



# The Hotspot and Evolution Trend of Talent Policy Research in China

## Based on the Perspective of Bibliometrics

Zhenlin Han<sup>1,2</sup> and Jinying Wang<sup>1,2</sup>(✉)

<sup>1</sup> Institute of Science and Technology for Development of Shandong, Qilu University of Technology (Shandong Academy of Sciences), Jinan 250014, China  
wangjy0401@qlu.edu.cn

<sup>2</sup> Research Center of SCO Countries, Qilu University of Technology (Shandong Academy of Sciences), Jinan 250353, China

**Abstract.** Based on the 3120 documents collected by CNKI Database from 2000 to 2022, with the help of the CiteSpace knowledge map analysis software, from the aspects of the annual number, institutions, authors, research hotspots, and current words, the research literature of Chinese talent policy research documents can be visualized and statistical analysis. Get the following conclusions: 1. Talent policy research issues are in line with the logic growth curve of Stype literature, which is currently in a transition period; 2. The density of cooperative research is low and the lack of innovative research; 3. Presenting a historical evolution from “talent power” to “innovation and entrepreneurship” and then to “self-reliance and self-improvement in science and technology”, “talent introduction” and “scientific and technological talents” are the main research hotspots. It is recommended that the majority of scientific and technological workers strengthen cooperation, promote theoretical innovation, and pay attention to the research on talent policy reflection.

**Keywords:** Talent policy · CiteSpace · Bibliometrics · Knowledge map · Research hotspots

## 1 Introduction

Talent policy is the banner of leading talent development. “Gather the world’s talents and use them” needs to formulate superior talent policies and build a comprehensive talent management system and mechanism. Talent policy research explores policy paths and frameworks, provide theoretical foundation for policy formulation, and ensure the scientific and standardized policies. Paying attention to talent is to attach importance to the development of productive forces, and the research on talent policy is practical to improve talent’s attractiveness and competitiveness.

## 2 Literature Review

For decades, Chinese scholars have conducted extensive and in-depth research on talent policies from different perspectives. At present, there are already literatures mainly from the following aspects:

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(1) Research from the talent policy system carried out at the national level. Zhongyan Liu et al. [1] conducted a systematic analysis of the overall development trend of China's science and technology talent policy system and the contradiction between the supply and demand structure of the policy system since the 30 years of reform and opening up; Qinghua Lan [2] pointed out that promoting the development of the talent policy system requires breaking down the policy barriers that restrict talent growth; Zhe Luo et al. [3] used a knowledge map to analyze the evolution trend of China's talent policy and summarized three categories of talent policy research.

(2) Research on local talent policies. Qun Zhang [4] evaluated the implementation effect of Shanghai's science and technology talent policy from the perspective of supply and demand, and found that the actual policy supply and talent demand match relatively low; Lanxia Zhang et al. [5] used the QFD method to evaluate the effectiveness of Liaoning Province's overseas technology talent introduction policy, and found that the government attached too much importance to talent attraction and ignored the issue of talent use; Dianchao Sun et al. [6] analyzed the technological talent policies of Guangdong Province over the past 20 years and proposed a more optimized layout plan for talent resources.

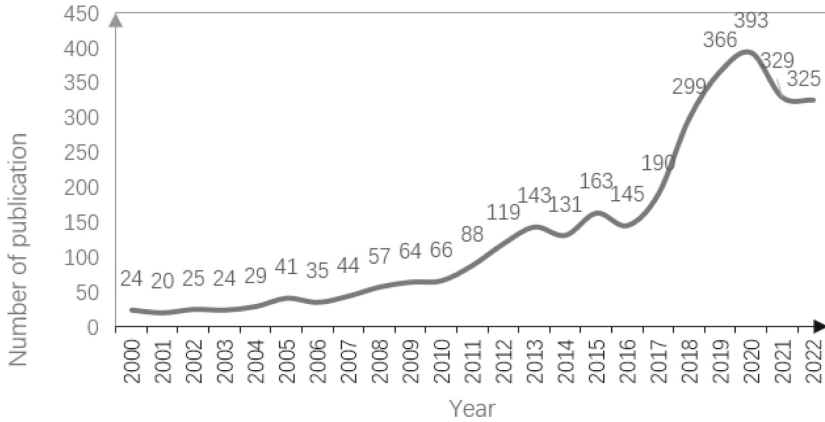
(3) Research on talent policies in specific industries. Ye Yuan et al. [7] to measure the talent policy of Chinese artificial intelligence, and found that the training of young talents did not get enough attention; Yan Ren et al. [8] analyzed the research object of national popular science talent policy, which clarified the current status and evolution trend of Chinese popular science talent policy; Yating Li et al. [9] through combing the talent policy of foreign haze prevention and control to obtain experience that can be used for reference in China; Hao Zhang et al. [10] analyzed the policy of new medical reform talents in Zhejiang Province based on a system dynamic model, proving that the policy would promote hierarchical medical reform.

