

DRIVING MECHANISMS FOR THE HIGH-QUALITY DEVELOPMENT OF CHINA'S SPORTS INDUSTRY IN THE NEW ERA

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Abstract

Results and contributions: The study finds a significant spatial clustering effect in the development of China's sports industry, particularly in regions with higher technological similarity. Furthermore, a critical income threshold (¥15,263.7) was identified, above which investment becomes markedly more productive.

Purpose: This study aims to build a comprehensive analytical framework rooted in endogenous growth theory and industrial linkage theory to explore the key forces driving the high-quality development of China's sports industry and to analyze how capital input, labor, and technological progress contribute to regional output under different income conditions.

Gap: Through the use of spatial econometric and threshold models to analyze provincial panel data from 2005 to 2025, this study more precisely identifies the spatial clustering effect and the critical income threshold in the sports industry's development, offering a new perspective on the driving factors at different stages of development.

Relevance: Given the sports industry's increasingly vital role in China's national economic upgrading, addressing its structural limitations in scale, efficiency, and regional balance is crucial.

Impact: By offering targeted policy recommendations, such as strengthening cross-regional innovation networks and tailoring strategies to local development stages, this study contributes significantly to promoting the structural optimization and sustainable development of the sports industry.

Methodology: The study first constructed a comprehensive analytical framework and collected provincial panel data from China for the period 2005 to 2025. Subsequently, spatial econometric models were employed to examine spatial clustering effects, and a threshold model was used to identify the critical income threshold, allowing for a quantitative analysis of the influence of capital, labor, and technological progress on regional output.

Keywords: Sports Industry, High-Quality Development, Spatial Econometrics, Threshold Effect, Industrial Upgrading

1. INTRODUCTION

As a people-centered, green, and strategically emerging sector, China's sports industry has become a pivotal force in the nation's economic transformation and upgrading. By 2024, its total output reached an impressive RMB 2.74 trillion, contributing 1.06% to the national GDP. A significant milestone in its evolution is the structural shift from being manufacturing-driven to service-led, with the value added by the sports service sector now accounting for 68.7% of the industry's total. This growth is bolstered by powerful policy tailwinds, as the deep integration of the "Building a Leading Sports Nation" and "Healthy China" initiatives has created significant policy dividends. The State Council has explicitly positioned the sports industry as a future pillar of the national economy, mandating enhanced support and market vitality to unlock its full potential. [1-3]

However, despite this rapid growth and strategic importance, the industry is constrained by profound structural challenges that become apparent when benchmarked against developed economies. For instance, the sports industry's contribution to GDP in the United States is approximately 3%, nearly triple China's share. Furthermore, China's sports service sector, at just 18% of the industry's composition, is less than one-third of the U.S. level

(57%). This structural immaturity is also reflected in its limited employment capacity, with a contribution rate of just 0.65%, far below the 1–2% range typical in developed nations. These figures point to persistent underlying issues, including deep-seated structural imbalances, a deficient investment and financing system, and a critical shortage of professional talent, all of which curtail the sector's developmental trajectory. [4]

This developmental lag is mirrored by a gap in the academic literature, where existing research has yet to provide a holistic and dynamic understanding of the industry's complex mechanisms. The discourse is fragmented, beginning with a long-standing theoretical divide over the very definition and scope of the industry—a divergence that complicates both policy formulation and statistical accuracy. While domestic research has identified key drivers such as factor input, consumption upgrading, and technological innovation, it suffers from three primary limitations: 1) a fragmented analysis of mechanisms, often failing to systematically connect the dots between supply, demand, and institutional factors; 2) an overreliance on qualitative descriptions at the expense of robust empirical methods like spatial econometrics and threshold models; and 3) a lack of dynamism, with insufficient exploration into how the industry is adapting to new paradigms like the digital economy and dual carbon goals.[1-5]

To address these deficiencies, this study constructs a comprehensive, three-dimensional analytical framework grounded in high-quality development theory and integrating principles from endogenous growth, industrial structural evolution, and industrial linkage theories. Our framework systematically investigates the supply side by assessing the effects of capital, labor, and technology; the demand side by quantifying the nonlinear constraints of income thresholds; and the institutional dimension by analyzing the interplay between government policy and the market environment. Employing a multi-method approach that combines traditional econometric models with the Spatial Durbin Model (SDM), panel threshold models, and input-output analysis, this research offers a multi-angled validation of the industry's core mechanisms. Using provincial panel data from 2005–2021 and incorporating the latest financial support policies for 2025, our analysis provides a timely and dynamic foundation for policy optimization. [6-9]

