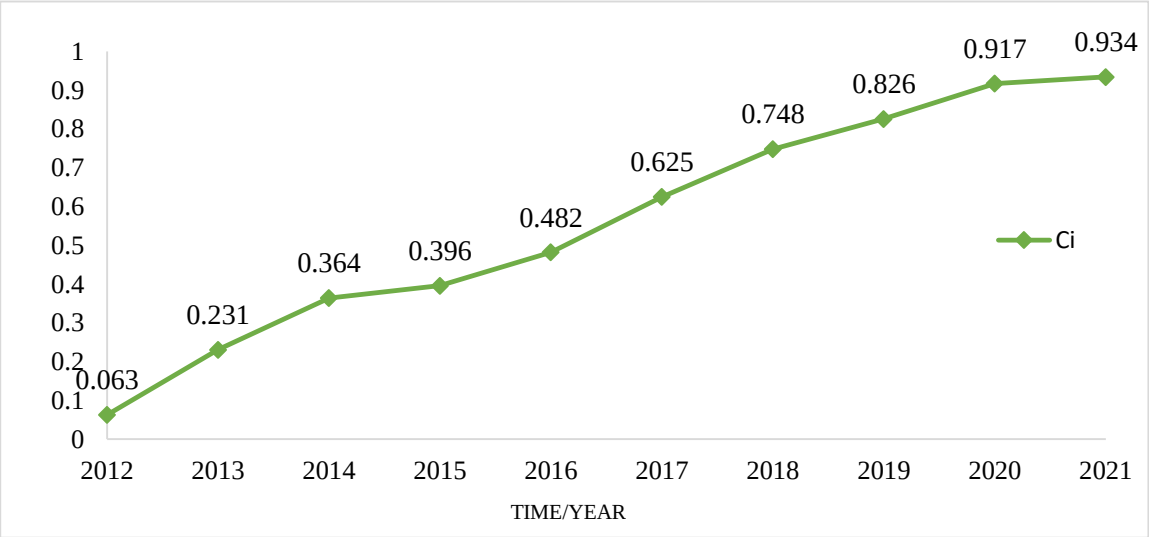

Figure 1. Economic System Modernization Development Level of Zhejiang Province

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 06 Issue 08 August 2023
DOI: 10.47191/ijcsrr/V6-i8-50, Impact Factor: 6.789
IJCSRR @ 2023

Over the period spanning 2012 to 2021, the developmental trajectory of Zhejiang Province's economic system modernization exhibits a consistent year-on-year advancement, culminating in a remarkable leap from an initial level of 0.063 in 2012 to 0.934 in 2021. Upon closer examination of specific temporal segments, a deceleration in the growth rate of modernization is discernible during the years 2014 to 2016. Pertinent sources reveal that in 2014, Zhejiang Province witnessed a transformative shift in the development of e-commerce and the internet economy. Noteworthy milestones include Alibaba Group's successful listing on the U.S. stock market and the globalization of the "Double Eleven" e-commerce phenomenon. Concurrently, Zhejiang proactively aligned itself with the Shanghai Free Trade Zone, establishing strategic cooperative zones in Jiaxing and Fenghua. Consequently, post-2014, Zhejiang Province successfully embarked on a rapid transformation toward economic system modernization, thereby departing from conventional patterns of economic growth. Despite encountering a setback in 2020 due to the COVID-19 pandemic, which induced a temporary localized economic stagnation, governmental efforts aimed at heightened investment yielded a 5.3% increase in infrastructure investment. This endeavor, alongside steadfast support for e-commerce and the internet economy, concurrently addressed deficiencies in transportation infrastructure. Notably, comprehensive transportation investments reached a formidable sum of 360 billion yuan, thereby enhancing the robustness and efficacy of the economic system's operations.