Analysis of literature on talent policy research can better grasp the current status and development trends of Chinese talent policy, summarize the research themes of different stages of historical development, tap the potential research hotspots in the field during the study of the literature, predict the future research focus change in the future research, provide reference for future research.

### 3 Research Method and Data Source

This article uses the latest version of the knowledge map analysis software developed by Professor Chaomei Chen as the latest version of CiteSpace 6.1.R6 as a literature measurement analysis tool to perform keyword analysis, sudden word analysis, cluster analysis, etc., and realize the visualization of data [11]. At the same time, through the analysis of the knowledge map, explore the research topics of different stages in the field of talent policy and the evolution of cutting-edge hotspots.

Literature text data is derived from the CNKI database. Due to the small number of talent policies and documents before 2000 and poor integrity, this article only collects and analyzes literature data after 2000. According to the precise search of the "Talent Policies", the setting time span is 2000–2022, for a total of 23 years, and obtained 3699 documents. Remove the meeting, newspapers, information incomplete documents and repeated documents. A total of 3,120 valid documents are obtained.



**Fig. 1.** Statistics on the number of literatures on talent policy research from 2000 to 2022 by year

**Table 1.** Three stages of annual publication volume

| Stage   | Timespan     | Number of publications | Duration | Characteristic                            |
|---------|--------------|------------------------|----------|-------------------------------------------|
| Stage 1 | 2000—2013    | 20—143                 | 14 years | Low publication volume and slow growth    |
| Stage 2 | 2014—2020    | 131—393                | 7 years  | High publication volume and rapid growth  |
| Stage 3 | 2021—present | 205—384                | 2 years  | High publication volume, slightly reduced |

## 4 Statistical Analysis

### 4.1 Analysis of Publications

The number of releases of Chinese talent policy research on the past years is divided into the trend of changes in the number of issues (Fig. 1), which can be divided into three stages (Table 1): The first stage is from 2000 to 2013, and the amount of the post is [20,143]. At this stage, this stage the number of documents published each year is relatively low and the growth trend is slow; the second stage is from 2014 to 2020. The volume range of the post is [131,393]. The volume interval is [205,384]. The number of posts in this stage is still at a high level, but compared with the end of the second stage, it decreases. In general, the number of publications in the field of Chinese talent policy in the past 23 years has shown an upward trend, and it is currently at a higher level of research and development.

### 4.2 Author and Research Institutions Analysis

The core author refers to the author who has an important contribution to the field and published an important impact on the field. According to Price law [12], the core author’s

**Table 2.** Core authors and number of publications

| No. | Author         | Publications | No. | Author        | Publications |
|-----|----------------|--------------|-----|---------------|--------------|
| 1   | Liu Zuojing    | 10           | 11  | Yin Xiaozhou  | 3            |
| 2   | Li Lili        | 6            | 12  | Pan Chenguang | 3            |
| 3   | Su Fan         | 4            | 13  | Hu Kai        | 3            |
| 4   | Li Yanping     | 4            | 14  | Zhang Ailin   | 3            |
| 5   | Zhang Zaisheng | 4            | 15  | Li Xiyuan     | 3            |
| 6   | Chen Jie       | 4            | 16  | Liu Bo        | 3            |
| 7   | Ren Wenshuo    | 4            | 17  | Tian Haisong  | 3            |
| 8   | Zhang Ping     | 4            | 18  | Li Ju         | 3            |
| 9   | Xue Qixin      | 4            | 19  | Wu Mei        | 3            |
| 10  | Zhang Tuizhi   | 3            | 20  | Li Yuanhui    | 3            |

identification formula is:

$$M \approx 0.749\sqrt{N_{\max}} \quad (1)$$

M is the minimum number of literatures in the core author, and  $N_{\max}$  is the author with the largest number of posts. After calculation  $M \approx 2.368$ , the number of core authors should not be lower than m, so 3 articles are taken. There are 21 core authors (Table 2).

