

## Retraction

# Retracted: Research Status of Sports Industry Laws from the Perspective of Knowledge Graph

### Security and Communication Networks

Received 11 July 2023; Accepted 11 July 2023; Published 12 July 2023

Copyright © 2023 Security and Communication Networks. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

### References

- [1] J. Zhao, "Research Status of Sports Industry Laws from the Perspective of Knowledge Graph," *Security and Communication Networks*, vol. 2022, Article ID 6541921, 11 pages, 2022.

## Research Article

# Research Status of Sports Industry Laws from the Perspective of Knowledge Graph

Jialei Zhao 

Department of Physical Education, Taiyuan Normal University, Taiyuan, Shanxi, China

Correspondence should be addressed to Jialei Zhao; zhaojialei2022@tynu.edu.cn

Received 13 April 2022; Revised 24 May 2022; Accepted 7 June 2022; Published 23 June 2022

Academic Editor: Chin-Ling Chen

Copyright © 2022 Jialei Zhao. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

The purpose of this study is to explore the hot topics of sports industry policy research and the future trends of research in this field. The time node selects the literature published in related journals from 1990 to 2022 as sample data. The research uses CiteSpace6.1 software to draw a knowledge map for research in this field, relevant statistics of research literature in this field, mathematical statistics, word frequency analysis, keyword cooccurrence analysis, and other methods. This study analyzed the temporal and spatial distribution of literature, the specific situation of cooperative research, the changes of research hotspots, and the future research trend in the whole development process of sports industry policy research. Results show that sports colleges/institution is the main institution for sports industry policy research. Among them, sports colleges and professional sports colleges in comprehensive universities occupy a dominant position in research results; research strength is mainly concentrated in the eastern and central regions, and the core authors of the article are mainly concentrated in the Middle East; the cooperation situation of sports industry policy research is gradually formed, but the scale and degree of cooperation in this field have a large room for improvement at present; the main research hotspots in this field are sports industry, sports industry policy, sports consumption, etc.; the hotspots of sports industry policy research are differentiated according to different time periods.

## 1. Introduction

As an important part of the national economy, the sports industry plays a major role in adjusting the economic structure, driving economic growth, expanding employment channels, and promoting the development of related industries. Policies are indispensable support for the development of the sports industry. Relevant policies play a vital role in the development direction of the sports industry and the grasp of relevant development priorities and hot spots. This research will be of great significance to the literature on sports industry policy research in China and analyze the changes in research hotspots in sports industry policy. Research trends in the field and clarifies the development context for related research on China's sports industry policy.

The sports industry policy is one of the national economic policies. It is formulated by the national or regional

government to achieve the goal of social development. It acts as an economic lever to intervene and regulate the development of the sports industry [1, 2]. China's sports industry policy appeared after the emergence and development of the sports industry. The earliest literature on sports industry policy in China appeared in 1994. China's sports industry policy-related research has been increasing year by year since 2000. Since 2010, sports industry policy research has received more attention, and in 2016, the research fever reached its peak [3, 4]. Despite this, there is relatively little content in this stage of research on how to formulate industrial policies, how policies are transmitted, how they are controlled, how to supervise the implementation of policies, and the performance evaluation after policy implementation [5–7].

In the classification of sports industry policies, the classifications given by researchers in different research periods according to the development of the sports industry

at that time are different. The research on sports industry policy is still relatively comprehensive. Whether it is from the overall sports industry or the subindustries under the classification, after more than 20 years of research, significant results have been achieved [8]. Different regions pay different attention to sports industry policies. The factors considered in formulating policies are closely related to the environment in which they are located. Geographical location, resource advantages, and the social economy will all affect the layout of sports industry policies to a certain extent [9]. Zhang et al. took the sports industry in Shaanxi Province as the research object and analyzed the total scale of the sports industry, the scale of the sports industry, the scale of the construction industry, the scale of the sports industry, and the scale of sports infrastructure practitioners [10].

Since 1994, relevant research on the sports industry policy has been developed, and a lot of achievements have been achieved. The relevant research on the sports industry policy has an important role in the development of the sports industry. Although the current research results in China are relatively significant, the level of research is also deepening. However, the problems existing in the research cannot be ignored [11]. Researchers usually tend to analyze the policy quickly after the country has introduced a certain policy but ignore the actual problems exposed by the policy in the current development process of the sports industry. Among the many studies, there is a lack of research on technical policies, and the multidisciplinary and cross-departmental cooperative research on sports industry policy has not received much attention [12].