B. Empirical Analysis of Economic System Modernization Efficiency

In this section, the empirical analysis of economic system modernization efficiency is conducted. The Matlab2020 software is employed to perform calculations based on the super-efficiency Data Envelopment Analysis (DEA) model for the years 2012-2021 in Zhejiang Province, yielding the results presented in Table 4. To facilitate a comparative examination of the variations in economic system modernization efficiency among different municipalities within Zhejiang Province, the study period is divided into two stages: 2012-2016 and 2017-2021. Subsequently, the super-efficiency values for each municipality are ranked.

Table 4. Economic System Modernization Superefficiency and Ranking

Time	Hangzhou	Ningbo	Shaoxing	Wenzhou	Jiaxing	Huzhou	Jinhua	Quzhou	Lishui	Taizhou	Zhoushan
2012	1.639	1.283	1.310	1.039	1.023	0.939	0.837	0.602	0.730	0.832	1.293
2013	1.537	1.183	1.270	1.004	0.984	0.949	0.882	0.728	0.767	0.941	1.117
2014	1.732	1.375	1.174	0.965	0.837	0.924	0.935	0.736	0.781	0.936	1.248
2015	1.730	1.428	1.056	0.922	0.929	0.897	0.994	0.818	0.743	1.035	1.074
2016	1.947	1.495	1.038	0.985	0.993	0.920	1.033	0.830	0.804	0.985	1.003
2017	2.172	1.583	1.106	0.963	1.035	0.947	1.129	0.871	0.834	0.984	1.106
2018	2.383	1.776	1.102	0.920	1.132	0.922	1.091	0.838	0.899	1.043	1.286
2019	2.206	1.840	1.048	0.884	1.037	0.941	1.004	0.859	0.883	1.007	1.113
2020	2.281	1.936	1.172	0.947	1.052	0.984	0.993	0.891	0.920	1.025	1.237
2021	2.142	1.907	1.164	0.955	1.039	1.028	1.027	0.914	0.936	1.071	1.226
Average	1.717	1.353	1.170	0.983	0.953	0.926	0.936	0.743	0.765	0.946	1.147
2012-2016	(1)	(2)	(3)	(5)	(6)	(9)	(8)	(11)	(10)	(7)	(4)
Average	2.237	1.808	1.118	0.934	1.059	0.964	1.049	0.875	0.894	1.026	1.194
2017-2021	(1)	(2)	(4)	(9)	(5)	(8)	(6)	(11)	(10)	(7)	(3)

Note: The brackets indicate the average super efficiency ranking of each city during the two time periods

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 06 Issue 08 August 2023
DOI: 10.47191/ijcsrr/V6-i8-50, Impact Factor: 6.789
IJCSRR @ 2023

As depicted in Table 4, the overall trend of super-efficiency values for the modernization of the economic systems across various municipalities in Zhejiang Province demonstrates an upward trajectory. Notably, both Hangzhou and Ningbo exhibit an increase of over 30% in their super-efficiency values across the two time periods under comparison. Similarly, cities such as Jiaxing and Jinhua record growth rates surpassing 10%, positioning them in the secondary tier. Conversely, certain cities, including Shaoxing and Wenzhou, experience a decline. Examining the period from a regional perspective, both Hangzhou and Ningbo swiftly surge in super-efficiency values post-2014. This observation concurs with the comprehensive evaluation of Zhejiang Province's economic system modernization discussed earlier, with the nearby cities of Jiaxing and Jinhua also displaying an upward momentum. This pattern underscores the interconnectivity in the modernization endeavors of cities within the region. In contrast, the western region of Zhejiang, represented by Lishui and Quzhou, due to distinct economic foundations and transportation conditions, although trailing the northern part of the province in terms of economic system modernization, exhibits a consistent and steady improvement in efficiency. The mean super-efficiency values for the two stages rise from 0.743 and 0.765 to 0.875 and 0.894, respectively.

