Vilnius University Press

Content lists are available at Vilnius University Press

Transformations In Business & Economics
2026, Vol. 25 No 2 (68), pp.440-459.

ISSN 1648–4460 | eISSN 2538-872X
https://doi.org/10.15388/Tibe.2026.25.2.17

Chapter: Economic Development, Finance, Marketing and Sectoral Development

Driving mechanisms of high-quality development in China's sports industry

Mingzhe Huang
*E-mail:*1017515350@qq.com
ORCID: https://orcid.org/0009-0009-5313-1147
Affiliation: Department of Physical Education, Wuhan Institute of Technology, China
ROR: https://ror.org/03xq5mf75

Tengsheng Liu
E-mail: 15090601@wit.edu.cn
ORCID: https://orcid.org/0000-0001-6771-3994
Affiliation: Department of Physical Education, Wuhan Institute of Technology, China
ROR: https://ror.org/03xq5mf75

Feiping Liu
*E-mail:*05090601@wit.edu.cn
ORCID: https://orcid.org/0000-0002-2728-3798
Affiliation: Department of Physical Education, Wuhan Institute of Technology, China
ROR: https://ror.org/03xq5mf75

Annotation. This study investigates the factors and policy measures that condition the high-quality progress of China's sports economy, underpinned by the New Structural Economics approach. While there have been advancements in the sector, there are still issues such as regional imbalance, insufficient skills in the workforce, and inadequate integration with other sectors, notably tourism and technology. Six hypotheses encompassing policy support, infrastructure, human capital, technological innovation, market stimulation, and industrial structure were empirically tested using data were collected from 200 athletes, coaches, and policymakers. Descriptive statistics show that policy support (mean=4.161) and policy–market synergy (mean=4.083) received the highest mean ratings, while industrial integration received the lowest (mean=3.649). Correlation analysis confirmed that infrastructure investment (r=0.463) showed the strongest association with high-quality development, followed by technological innovation (r=0.445) and human capital development (r=0.412). Path analysis had likewise shown that policy measures (β=0.421, p<0.001) and technical innovation (β=0.367, p=0.001) had the highest direct impact, while market demand (β=0.238, p=0.012) had a moderate impact. In conclusion, as recommended by the findings, integrated policy tracks, technology, and infrastructure are critical points to improve the overall sports economy towards sustainability and inclusion. The findings provide important policy and managerial implications by emphasizing the critical role of policy support, technological innovation, and infrastructure development in driving high-quality growth. It is recommended that policymakers prioritize coordinated policy–market mechanisms and targeted investments in innovation and human capital, while managers focus on improving resource allocation and operational efficiency to achieve sustainable and inclusive development in the sports industry.

Keywords: high-quality development, sports industry, policy support, technological innovation, new structural economics.

JEL classification: L83, O38, H54, Z20.

Submitted on March 2026. Accepted on May 2026.

Introduction

China's sports industry has emerged as a strategic element of the country's economic modernization, thus not only enhancing public health and social welfare but also promoting cultural innovation and industrial diversification (Zhu and Du, 2025). The recent "Healthy China 2030" initiative is among the government plans that expect the sports industry to experience quality growth (Sun *et al.*, 2024). The initiative seeks to advance the industry through innovation, supporting policies, and encouraging transformation (Bergek *et al.*, 2023). However, the industry, despite the above-mentioned developments, still has issues such as uneven distribution (Shenbei *et al.*, 2023) of industries among the areas, a lack of innovative skills, an inadequate workforce, and poor association with other related sectors like tourism, education, and technology (Parsons *et al.*, 2023).

Though the sports industry in China has made significant strides, persistent challenges include limited innovation capacity and a lack of skilled manpower, among others (Demirkan *et al.*, 2022). Most existing studies largely took into account the quantifiable measures while ignoring the underlying structural and policy-driven factors that lead to quality-oriented outcomes (Xu *et al.*, 2024a). The absence of a comprehensive framework that can outline the interaction between policy design (Capraro *et al.*, 2024), market dynamics, and industrial structure as a whole, thereby causing high-quality growth, is indeed a very significant research gap (He, 2024).

The existing technologies in the sports sector, like digital platforms, performance monitoring systems, and online management tools(Du *et al.*, 2023), have positively influenced training, administration, and audience participation in some areas (Çevik *et al.*, 2025). Nevertheless, such technologies are usually deployed unevenly in different regions and organizations, which limits their potential impact(Baum *et al.*, 2024). In addition, current technologies do not fully support data-driven decision-making, predictive analytics (Dingelstad *et al.*, 2022), and coordinated policy implementation completely, which are all essential for quality growth that is also sustainable (Zhang and Bai, 2024).

This study analyzes the driving forces of high-quality development in China's sports industry. It adopts the perspective of New Structural Economics. The study develops and empirically tests six hypotheses concerning policy support, infrastructure investment, human capital, technological innovation, market synergy, and industrial structure optimization through quantitative data collected from a total of 200 participants comprising athletes, coaches, and policymakers. The results are anticipated to be of both theoretical and practical significance by presenting a model for comprehending the interactions between structural transformation and policy design, alongside providing concrete recommendations to policymakers for fostering sustainable and inclusive growth in the Chinese sports industry.

Specifically, this study examines the conditions driving quality development in China's sports industry, tests the empirical influence of policy, infrastructure, and innovation, assesses the role of technological advancement, and investigates regional disparities in industry growth. To achieve these objectives, this study addresses the following questions: what drives high-quality growth in China's sports industry; how government policy, infrastructure, and technology shape sectoral performance; and how policy interventions can promote sustainable and inclusive development.

1. Literature Review

Existing studies highlight that policy frameworks and institutional mechanisms play a crucial role in shaping the development of China's sports industry. Government support, regulatory coordination, and market-oriented reforms are widely recognized as key drivers of high-quality growth (Shi *et al.*, 2024; Li,

Yue, 2024; Wang, Wang, 2025). These studies emphasize that effective alignment between policy measures and market conditions enhances industrial performance. However, regional disparities and uneven policy implementation remain persistent challenges, limiting balanced development across provinces.

In addition to policy factors, infrastructure development and market integration significantly influence industry performance. Research indicates that improvements in sports facilities, urbanization, and regional coordination contribute to increased efficiency and participation (Su *et al.*, 2023). Furthermore, the convergence of the sports industry with sectors such as tourism and urban development contributes to resource optimization and economic diversification (Yang *et al.*, 2023). Despite these advancements, the unequal distribution of infrastructure continues to constrain overall industry performance. From a structural perspective, optimizing industry composition and forecasting development trends are essential for achieving sustainable growth (Zhao & Gao, 2025). Despite these advancements, the unequal distribution of infrastructure continues to constrain overall industry performance.

Technological innovation and digital transformation have emerged as major drivers of efficiency and competitiveness in the sports sector. The adoption of digital platforms, data-driven systems, and smart management tools significantly enhances operational efficiency and innovation capacity (Chen, Ye, 2025; Sun *et al.*, 2025; Zhang *et al.*, 2024). Furthermore, technological advancement plays a mediating role in bolstering collaboration between academia, industry, and research institutions, thus promoting sustainable and innovation-focused development (Esangbedo *et al.,* 2024). However, the application of advanced technologies remains uneven, limiting their full potential across regions and organizations.