In recent years, with the continuous progress of science and technology, China has entered the era of big data. By using various technologies of computer software and combining disciplinary knowledge with computers, significant research results can often be obtained [13]. The knowledge graph is an interdisciplinary scientific research method that relies on the powerful computing functions of computers, combined with the characteristics of applied mathematics, graphics, and other disciplines, the results of which are often the overall situation and structure type of the development of the subject area, which is beyond the reach of traditional research methods [14]. The technical application of a knowledge graph requires data as the basis. Through data import, the imported data is finally presented in the form of a cooccurrence graph. According to the cooccurrence graph, we can clearly know the research hotspots of a certain discipline at different time stages. According to the results, analyze the overall development trend of the discipline and predict the future development prospects. As one of the important research methods in science, knowledge graph visualization analysis is closely related to the scientific field. In 1938, Bemar made an early subject graph. With the rapid development of computer technology, by the middle of the 20th century, Price presented the growth law of scientific knowledge index through curve visualization [15]. Garfield created the "Science Citation Index," which led to research on "document coupling," "cword analysis," "science citation network," and other related issues, and promoted the

further exploration of scientific knowledge visualization by scientific researchers [16].

In the field of sports science in China, a knowledge graph is mainly used as a research method, and the functions of cooccurrence analysis, cword analysis, citation analysis, and other functions in a knowledge graph are used to conduct scientific statistics on literature data, so as to find out the research hotspots of the discipline [17]. Its main research model is to start research around the research hotspots, research frontiers, cooperation networks, and other issues of a certain discipline, and finally, to sort out the basic model of the scientific development process and trend of the discipline. Its main coverage includes physical education, sports science, school sports, campus football, aerobics, martial arts, table tennis, physical education teachers, physical education courses, physical fitness training, national fitness, tai chi, basketball, youth, etc. [18].

From the birth of the knowledge map in 2003 to the introduction of the knowledge map into the field of scientific research in China in 2005, it was only two years apart. The rapid development of science and technology and the advent of the information age have provided the possibility for the rapid and widespread dissemination of knowledge. In the early days of the introduction of knowledge maps into China, it was mainly used in the research of library information and digital libraries. With the change of time, the application of knowledge maps in various research fields in China is also increasing, such as education theory and management, computer software and research on its application, higher education, scientific research management, enterprise economics, and other research fields. The earliest use of knowledge graphs in sports research in China was in 2010 when Wang Qi from the Shanghai Institute of Physical Education applied this method to sports related research. Since then, knowledge graphs have attracted more attention in sports research, and this method has been applied to many research fields such as sports consumption, sports training, martial arts, sports policy, and other fields, and the research results have been remarkable. Although in the related research of sports disciplines, there is no systematic research in the field of sports industry policy research.

However, there is almost no research on the overall grasp of the entire sports industry policy research field. Therefore, this study aims to draw a statistical and relevant map of the literature on related research on sports industry policy and provide an overall understanding of China's sports industry policy. The research field is systematically analyzed, and the future research trend of this research field is grasped by careful analysis of the map.

In the following steps, we first introduced research methods which are needed for our study in Section 2. Then, we analyzed sports industry law including cooperation degree and cooperation rate analysis, author collaboration network analysis, cooperative network analysis of research institutions, research hotspots and theme analysis of sports industry policy, cluster analysis of research hotspots, and analysis of research topic in Section 3; finally, we present our main conclusions in Section 3.

## 2. Research Methods

This paper takes “the current situation of policy research of sports industry law” as the research object and retrieved from the full-text database of China National Knowledge Infrastructure (CNKI) and Web of Science (WoS) academic journals during the twenty-five years from January 1, 1990, to December 31, 2022, a total of 2295 articles. Recreational sports related research literature is used as the data of this study, and the data is visualized and analyzed by Citespace6.1.R2 (64-bit) software.

*2.1. Literature Method.* The literature method is a theoretical foundation for the research content before conducting academic research. By consulting a large number of literature materials and reading, sorting, and analyzing them, researchers can be prompted to have a relatively full understanding of their research directions. There is sufficient theoretical support in the process, which is a research method with important guiding significance for this research. According to the research purposes and tasks, this research has specific plans and measures in terms of literature data collection, as follows.

The first step is to use network database resources such as China National Knowledge Infrastructure (CNKI) and WoS academic journal full-text database, China National Knowledge Infrastructure (CNKI) master and doctoral dissertation database, VIP Chinese journal full-text database, Chaoxing Library full-text electronic books, Wanfang Data Resource System and other network database resources. Extensive collection of relevant research materials on “sports industry policy,” “knowledge map,” and “visualization analysis”; the second step is to consult relevant books such as “sports industry,” “knowledge map,” and “scientometrics” through libraries with large collections such as Beijing Library, Peking University Library, and Tsinghua University Library; the third step is to inquire about the policies and regulations related to the sports industry through the Internet platform. In order to ensure the authenticity of the inquired results, a review is carried out on the release platform, mainly based on the official website of the government agency.

The above three steps can effectively help us to obtain a large number of sports industry research materials and then organize, classify, and analyze these materials so as to lay a solid foundation for the next research.