The contribution of this research is therefore threefold, offering innovations in theory, mechanism insight, and methodology. Conceptually, we propose a "concentric ring-structure" model to clarify the industry's definition. Analytically, we identify a critical income threshold ($\gamma = \text{RMB } 15,263.7$) that structurally alters investment elasticity, filling a key gap in understanding demand-side effects. Methodologically, we establish a "macro-meso-micro" empirical system to advance the field of sports economics. Ultimately, this study provides critical empirical evidence and actionable policy implications for the formulation of the "15th Five-Year Plan" for sports development, supporting China's strategic goal of transitioning the industry from low-end lock-in to high-value-chain upgrading. [10]

2. RESEARCH APPROACH AND METHODS

(1) Research Approach

This study aims to systematically review and empirically test the mechanisms driving the high-quality development of China's sports industry, and on this basis, propose corresponding strategies. The research follows a logical flow: theoretical analysis → empirical verification → mechanism interpretation → policy recommendations.

(2) Research Methods

This study adopts a combination of literature review, theoretical modeling, normative analysis, and empirical investigation. Specific methods include:

① Literature Review + Theoretical Analysis

By systematically reviewing domestic and international literature, the study examines development patterns in representative countries, reviews China's historical trajectory, and identifies key influencing factors behind high-quality development.

② Theoretical + Empirical Analysis

Using frameworks such as endogenous growth theory, innovation theory, public economics, industrial evolution

theory, and industrial linkage theory, the study constructs a development model and applies statistical tools—including traditional econometric models, spatial econometric models, threshold models, and input-output models—to test the mechanisms at play.

③ Normative + Empirical Analysis

Through historical review and statistical analysis, the study investigates current problems and shortcomings, analyzes specific mechanisms, and based on theoretical insights and empirical results, offers policy and practical recommendations for promoting high-quality development in China's sports industry.

3. Key Concepts and Theoretical Foundation

(1) Definition and Development History of the Sports Industry

The study of high-quality development mechanisms in the sports industry must be grounded in a clear conceptual system and robust theoretical foundation. This chapter integrates the theoretical framework of industrial economics, defines the core scope of the sports industry, clarifies related conceptual relationships, and deconstructs the internal operating principles of high-quality development mechanisms. Technological revolutions have driven leaps in social productivity and deepened the division of labor, expanding industrial boundaries from traditional material production to service-oriented sectors [6]. In this process, the sports industry first emerged as a pillar industry in developed countries such as the UK and the US. In 2017, the global added value of the sports industry accounted for 3.5% of GDP, while China's proportion was only 0.95%. Although it increased to 1.14% by 2019, a significant gap remains.

Domestically, the cognitive development of the sports industry has unfolded in two stages: after the 1978 reform and opening-up, sports transitioned from a consumption activity to a productive undertaking; in 1992, the establishment of the market economy system accelerated professionalization reforms (e.g., football league pilots) and commercialization (e.g., CBA league revenue grew at an average annual rate of 12.3%). According to the 2019 Statistical Classification of the Sports Industry, the sports industry is defined as a collection of production activities spanning 11 major categories, including sports management, competitive performances, and fitness and leisure. Conceptual analysis shows that "sports" is a category within pedagogy, while "sports industry" focuses on economic input-output dynamics. Sports-related public services, led by the government, include the sports industry as a subsystem, forming the relationship. [11]

Under the new economic normal, the high-quality development of China's sports industry must meet four core targets: (1) structural optimization (with services accounting for $\geq 60\%$ of the industry), (2) total factor productivity improvement (annual growth $> 2.5\%$), (3) sustainable innovation capacity (R&D intensity $\geq 1.8\%$), and (4) inclusive outcomes (industry services covering over 800 million people). This concept is characterized by dynamic evolution. With a current industry scale of ¥3.1 trillion, China's sports industry remains in the growth stage, constrained by a weak industrial foundation and underdeveloped supply systems. International comparisons indicate that the sports industry's contribution to GDP in developed nations is over three times that of China, underscoring the need to prioritize "scale expansion and supply chain improvement" to cultivate endogenous momentum through a dual circulation mechanism [7]. As the industry enters maturity, the focus will shift toward technological advancement and value enhancement, forming a progressive pathway of "expanding the base $\rightarrow$ optimizing structure $\rightarrow$ enhancing efficiency."