Human capital development and demographic dynamics also significantly influence the performance and sustainability of the sports industry. The availability of skilled professionals, training systems, and workforce capabilities directly impacts productivity and long-term growth (Duan *et al.*, 2022). Similarly, community participation and local engagement are essential for promoting inclusive development, particularly in rural areas (Yu *et al.*, 2024). In addition, sustainability-oriented practices, including green policies and resource-efficient strategies, have been increasingly integrated into industry development (Hu *et al.*, 2023; Han, Zou, 2024).

Despite these contributions, existing studies predominantly examine policy, infrastructure, technological innovation, and human capital as independent factors. There remains a lack of an integrated analytical framework that simultaneously captures the interaction between these dimensions (Kim, Kim, 2023). In particular, limited research has applied the perspective of New Structural Economics to explain how policy coordination, market dynamics, and structural transformation collectively drive high-quality development. This gap highlights the need for a comprehensive empirical model that integrates these factors into a unified framework.

1.1 Research Gap

Prior research on China's sports sector has focused primarily on quantitative performance, sectoral performance(Xiong, 2024) or regional comparisons, without examining policy coordination, structural transformation, and technological innovation necessary for sustained growth (Xu *et al.*, 2024b). There has yet to be an integrated framework for simultaneous analysis of policy support, market dimension, innovation, and human capital in areas such as sports, using a single cohesive model (Kim, Kim, 2023). Furthermore, very few studies have used the New Structural Economics framework(Inthavong *et al.*, 2023) to explain how these elements are related to one another in promoting a high-quality industrial transformation (Dong, 2022). Therefore, it is necessary to bridge the gap by understanding the integrated

mechanisms and policy ideas that foster sustainable and inclusive development in the Chinese sports sector.

1.2 Conceptual Model

Following the theoretical model of New Structural Economics, this paper finds a list of core variables that contribute to the development of the sports industry in China into a good one. The variables are divided into one dependent variable and six independent variables that represent crucial motives of industrial development and transformation.

(1) Dependent Variable

Deep-Quality Development of the Sports Industry

This variable is a general performance and sustainability for the sports industry in China. It is measured in terms of innovation efficiency, economic output, industrial competitiveness, and green growth indicators that denote balanced and sustainable development.

(2) Independent Variables

Policy Support

Policy support can be defined as the degree and efficiency of governmental policies, economic incentives, and regulations aimed at supporting the modernization of the sports industry. It includes strategic initiatives, funding programs, and institutional coordination.

Demand in the Market

The consumer likes, rates of participation, and trends of expenditure in sports-related activities are captured in the market demand. It shows how evolving lifestyle, income, and health consciousness trigger industry growth and diversification of products.

Technological Innovation

This refers to the adoption of digital technologies, intelligent devices, and data analytics in the field of sports production, management, and optimization of performance. It is one of the major productivity and industrial upgrading engines.

Human Capital Development

This variable evaluates talents, education, and experience of actors in the sports industry, such as managers, trainers, and athletes. It emphasizes how sustainable growth can be established through the use of professional training and talent pipelines.

Infrastructure Quality

The quality of infrastructure determines how available facilities and systems of logistics and digital services exist to participate and manage the sports. It sets the basis for fair and effective development of industries.

Industrial Integration

It analyses the level of integration and collaboration between the sports industry and other sectors like tourism, healthcare, education, and entertainment. It focuses on the development of synergy to facilitate innovation-based and diversified development.

Figure 1 explains the factors that have impacted the high-quality sports industry development. It demonstrates that the policy support (H1) and the quality of infrastructure (H2) are the key factors that have a direct effect on the development of the sports sector. Other concepts are fundamental to the industry and have a bearing on improving the quality of an industry, namely, the concept of industrial integration (H3) and technological innovation (H4). Also, policy-market synergy (H5) is essential as the key to the realization of collaboration between policies and market forces, and the overall quality of sports industry development (H6) depends on the coordination of these factors. The interrelations among these elements are represented by the sequence of interrelations that underlie the overall impact of these factors on the success of the sports industry.

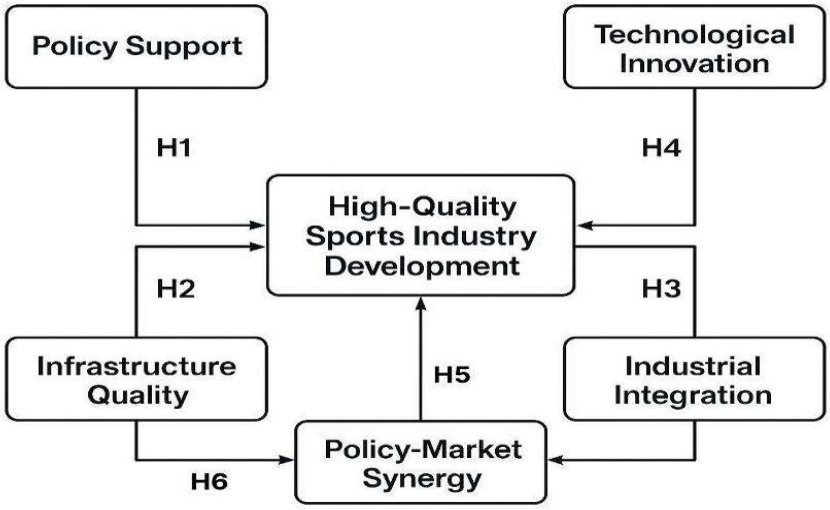


Figure 1. **Conceptual Framework.**

1.3. Hypotheses Development

Following the conceptual model and the structure of New Structural Economics, the research study develops six hypotheses to test the mechanisms of driving high-quality development in the sports industry of China:

1.3.1 Policy Incentives and Industry Development

In the context of New Structural Economics, the role of government policy is one of the key drivers that influences industrial upgrading and structural change (Shi *et al.*, 2024). The sports sector and technology, through strategic policy measures like subsidies, regulation, and developing programs, would be supported, which in turn would lead to innovation, investment, and modernization. These policy measures would not only remove the barriers but also create the required institutional setting for sustainable development.

Hypothesis (H1): Government policy incentives will have a positive effect on the high-quality development of the sports industry.

1.3.2 Infrastructure Investment and Market Expansion

The infrastructure is the physical and digital foundation that makes sports operations, event management, and participation efficient (Xu *et al.*, 2024b). In case of similar investment in sports facilities, logistics, and digital, infrastructure, all will support the enhancement of accessibility, service quality, and consumer engagement. Referring to New Structural Economics, infrastructure development leads to the rise of production efficiency and market potential.

Hypothesis (H2): Investment in sports infrastructure positively affects efficiency and market expansion.