*2.2. Knowledge Graph Method.* The knowledge map method is a relatively advanced data analysis method in the field of scientometrics. Its main development advantage lies in the combination of traditional metrology and modern information technology and cross-analysis by integrating graphics, applied mathematics, and other disciplines to present a more intuitive and clear visual map. Through the review of relevant literature, it is found that the relevant research on knowledge graphs in China started in 2005. In the field of sports science, there is relatively little literature using the knowledge graph method for research, and there

are no articles that use the knowledge graph method to visualize the current status of my leisure sports research [19].

According to the related research on the knowledge graph method, the commonly used knowledge graph analysis software programs in the current academic research field are Bibexcel, Citespace, SPSS, Ucinet, TAD, etc. Sources also have different degrees of applicability. Therefore, according to their relevant characteristics, this paper chooses the Citespace software system that has a higher degree of data fit and more powerful analysis data of China National Knowledge Infrastructure (CNKI) and WoS for research.

*2.3. Word Frequency Analysis Method.* Term frequency analysis method refers to TF-IDF (term frequency-inverse document frequency) term frequency-inverse document frequency, a common weighting technique mainly used for data retrieval and text mining, used to measure the effect of a certain word on an article or a document. The importance of the field literature data, the importance of the word to the literature in which it is recognized by the frequency of occurrence of the word, and the relationship between the two is proportional. The higher the frequency, the greater its importance and the most relevant research [20]. For academic research, word frequency analysis can timely reflect the research frontier issues of a certain discipline and understand its development trend. For this study, the word frequency analysis method can reveal the focus and research hotspots of China’s sports industry policy research in five development stages. Mathematical statistics method.

Mathematical statistics is a branch in the field of mathematics. It is a common scientific research method that uses statistical methods to derive and analyze relevant data to obtain research results. In this paper, the mathematical statistics method is mainly used for the statistics of the authors and the institutions to which the authors belong so as to facilitate the analysis of their relevant cooperation degrees.

## 3. Results and Discussion

*3.1. Cooperation Degree and Cooperation Rate Analysis.* The arrival of the information age of human society is accompanied by the rapid development of science and technology, and the level of scientific research is also constantly improving with the growth of science and technology. The objects of scientific research are developing widely, and the scope of research is developing towards high depth and precision. The explosive growth of scientific knowledge and the highly specialized development of scientific knowledge and technology have become an undeniable fact [21]. At present, relatively independent scientific researchers can generally provide limited funding and resources for the scientific research process. Therefore, collaborative research will gradually become the mainstream form of disciplinary research. The forms of cooperation are also becoming more and more diverse, including various forms of cooperation between countries, between scientific research institutions, between authors, and between individuals and scientific

research institutions. In the research of sports, it is an extremely important form for researchers to carry out scientific research activities in the form of cooperation. Sports industry policy is a research branch with strong comprehensiveness and professionalism. Through scientific research cooperation in this field, the online analysis and research will explore the general situation of cooperative research in the field of sports industry policy research, which will help scholars to carry out more research in the form of cooperation in the future and promote the in-depth development of sports industry policy research [22].

There are many ways for scientific researchers to cooperate. Participating in research and publishing research results can be understood as collaborative research between authors. The cooperation between different institutions is mainly manifested in the coauthoring of papers or books between different institutions. Understanding the distribution of researchers and scientific research institutions in the field of sports industry policy research and the cooperation in the process of scientific research, and exploring the trend of cooperation among future scholars in this research field are not only conducive to objective scientific guidance in future sports scientific research but also helpful. It is helpful for scholars to choose good partners in the research of sports industry policy and to promote the comprehensive improvement and development of sports industry policy while promoting the research and development of sports industry policy.

The two indicators of cooperation degree and cooperation rate are mainly used to indicate the cooperation scale in the subject category. The larger the obtained value, the higher the cooperation scale or degree of cooperation. Cooperation degree and cooperation rate are two benchmarks for weighing cooperation in scientific research [23]. Cooperation degree is the ratio between the total number of authors of relevant literature and the total number of papers in a certain period of time, and the cooperation rate is the sum of the number of cooperative papers and the total number of papers in a certain period of time. The ratio between the two is affected by many factors, such as the difficulty of research projects, the relevant capabilities of scientific researchers, and the level of scientific research management.

In order to more intuitively understand and grasp the cooperation degree and cooperation rate of the authors of the sports industry policy research, the collated sample data are counted and analyzed, and the authors with the same name in the data are excluded. It is concluded that 3400 authors have published 2295 journals. According to the above formula on the degree of cooperation, it is concluded that the degree of cooperation in this research field in China is 1.5, and the cooperation rate is 45.86%. The relevant statistical results are shown in Tables 1 and 2.

