

# Research Course and Prospect of Piano Literature in China

## --Visual Analysis Based on Citespace

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**Abstract:** by utilizing visualized analytical technology and citespace, this article examines the literature on piano studies published from 1954 to 2018, which are confined to the articles published on the journals included by the Peking University core journal and inside CNKI database. The research data indicates the points as following: (1) since 1954, the literature on piano studies are fruitful, which can be identified as four stages - rudimentary period (1954-1964), stagnant period (1965-1976), developmental period (1977-2006), and mature period (2007-2018). (2) The predominant authors are Dai Baisheng, Wei Tingge, Zhou Weiming, and Chen Bigang. The major institutions are the musical colleges and the music department of normal universities. The core regions are concentrated on the first-tier cities while being relatively independent with each other. (3) Piano, musician, and musical work are at the core of the research regarding piano studies. Chinese piano works and the performance of them will be the future core of piano studies.

## 1. Introduction

Among many musical instruments, piano has always been a category of attention and a large number of learners. The statistics of the literature in the field of piano research will help us to grasp the current research situation in this field, get its research hotspots and research frontiers, lay a good foundation for further research, and is of great significance to the development of the piano field. using citespace bibliometrics software to analyze it can effectively save research time and cost, and the presentation of clustering knowledge graph will visualize the information, which can get the research results more efficiently and accurately.

Information Visualization is to Represent Abstract Data in Visual Form in Order to Analyze Data, Discover Rules and Regulations and Support Decision-Making. among Them, Citation Analysis Visualization is an Important Branch of Information Visualization, Which First Deals with Massive Citation Data, and Then Uses Information Visualization Technology to Make It Easier for People to Observe, Browse and Understand Information, So as to Find the Hidden Rules and Patterns in the Data. [1]

## 2. Data Sources and Research Methods

### 2.1 Data Sources

The research data used in this paper are all from china journal network full-text database (referred to as cnki). The search period is set from January 1, 1954 to December 31, 2018 (the search results show that the earliest literature that meets the research conditions included in the CNKI was published in 1954), and the piano-related papers of the core periodicals of Beijing university in 65 years were included in CNKI. According to the 2017 Beijing university core journal's eighth edition of the catalog, the music journals are: Chinese musicology, central journal of music, music research, Chinese music, people's music, music art (journal of shanghai conservatory of music), Huang Zhong (journal of Wuhan conservatory of music), music creation, Xinghai music journal.

In the Advanced Search of the CNKI Database, "Topic = Piano" and "Topic = Piano" Were Used

as the Search Terms. the Source of the Documents Was Limited to the Core Journals of Peking University. a Total of 3402 Documents Were Obtained. after Screening, the Winning Information, Meeting Records, the Literature Reports Such as Picture Reports, Le Hai Shortwave, Etc., Finally Obtained a Total of 2,725 Valid Literatures That Can Be Used in This Research.

## **2.2 Research Methods**

This paper is based on the Citespace bibliometric software compiled by Professor Chen Chaomei to visualize the data. The software is designed based on co-citation analysis and path-finding network algorithm theory. By drawing a visual map, it presents the evolution process of the discipline, analyzes the internal dynamic mechanism and explores the discipline. Development helps to better understand a certain research area, and finds groundbreaking and iconic literature, mainstream topics, evolutionary trends, and links between subfields.[2]

First, download the downloaded CNKI data into a data format that Citespace can analyze. Set the relevant parameters on the Citespace function and parameter page. The time span is set from 1954 to 2018, the time slice is 1, and the Node Type is selected. Select Top50 as the slice, that is, the data extraction object is the top 50, and the strength of the connection is Cosine to obtain the keyword co-word network clustering. Select “Author”, “Organization”, and “Keywords” respectively in the same way to get the cluster analysis map of each node, and then separately calculate the factors such as the author of the document, the institution, keywords, and emergence rate. Form the research process framework and structure in the field of piano music, and visually display the research status, research hotspots, and research development frontiers in this field.