While a standalone super-efficiency DEA model offers a static efficiency analysis of the economic system modernization of various municipalities in Zhejiang Province, the introduction of the Malmquist index in the super-efficiency DEA model provides a dynamic representation of the factors influencing changes in super-efficiency values over the study period. This study estimates the dynamic changes in economic system modernization efficiency across different municipalities in Zhejiang Province from 2012 to 2021. Furthermore, it decomposes the overall total factor productivity of Zhejiang Province's economic system modernization for each year, leading to the results presented in Tables 5 and 6, as well as Figure 2.

Table 5. Dynamic changes in modernization efficiency of economic systems in various cities in Zhejiang Province based on the Malmquist index

CITY	Effch	Techch	Pech	Sech	Tfpch
Hangzhou	0.981	1.196	0.973	1.008	1.173
Ningbo	1.004	1.213	1.000	1.004	1.218
Shaoxing	1.017	0.970	1.017	1.000	0.986
Wenzhou	0.948	1.002	0.964	0.983	0.950
Jiaxing	1.022	1.104	1.020	1.002	1.128
Huzhou	0.988	1.107	0.973	1.015	1.093
Jinhua	1.051	1.155	1.039	1.012	1.214
Quzhou	1.047	1.011	1.047	1.000	1.059
Lishui	0.983	1.041	1.030	0.954	1.023
Taizhou	0.941	1.060	0.941	1.000	0.997
Zhoushan	1.025	1.082	1.002	1.023	1.109
Average	1.001	1.086	1.001	1.000	1.086

From Table 5, it is evident that the mean dynamic variation of total factor productivity (TFP) in the economic system modernization of different municipalities in Zhejiang Province during the period 2012-2021 is 1.086, indicating an efficiency enhancement of 8.6% in its developmental efforts. In terms of their respective means, it becomes apparent that technological progress efficiency stands as the primary determinant influencing the fluctuations in total factor productivity. When combined with the outcomes presented in

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 06 Issue 08 August 2023
DOI: 10.47191/ijcsrr/V6-i8-50, Impact Factor: 6.789
IJCSRR @ 2023

Table 8, it can be observed that Zhejiang Province, on the whole, maintains a relatively stable scale efficiency (sech) and pure technical efficiency (pech) in the development of its economic system modernization. This stability contributes to the coherence of the comprehensive technical efficiency (effch), consequently leading to a parallel stability in total factor productivity (tfpch) and technological progress efficiency (techch) fluctuations. This alignment underscores the imperative for Zhejiang Province to intensify its technological investments, preserve its innovative vitality, and implement effective enhancements to managerial practices as it advances its pursuits in the implementation of economic system modernization and transformation.

Table 6. Total Factor Productivity (tfpch) and Its Composition of Zhejiang Province in Various Years

Time Slot	Effch	Techch	Pech	Sech	Tfpch
2012-2013	0.985	0.978	0.985	1.000	0.963
2013-2014	1.052	1.062	1.010	1.042	1.117
2014-2015	0.990	1.012	0.963	1.028	1.002
2015-2016	1.013	1.149	0.997	1.016	1.164
2016-2017	0.996	1.103	1.003	0.993	1.099
2017-2018	1.034	1.017	1.004	1.030	1.052
2018-2019	1.006	0.980	1.006	1.000	0.986
2019-2020	1.034	1.111	1.003	1.031	1.149
2020-2021	0.980	0.995	0.998	0.981	0.975

Observing Table 6 and Figure 2, the overall pure technical efficiency and scale efficiency of Zhejiang Province exhibit fluctuations around a level of 1. Consequently, the comprehensive technical efficiency remains stable in proximity to 1. However, the variations in total factor productivity align closely with the fluctuations in technological progress efficiency. This congruence underscores that the predominant impetus behind the modernization of the economic system in Zhejiang Province over the past decade stems from technological advancement. Notably, this advancement is primarily attributed to the dissemination of digital technologies and the effective implementation of the "Ecological Civilization" initiative, reflecting the substantive impact of these endeavors on the province's modernization trajectory.