According to Table 2, there are a total of 2,295 pieces of literature on sports industry policy research selected in this study. By importing the data into Excel for relevant statistics, it is concluded that the total number of authors is 3,400, and the degree of cooperation of the papers is calculated to be 1.5. The degree of cooperation in the field shows that the higher

the degree of author cooperation, the higher the academic influence of the research, and the two are positively correlated. Compared with the cooperation degree of sports industry research and national fitness research, the cooperation degree of China's sports industry policy research has a large room for improvement. Compared with the degree of cooperation in other research fields, there is a certain gap. First, it is because of the differences in the degree of development between the research fields. Another reason may be the uneven distribution of resources in the field of sports industry policy research. In view of the current low level of cooperation in China's sports industry policy research, research in this field still needs to strengthen cooperation between scientific researchers and improve the level of scientific research management in this field, especially the field of sports industry policy and other research cannot be ignored. There is overlap and integration between fields, and the scientific research methods in sports research are constantly enriched to improve the degree of cooperation between authors.

From the data in Table 3, it can be seen that cooperative research in the field of sports industry policy research has gradually become a general trend. The number of papers written by one person alone accounts for 60.2%, more than half of the total, indicating the scale of cooperation in this field in China. There is still room for improvement. In the coauthored literature data, the number of coauthors with 2 people and coauthors with 3 people occupies an absolute advantage, indicating that the current cooperation scale in the field of sports industry policy research has a large room for improvement. The coexistence of professionalism and comprehensiveness is a major feature of sports industry policy research.

*3.2. Author Collaboration Network Analysis.* In order to have a more comprehensive and intuitive understanding of the cooperation between authors in the field of sports industry policy research, this study uses Citespace software to draw the author cooperation map of the journal literature on sports industry policy research from Web of Science. The drawing process is as follows: In Citespace software, the time node is set to 2003–2022, the time slice is set to 1, the node type is selected as the author, and the threshold is selected as 50, which means the top 50 authors every 1 years. Selecting Pathfinder (path-finding network algorithm) to cut the map reasonably, and finally obtain a map suitable for this study, and conduct a comprehensive analysis of the corresponding map. Figure 1 shows the cooccurrence map of authors in the field of sports industry policy research in China.

In Figure 1, the connection between different scholars is represented by the connection between different points, and the degree of cooperation between scholars is positively correlated with the width of the connection. The size of the font of the name represents the number of articles published in the field. It can be seen from the map that in the current research on sports industry policy, researchers such as Shcuster, Galea, Henderson et al. are relatively productive

TABLE 1: Statistics of the top ten articles by citation frequency.

Authors	Research institute	Papers	Source	Citations	Total upload
Feng et al.	Capital Institute of Physical Education	The Equalization of Sports Public Service and Its Fiscal Policy Choice	Journal of Shanghai Institute of Physical Education	170	2680
Bao et al.	General Administration of Sports of the People’s Republic of China	Theoretical Thinking on Establishing and Perfecting the New National System	Journal of Tianjin Institute of Physical Education	190	1344
Chen et al.	Wuhan Institute of Physical Education	Research on the Policy Choice of China’s Sports Industry Structure and Industrial Layout	Sports science	153	4381
Zhao et al.	National Sports Commission Research Institute	Research on the Policy System of Sports Industry	Sports science	182	1693
Don et al.	Department of Education, Science and Culture, Ministry of Finance	Status quo, development measures and experience of foreign cultural industries	Economic Research Reference	107	3132
Li et al.	General Administration of Sports of the People’s Republic of China	The Present Situation and Thinking of the Development of China’s Sports Industry	Sports market	165	498
Yu et al.	Shanghai Institute of Physical Education	Research on the Development Strategy of China’s Sports Industry	China Sports Technology	102	1642
Lei et al.	Beijing Sports University Venue Office	General situation and existing problems of sports venues development (summary)	Shandong Sports Technology	160	1322
Xiong et al.	Beijing Sports University, Jiangxi Normal University	The Formation, Evolution and Reconstruction of China’s Competitive Sports Development Model	Sports science	212	4090
Li et al.	School of Physical Education, East China University of Technology	The Enlightenment of “Supply Side Reform” to the Development of China’s Sports Industry—Based on the Perspective of New Supply Economics	Journal of Wuhan Institute of Physical Education	4	5633

TABLE 2: Statistical table of cooperation degree of sports industry policy research literature.

Total number of papers	2295
Number of authors	3400
Author cooperation	1.5

TABLE 3: Statistical table of coauthorship of research papers on sports industry policy.