## **3. Research Status of Domestic Piano Literature**

### **3.1 Literature Time and Quantity Analysis**

In this paper, a statistical analysis of 2,725 documents collected from the CNKI is conducted, and it is found that the number of documents in the field of piano research has generally increased year by year. The results are shown in Figure 1. It can be seen from the figure that so far, the research has gone through four stages:

The first stage is the budding period (1954-1964), and the average number of papers published in each of these 11 years does not exceed 10. Representatives of this stage are Hong Shizhen and Zhao Shengshu, etc. The main source of literature in this period is “People's Music”. At this stage, in the early days of the founding of China, Comrade Mao Zedong formally put forward the policy of “a hundred schools of thought contending and a hundred flowers blooming” in scientific and cultural work at the enlarged meeting of the Political Bureau of the CPC Central Committee in 1956. In the field of literature and art, there are many dramas, and colorful situations. However, due to the weak level of research and the scarcity of research scholars, the literature types are mainly based on the piano concert after hearing, and there are also some piano music works analysis and piano practice tutorial literature;

The second stage is the stagnation period (1965-1976), and the valid literature during these 12 years is blank. During this period, due to political changes at home and abroad, research scholars were led by extreme trends of “extreme left” and “unification” and entered a lost period, so they did not make much academic contribution to art during this period;

The third stage is the development period (1977-2006). The number of publications in the past 30 years has shown a steady upward trend, with an average annual publication volume of about 50. Representatives at this stage are Wei Tingge, Dai Baisheng, Chen Xu, etc. These scholars have made outstanding contributions to the development of Chinese piano music. The concept of music in contemporary Chinese society during this period began from the “unification” of the Cultural Revolution to “multiple development” and entered a new period of emancipating the mind. An unprecedented active situation has emerged. Due to the increase in research scholars and research institutions, the level of research continues to increase, coupled with the increasing frequency of exchanges and learning with foreign scholars, the field of piano art research has gradually expanded,

the research team has continued to grow, and its academic influence has become stronger and stronger.

The fourth stage is the maturity period (2007-2018). In 2007, the number of papers exceeded 100, showing a leaping growth, reaching a peak in 2015, and the annual volume of papers was as high as 156. This rapid progress continued until 2018. The volume of posts has remained relatively stable at around 140. Representatives at this stage are Zhou Weimin, Dai Baisheng, Wu Xiaona, etc. During this period, research fields became diversified, and interdisciplinary research directions emerged. From the tradition, a new language of Chinese music has evolved. Music technology has gradually become one of the research focuses. The research method has also changed from a single descriptive analysis to a combination of data and More research methods with the integration of scientific methods have greatly enriched and expanded research horizons and research results.

The analysis of the above data shows that as piano music gradually enters more families and is loved by the general public, research talents are growing rapidly, and the academic community is paying more and more attention to the field of piano research. Statistics show that domestic scholars have made rich achievements in the field of piano research, and their research is entering a stage of rapid development.

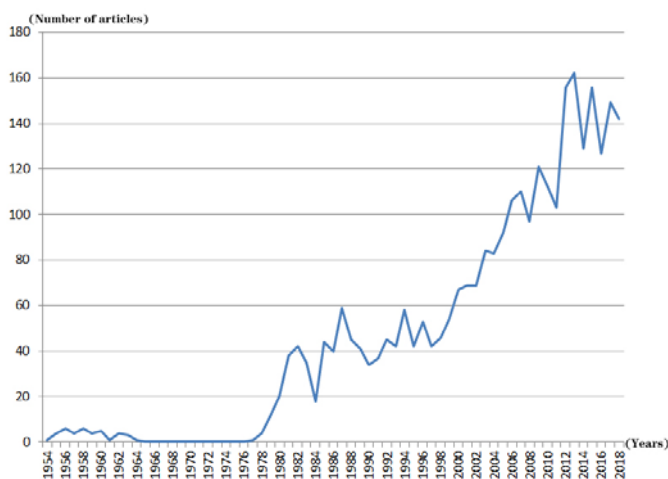


Fig.1 Trend of the Number of Papers Issued from 1954 to 2018

### 3.2 Analysis of Core Authors

The core author means the author who appears relatively frequently and has published a relatively large number of papers in the scope of the research journal of this article. The co-occurrence map of authors is drawn in Citespace. The contents in Tables 1 and 2 are detailed information of the top authors with the highest frequency of citations and emergence. Statistics show that the authors with outstanding achievements include Dai Baisheng, Wei Tingge, Zhou Weimin, and Chen Bigang. Dai Baisheng posted the first 17 articles; the authors Chen Bigang and Zhou Haihong had the highest emergence rate and were cited more frequently.