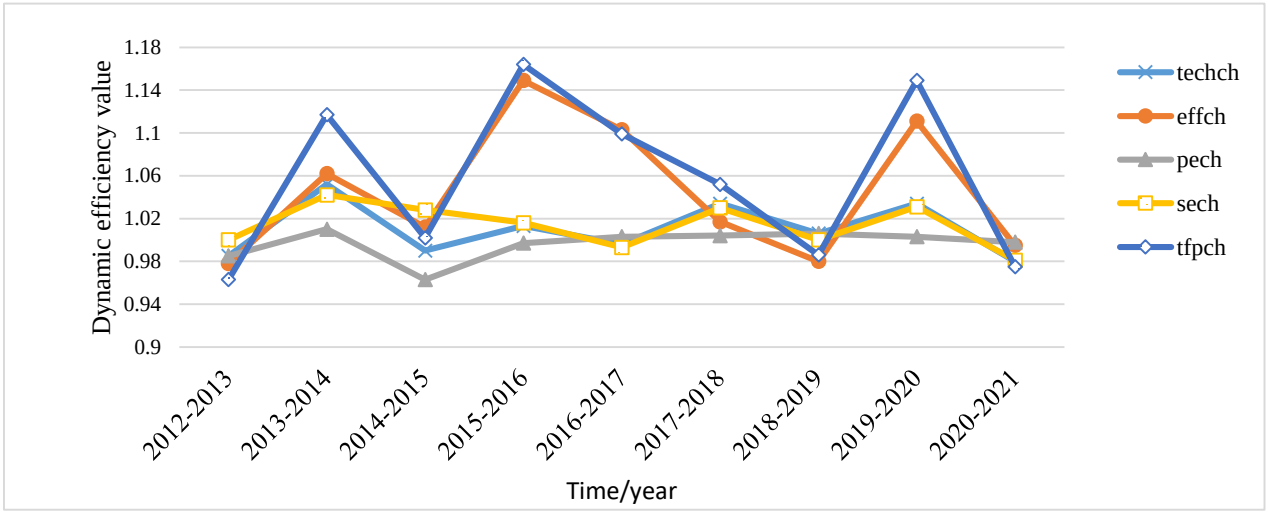

Figure 2. Annual Average Change Trend of Overall Total Factor Productivity

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 06 Issue 08 August 2023
DOI: 10.47191/ijcsrr/V6-i8-50, Impact Factor: 6.789
IJCSRR @ 2023

V. CONCLUSIONS & RECOMMENDATIONS

A. Conclusions

This study focused on the modernization of the economic system in Zhejiang Province, investigating its developmental level, modernization efficiency, and dynamic changes. The following conclusions are drawn:

(1)based on the results of comprehensive evaluation, the developmental level of Zhejiang Province's economic system modernization has demonstrated a progressive enhancement over the years. Notably, the weightings of four indicators, namely, patent authorizations per capita, educational welfare, high-tech innovation technology yield, and circulation facility improvement, contribute significantly to this progress.

(2)the overall super-efficiency values of Zhejiang Province's economic system modernization exhibit a fluctuating upward trend, with variations in super-efficiency values across different municipalities during the study period.

(3)the research findings derived from the super-efficiency DEA-Malmquist index model regarding the dynamic efficiency of Zhejiang Province's economic system modernization indicate that technological progress efficiency constitutes the primary factor influencing fluctuations in total factor productivity. Notably, there is relatively minimal fluctuation in the overall technical efficiency and scale efficiency of Zhejiang Province.

B. Recommendations

This paper offers rational recommendations for the construction of an economically modernized system from the perspective of government social governance:

(1)Emphasis should be placed on comprehensive policy support for high-tech industries and ensuring sufficient investment in education. Initiating pilot programs for "industry-education integration" is advisable, encouraging collaboration between such endeavors and well-established high-tech enterprises. This collaborative approach serves to elevate the returns from high-tech investments, actively embracing "digital transformation" and propelling the modernization of the economic system to greater heights. Augmenting industrial circulation facilities and establishing additional paths for industrial extension can significantly contribute to the modernization of the high-quality economic system.