Number of authors of a single article	Number of papers	Contribute %
One person	1250	54.4
Two persons	445	19.4%
Three persons	100	4.3%
Four persons	30	1.3%
Five persons	25	1.1%
Above 6 persons	5	0.2%
Total	2295	100%

authors. The degree of cooperation between the research teams can be seen on the map. The degree of cooperation among the research teams, such as the Gani et al. team, is relatively high. The Schuster team’s research in the field of sports industry policy research is involved in the policy sector of the sports service industry, mainly conducting research on the policies of the sports service industry. Its research focuses mainly on the overall environment of the sports service industry, the basic characteristics of policies,

the evaluation system of policy changes and implementation effects, etc., and the research results are quite rich.

Through the analysis of the map combined with the relevant status quo, it can be seen that the degree of cooperation between the authors of sports industry policy research needs to be improved. The team research is mainly inclined to carry out in-depth and detailed research on a specific sector, and only a small number of research teams are involved in relatively extensive research content. Because the number of high-level research teams is limited, there is still room for improvement in the excellent results of cooperative research on sports industry policy research.

### 3.3. Cooperative Network Analysis of Research Institutions.

From a comprehensive perspective, analyze the scientific research cooperation and scientific research achievements of research institutions in the field of sports industry policy research and analyze the role of each research institution in the cooperation network in this research field, which is conducive to scientifically and objectively exploring sports industry policies. This study uses Citespace software to draw the cooccurrence knowledge map of research institutions, which can clearly show its specific distribution and try to use the cooperation network map of scientific research institutions in sports industry policy research literature and combine the corresponding literature data. The method of drawing the cooperation map of scientific

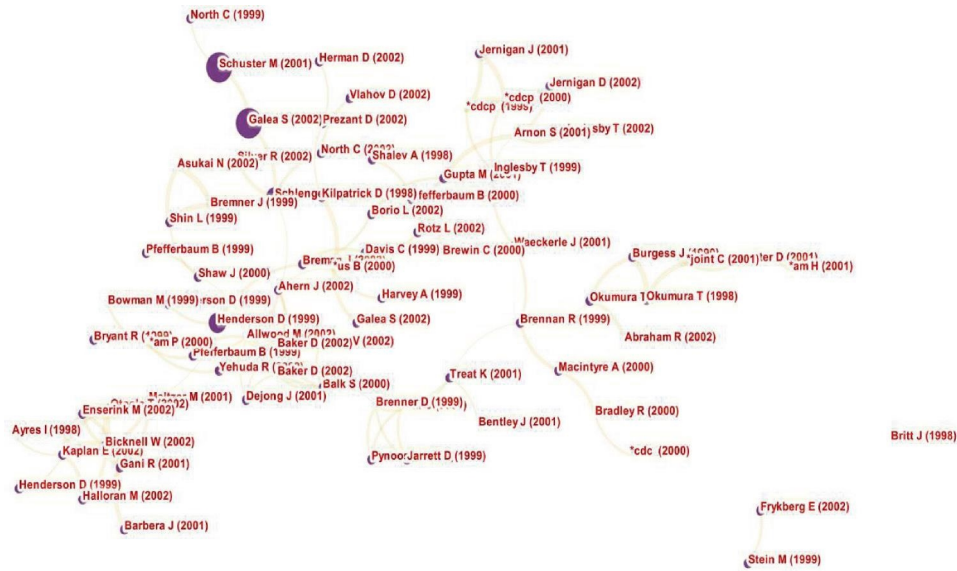


FIGURE 1: Author cooccurrence map for sports industry policy research.

research institutions in the field of sports industry policy research is the same as the drawing method of the author's cooperation network map, and the institutional cooperation network map of sports industry policy research is obtained.

From Figure 2, it can be clearly understood that the main force of sports industry policy research comes from colleges and universities, mainly concentrated in professional sports colleges or sports colleges among comprehensive colleges, although other types of schools are also involved in the sports industry. But policy research's status is not obvious. There are 10 connections between institutions, indicating that cooperation between institutions exists, but the intensity of cooperation still has a strong room for improvement in the future. It can be seen from the map that the main areas of cooperation between institutions are different colleges and universities in the same region. Harvard University, Columbia University, and other scientific research institutions are the main research institutions in this field, and their publication volume also ranks at the forefront of all research institutions. These institutions can be considered as knowledge creation and distribution centers for sports industry policy research, and these institutions have strong research strength. Among these institutions, Harvard University, in particular, has conducted in-depth research on sports industry policy, especially the number of published papers ranks among the top of all research institutions, and its research scope is also relatively extensive, mainly in sports industry policy, sports industry development-related policies, which also has rich research results in the fields of sports rule of law and policies related to sports venues. From the perspective of the connection of institutional cooperation, there are strong and weak alliances in the current cooperative institutions of sports industry policy research, such as the cooperation between Harvard



FIGURE 2: Institutional cooperation network map of sports industry policy research.