The author with the most posts is Professor Dai Baisheng. He co-authored a paper entitled “What is the” Chinese Style “of Piano Music--A Study of Chinese Piano Music from a Cultural Perspective” [3], published in “Chinese Musicology” in 2005, with 127 citations and 2124 downloads. This article explains the connotation of Chinese piano music from the perspective of traditional Chinese culture, which is of great significance to the field of Chinese piano research.

Table 1 Top 4 Authors

Sort	Post volume	Author
1	17	Dai Baisheng
2	15	Wei Tingge
3	15	Zhou Weimin
4	13	Chen Bigang

Table 2 the Top Three Authors with the Highest Emergence Rate

Sort	Emergence rate(%)	Author
1	5.16	Chen Bigang
2	4.61	Zhou Haihong
3	4.21	Wei Tingge

Cluster analysis was performed on the authors using Citespace. The analysis results are shown in Figure 2. The nodes in the figure are annual rings. When the author's node and name font are larger, it means that the author's overall frequency is higher, and vice versa. The connection between authors represents cooperation between authors. The thicker the connection, the higher the frequency of co-occurrence. Statistics show that the field of piano research has formed researchers mainly composed of Wei Tingge, Chen Bigang, Zhou Haihong, Zhou Weimin, Dai Baisheng, etc., and has not yet formed a research team, and there are fewer horizontal and vertical connections between the authors. Researchers are still relatively independent.



Fig.2 Knowledge Cluster of Authors

### 3.3 Analysis of Core Institutions

The core institution means the institution that appears relatively frequently and has a relatively large number of published papers within the scope of the research periodical of this article. The author's co-occurrence map was drawn in Citespace, and the detailed information of the first few institutions with the highest cited frequency and highest emergence rate was extracted. The results are shown in Tables 1 and 2. As can be seen from the data in the table, the more prominent institutions are the Department of Piano of Wuhan Conservatory of Music, the School of Music of Capital Normal University, Shanghai Conservatory of Music, China Conservatory of Music, and the Department of Music of Taiyuan Normal University. The Wuhan University of Music's Piano Department has been cited for 28 times. The Music Education Department of the China Conservatory of Music and Hangzhou Normal University's School of Music have the highest emergence rates, both above 5.0. Statistics show that most of the core institutions in the field of piano research in China are concentrated in the music college and the music department of the normal university, especially universities in large and medium cities or provincial capitals.

Table 3 Top 5 Most Cited Institutions

Sort	Cited Frequency(times)	mechanism
1	28	Wuhan University of Music's Piano Department
2	20	School of Music of Capital Normal University
3	18	Shanghai Conservatory of Music
4	17	China Conservatory of Music
5	15	Department of Music of Taiyuan Normal University

Table 4 Top 4 Institutions with Highest Burst Rate

Sort	Emergence rate(%)	mechanism
1	5.72	Music Education Department of the China Conservatory of Music
2	5.34	Hangzhou Normal University's School of Music
3	4.70	Wuhan Conservatory of Music
4	4.49	College of Music of Hebei Normal University

Citespace was used to perform cluster analysis on the publishing units and their cooperative relationships. The analysis results are shown in Figure 3. The meaning of nodes and lines is the same as the knowledge graph of the author's clustering. Statistics show that piano research institutions are mostly located in Beijing, Shanghai, and Wuhan, with relatively few universities in other regions. These areas of the core institutions have gathered most of the domestic related scholars in piano research, and have been engaged in piano music research for a long time. Relying on the advantages of rapid regional development, developed and convenient international cooperation, the cited frequency and volume of publication are at the forefront. At present, these institutions are also the main force of music research in China, but most of them are relatively independent.