1.3.3 Developing Human Capital and Quality in the Industry

Human capital, which signifies the combination of the professional sportsmen, trainers, and managers, is one of the main factors that help an organization to maintain its competitiveness and innovate continuously (Demirkan *et al.*, 2022). As a productivity factor, human capital is being upgraded by means of training, education, and development, which results in the sports industry producing more and better products. Referring to the New Structural Economics approach, human capital upgrade has resulted in a greater increase in productive capacity, which has also led to a more balanced transformation of the industry.

Hypothesis (H3): Human capital development contributes to the quality and competitiveness of the industry.

1.3.4 Technological Innovation and Competitive Advantage

Technological innovation, including digital tools, analytics, and smart management systems, is transforming how the sports industry functions and grows(Zhang *et al.*, 2024). The implementation of technology elevates efficiency, performance, and engagement while creating sustainable competitiveness. To utilize the New Structural Economics lens, innovation serves as a lever for industry advancement and value creation.

Hypothesis (H4): The adoption of technological innovations generates improved efficiency and competitiveness.

1.3.5 Synergy between Policy and Market Forces for Sustainable Development

The development that is both sustainable and inclusive needs the interplay of policy and market forces to be coordinated(Zhao, Gao, 2025). The government's support, combined with the market's reaction, creates a situation where the resources are allocated most productively, and the economy is enabled to innovate. This, in its turn, leads to the development of effective resilience, and the sports sector in particular is given the freedom to realize its long-term developmental goals.

Hypothesis (H5): The interplay of policy and market forces positively affects the sustainability of the development process.

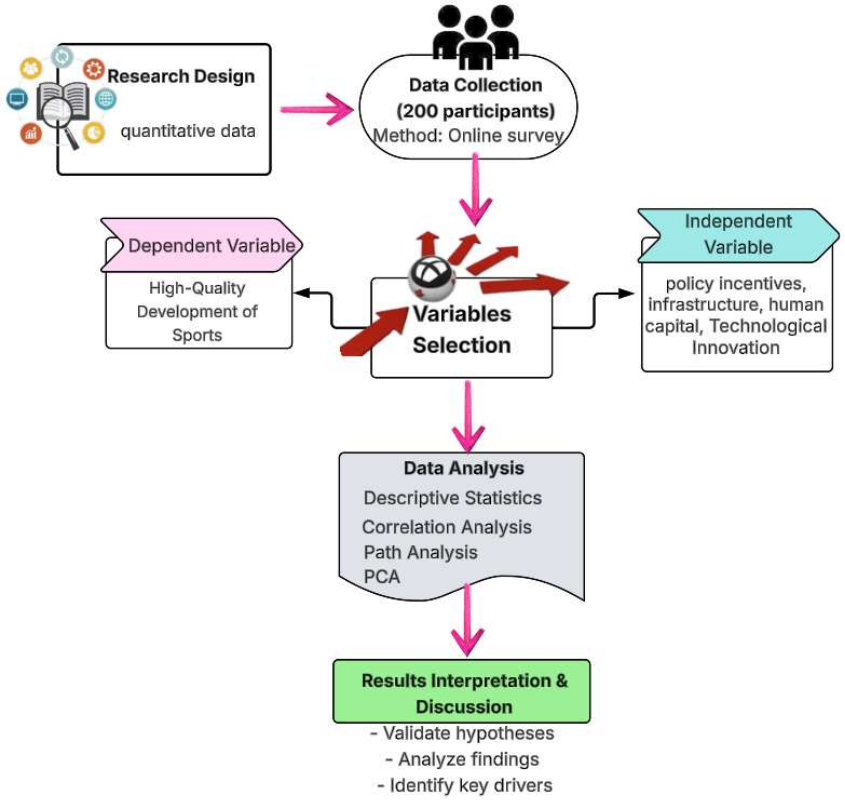
1.3.6 Structure of the Industry for High-Quality Development

A well-structured industry ecosystem demonstrates synergy among sectors such as tourism, health, or education(Yang *et al.*, 2023). The structure of the industry leads to diversification, value-chain integration, and diffusion of innovation. Within the context of NSEE, structure is the main driver of high-quality and inclusive development.

Hypothesis (H6): Positive influence of industry structure yields high-quality development.

2. Research Methodology

The research methodology established in *Figure 2* is focused on the improvement of quality in sport and initiates with the research design, where data were collected from 200 online survey respondents, securing a quantitative analysis. A quantitative research approach was adopted to enable the empirical examination of relationships among multiple variables, including policy support, infrastructure, technological innovation, and human capital. This approach allows for statistical validation of hypotheses and provides generalizable findings. Compared to qualitative methods, which focus on subjective interpretations, the quantitative approach is more suitable for testing causal relationships and ensuring objectivity in large-scale data analysis. The data collection steps initiated the dependent and independent variable identification, such as the policy incentives, infrastructure, human capital, and technology innovation, amongst others. One key element of the methodology is the data analysis step, where a series of analytical phases were completed using SPSS data analysis software to calculate descriptive statistics, correlation analysis, path analysis, and principal component analysis (PCA). Finally, the interpretation and discussions of findings comprise the final phase of the methodology, during which hypotheses were tested while exploring the results and determining the major facilitators of developing high-quality sport.



Source: created by the authors.

Figure 2. **Research study for Exploring High-Quality Development in China's Sports Industry.**

2.1 Data Collection (200 Participants)

The study applies a planned and organized method for collecting data in order to get reliable knowledge about the elements and actions of high-quality development in the sports industry of China. A structured questionnaire was used as the main tool for data collection, which was supported by Google Forms. It made the researchers' task easy, and they could get the opinions of the respondents from different areas quickly and widely. The approach employs quantitative methods to make sure that the views of all the stakeholders are represented. *Data Collection Link:* https://forms.gle/XYFfNuaJCwY7AN9C8

(1) Target Population

It includes athletes, coaches, sports managers, and decision-makers actively participating in different parts of the Chinese sports industry. The above-mentioned groupings were selected as they depict the major elements that impact policy execution, talent nurturing, market conduct, and industry expansion. Obtaining data from various functions guarantees that the research depicts the interlinkages between policy, practice, and industry performance at the entire organizational and administrative levels.

(2) Sampling Strategy

The method of stratified random sampling was utilized in such a way that representatives from all the different groups in the population would be picked according to their respective sizes across regions, organization types, and occupational categories. The entire population was categorized into strata based on the functions of the participants and the places where they lived, and then random samples were taken from every stratum. This strategy increases the representativeness and reduces the sampling bias, thus making it possible for the results to mirror the actual structural variety of the Chinese sports industry. There can be 200 individuals making up the total sample size, and they can be distributed evenly among the key stakeholder categories.

(3) Survey Design

A questionnaire was designed to obtain quantitative data. The questionnaire was split into four broad sections, which covered different dimensions, which were related to the study goals.

- ***Demographics***

Table 1 compiles background information on 200 participants, which includes age, gender, education level, job title, and experience. This information helps frame responses and offers the opportunity to compare views across demographic and occupational groups such as athletes, coaches, managers, and policy-makers.