With CiteSpace software statistics on research institutions with more than 10 articles, you can get the rankings of the author's research institution (Table 3). Among them, Shanghai Jiao Tong University is the largest number of research institutions for publishing articles. There are 29 articles. The number of articles published by five universities including Tianjin University and Guangxi University also has more than 20 articles.

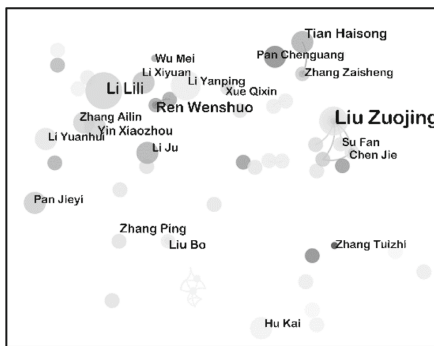
### 4.3 Author and Institutional Collaboration Network

The author cooperation network diagram can provide a more intuitive understanding of the cooperative relationship between authors. Each node represents an author, and the connection represents a collaboration between the authors (Fig. 2). It can be seen from the diagram that the three core authors, Liu Zuojing, Su Fan, and Chen Jie, have formed a relatively good cooperative relationship. Zhang Zaisheng and Tian Haisong, Yin Xiaozhou, and Liu Ailin have also collaborated, while other core authors have not significantly collaborated. Currently, the density of author collaboration in the field of talent policy research is relatively low, with few core authors with a high number of posts collaborating, and other authors collaborating less frequently. The lack of cooperation between authors and the obvious fragmentation of research will in the long run make research weak and not conducive to the forefront of exploration in the field of talent policy.

Draw the cooperation network map of the institutions, node representative agencies, and cooperation between connected representative agencies (Fig. 3). It can be seen from

**Table 3.** Research institutions (more than 10 publications)

| No. | Institution                                 | Publications |
|-----|---------------------------------------------|--------------|
| 1   | Shanghai Jiao Tong University               | 29           |
| 2   | Tianjin University                          | 24           |
| 3   | Guangxi University                          | 23           |
| 4   | Soochow University                          | 21           |
| 5   | Dalian University of Technology             | 20           |
| 6   | Harbin University of Commerce               | 20           |
| 7   | Northeastern University                     | 19           |
| 8   | South China University of Technology        | 15           |
| 9   | Chongqing University                        | 14           |
| 10  | Dongbei University of Finance and Economics | 13           |
| 11  | Chinese Academy of Personnel Science        | 12           |
| 12  | Inner Mongolia University                   | 12           |
| 13  | China University of Mining and Technology   | 11           |
| 14  | Fujian Normal University                    | 11           |
| 15  | Huaqiao University                          | 11           |
| 16  | Jilin University                            | 11           |



**Fig. 2.** Author Collaboration Network



**Fig. 3.** Institutional Cooperation Network

the figure that, like the author’s cooperation network, the cooperation density between various institutions is low, and important research institutions lack of communication. In terms of geographical location, the distribution of research institutions shows obvious differences in things. It is obviously concentrated in the developed areas of the Eastern economy. Only the number of articles published by Inner Mongolia University in the western region has exceeded 10 articles, and the differences in North and South are relatively not obvious.