University and Columbia University's School of Physical Education, which is conducive to promoting the improvement of teams with weak research strengths. There are strong alliances, such as the cooperative research between North University Penn and Uniformed Ser University, which can produce high-quality and efficient research results. However, it can also be seen from the map that the weak link in the current cooperation between sports industry policy research institutions is that the scale of cooperation is small, and the density of cooperation and the external cooperation between regions is also relatively small. The cooperation between the eastern, central, and western regions is mainly concentrated in the eastern region. The cooperation between the central and eastern regions is better than the cooperation between the western and central regions, while the cooperative research between

the western and central scientific research institutions is hardly carried out.

**3.4. Research Hotspots and Theme Analysis of Sports Industry Policy.** The important programmatic vocabulary that reflects the subject content and research focus of the article is the keyword. Drawing a keyword cooccurrence map and analyzing it makes it possible to intuitively understand the hot content and topic distribution in this research field. Counting the keywords in the field of sports industry policy research and drawing a knowledge map can reflect the changes between the research hotspots in different periods. As the refined vocabulary of an article, keywords can intuitively reveal the research theme and focus of the paper. To a certain extent, keywords have obvious timeliness and freshness and can reflect the author's cognition of the research field.

Citespace software comes with the function of counting the frequency of keywords. It can clearly show the frequency and clustering relationship in a visual way on the basis of counting the occurrence frequency of related words. In order to show the hotspots and research topics of sports industry policy research clearly and intuitively, this study used Citespace software to draw the keyword cooccurrence map of the keywords in the sample data for the 2295 articles collected in this field. The method is the same as that of drawing the author's cooperation network, but there is a difference in selecting the node type. After the graph is properly trimmed, the obtained graph is shown in Figure 3.

In the keyword cooccurrence map of sports industry policy research, there are a total of 300 nodes and 410 connections. The differentiation of the analysis objects is displayed by different nodes, and the frequency of keywords is determined by the size of the nodes. The connection between keywords is represented by the thickness of the connection between the nodes, and the two are positively correlated.

From Figure 3, it can be seen that the keywords with larger nodes are sports industry, sports industry policy, sports economy, policy, sports policy, industrial policy, development, sports service industry, supply-side reform, and other keywords. It shows that the hotspots of sports industry policy research are mainly concentrated in the above-related sectors. It can be seen from the cooccurrence map that the lines between different keywords are generally thick and thin. In the map, the keyword sports industry has the largest node, mainly because the research on sports industry policy is originally carried out around the relevant policies released by the sports industry. Secondly, the subject search is used when retrieving documents, and the subject words are limited between the words "sports industry" and "policy." Therefore, among the relevant documents searched, the word "sports industry" has the largest node in the graph.

**3.5. Cluster Analysis of Research Hotspots.** Using the clustering function of Citespace software, through the analysis of keyword clusters, select the first 10 clusters

and interpret the theme trends of sports industry policy research through these eight clusters, as shown in Figure 4.

Citespace software has the function of a synthetic cluster analysis model, which can divide keywords into multiple clusters according to the cooccurrence relationship between keywords, and each independent cluster or closely related adjacent clusters represents similar research topics. This study uses the clustering function of Citespace software, selects the top 10 clusters through the analysis of keyword clusters, and uses these eight clusters to interpret the theme trends of sports industry policy research, as shown in Figure 4.

The first cluster group is sports industry. The sports industry has not been around for a long time, but its development has been accelerating over time. At present, the development of the sports industry has received unprecedented attention, and related research on the sports industry has developed rapidly in recent years.

The second clustering group is countermeasures. Countermeasure research is prevalent in the research of various disciplines. In the field of sports industry policy research, researchers often conduct research on relevant policies on the basis of the current development of the sports industry so as to provide substantive and effective measures for the development of various industries in the sports industry. Operable countermeasures and countermeasure research can often be more realistic in testing the practical application of scientific research results.

The third cluster group is sports industry development. From the beginning of the development of the sports industry to the present, the research field of the sports industry has never stopped according to the development of the sports industry in various periods, so as to study its current situation, which is of great reference significance for grasping its future development trend. In the research of sports industry policy, it is particularly important to grasp the current situation of the development of the sports industry so as to match the actual development of the sports industry with the relevant policies issued and explore the key direction of the future development of the sports industry.

The less the cluster number, the more articles in that cluster. Therefore, we only analyzed the top three clusters, which can be the best illustrate research hotspots.

**3.6. Analysis of Research Topic.** "Research hotspots" are the focus of scientific researchers on certain special issues within a certain period of time. One of the samples that can best reflect the research topic in the literature is the keyword, and when this research retrieves relevant journal literature on sports industry policy research, the search criteria is selected as the topic, and the subject heading is limited to "sports industry" and contains "policy." Therefore, the keywords of the literature collected in this way can better represent the research hotspots in this field when conducting data sample statistics and analysis. According to the drawing of the knowledge map of





TABLE 4: Statistics table of top 15 high-frequency keywords in sports industry policy research.