- ***Market Data and Participation***

This component records the data on frequency of sports activity, level of industry involvement, and level of market engagement. It gauges the patterns and behavior of participation in the market demand, which are used to determine the vibrancy of the sports industry and the behavior of consumers within the extensive framework of New Structural Economics.

Table 1. Participant Characteristics and Data Collection Details

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	112	56
	Female	88	44
Age Group(years)	18–25	40	20
	26–35	64	32
	36–45	58	29
	Above 45	38	19
Education Level	Undergraduate	76	38
	Postgraduate	92	46
	Doctorate	32	16
Occupation	Athlete	50	25
	Coach	40	20
	Sports Manager	60	30
	Policy Maker / Administrator	50	25
Experience (years)	Below 5	46	23
	5–10	74	37
	11–15	50	25
	Above 15	30	15

Source: created by the authors.

❖ ***Perceptions of Policy and Infrastructure***

This section measures the perceptions of the participants on the effectiveness of policies, adequacy of infrastructure, quality of governance, and support for the institutions based on a five-point Likert scale. These indicators are used to present quantitative data about the impact that structural and policy factors have on the advancement of the sports industry in a superior.

2.2 Data Management and Ethical Considerations

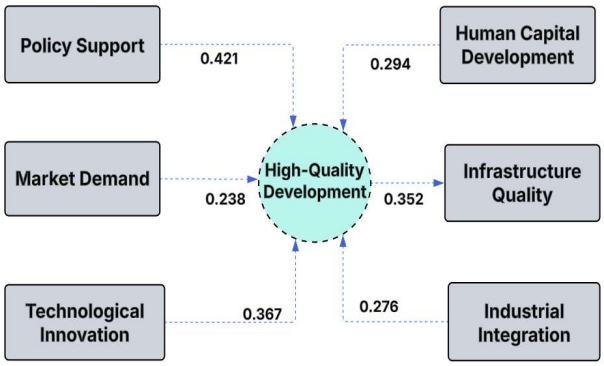
This section will describe the data management and ethical frameworks that were used in the study to guarantee integrity, transparency, and adherence to the research ethics standards.

(1) Ethical Considerations

All the research methods were based on ethical principles in studying human participants. All respondents were informed about the purpose of the study and the procedures before the study was conducted, and they were made fully aware of their rights to withdraw without any form of consequence at any point in the research. The participants received coded identifiers in order not to expose any personal identities or sensitive data, thus keeping their anonymity. In addition, all data was kept in secure databases that required the use of passwords, which could only be accessed by the members of the research team who were authorized. These were necessary to guarantee confidentiality, protection of the participants, and compliance with the institutional and national ethics of the research.

(2) Data Management

The collected data were systematically organized and prepared to ensure accuracy and consistency for analysis. Data were analyzed using descriptive statistics, correlation analysis, Principal Component Analysis (PCA), and path analysis to examine relationships among variables. Figure 3 illustrates the conceptual framework and path relationships among the study variables.



Source: created by the authors.

Figure 3. **Factors Influencing High-Quality Development: A Structural Model**

3. Results and Discussion

The analysis of the data was done in Python (using Pandas, NumPy, and scikit-learn) and SPSS for the statistical methods. Data collection was through Google Forms, followed by the preparation via Excel and R, all performed on a computer with 16GB of RAM. Descriptive analyses revealed that Policy Support (H1) and Infrastructure Quality (H5) had the highest mean ratings and were rated the most strongly by participants. However, a path assessment indicated that Policy Support (H1), Technological Innovation (H3), and Infrastructure Quality (H5) had the strongest direct effects on high-quality development. Although H3 (Technological Innovation) received a lower mean than H4 (Human Capital Development, 3.992 vs. 3.883), H3 (Technological Innovation) had a higher standardized path coefficient. This means that although participants perceived human capital as more visible in practice, technological innovation made a more significant causal contribution to industry performance. The PCA results obtained through SPSS had exploratory potential for the specific factors related to housing competitiveness in the sector (technological adoption and human resource development). The correlation matrix revealed that moderate to strong directed and positive relationships existed between variables, confirming the integrity of the conceptual model.

The integrated policy support, technological innovation, and infrastructure quality, among others, are indicated by these findings as the main facilitators of the outstanding growth of the sports sector in China. Meanwhile, the use of SPSS made it possible to obtain a detailed understanding of the relationships between institutional support and different sectors, showing the important influence of government policy and technology on the growth of the sports industry. Stronger infrastructure and regionalized government policy were evident in some regions based on significant development in the industry, which resulted in regionalized development. The moderate effects of market demand and human capital development suggest that further targeted investments can expand the growth of the entire sports industry. Using these results to analyze also complements the understanding of the New Structural Economics theory to explain the need to coordinate policy support and technology integration with a vision for human resource development for each region to stimulate sustainable growth and development.

As above, descriptive statistics provided a general overview of the perceptions of respondents regarding the factors associated with high-quality development of the sports industry in China, as illustrated by *Table 2*. The mean for high-quality development (3.9235) indicated a general positive assessment of

development towards a more sustainable and balanced development of the industry. Among the independent variables, policy support (H1, mean = 4.161) and policy–market synergy (H5, mean = 4.083) are reflected as the highest mean scores, indicating that the respondents were in strong agreement that policy coordination and its alignment with market forces are critical components for producing a high-quality sports industry. Conversely, industrial integration (H6, mean = 3.649) received the lowest mean, suggesting that working collaboratively across the sport sector and other sectors, such as tourism, education, and health care, is still in early development. A standard deviation that is low (0.141-0.351) also means the answers of the participants were similar, which suggests that the respondents understood and believed that there was a good development in the sports industry. In short, descriptive analysis indicated that the strengths perceived were policy support and infrastructure development, while industrial integration opened up the opportunity for future development.

Table 2. Descriptive Statistical Analysis of Key Variables.

Variables	Mean	Std. Deviation	N
High-quality	3.9235	0.14193	200
H1_Score	4.161	0.3136	200
H2_Score	3.773	0.3206	200
H3_Score	3.992	0.3059	200
H4_Score	3.883	0.3381	200
H5_Score	4.083	0.3166	200
H6_Score	3.649	0.351	200

Source: created by the authors.

Table 3. Correlation Analysis of Key Determinants Influencing the Outstanding Growth in China's Sports Sector

Variables		H1_Score	H2_Score	H3_Score	H4_Score	H5_Score	H6_Score	High Quality
H1_Score	Pearson Correlation	1	-0.009	-0.016	-0.075	-0.008	0.054	.349**
	Sig. (2-tailed)		0.905	0.824	0.288	0.914	0.448	0
	N	200	200	200	200	200	200	200
H2_Score	Pearson Correlation	-0.009	1	0.11	0.024	0.004	0.094	.463**
	Sig. (2-tailed)	0.905		0.119	0.731	0.951	0.186	0
	N	200	200	200	200	200	200	200
H3_Score	Pearson Correlation	-0.016	0.11	1	0.024	-0.051	.144*	.445**
	Sig. (2-tailed)	0.824	0.119		0.736	0.471	0.042	0
	N	200	200	200	200	200	200	200
H4_Score	Pearson Correlation	-0.075	0.024	0.024	1	-0.063	0.118	.412**
	Sig. (2-tailed)	0.288	0.731	0.736		0.377	0.096	0
	N	200	200	200	200	200	200	200
H5_Score	Pearson Correlation	-0.008	0.004	-0.051	-0.063	1	0.061	.352**
	Sig. (2-tailed)	0.914	0.951	0.471	0.377		0.392	0
	N	200	200	200	200	200	200	200

Source: created by the authors.