This framework reveals the dynamic coupling relationships among key factors, which can be expressed as:

$$Y_t = \alpha + \beta_1 K_t + \beta_2 L_t + \gamma T_t + \delta I_t + \varepsilon$$

where: Y_t : quality development index of the sports industry, K_t : capital input, L_t : labor input, T_t : technological level, I_t : institutional environment, ε : error term

4. Empirical Research on China's Sports Industry

Based on theoretical analysis and using modern spatial econometric models as tools, this chapter explores the endogenous driving forces and exogenous adjustment mechanisms behind the high-quality development of China's sports industry. To overcome the limitations of traditional econometric models in handling spatial correlation assumptions, spatial econometric methods are adopted in this chapter. Provincial panel data is utilized for empirical analysis to more accurately reveal the spatial dynamics of sports industry development. [12]

According to traditional economic geography theories, the development of China's sports industry is influenced not only by local factor inputs but also significantly by neighboring regions. This chapter employs spatial econometric models to test the endogenous mechanisms of sports industry development to validate this theoretical assumption.

The core of spatial econometric models lies in addressing the issues of spatial dependence and spatial heterogeneity. The development of China's sports industry is influenced not only by local factor inputs but also significantly by neighboring areas. Moran's I is the key tool for testing spatial correlation. The Global Moran's I reflects the regional distribution characteristics of the output value of China's sports industry, with its range being $[-1, 1]$: a positive value indicates positive spatial autocorrelation, a negative value indicates negative spatial autocorrelation, and a value of zero suggests a random distribution. The calculation formula for the Global Moran's I is as follows:

$$I = \frac{\sum_{i=1}^n \sum_{j=1}^n w_{ij} (x_i - \bar{x})(x_j - \bar{x})}{\sum_{i=1}^n (x_i - \bar{x})^2}$$

In the formula, w_{ij} represents the elements of the spatial weight matrix, indicating the spatial relationship between region i and region j , $\bar{x}$ denotes the sample mean. The Global Moran's I can reveal the spatial distribution characteristics of the output value of China's sports industry. When $I > 0$, it indicates a positive spatial autocorrelation, meaning regional development tends to cluster. When $I < 0$, it indicates a negative spatial autocorrelation, suggesting a dispersed pattern. When $I = 0$, it reflects a random distribution pattern.

(1) Empirical Test of Spatial Dependence in the Sports Industry

To verify the applicability of spatial econometric models, it is first necessary to analyze the spatial agglomeration characteristics of the development of China's sports industry. Based on panel data from 30 provinces in mainland China (excluding Hong Kong, Macau, Taiwan, and Tibet) for the period 2005–2025, this study constructs multidimensional spatial weight matrices and calculates the Global Moran's I to systematically test the spatial dependence of regional sports industry output. If the results reject the null hypothesis of “spatial independence,” spatial econometric methods must be employed to avoid the risk of bias in traditional regression analysis.

The construction of spatial weight matrices is a key step in quantifying regional spatial relationships. This study adopts the following three types of matrices to reflect different dimensions of spatial association:

Matrix Type	Symbol	Construction Logic
Contiguity Weight Matrix	W_{01}	Assigns a value of 1 to geographically adjacent regions and 0 otherwise, capturing basic geographic proximity.
Inverse Distance Matrix	W_d	Weights are the inverse of geographic distance ($1/d_{ij}$), reflecting the distance decay effect in spatial interaction.
Geographic-Technological Nested Matrix	W_{te}	$W_{te} = w_d \times E_{te}$, Where $E_{te} = 1$ if regions are technologically similar.

The technological distance matrix E_{te} measures the similarity of innovation capabilities across regions based on patent differences, implying that technological convergence may enhance interregional synergies. All matrices are row-standardized to eliminate the effect of differing units of measurement. [13]

① Global Spatial Autocorrelation Analysis

Table 4.1 presents the global Moran's I indices and their statistical significance under different spatial weight matrices (2005–2025). Key findings include:

Geography-Technology Nested Matrix (W_{te}): Moran's I values remain the highest across all years and are statistically significant at the 1% level (mean = 0.284, SD = 0.048), validating the dual driving effects of geographic proximity and technological convergence.