## 5 Research Hotspots and Historical Evolution Analysis

### 5.1 Research Hotspot

#### Keyword Frequency

The larger the frequency of keywords, the more important it is in the field of research. Select keywords with a frequency greater than 40 for analysis (Table 4), and remove the search terms “talent policy”, “talent”, and “policy”. It is found that “talent introduction” and “scientific and technological talent” are by far the largest research hotspots, with a frequency exceeding 100. Since 1994, the “Hundred Talents Plan” of the Chinese Academy of Sciences proposed the introduction of high-level overseas scientific and technological talents [13], talent introduction and scientific and technological talents have become the focus of national talent work. In 2002, China proposed a strategy of strengthening the country to strengthen the country to further increase the importance of the cultivation and introduction of scientific and technological talents. In 2010, the “Outline of the National Middle and Long-term Talent Development Plan (2010–2020)” was promulgated, and proposed to cultivate innovative scientific and technological talents, and then formulated a series of talent projects such as “National Excellent Youth Fund” and “10,000 Plan” [14]. The attention of “talent introduction” and “scientific and technological talents” runs through all stages of the Chinese talent policy.

Among the keywords that do not exceed 100 frequency, the three research hotspots of “talent gathering”, “talent flow” and “human resources” start from the perspective of human capital theory to study talent policies, reflecting the government’s ideological transformation from the government-oriented position to the service-oriented thinking, respecting The laws of socialist markets and giving full play to the efficiency of market regulation are the necessary prerequisites for China to achieve high-quality development strategic goals and build a high-level talent governance system [15]. In addition, the talents of talents in various cities in China are in full swing, and various “local government” have formulated a game strategy of talent policies [16], and “local government” have become the focus of the research of many scholars’ talent policies. In 2014, the strategy of “mass entrepreneurship and innovation” proposed that the country put forward new requirements for talents based on the new development stage [17]. Essence “policy tools” is widely used in the research of public policy at home and abroad. In recent years, more and more scholars have carried out talent policy research based on the perspective of policy tools [18]. Chinese talent policy research has strong attachment to national strategic orientation. At the same time, in addition to changes in policies, research hotspots also reflect the development and changes of research theory and research methods.

#### Centrality Analysis

The centrality represents the connection role of keywords in this field. The larger the centrality, the more the keywords are connected with other keywords. Software export keyword center Table (Table 5), select the top 20 keywords in the center of the center to analyze, “talent”, “talent introduction”, “science and technology talent”, “policy” and other keywords not only have a large frequency, the centrality is also very High, it shows that these keywords have also played an important connection role as the focus of research. It should be noted that the central ranking of keywords such as “Personnel

**Table 4.** Keywords with a frequency exceeding 40

| No. | Frequency | Begin year | Keyword                         |
|-----|-----------|------------|---------------------------------|
| 1   | 645       | 2000       | talent policy                   |
| 2   | 191       | 2000       | talent                          |
| 3   | 186       | 2004       | talent introduction             |
| 4   | 129       | 2001       | science and technology talent   |
| 5   | 96        | 2000       | policy                          |
| 6   | 79        | 2000       | countermeasure                  |
| 7   | 76        | 2014       | policy instrument               |
| 8   | 69        | 2005       | talent gathering                |
| 9   | 59        | 2010       | local government                |
| 10  | 58        | 2001       | talent flow                     |
| 11  | 47        | 2015       | innovation and entrepreneurship |
| 12  | 44        | 2000       | human resources                 |

Bureau”, “Shanghai”, “Party Management Talent” is greater than the ranking of frequency, indicating that these keywords are paying less attention, but they have played a necessary connection role. Perhaps potential research value is worthy of attention in the research process.

On the whole, the central degree of keywords with large frequency is usually relatively high, and the frequency and centrality presentation is consistent. The side reflects the phenomenon of research focusing on a specific range [19]. At the same time, it can be found that the connection between different gatherings is weak. Although the phenomenon of gathering helps the development and breakthrough of this research direction, it may also weaken the divergence of research, reduce the density of cooperation, and then limit research and development.

### Keywords Network Map

Keyword maps can more intuitively reflect the distribution of research hotspots (Fig. 4). Each node in the map represents a keyword. The size of the node indicates the frequency of the keywords. The lines connected on the node represent the connection between keywords. The more connecting, the higher the center of the keyword. The thickness of the lines represents the tightness between keywords. The thicker the lines, the closer the connection between the keywords. There are 604 nodes and 1481 connectors. Among them, “talent policy” mentions the most frequently, the most obvious nodes, “talent”, “science and technology talent”, “talent introduction”, “innovation and entrepreneurship” and other nodes mention more frequency. Uniform, the connection between keywords is relatively uniform.