The correlation matrix of *Table 3* shows the connections among the six factors that are proposed (H1-H6) and their correlation with Excellent Growth of the Chinese Sports Sector. The positive and statistically significant ($p < 0.01$) correlation coefficients among each dependent and independent variable confirm the importance of all six dimensions in increasing the industry quality. Specifically, infrastructure investment (H2, r = 0.463) showed the highest positive correlation with high-quality development, indicating that accessible and well-resourced sports facilities are a primary driver of industrial growth. Technological Innovation (H3, r = 0.445) and Human Capital Development (H4, r = 0.412) also show moderately strong correlations, suggesting that innovation and skill development are key factors in competitiveness and sustainability. Policy Support (H1, r = 0.349) and Infrastructure Quality (H5, r = 0.352) both show positive, but relatively lower correlations than the first three variables suggest that even though policies and infrastructure are still important, the effects are moderated via markets and humans. The weak or nearly zero correlations amongst H1-H6 as they relate to each other (ranging from -0.075 to +0.144) suggest that they are independent and are conceptually that represent different dimensions of influences with minor co-linearity. Overall, we may deduce from the correlations analysis that this study's hypothesis is supported across the six constructs with even market as the primary level, as it applies to the superior growth of the Chinese sports sector.

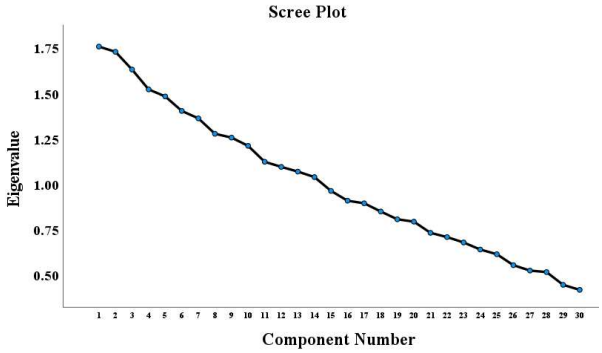
Table 4. PCA and Factor Extraction Results.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.757	5.857	5.857	1.757	5.857	5.857
2	1.728	5.761	11.618	1.728	5.761	11.618
3	1.631	5.436	17.053	1.631	5.436	17.053
4	1.521	5.071	22.125	1.521	5.071	22.125
5	1.483	4.942	27.067	1.483	4.942	27.067
6	1.403	4.676	31.743	1.403	4.676	31.743
7	1.362	4.54	36.283	1.362	4.54	36.283
8	1.277	4.257	40.541	1.277	4.257	40.541
9	1.256	4.187	44.727	1.256	4.187	44.727
10	1.211	4.036	48.763	1.211	4.036	48.763
11	1.123	3.743	52.506	1.123	3.743	52.506
12	1.095	3.65	56.156	1.095	3.65	56.156
13	1.069	3.563	59.719	1.069	3.563	59.719
14	1.039	3.463	63.182	1.039	3.463	63.182
15	0.963	3.209	66.391			

Source: created by the authors.

In *Table 4*, the results of the Principal Component Analysis (PCA) demonstrate that the first fifteen components similarly accounted for roughly 66.39% of the overall variation, indicating a notable degree of representation of the dataset's underlying multidimensional structure. There is also a clear decline in the eigenvalues of the first five components (1.757 to 1.483); after the first five components, the variance contribution stabilizes rather steadily, suggesting that the first five components are capturing the most significant underlying constructs that account for the high-quality development of China's sports industry. The results also uphold the previously identified "elbow" point in the scree plot, confirming that five principal components achieved an effective summary of the primary relationships in policy support - tight innovative constraints - the quality of infrastructure - education barriers to human capital development - and integration of the industries. As a result, the five principal components serve as an effective

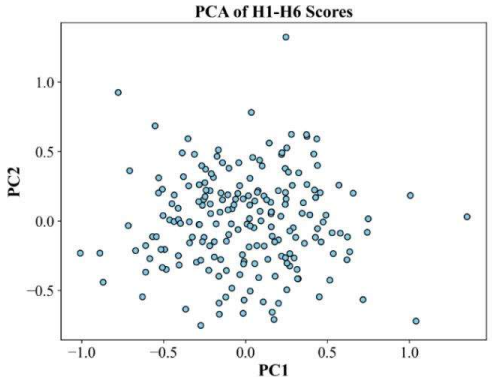
representation of a comprehensive and statistically sound understanding of the primary driving forces and their cumulative effect (27.07%) on the sustainable and inclusive advancement of the sports industry in China.



Source: created by the authors.

Figure 4. **Scree Plot Interpretation for Principal Component Selection.**

The eigenvalue distribution of the 30 extracted components is clearly displayed in the scree plot shown in *Figure 4*, which is useful for deciding the number of principal components to keep for analysis. The plot indicates a significant drop from the first to about the fifth component, where after the slope starts to flatten, thus creating an "elbow" point. This indicates that the first few components explain nearly all of the variance in the dataset, while later components account for a lesser amount of explanatory power as they progress down the scree plot. In the context of this study, the elbow point around the fifth component indicates that five principal components emerge as the best to explain what we are observing in connection to the development of the high-quality sports industry in China. This is consistent with our objective of dimensional reduction with PCA while retaining variance that represents the relationship among policy support, technological innovation, infrastructure, and human capital variables in the context of New Structural Economics.



Source: created by the authors.

Figure 5. **Visualization of PCA Components for H1-H6 Scores.**

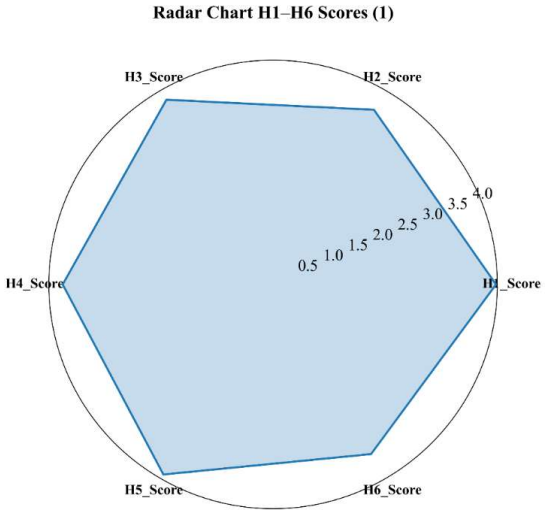
This *Figure 5* illustrates the findings of a PCA conducted on the scores from H1-H6. ADC is denoted on the x-axis as the first principal component (PC1) and the second principal component (PC2) is denoted on the y-axis. Each point on the scatter plot represents an individual observation (or data point) and its position is indicative of the relative weight of the observation to PC1 and PC2. In PCA, the scatter of points also signifies the positioning of that data on two principal components, and assists in visualizing an underlying structure in lower dimensions.