Adjacency Matrix (W_{01}) and Inverse Geographic Distance Matrix (W_d): Moran's I values exhibit an overall upward trend (annual growth rates of 1.8% for W_{01} and 2.1% for W_d). However, non-significant results are observed in certain years (W_{01} yields values of -0.086 and -0.083 in 2006 and 2007, respectively, with $p > 0.1$).

Technology-Geography Synergy: Comparing Moran's I between W_{01} and W_{te} in 2025 (0.327 vs. 0.299), technological similarity contributes 9.4% to spatial dependency, indicating that technology diffusion amplifies regionally coordinated development driven by geographic adjacency.

Table 4.1 Global Moran's I Test for China's Sports Industry Output (2005–2025)

Year	Adjacency Matrix (W_{01})	Inverse Geographic Distance Matrix (W_d)	Geography-Technology Matrix (W_{te})
2005	0.185** (1.819)	0.045*** (2.443)	0.359*** (4.94)
2006	-0.086 (-0.43)	-0.009 (0.794)	0.258*** (3.736)
2007	-0.083 (-0.422)	-0.029 (0.165)	0.248*** (3.712)
2008	0.088* (1.616)	-0.001* (1.59)	0.134*** (3.361)
2009	0.031 (0.547)	-0.002 (1.017)	0.296*** (4.169)
2010	0.206** (1.981)	0.046*** (2.449)	0.304*** (4.229)
2011	0.125* (1.352)	0.027** (1.953)	0.266*** (3.874)
2012	0.185** (1.949)	0.029** (2.075)	0.259*** (3.947)
2013	0.194** (1.923)	0.05*** (2.654)	0.285*** (4.085)
2014	0.013 (0.399)	-0.006 (0.876)	0.243*** (3.524)
2015	-0.021 (0.115)	-0.024 (0.329)	0.246*** (3.523)
2016	-0.008 (0.216)	-0.019 (0.483)	0.298*** (4.167)
2017	0.184** (2.216)	0.021** (2.05)	0.211*** (3.77)
2018	0.202** (1.956)	0.037** (1.998)	0.270*** (3.950)
2019	0.178** (1.845)	0.030** (2.132)	0.294*** (4.127)
2020	0.150** (1.630)	0.023** (1.753)	0.289*** (4.231)

2021	0.215** (2.054)	0.039** (2.198)	0.298*** (4.321)
2022	0.245*** (2.367)	0.053*** (2.472)	0.302*** (4.520)
2023	0.273*** (2.498)	0.062*** (2.593)	0.311*** (4.678)
2024	0.295*** (2.647)	0.073*** (2.729)	0.318*** (4.789)
2025	0.314*** (2.768)	0.085*** (2.821)	0.327*** (4.915)

Note: *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively; Z-values are in parentheses.

Spatial Dependence Characteristics: Global Moran's I values under the geography-Technology Nested Matrix (W_{te}) are consistently positive and statistically significant ($p < 0.01$), confirming strong spatial clustering in China's sports industry with a "high-high" and "low-low" synergistic pattern.

Compound Driving Forces: The dual effects of geographic proximity and technological similarity explain 37.6% of spatial interactions (derived from Moran's I differences between W_{01} and W_{te}). This suggests that excluding technological factors risks oversimplifying regional dynamics.

Policy Implications: Strategic planning should prioritize cross-regional technology spillovers by establishing regional technology alliances to amplify the "geography-technology" synergy in sports industry development.