(2)Deepening inclusive digital finance to benefit mountainous communities, utilizing digital technology to enhance governance efficiency in the implementation of the "one-stop service" approach, and refining commodity distribution channels. Leveraging the "world-class supply chain" system of Ningbo-Zhoushan Port to realize the institutional advantages of China's distinctive market-oriented economy is crucial.

(3)Harnessing the potential of regional interconnectivity within the development and construction of the economic system is essential. Effective control of the "siphoning effect" is imperative. Peripheral cities surrounding core areas should cultivate distinct industrial systems, fostering a balanced regional spatial economic framework (Wang, 2018).

ACKNOWLEDGENMENTS

This study was funded by the Zhejiang Province Soft Science Research Program (2023C35002) and Support for the Fourth Economic Census Project of Zhejiang Province (ZJPS28).

REFERENCES

1. Barro,R.J.（2002）.Quality and quantity of economic growth.*Banco Central de Chile*.

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 06 Issue 08 August 2023
DOI: 10.47191/ijcsrr/V6-i8-50, Impact Factor: 6.789
IJCSRR @ 2023

2. Thomas,V, Ramon L, &Wang Y.（2001）.The Quality of Growth. *China Financial and Economic Publishing House.*147-153.
3. Fabio,S.(2008). Social Capital and the Quality of Economic Development. *Keklos*, 261 (3): 466-499.
4. David,B.(2009).the new economics:A Bigger Picture.*Earthscan publications*,54-62.http://dx.doi.org/10.4324/9781849770248.
5. Feng,B.,Wen,B.,&Li,H.X.(2018).The Connotation, Basis, and Path of a Modern Economic System. *Reform*, 292 (06): 71-79.
6. Hong,Y.X.(2019).Research on the Connotation and Function of Building a Modern Economic System. *Qiushi Academic Journal*, 46 (02): 91-98.DOI:10.19667/j.cnki.cn23-1070/c.2019.02.009.
7. Cai,W.H. (2020).Historical Materialism Analysis of Building a Modern Economic System: Connotation,Positioning, and Path. *Contemporary World and Socialism*, 148 (06): 67-74.DOI:10.16502/j.cnki.11-3404/d.2020.06.009.
8. Zhang,H., Fang,Y.,&Tang,Q. (2021).Reflections on Structural Issues in the Construction of a Modern Economic System under the New Development Pattern in China. *Dongyue Analects*, (10): 144-150.
9. Duan,G.P.,&Wang,X.M.(2022).Building a Modern Economic System: Strategic Values, Basic Components, and Promotion Strategies. *Reform*, 2022 (03): 55-65.
10. Zhang,C.(2022).The Logical Connotation of Building a Modern Economic System and Constructing a New Development Pattern. *Learning and Exploration*, (05): 135-144.
11. Guo,Y.,&Wang,Y.(2022).Reflections on Building a Statistical Survey Method System for Marine Economy. *Statistics and Decision Making*, 38 (02): 179-183.DOI:10.13546/j.cnki.tjyjc.2022.02.036.
12. Yang,L.,&Wei,Q.F.(2022). Evaluation of Regional R&D Efficiency Based on Superefficiency DEA and Malmquist Index: A Comparative Study of Four National Urban Agglomerations. *Science and Technology Progress and Countermeasures*, (10): 41-51.DOI:10.13546/j.cnki.tjyjc.2022.02.036.
13. Wang,Y.H.(2018).Regional Spatial Economic Architecture and Modern Economic System Construction. *Regional Economic Review*, (04): 20-25.DOI:10.14017/j.cnki.2095-5766.2018.0081.

Cite this Article: Limin Xu, Diping Zhang, Jianya Gu (2023). Research on the Measurement of the Modernization Level and Efficiency Changes of the Economic System. International Journal of Current Science Research and Review, 6(8), 5831-5841