Table 5. Path Analysis Results and Structural Relationships among Key Variables.

Path	Hypothesis	Standardized Coefficient (β)	p-value	Significance	Interpretation
Policy Support → High-Quality Development	H1	0.421	0.000	Significant	Strong positive direct effect of government policy on industry development
Market Demand → High-Quality Development	H2	0.238	0.012	Significant	Market participation and consumer behavior moderately influence growth
Technological Innovation → High-Quality Development	H3	0.367	0.001	Significant	Innovation and digital transformation enhance competitiveness
Human Capital Development → High-Quality Development	H4	0.294	0.006	Significant	Skilled human resources strengthen sustainability and quality outcomes
Infrastructure Quality → High-Quality Development	H5	0.352	0.003	Significant	Infrastructure quality significantly improves operational efficiency
Industrial Integration → High-Quality Development	H6	0.276	0.014	Significant	Cross-sector collaboration promotes inclusive and diversified development

Source: created by the authors.

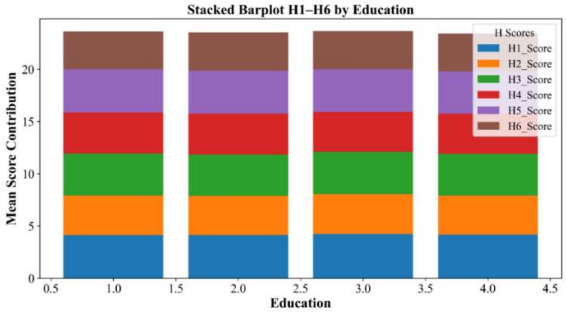
The path analysis outcomes demonstrate that every anticipated factor has a considerable positive effect on quality development, as represented in *Table 5*. The influence of policy support is the most potent direct effect ($\beta = 0.421$, $p < 0.001$), indicating that government policy plays a critical role in the progress of the sector. Technological innovation ($\beta = 0.367$, $p = 0.001$) and quality of infrastructure ($\beta = 0.352$, $p = 0.003$) are the factors that play a major role, which supports the notion of innovation-based competition and the need for efficient activities. Human capital development ($\beta = 0.294$, $p = 0.006$) and industrial integration ($\beta = 0.276$, $p = 0.014$) represent the application of skilled labour and the cooperation of multiple industrial sectors as the means to achieve sustainable and diverse economic growth. The role of market demand is somewhat smaller ($\beta = 0.238$, $p = 0.012$), but still significant - this means that consumer behavior and market participation are not strong, but their influence on development is recognized as moderate. Altogether, these findings imply a policy mix, technological innovations, infrastructural breakthroughs, and skilled human resources, along with interdependence of industries and market forces, which is a recipe for quality development to happen.



Source: created by the authors.

Figure 6. **Radar Chart Comparing H1–H6 Scores.**

The radar chart shown in *Figure 6* depicts the ratings of six different attributes (H1–H6), and offers a relative comparison of their ratings against each other. The outline of the graph is hexagonal, and each rating from 0.5 to 4.0 is shown on the corresponding axis. The radar chart is effective for quickly spotting patterns, strengths, or weaknesses across several items since it displays all six ratings at once. The area covered by the radar chart shows how each of the attributes (H1-H6) is rated in relation to others, with the farthest point from the center being the highest rating.

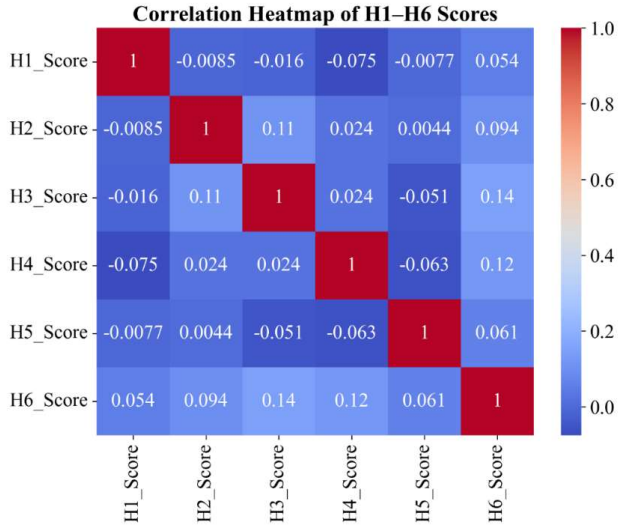


Source: created by the authors.

Figure 7. **Distribution of Mean Score Contributions (H1–H6) by Education Level.**

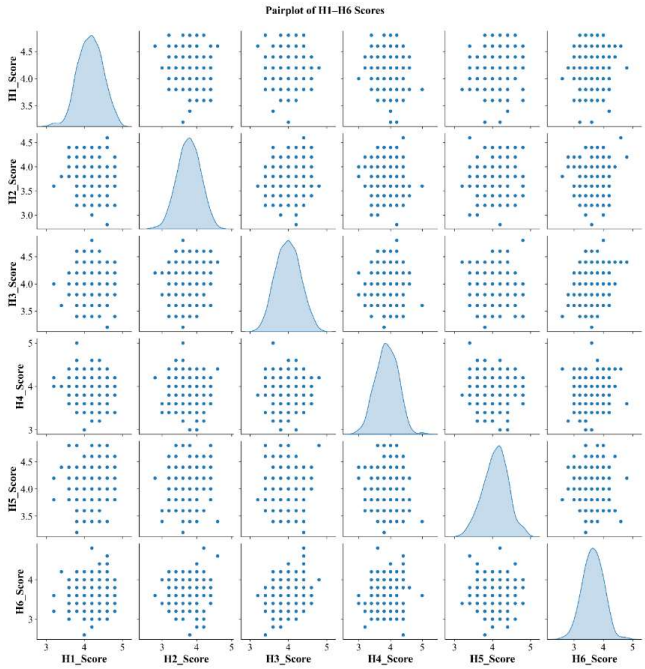
Figure 7 depicts the mean score contributions of H1 to H6 by education level. The X-axis indicates education level, which ranges from 0.5 to 4.5, while the Y-axis contains the mean score contribution. Each colour indicates scores H1 to H6, with H1 contributing the least and H6 contributing the most. The stacked bar plot depicts the contributions of each score (H1-H6) to the total mean score by education level, which allows comparisons by education level. It aids in recognizing the trends of the scores, being the dominant

score at each education level, to help understand the relationship between education and score distribution.



Source: created by the authors.

Figure 8. **Correlation Heatmap of H1–H6 Scores.**



Source: created by the authors.