Fig.3 Clustering Knowledge Map of Publishing Organizations

#### 4. Research Hotspots and Research Frontiers

Set the relevant parameters on the Citespace function and parameters page. The time span is set from 1954 to 2018, the time slice is 1, the Node Type is selected as the keyword, and each time slice is selected as Top50, that is, the data extraction object is the top 50, and the connection strength is selected. Cosine, get the keyword co-word network clustering.

##### 4.1 Research Hotspot Analysis

Research hotspots refer to “a certain set of scientific issues discussed in a relatively large number of papers with internal connections within a certain period of time” [4]. It can be seen from Table 5 that from 1954 to 2018, the hot topics in the field of piano research are “Piano”, “Keyboard Instrument”, “Musician”, “Pianist”, “Composer”, etc., with a frequency of up to 463 Times. Statistics show that the scope of research in the field of piano research is very wide. Among them, the research on piano, musicians, analysis of piano works, and piano education is more concentrated.

Table 5 Top 10 Keywords with the Highest Citations

Sort	Keywords	Cited frequency(times)	years
1	piano	463	1978
2	Keyboard instrument	386	1978
3	musician	321	1956
4	pianist	235	1979
5	composer	233	1958
6	Piano works	152	1982
7	Works	152	1956
8	Musical work	144	1956
9	Piano teaching	143	1979
10	Music	131	1981

This paper also selects the literatures that were cited more than 100 times and downloaded more than 2,000 times from 1954 to 2018 to conduct research hotspot analysis. The results are shown in Tables 6 and 7. From the literature citations in the field of piano research, The most cited literature is Wei Tingge's "On Wang Jianzhong's Piano Arrangements" published in "Chinese Musicology" in 1999, 157 times. The most frequently downloaded literature is "History and Development of Chinese Piano Education", published by Zhou Weimin in "Chinese Music" in 2010, up to 2626 times. On the whole, domestic research in the field of pianos mostly focuses on the adaptation of Chinese piano music and traditional music. The time span is long, and the authors focus on a few scholars. This shows that the research hotspots in the field of piano research in China have long been concentrated in the development and progress of traditional Chinese music, which has national characteristics, but the research level is uneven, and there are still some differences. In addition, it can be seen from the download frequency that scholars have always attached great importance to the education of Chinese pianos, as well as the style and adaptation of works, especially around 2010. From these statistics, it is not difficult to see that most of the high-profile literature in the field of piano research comes from journals such as "Chinese Musicology" and "Music Research", while other journals are relatively few. Has a higher impact, published earlier papers, cited and downloaded more frequently.

Table 6 Literature Cited More Than 100 Times

Sort	Literature name	Author	Issuing time	Literature source	Cites Frequency
1	On Wang Jianzhong's Piano Arrangements	Wei Tingge	1999	Chinese Musicology	157
2	The Development of China's Piano Music Creation	Wei Tingge	1983	Music research	148
3	The Creation of Chinese Piano Music and Its Enlightenment	Chen Xu	2001	Music research	144
4	What is the "Chinese Style" of Piano Music--A Study of Chinese Piano Music from a Cultural Perspective	Dai Baisheng	2005	Chinese Musicology	127
5	Performance characteristics of Chinese piano music adapted from traditional music	Dai Baisheng	1999	Music research	102
6	Artistic characteristics of 5 Chinese piano songs adapted from traditional music	Dai Baisheng	1999	Huang Zhong (Journal of Wuhan Conservatory of Music)	101

Table 7 Documents Downloaded More Than 2,000 Times

Sort	Literature name	Author	Issuing time	Literature source	Download Frequency
1	History and Development of Chinese Piano Education	Zhou Weimin	2010	Chinese music	2626
2	“Near-My Experience” and “Near-Myself Reflection” -- Methods and Significance of Urban Field Work in Musical Anthropology	Luo Qin	2011	Music Art (Journal of Shanghai Conservatory of Music)	2427
3	On Wang Jianzhong's Piano Arrangements	Wei Tingge	1999	Chinese Musicology	2145
4	What is the “Chinese Style” of Piano Music--A Study of Chinese Piano Music from a Cultural Perspective	Dai Baisheng	2005	Chinese Musicology	2124