Ranks	Keywords	Frequency	Centrality	Emergence rate
1	Sports industry	320	1.1	
2	Policy	70	0.2	10.1
3	Sports economy	51	0.2	
4	Development	50	0.1	5.2
5	Sports industry policy	40	0.1	
6	Sports	40	0.08	7.7
7	China	30	0.14	
8	Measures	30	0.07	
9	Industry measure	27	0.08	5.5
10	Sports policy	20	0.01	3.3
11	Industry	20	0.04	
12	Sports industry development	17	0.02	
13	National fitness	15	0.09	4.00
14	Question	15	0.01	
15	Sports tourism	13	0.02	4.0

sports industry policy will inevitably lead to research on the sports industry. From the literature review of knowledge graph-related research, it can be seen that betweenness centrality can measure the importance of nodes in the network. A measure of the importance of a node in Citespace is betweenness centrality, which refers to the ratio of the shortest path passing through a point and connecting the two points to the total number of shortest path lines between the two points in the network, which is used to express the degree to which a node controls the interactions between others, and the position and importance of an individual or organization in its network is represented by it. From Table 4, the intermediary centrality of each keyword shows that the sports industry occupies a considerable proportion of the sports industry policy research and which is an indispensable and important part of the sports industry policy research field.

The importance of the sports industry continues to rise. In recent years, the state has frequently issued policies on the development of the sports industry and even issued plans for the development of a single sport. As a result, the proportion of the sports industry in the national economy has continued to rise, and the composition of the national economy has been optimized. Policy, sports economy, development, sports policy, etc. are the keywords with the highest frequency in sports industry policy research, indicating that the theme of sports industry policy research mainly revolves around the sports industry, the development of the sports industry, and its related supporting functions and has a supporting role the policy of conducting research. The high frequency of occurrence of keywords indicates that these have become the focus of scientific research workers in the research of sports industry policy because the research of sports industry policy is inseparable from the sports industry and even more inseparable from related policies. At the same time, the continuous development of the sports industry is the research possible to continue. From the perspective of the sports industry, the current attention the sports industry has received is inseparable from the intensive introduction of relevant sports industry policies by the state.

#### 4. Conclusions

This paper selects 2,295 journal documents on sports industry policy research from 1990 to 2022 as the sample data for this research and used Citespace software to visualize and draw the relevant content for analysis. The main conclusions are as follows:

The annual output of journal literature on sports industry policy research and its corresponding time has its own uniqueness. In 2008, the number of related research literature began to show a rapid growth trend, and then the output of papers showed a stable development trend. Colleges and universities are the main institutions for sports industry policy research. Among them, sports colleges in comprehensive universities and professional sports colleges occupy a dominant position in research results. The research strength is mainly concentrated in the eastern and central regions, and the core authors are mainly concentrated in the central and eastern regions.

The cooperation situation of educational, industrial policy research is gradually taking shape, but the scale and degree of cooperation in this field have a large room for improvement. Concentrated in the central and eastern and a few cities in the west, the distribution of research in this field by scientific research institutions is uneven, and the regions are mainly concentrated in the central and eastern regions, which also shows the current regional development differences of the sports industry.

Through the statistics and mapping of relevant data, it is found that the research hotspots of sports industry policy mainly include sports industry, sports economy, development, countermeasures, sports industry policy, sports consumption, national fitness, and other research hotspots. The content of sports industry policy research is based on the current research status. The two research hotspots of the sports industry and sports industry policy have always been accompanied by research in this field. Because of the particularity of the topic selection, the research hotspots are definitely inseparable from these two points. Compared with the persistence of the first two research hotspots, sports

economy and countermeasures appeared a little later. The research hotspots of sports consumption and national fitness have only rapidly become the research hotspots in this field in recent years.

The hotspots of sports industry policy research are differentiated according to different time periods. The future trends of research mainly include interdisciplinary research and cooperative research between different regions will gradually become a trend, cooperative research between authors will become a common phenomenon, and the distribution of research subjects will be more uniform, and more comprehensive colleges and other research institutes will join.

This research will provide a clear research context for future sports industry policy research and provide new perspectives and new ideas for grasping the hotspots and future trends in the research process in this field.

In the future, we should break the geographical limitations of research, strengthen the cooperation between research teams, and encourage strong alliances between research forces, but we should not ignore the exchange and collaboration between talents. The society can create a good communication platform for each research team, promote the balanced development of the main body of sports industry policy research, and thus promote the continuous development of China's sports industry. In particular, the cooperation between cross-regional research teams and the cooperation between comprehensive research institutions and professional research institutions will play a good role in promoting the comprehensiveness of sports industry policy research. Cultivate multidisciplinary talents, especially the research teams of comprehensive colleges and financial colleges, and at the same time, professional research institutions in the field of the sports industry cannot be ignored.

## Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

## Conflicts of Interest

The authors declare that they have no conflicts of interest to report regarding the present study.

## References

- [1] A. Maedche and S. Staab, "Ontology learning for the semantic web," *Intelligent Systems IEEE*, vol. 16, no. 2, pp. 72–79, 2001.
- [2] Y. Yang and Z. Liang, "Research on the present situation of public sports products supply in rural areas," *Proceedings of the 2nd International Conference on Culture, Education and Economic Development of Modern Society (ICCESE)*, vol. 205, pp. 1102–1105, 2018.
- [3] Yu Zhang, J. Ding, Y. Hui, M. He, W. Wang, and F. Xiong, "A study of the influence of collaboration networks and knowledge networks on the citations of papers in sports industry in China," *Complexity*, vol. 2022, Article ID 9236743, 10 pages, 2022.
- [4] L. Tang, "Study on coupling coordination degree between regional sports industry development and healthy China construction," *Journal of Healthcare Engineering*, vol. 2022, Article ID 7785267, 5 pages, 2022.
- [5] L. Yuxin and L.2 Lu, "Countermeasures for the sports industry to promote the construction of China's economic internal circulation," *International Journal of Educational Management*, vol. 6, no. 4, 2021.
- [6] D. Garewal Das, "Research on sports industry governance mode," *Journal of Social Science and Humanities*, vol. 3, no. 8, 2021.
- [7] X. Ye and Li Chen, "The current trend of structural change in sports industry in China is studied," *International Journal of Education and Economics*, vol. 4, no. 1, 2021.
- [8] J. Torres Pruñonosa, M A. Plaza Navas, D. Martín Francisco, and P. R. Camilo, "The sources of knowledge of the economic and social value in sport industry research: a Co-citation analysis," *Frontiers in Psychology*, vol. 11, 2020.
- [9] Y. Song and Ye Cheng, "Exploration on the conversion path of the new and old kinetic energy of Chinese sports industry," *Frontiers in Sport Research*, vol. 2, no. 60, 2020.
- [10] J. Zhang, Li Nan, and X. Yang, "The development status and countermeasures of the sports industry in Shaanxi Province," *Frontiers in Sport Research*, vol. 20, no. 50, 2021.
- [11] Li Ka-sing, "Research on the development of sports industry structure in China[J]," *The Frontiers of Society, Science and Technology*, vol. 2, no. 9, 2020.
- [12] Research and Markets and Global Sports Industry, "COVID-19 to cause serious financial and logistical implications - Research-AndMarkets.com," *Medical Letter on the CDC & FDA*, 2020.
- [13] C. Deng, Z. Tang, and Z. Tang, "Historical opportunity and structural transformation of sports industry development under the background of new information technology," *Journal of Physics: Conference Series*, vol. 1575, no. 1, Article ID 012170, 2020.
- [14] Y. Li, "Study on the evolution of governmental relationship of Chinese sports industry policy from the perspective of policy documentation quantification," *Frontiers in Social Science*, vol. 10, no. 07, 2021.
- [15] M. S. Kim, S. W. Oh, J. W. Lim, and J. W. Han, "Social big data analysis of demands for sport industry policies," *Korean Journal of Sport Management*, vol. 22, no. 2, pp. 45–66, 2017.
- [16] S.-Il Hong, S.-Ki Ahn, and T.-W. Chung, "Examination of determinant factors influencing local governments' sport industry policy adoption and diffusion: a case of major league baseball host cities," *Korean journal of sport management*, vol. 18, no. 6, 2013.
- [17] S. K. Kim, "A study of sports industry policy in China," *The Korean Journal of Physical Education*, vol. 51, no. 5, 2012.
- [18] X. Zhan, "From budding to developing: The history of china's sport industry policy," *The International Journal of the History of Sport*, vol. 33, no. 18, 2017.
- [19] Sustainability Research, "Recent findings from K.H. Hu and Co-researchers yields new information on sustainability research (evaluating the improvement of sustainability of sports industry policy based on MADM)," *Ecology Environment and Conservation*, 2016.
- [20] C. Sun, "The evolution and enlightenment of school sports policy implementation in developed countries," *Scientific*

*Journal of Economics and Management Research*, vol. 2, no. 11, 2020.

- [21] M. Jarmo, L. Jari, and L. Kati, "The analysis of structural changes in Finnish sport policy network from 1989 to 2017," *International Journal of Sport Policy and Politics*, vol. 11, no. 4, 2019.
- [22] A. M. Strittmatter, C. Stenling, J. Fahlén, and E. Skille, "Sport policy analysis revisited: the sport policy process as an interlinked chain of legitimating acts," *International Journal of Sport Policy and Politics*, vol. 10, no. 4, pp. 621–635, 2018.

RETRACTED