From the frequency, centrality, and common map of keywords, we can find that the themes with the highest attention in the field of Chinese talent policy research are “talent introduction” and “science and technology talent”, which reflects the fundamental

**Table 5.** Keyword centrality of top 20

| No. | Frequency | Centrality | Keyword                         |
|-----|-----------|------------|---------------------------------|
| 1   | 563       | 0.79       | talent policy                   |
| 2   | 175       | 0.14       | talent                          |
| 3   | 157       | 0.13       | talent introduction             |
| 4   | 110       | 0.08       | Science and technology talent   |
| 5   | 94        | 0.07       | policy                          |
| 6   | 51        | 0.07       | talent flow                     |
| 7   | 47        | 0.06       | innovation and entrepreneurship |
| 8   | 65        | 0.05       | talent gathering                |
| 9   | 42        | 0.05       | human resources                 |
| 10  | 11        | 0.05       | personnel bureau                |
| 11  | 74        | 0.04       | countermeasure                  |
| 12  | 28        | 0.04       | policy innovation               |
| 13  | 13        | 0.04       | Shanghai                        |
| 14  | 37        | 0.03       | talent development              |
| 15  | 30        | 0.03       | public policy                   |
| 16  | 26        | 0.03       | the brain drain                 |
| 17  | 22        | 0.03       | senior personnel                |
| 18  | 19        | 0.03       | party management talent         |
| 19  | 26        | 0.02       | introduce                       |
| 20  | 24        | 0.02       | policy implementation           |

orientation of Chinese talent strategies and the focus of talent work. “Innovation and entrepreneurship” is the core of the secondary research, reflecting the target needs of talent policies. Most literatures conduct policy content research, human capital research, and improvement strategy research around these three core hotspots and their derivative themes.

## 5.2 Historical Evolution

Based on keywords as an analysis perspective, it can intuitively reflect the time change effect of research hotspots in the field. Select 25 keywords with the highest stress on keywords, and each of them is arranged according to the order of the beginning of the emergence (Fig. 5). The emergence intensity is to measure the popularity indicators of the emergence during the emergence period. The greater the existing intensity, the higher the keyword thermal heat. The figure contains the first year of the keywords, the start time and the end time, the time of the end of the emergence, and the visualization of the current situation. The length of the progress bar represents 23 years. The line progress



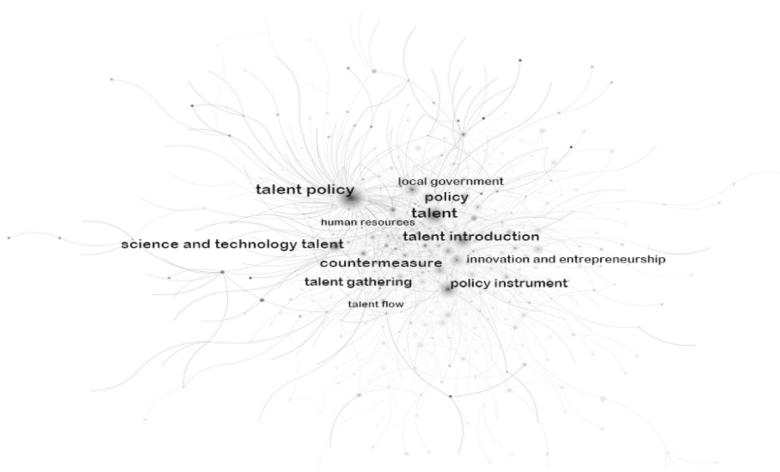


Fig. 4. Keywords Network Map

bar indicates that the keywords have not appeared, and the black progress bar represents the appearance of keywords.