#### 4.2 Research Frontier Analysis

The research front is generally regarded as “the most promising, newest and most advanced research field or research theme in scientific research”<sup>[5]</sup>. Statistics of emerging words in the field of piano research are shown in Table 8. Statistics show that the frontiers of piano research are “Piano Performance”, “Performance”, “Piano Music”, and “Nationalization”. Emergent words are mainly concentrated in the 1980s and 2007. The keywords that emerged in 2007 were mainly “performing” and “nationalization”. It can be seen that the future piano research field will be paid more attention to in piano performance and Chinese piano works.

Table 8 Top 10 Keywords with Highest Emergence Rate

Sort	keywords	Emergence rate(%)	years
1	Piano playing	14.29	1981
2	Playing	10.90	2007
3	Piano piece	9.13	1991
4	Nationalization	8.88	2007
5	Piano music	8.20	1982
6	Music	8.18	1956
7	Art song	8.10	1987
8	Piano works	8.09	1982
9	Keyboard instrument	7.99	1978
10	Debussy	7.79	1982

Use the “Network Summary Table” in the “Export” of the cluster view interface in Citespace software to export the statistical table of keywords with their cited frequency, emergence rate, and year, and then convert it to Excel format and rename it to “pianokeyword.xlsx”, and then use R software to implement cluster analysis: first, import the relevant data set, the code is “data = read.table(“pianokeyword.xlsx”); the second step is to aggregate the reference frequency variables in the data set Class analysis, the code is “hc = hclust(dist(data))”; Finally, the cluster analysis tree diagram is drawn, as shown in Figure 4, the code is “plot(hc)”. Statistics show that the current research fields of pianos are generally concentrated in the following four categories: one is “research on musical instruments”, and in the years of piano research, piano and keyboard instruments have been the focus of research; the second is “music related to pianos” “Home study”, mainly including pianists and composers; third, “research on piano-related music activities”, the most of which are piano teaching and concerts, including concerts including piano performances,



piano accompaniment and other recreational activities; four It is a “composer and works research”, such as Liszt, Debussy, Beethoven, Chopin and other famous composers and their piano works, which mainly include etudes, artistic songs, concertos, sonatas, etc.