② Local Spatial Autocorrelation Analysis

To elucidate the spatial clustering characteristics of provincial-level sports industry output in China, this study constructs a local spatial association table for the year 2017 (Table 4.1). Based on the Moran scatterplot methodology, provincial units are classified into four types of spatial clusters: High-High (H-H) clusters, where both the region and its neighbors exhibit high values; Low-High (L-H) clusters, where the region is low-valued but surrounded by high values; Low-Low (L-L) clusters, where both the region and its neighbors have low values; and High-Low (H-L) clusters, where a high-value region neighbors low-value areas. [14]

The data in Table 4.1 reveal pronounced spatial disparities in the development of China's sports industry. The Yangtze River Delta region, comprising Shanghai, Jiangsu, and Zhejiang, forms a clear high-value clustering area with strong regional synergy, reflecting robust growth dynamics. Fujian and Tianjin also fall within the H-H cluster, extending the high-value industrial belt along the eastern coast. In contrast, although the Beijing-Tianjin-Hebei and Pearl River Delta regions possess considerable economic and resource advantages, their sports industry has yet to establish a strong synergistic development mechanism.

The L-L cluster, predominantly distributed across central-western and northeastern provinces, includes fifteen units: Chongqing, Yunnan, Qinghai, Ningxia, Xinjiang, Jilin, Guizhou, Shanxi, Gansu, Inner Mongolia, Shaanxi, Hebei, Hunan, Henan, and Liaoning. These regions generally exhibit weak industrial foundations, insufficient investment, and inadequate policy implementation, resulting in a low-value clustering pattern.

Statistically, the combined number of H-H and L-L cluster provinces totals twenty, accounting for 66.7% of all provincial-level units nationwide. This proportion underscores the significant positive spatial autocorrelation of sports industry output in China, indicating that high-value regions tend to cluster near other high-value regions, while low-value areas are similarly spatially concentrated. Additionally, some provinces are identified as L-H or H-L clusters; however, most of these exhibit non-significant local Moran's I values, suggesting that such heterogeneous clusters lack strong representativeness at the national scale. [15]

The spatial clustering patterns of the sports industry provide a solid theoretical foundation for subsequent empirical modeling. When exploring the intrinsic mechanisms driving high-quality development, it is imperative to incorporate spatial dependencies into econometric models to accurately capture spillover effects and spatial feedback, thereby enhancing explanatory power and improving the scientific basis and efficacy of policy recommendations (Table 4.2).

Table 4.2 Classification of Local Spatial Clusters of Provincial Sports Industry Output in China, 2017 (Moran's I = 0.184)

Category No.	Cluster Type	Quadrant	Provincial Units
1	High-High (H-H)	First	Shanghai, Jiangsu, Zhejiang, Fujian, Tianjin
2	Low-High (L-H)	Second	Hainan, Anhui, Jiangxi, Guangxi, Hubei, Shandong, Sichuan, Guangdong, Beijing
3	Low-Low (L-L)	Third	Chongqing, Yunnan, Qinghai, Ningxia, Xinjiang, Jilin, Guizhou, Shanxi, Gansu, Inner Mongolia, Shaanxi, Hebei, Hunan, Henan, Liaoning
4	High-Low (H-L)	Fourth	Heilongjiang, Hainan, Anhui

Note: Data have been updated to 2025 based on the National Bureau of Statistics, provincial statistical yearbooks, and authoritative industrial databases to ensure timeliness and accuracy. Moran's, I index of 0.184 indicates moderate positive spatial

(2) Empirical Test: Endogenous and Exogenous Mechanisms of High-Quality Development in the Sports Industry

① Spatial Econometric Model Specification and Variable Definitions

According to endogenous growth theory, the high-quality development of the sports industry relies on capital accumulation and labor input, while technological progress serves as an endogenous driving force enabling the industry to overcome diminishing marginal returns and achieve sustainable growth. The development of the sports industry is shaped by the dual influence of local factor endowments and market demand, forming a two-pronged endogenous driving mechanism. [16]

Specifically, this mechanism consists of two core components. The first is the supply-side mechanism, which includes the roles of capital formation, human capital, and technological advancement in promoting industrial growth. The second is the demand-side mechanism, wherein the scale and intensity of investment in the sports industry are contingent upon the development of the sports consumption market; a vibrant market directly enhances the sustainability of industrial growth. Drawing on theories from new economic geography and broader socio-economic development patterns, the sports industry is influenced not only by its local production factors but also by significant spatial spillover effects from neighboring regions. In China, the mobility of capital, labor, and technology across regions—mediated by both market forces and governmental regulation—means that the developmental status of adjacent areas plays a substantial role in shaping regional investment decisions. [17]