Judging from the current situation of keywords, the research of Chinese talent policy can be divided into four stages:

The first stage: research on talent policy under the strategic guidance of “Talent Power”. The most distinctive feature of this stage is to attach importance to the construction of talent teams. In the “Strategy of Science and Education and Education and

Top 25 Keywords with the Strongest Citation Bursts

| Keywords                        | Year | Strength | Begin | End  | 2000 - 2022          |
|---------------------------------|------|----------|-------|------|----------------------|
| personnel bureau                | 2000 | 6.1      | 2000  | 2009 | ████████████████████ |
| talent resources                | 2001 | 5.49     | 2001  | 2012 | ████████████████████ |
| abroad                          | 2001 | 3.3      | 2001  | 2010 | ████████████████████ |
| talent development              | 2003 | 4.13     | 2003  | 2012 | ████████████████████ |
| party management talent         | 2003 | 4.05     | 2003  | 2011 | ████████████████████ |
| countermeasure                  | 2000 | 6.11     | 2005  | 2015 | ████████████████████ |
| talent market                   | 2005 | 4.08     | 2005  | 2012 | ████████████████████ |
| the flow of talent              | 2001 | 4.11     | 2006  | 2008 | ████████████████████ |
| status quo                      | 2008 | 4.48     | 2008  | 2013 | ████████████████████ |
| power of talent                 | 2009 | 4.28     | 2009  | 2013 | ████████████████████ |
| policy                          | 2000 | 4.54     | 2011  | 2014 | ████████████████████ |
| issues                          | 2011 | 4.53     | 2011  | 2015 | ████████████████████ |
| culture industry                | 2011 | 4.1      | 2011  | 2016 | ████████████████████ |
| talent support                  | 2011 | 3.92     | 2011  | 2017 | ████████████████████ |
| policy innovation               | 2011 | 3.38     | 2011  | 2014 | ████████████████████ |
| policy suggestion               | 2002 | 3.75     | 2012  | 2015 | ████████████████████ |
| talent development              | 2000 | 3.43     | 2013  | 2016 | ████████████████████ |
| introduce                       | 2012 | 4.97     | 2014  | 2018 | ████████████████████ |
| innovation and entrepreneurship | 2015 | 6.56     | 2015  | 2019 | ████████████████████ |
| enterprise                      | 2004 | 3.87     | 2015  | 2016 | ████████████████████ |
| develop                         | 2015 | 3.62     | 2015  | 2016 | ████████████████████ |
| government                      | 2008 | 3.3      | 2016  | 2017 | ████████████████████ |
| policy optimization             | 2019 | 4.15     | 2019  | 2022 | ████████████████████ |
| policy implementation           | 2017 | 7.7      | 2020  | 2022 | ████████████████████ |
| text analysis                   | 2018 | 3.46     | 2020  | 2022 | ████████████████████ |

Fig. 5. Keyword Emergence

Education” proposed in 1995, it emphasizes “respecting knowledge, respect for talents”, and building efficient and capable scientific research talents. In 2002, the “Outline of the National Talent Team Construction Planning of 2002–2005” was officially proposed in the “Talent Powerful Country” strategy for the first time, and at the same time, the guiding principle of “party management talent” was determined. The main task of this period was to initially open the door to the introduction of talents, attach importance to the introduction and training of talents, and the government played a leading role in the initial formation of the talent management system.

The second stage: research led by “independent innovation”. In 2006, the “Outline of the National Middle and Long term Science and Technology Development Planning (2006–2020)” was released, and advocating to build an innovative country with independent innovation as the core concept. After that, enter the new period of independent innovation [20], “talent market” and “talent flow” emerged during this period, indicating that researchers began to focus on researching talent allocation from the perspective of human capital and talent market, and realized the government’s “tangible” Hand and the market are “invisible”. In 2010, the “National Medium- and Long-term Talent Development Planning Outline (2010–2020)” further emphasized the work mechanism of innovative talents. The goal of talent policy should not simply pursue the number of talents but take into account quality and innovation ability. The talent policy system is to adapt to the request of the new era to improve, and “policy innovation” can be emerged during this period. At this stage, the Chinese talent system has changed from “management” to “governance”, and the construction of talent teams has shifted from government-driven to market-driven and innovation-driven.