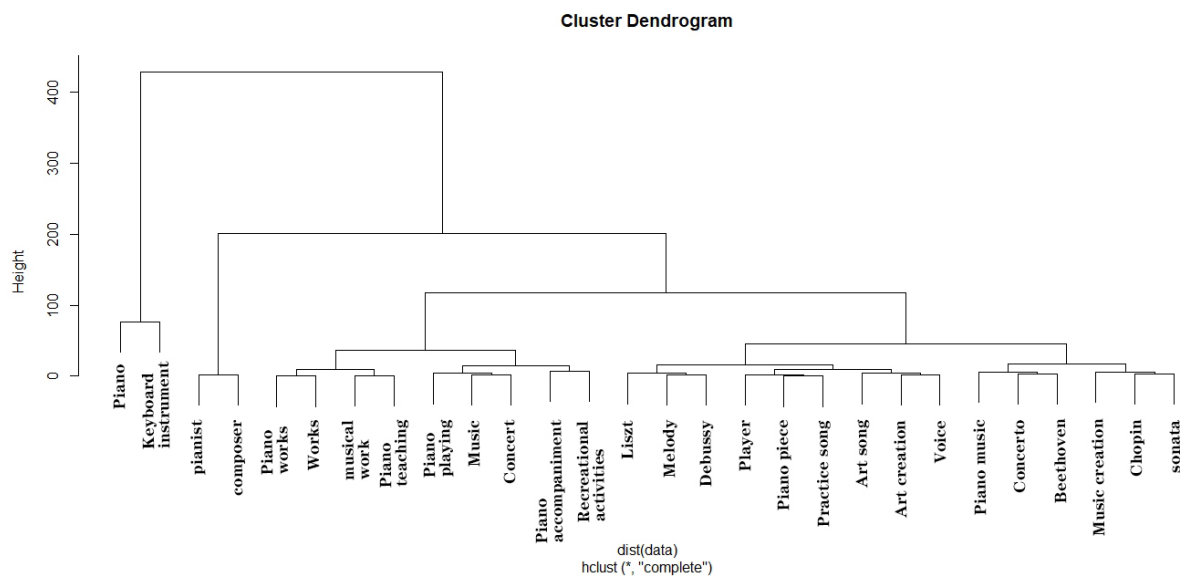


Fig.4 Tree Diagram of Keyword Clustering Analysis

## 5. Conclusion

This article takes the literature in the field of domestic piano research as the research object, and analyzes it with Citespace information visualization software, and draws the research status, research hotspots, and research knowledge of visual piano maps and detailed table information of domestic piano literature from 1954 to 2018. By analyzing the number and time of publications in the field of piano research, core authors, core institutions, keyword citation frequency and emergence rate, and citations and downloads of literature, the following conclusions are concluded:

(1) Since 1954, research in the field of piano in China has gone through four stages: germination period (1954-1964), stagnation period (1965-1976), development period (1977-2006), and mature period ((2007-2018), has made rapid development in 65 years, and has achieved fruitful results.

(2) From the analysis of the core authors and core institutions, it can be seen that research scholars in this field, such as Dai Baisheng, Wei Tingge, Zhou Weimin, and Chen Bigang, have formed, and these scholars are in a relatively independent state, and no research has been formed at present. team. It can be seen from the core institutions that institutions with a high volume of publications are concentrated in colleges and universities, mainly music schools and music departments of normal universities. Most of them are located in Beijing, Shanghai, Wuhan, Taiyuan, and other educationally developed and provincial capitals. , Participation is not high, and institutions are relatively independent.

(3) From the statistics of keyword citation frequency and emergence rate, it can be concluded that the field of piano research focuses on Chinese piano works and adaptations, piano performance, and traditional music creation.

(4) Through further research hotspots and research frontiers, “piano”, “musician” and “musical works” are the current research hotspots, and “Chinese piano music works” and “piano performance” will be future research directions.

Based on the above analysis, here are some suggestions for the further development and promotion of the field of piano research in China:

(1) The scope of research topics needs to be broadened. The theoretical research in the field of piano research in China started late. The research results have distinct Chinese characteristics and characteristics, and the research hotspots are relatively concentrated. In the future, we can consider expanding the research topic to a broader field, with a longer-term perspective and



internationalization. Drawing on and absorbing the basics of western research, it is not possible to copy western theories, go to the coarse and fine, and combine it with reality to further enrich the research in the field of piano in China.

(2) Authors and research institutions need to reduce their relative independence and increase cooperation. Deepening and expanding the relationship between authors and cooperation between research institutions can promote mutual learning and accumulation and make research results more extensive and in-depth.

(3) The comprehensive research level of scholars needs to be further improved. Due to regional differences and other reasons, the level of authors and institutions in the field of piano research in China is uneven, and the influential literature is concentrated in a few scholars and institutions. It may be considered to establish more relevant lectures and training, improve related policies and systems, increase the research enthusiasm of scholars, and enhance the comprehensive research level of scholars in other regions, which will have a profound impact and important role on the coordinated development of the piano research field in China.

(4) The research content and method are relatively single and lack interdisciplinary dialogue. According to the statistical analysis of the article, it can be seen that the current research results in the field of piano are mostly works creation, analysis, and performance, and the methods are mostly humanities and social sciences methods. They lack communication and integration with natural science and emerging technologies. There are many reasons why researchers are mostly performers or music theory researchers. With the advancement of society and the development of the times, big data, the Internet and artificial intelligence have become hot topics at the moment, and many humanities have begun to seek to combine these fields to form new research growth points. Whether piano theory research and artificial intelligence can be combined to form complementary advantages and provide possibilities for the study of music technology and music emotional computing is another new topic worthy of consideration for many piano theory researchers. In addition, it can also draw on the outstanding achievements and latest developments in statistics, sociology, psychology, education and other disciplines, and increase cross-disciplinary cross-disciplinary cooperation. This will help expand the research perspective of the piano field and improve the quality of research.

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