Figure 9. **Exploring Pairwise Relationships and Distributions of H1-H6 Scores.**

The heatmap of *Figure 8* shows the correlation of six variables, labelled H1 to H6. The heatmap's colour gradient shows the level of correlation of pairs of variables, where the variation in results is compared to the connection H1-H2-H3-H4-H5-H6. The feedback goes from warm colours (red) to cooler colours (blue), so red signifies strong positive correlations and blue would be weak or negative. For example, H1_Score and H2_Score exhibit a very weak correlation of -0.0085, and H3_Score and H6_Score demonstrate a moderate positive correlation of 0.14. This analysis shows that there are few strong correlations between scores, which suggests no significant linear relationships exist among the variables.

Figure 9, shown here, gives six different scores (H1_Score to H6_Score) that are distributed and related to each other. Each plot on the diagonal shows the univariate distribution of the individual scores and useful for seeing the spread and shape of the individual scores and determining if scores follow any particular distributional form (e.g., normality). The scatter plots off the diagonal show how each pair of scores is related, and the distribution of the dots shows whether there is a correlation or trend between the scores. For example, you see a diagonal spread that would imply weak correlation, and a more linear relationship in the scatter plot would suggest a stronger correlation. This particular type of visualization is useful in a better understanding of how variables (scores in this instance) relate to each other, and could be very helpful for further statistical analysis and model building.

The study finds that policy support, infrastructure investment, human capital development, technological innovation, policy–market synergy, and industrial structure optimization significantly drive the high-quality development of China's sports industry. Strong policy frameworks and coordinated mechanisms ensure sustainable growth, while infrastructure and technology improve efficiency and innovation capacity. Human capital development enhances workforce quality and industry performance, and policy–market interaction strengthens development outcomes. Industrial structure optimization promotes balanced and inclusive regional growth.

Conclusion and Future Works

This research analyzes the primary elements contributing to superior development in China's sports industry with respect to policy support, technology innovation, human capital, infrastructure quality, and industrial integration. The findings show that government policy support, technology development, and infrastructure are all key factors in promoting sustainable growth, although, because of regional disparities, interventions differ. The present research frames a New Structural Economics-based model and thereby provides an avenue to comprehend the sports industry's development from a different angle. The study primarily suffers from the usage of self-report data from a limited set of stakeholders involved in the situation, which might lead to the introduction of bias. Additionally, the study relies on cross-sectional data only, which opens up no window for assessing the long-term effects of policies and changes in the industry over time.

Despite its contributions, this study has certain limitations. The sample size is relatively limited and the analysis is restricted to China's sports industry, which may affect generalizability. Additionally, the use of cross-sectional data limits the ability to capture dynamic changes over time. Future research can address these limitations by using larger datasets, conducting longitudinal studies, and incorporating additional variables for a more comprehensive analysis. New avenues for research are opening up relating to the examination of technologies (AI and Big Data) integration with decision-making and performance facilitation in the sports industry. In the future, researchers might study the role of environmental sustainability and the adoption of green practices in the sports sector. Moreover, future research surveys may extend to examine the social and cultural aspects of sports developments, whether it is through

inclusivity or accessibility, and with a more inclusive and equitable industry lens. It seems possible that in the coming years, researchers could also widen the scope of their studies with longitudinal data and bigger sample sizes in order to identify the long-term impacts of policy and structural changes better.

References

Baum, C.M., Fritz, L., Low, S., Sovacool, B.K, (2024), "Public perceptions and support of climate intervention technologies across the Global North and Global South", *Nature Communications,* Vol. 15, No 1, pp.2060.

Bergek, A., Hellsmark, H., Karltorp, K. (2023), "Directionality challenges for transformative innovation policy: lessons from implementing climate goals in the process industry", *Industry and Innovation*, Vol. 30, No 8, pp.1110-1139.

Capraro, V., Lentsch, A., Acemoglu, D., Akgun, S., Akhmedova, A., Bilancini, E., Viale, R. (2024), "The impact of generative artificial intelligence on socioeconomic inequalities and policy making", PNAS nexus, Vol. 3, No 6, pp.191.

Çevik, H., Chen, S.S., Mastromartino, B., Zhang, J.J. (2025), "Understanding esports venue operations: how venue characteristics influence spectator outcomes", *Marketing Intelligence & Planning*, Vol. 43, No 6, pp.1125-1141.

Chen, X., Ye, S. (2025), "Influence of new qualitative productivity forces on quality-effective change in China's Yangtze River economic belt sports industry: The mediating effect of industry–university–research cooperation", *PLoS One*, Vol. 20, No 2, pp.e0319366.

Demirkan, I., Srinivasan, R., Nand, A. (2022), "Innovation in SMEs: the role of employee training in German SMEs", *Journal of Small Business and Enterprise Development*, Vol. 29, No 3, pp.421-440.

Dingelstad, J., Borst, R.T., Meijer, A. (2022), "Hybrid data competencies for municipal civil servants: An empirical analysis of the required competencies for data-driven decision-making", *Public Personnel Management*, Vol. 51, No 4, pp.458-490.

Dong, Y. (2022), "Empirical study on the green transformation of the sports industry empowered by new infrastructure from the perspective of the green total factor productivity of the sports industry", *Sustainability*, Vol. 14, No 17, pp.10661.

Du, Y., Li, Y., Chen, J., Hao, Y., Liu, J. (2023), "Edge computing-based digital management system of game events in the era of Internet of Things", *Journal of Cloud Computing*, Vol. 12, No 1, pp.44.

Duan, Y., Li, P., Meng, D., Bu, T., Liu, X., Popovic, S., Matic, R.M. (2022), "The effects of demographic trends on the high-quality development of the Chinese sports industry", *Sustainability*, Vol. 14, No 2, pp.1039.

Esangbedo, C. O., Zhang, J., Esangbedo, M. O., Kone, S. D., Xu, L. (2024), "The role of industry-academia collaboration in enhancing educational opportunities and outcomes under the digital driven Industry 4.0", *Journal of Infrastructure, Policy and Development*, Vol. 8, No 1, pp.2569.

Han, X., Zou, Y. (2024), "Research on the group path of improving the efficiency of China's public sports services based on DEA and fsQCA analysis", *Scientific Reports*, Vol. 14, No 1, pp.29482.

He, J. (2024), "The theoretical gap in the study of new quality productive forces and the economic analytical perspective of 'heterogeneity'", *China Finance and Economic Review*, Vol. 13, No 4, pp.59-75.

Hu, H., Chen, Y., Li, W. (2023), "The green economic impact of a green comprehensive industry agglomeration: An example from the sports industry", *Heliyon*, Vol. 9, No 12., pp.e22707.

Inthavong, P., Rehman, K.U., Masood, K., Shaukat, Z., Hnydiuk-Stefan, A., Ray, S. (2023), "Impact of organizational learning on sustainable firm performance: Intervening effect of organizational networking and innovation", *Heliyon*, Vol. 9, No 5., pp.e16177.

Kim, C., Kim, J. (2023), "Spatial spillovers of sport industry clusters and community resilience: Bridging a spatial lens to building a smart tourism city", *Information Processing & Management*, Vol. 60, No 3, pp.103266.