The third stage: research in the background of “Innovation and Entrepreneurship”. Following the transformation of independent innovation in the previous stage, by 2014, Premier Li Keqiang publicly issued a call for “mass entrepreneurship and innovation” at the Summer Davos Forum. Chinese talent policy innovation research has completely risen, “innovation and entrepreneurship”, “enterprise” The popularity such as “development” has formed a coordinated talent governance system that the government and the market are adjusted together. The talent training and introduction mechanism is basically mature at this time, and the demand for talents in various regions and industries has exploded. The fierce talent competing for talents between countries and local governments has introduced talents. And “government” emerged. From the perspective of the number of documents, this stage is also the fastest growth rate to date, and research on talent policy has shown explosive growth.

The fourth stage: research on talent policy reflection on talent policy represented by “policy tools”. With the tendency of talent policies in various places and the cooling of talent competition, talent policy has begun to return rationally. At this stage, the research on talent policy is more concerned about the use of “policy tools”, policy performance, policy evaluation, and how to optimize policies to improve their competitiveness in the talent market. The main features of this stage are refined, more attention to the solution of specific issues in the process of policy enforcement, and pay more attention to the accuracy of evaluation in policy effect evaluation. On the basis of mature talent governance systems in various places, in the face of increasingly fierce talent competition, high-quality talent policies must be introduced to attract innovative talents. Compared

with guiding research, it is more needed as “policy tools” that can be Research on the effect of effectively pointing out the problem and improving the effectiveness of the policy, “policy optimization”, “policy implementation”, and “text analysis” appear at this stage.

## 6 Conclusions and Suggestions

### 6.1 Conclusions

This article is based on CiteSpace on the knowledge map and literature measurement analysis of the talent policy research documents of CNKI database 2000–2022. The following conclusions are mainly obtained:

(1) It is obvious in accordance with the growth curve of the Stype, and a new research peak is expected to occur after 2022. Over the past 23 years, the field of Chinese talent policy research has gone through the steady development period of “party management talent”, the period of “market participation” and the highspeed development period of “innovation and entrepreneurship.” Although the number of documents has been slightly reduced in recent years, the supporting research system support and talent governance research system for talent policy theory has basically been formed.

(2) Researchers have low cooperation density and lack of innovative theory. There are small-scale cooperative relationships between authors and institutions in the field of Chinese talent policy research, but overall speaking, the density of cooperation is low, the lack of effective communication channels between researchers, and the lack of cooperation and innovation platforms between institutions. In addition, the research of Chinese talent policy started late, the selfinnovation theory was relatively lacking, which hindered the innovative progress of the exploration and research of cuttingedge theory to a certain extent.

(3) Research hotspots and the themes reflect the demand orientation of national and industrial development. “Talent introduction” and “science and technology talent” are the two major research hotspots in the field of talent policy, representing the key content and targets of talent policy work, which basically run through various research stages. “power of talent” and “innovation and entrepreneurship” are two main backgrounds in the field of talent policy research, reflecting the national development strategy at different periods. “Policy tools” are the main directions of talent policy research at the current stage, reflecting the needs of continuous optimization of talent policies.

### 6.2 Suggestions

Adhere to innovative research and encourage theoretical innovation. Attach importance to the research of basic theory, and motivate scholars to carry out theoretical innovation in talent theory and public policy theory. Based on the theories of the theory of Marxist thought with Chinese characteristics, the vision of Chinese characteristics, the evolution of Chinese talent policy, and the impact mechanism of Chinese-style modernization on talent growth, etc. And the practical foundation, propose a Chinese style talent policy theory that meets the actual needs, and build China’s discourse system in the field of

human resources. Establish a network based cooperative relationship and promote the effective sharing and application of innovative resources. Build a high-level talent think tank, coordinate and coordinate cross disciplinary, cross regional scientific research tasks, build information platforms such as research intelligence libraries and expert banks, and cooperate with talent governance and talent policy research. Respect the factors of cooperation such as geographical neighborhoods and social neighborhoods, and give priority to group cooperation with high possibilities of potential cooperation to achieve the effect of with a point with a point. Follow the national talent strategy deployment and carry out research on talent policy innovation around the major needs of the party and the country. Improve the policy evaluation system, carry out policy reflection research, and enrich the diversity of the content and methods of talent policies.

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