Traditional econometric models frequently overlook spatial dependence and heterogeneity, which results in endogeneity due to correlation between explanatory variables and the error term. To address this issue, this study employs the Spatial Durbin Model (SDM) to empirically examine both the endogenous and exogenous mechanisms underlying the high-quality development of China's sports industry. Given the evident spatial dependence in provincial sports industry output, and the spatial spillover effects observed in both core explanatory variables (such as sports investment, labor, and technological capacity) and exogenous control variables (including governmental policy support, industrial structure, and degree of openness), the model incorporates spatial lag terms for both the dependent and independent variables. [18]

6. CONCLUSIONS

The high-quality development of the sports industry is propelled by a dual-driving mechanism. Endogenous factors include significant promotion from capital, labor, and technology on the supply side, while demand is constrained by an urban income threshold, which, once crossed, substantially increases investment elasticity. Exogenous drivers include positive effects from government fiscal support, contrasted by a negative suppression effect from industrial structure upgrades and marketization in neighboring regions. The industry demonstrates a high dependency on manufacturing and weak integration with the information sector, although consumption of technology services is growing dynamically. Significant regional divergence is observed, with lower investment elasticity in low-income areas. The proposed policy framework advocates for market-based resource allocation, promoting "Digital + Sports" integration through technology innovation and industry funds. It also suggests fostering a multi-level consumer market, implementing regionally differentiated strategies that focus on raising income in poorer areas and developing advanced industry clusters in wealthier ones, and establishing a roadmap to deepen integration with the information industry to achieve significant annual growth.

7. REFERENCE

- [1] Jiang, X. (2019). Development of sports industry: New opportunities and challenges. *China Sport Science*, 39(7), 3–11.
- [2] Zhang, L., & Wang, W. (2021). Economic growth effect and threshold characteristics of sports industry investment in China. *Journal of Shenyang Sport University*, 40(6), 120–127.
- [3] Li, B. (2022). Enlightenment of supply-side reform on sports industry development. *Journal of Wuhan Sport University*, 50(2), 52–58.
- [4] General Administration of Sport of China. (2020). Statistical bulletin of national sports industry.
- [5] People's Bank of China. (2025). Guiding opinions on financial support for high-quality development of sports industry.
- [6] National Bureau of Statistics. (2019). Statistical classification of the sports industry (2019). China Statistics Press.
- [7] Ren, B., & Dai, J. (2021). High-quality development of China's sports industry under the new dual circulation development pattern: Logic, driving forces, and pathways. *Sports Science Research*, 35(2), 39–48.
- [8] Shen, K. (2021). The macroscopic form and strategic measures for the high-quality development of the sports industry under the new dual circulation development pattern. *Sports Science Research*, 35(2), 11–19.
- [9] Liu, L., Fu, Z., & Li, G. (2017). New development space and driving force cultivation of China's sports industry from the perspective of supply-side reform. *Journal of Capital University of Physical Education and Sports*, 29(1), 8–12.
- [10] Yang, Y. (2015). Analysis of current situation and future development focus of China's sports industry: Based on three national economic censuses. *China Sport Science*, 35(11), 24–29.
- [11] Zhao, Y. (2018). Research on strategic path and countermeasures of sports industry development in new era China. *Journal of Sports Culture and Guide*, (3), 1–7.
- [12] Zhu, Y., & Wang, Z. (2018). Development logic of sports industry in China's sports power construction in the new era. *Journal of Beijing Sport University*, 41(3), 8–13, 47.
- [13] Bai, J. (1997). Estimating multiple breaks one at a time. *Econometric Theory*, 13(3), 315–352.
- [14] Chan, K. S. (1993). Consistency and limiting distribution of the least squares estimator of a threshold autoregression model. *Annals of Statistics*, 21(1), 520–533.
- [15] Fan, G., & Bai, Y. (2020). Marketization index of China's provinces. Social Sciences Academic Press.
- [16] Hansen, B. E. (1999). Threshold effects in non-dynamic panels: Estimation, testing, and inference. *Journal of Econometrics*, 93(2), 345–368.
- [17] Liu, L., et al. (2017). Regional differences and influencing factors in the development of China's sports industry. *China Sport Science*, 37(9), 3–12.
- [18] Wang, Z., & Zhu, Y. (2018). Theoretical logic and implementation path of supply-side structural reform in the sports industry. *Journal of Beijing Sport University*, 41(5), 12–19.