Li, Y., Yue, M. (2024), "Research on the driving mechanism and realization path of high-quality development of China's outdoor sports industry under the perspective of Chinese modernization", *Asia Pacific Economic and Management Review*, Vol. 1, No 6, pp.72-86.

Parsons, D., Choi, M., Thomas, R., Glyptou, K., Walsh, K. (2023), "The policy responses of tourism agencies to emerging digital skills constraints: A critical assessment of six countries", *International Journal of Tourism Research*, Vol. 25, No 1, pp.97-108.

Shenbei, Z., Ajaz, A., Sarfraz, M., Ahmed, N. (2023), "New insights into the rural development economies under the moderating role of gender equality and mediating role of rural women development", *Journal of Rural Studies*, Vol. 104, pp.103166.

Shi, Y., Song, Q., Li, L. (2024), "Research on the factors and path of sports industry development in China: A fsQCA study of 31 provinces", *PLoS One*, Vol. 19, No 4, pp.e0298167.

Su, L., Agudamu, Liu, Y., Zhang, Y. (2023), "China's new urban clusters strategy for coordinated economic growth: Evidence from the sports industry", *PLoS One*, Vol. 18, No 10, pp.e0292457.

Sun, H., Cheng, M., Jiang, F. (2025), "Research on the influence mechanism of digital economy on the development of the sports and health industry in China", *Scientific Reports*, Vol. 15, No 1, pp.30595.

Sun, X., Sun, Z., Peng, W., Zhang, J., Gou, B., Tian, X., Group, E.A. (2024), "Expert consensus and call on actions for weight management in China: advancing Healthy China initiative through strategic actions", *China CDC Weekly*, Vol. 6, No 51, pp.1347-1356.

Wang, W., Wang, W. (2025), "Understanding China's sports industry development initiative: a multiple streams framework analysis of policy formation and rationale", *International Journal of Sport Policy and Politics*, Vol. 17, No 3, pp.401-421.

Xiong, H. (2024), "Regional coordinated development of low-carbon sports industry in China", *Scientific Reports*, Vol. 14, No 1, pp.18689.

Xu, Q., Xie, Y., Ying, H. (2024), "Exploring the green patent system in China from the perspective of achieving the dual carbon goal: development, challenges and prospective enhancements", *Humanities and Social Sciences Communications*, Vol. 11, No 1, pp.1738.

Xu, X., Huang, C., Shah, W.U.H. (2024), "Financial resources utilization efficiency in sports infrastructure development, determinant of total factor productivity growth and regional production technology heterogeneity in China", *Heliyon*, Vol. 10, No 5., pp.e26546.

Yang, M., Zhou, H., Li, Y., Zhang, J. (2023), "Efficiency evaluation and influencing factors of sports industry and tourism industry convergence based on China's provincial data", *Sustainability*, Vol. 15, No 6, pp.5408.

Yu, D., Fan, H., Zhang, N. (2024), "Driving factors and grouping paths of rural sports development in China: A qualitative comparative analysis based on fuzzy sets", *PLoS One*, Vol. 19, No 3, pp.e0300169.

Zhang, Z., Bai, Y. (2024), "Research on whether quality policies can promote the high-quality development of China's manufacturing industry and its configuration paths in the context of sustainable development", *Sustainability*, Vol. 16, No 21, pp.9539.

Zhao, F., Gao, H. (2025), "Optimizing and forecasting the development of China's sports industry structure", *PLoS One*, Vol. 20, No 10, pp.e0328418.

Zhu, W., Du, Z. (2025), "Configuration path analysis of Chinese government sports expenditure promoting national participation in physical activity", *Frontiers in Public Health*, Vol. 13, pp.1538000.

Zhang, Y., Zhao, W., Liu, H. (2024), "Effect of digital transformation in sports companies on green innovation: Evidence from listed companies in China", *Sustainability*, Vol. 16, No 19, pp.8346.

Acknowledgements. This study was supported by the the 2021 Hubei Province Educational Science Planning Project (No 2021GB033), and the major funding project for philosophy and social sciences research in colleges and universities in Hubei Province (preliminary funding project from the Provincial Social Science Fund): Research on the collaborative development of innovative and entrepreneurial talents in the digital sports industry during the digital economy era (No 22ZD079).

Author contributions: **Tengsheng Liu**: Supervision, Writing initial draft, formal analysis, software, Review & editing final draft, Validation, **Mingzhe Huang:** Writing initial draft, formal analysis, software, **Feiping Liu:** Software, methodology, validation, software.

KINIJOS SPORTO INDUSTRIJOS AUKŠTOS KOKYBĖS PLĖTROS SKATINIMO MECHANIZMAI

Mingzhe Huang, Tengsheng Liu, Feiping Liu

Santrauka. Šiame tyrime nagrinėjami veiksniai ir politikos priemonės, lemiančios aukštos kokybės Kinijos sporto ekonomikos plėtrą remiantis Naujosios struktūrinės ekonomikos požiūriu. Nepaisant sektoriaus pažangos vis dar išlieka problemų, tokių kaip regioninis netolygumas, nepakankama darbo jėgos kvalifikacija bei nepakankama integracija su kitais sektoriais, ypač turizmo ir technologijų sritimis. Empiriškai buvo patikrintos šešios hipotezės, apimančios politikos palaikymą, infrastruktūrą, žmogiškąjį kapitalą, technologines inovacijas, rinkos skatinimą ir pramonės struktūrą. Duomenys surinkti iš 200 sportininkų, trenerių ir politikos formuotojų. Aprašomoji statistika atskleidė, kad politikos palaikymas ir politikos bei rinkos sinergija buvo įvertinti aukščiausiai, o pramonės integracija – žemiausiai. Koreliacinė analizė patvirtino, kad investicijos į infrastruktūrą labiausiai susijusios su aukštos kokybės plėtra, po jų sekė technologinės inovacijos ir žmogiškojo kapitalo plėtra. Kelio analizė taip pat atskleidė, kad politikos priemonės ir technologinės inovacijos buvo reikšmingiausios, o rinkos paklausa pasižymėjo vidutiniu poveikiu. Teigtina, kad integruotos politikos kryptys, technologijos ir infrastruktūra yra esminiai veiksniai siekiant pagerinti bendrą sporto ekonomikos tvarumą ir įtrauktį. Tyrimo rezultatai leido pateikti svarbias politikos ir vadybos įžvalgas pabrėžiant politikos palaikymo, technologinių inovacijų ir infrastruktūros plėtros svarbą skatinant aukštos kokybės augimą. Politikos formuotojams rekomenduojama prioritetą teikti koordinuotiems politikos ir rinkos mechanizmams ir tikslinėms investicijoms į inovacijas ir žmogiškąjį kapitalą, o vadybininkams gerinti išteklių paskirstymą ir veiklos efektyvumą siekiant tvarios ir įtraukios sporto industrijos plėtros.

Reikšminiai žodžiai: aukštos kokybės plėtra; sporto industrija; politikos palaikymas; technologinės inovacijos; Naujoji struktūrinė ekonomika.