

Analysis of University Scientific Research Performance Evaluation Based on CiteSpace

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ABSTRACT

This study utilizes CiteSpace software to analyze 797 articles related to university scientific research performance evaluation from CNKI database between 2002 and 2022, exploring the development trend, hotspot transition and future research directions of domestic university scientific research performance evaluation. The results demonstrate an overall growing trend of university scientific research performance evaluation research, while the collaboration between authors and institutions remains relatively low. Performance evaluation, scientific research funding, and universities are major research hotspots, shifting from classic performance appraisal issues towards performance synergy and innovation. Therefore, future research should strengthen the basic theoretical research on university scientific research performance evaluation, pay close attention to frontiers regarding research efficiency and technological innovation, and adopt interdisciplinary comprehensive research methodology. Scientifically positioning research directions will contribute to promoting the theoretical and practical development of university scientific research performance evaluation.

Keywords: *Research performance, Performance evaluation, Innovation visualization analysis.*

1. INTRODUCTION

Research and innovation constitute essential functions within universities. Universities play a crucial role in cultivating high-level innovative talents, advancing fundamental research, and originating innovations in high-tech fields. They contribute significantly to addressing major technological challenges in the process of national economic development, facilitating the practical transfer of technology, and promoting the applicability transformation of outcomes. Research performance evaluation, as a vital component of higher education management, helps standardize the scientific research process, foster improvements in research proficiency and capabilities, and serves as a powerful means to advance the institutionalization, standardization, and efficiency goals of research activities.

However, challenges exist in higher education institutions concerning the number of research projects initiated versus the number successfully concluded, as well as disparities in the quality of research outcomes. These issues significantly hinder the elevation of the research proficiency in

Chinese higher education institutions [1-3]. Therefore, conducting a systematic and objective analysis of research performance evaluation in higher education institutions holds crucial significance for enhancing research proficiency, optimizing resource allocation, and elevating China's overall research capabilities [4-6].

In order to further enhance the research performance evaluation in Chinese higher education institutions, construct a rational performance evaluation system, and elevate the overall research proficiency, this paper conducts a comprehensive review of the research landscape over the past 20 years using Citespace. The analysis systematically examines research teams, institutions, collaborative relationships, and research focal points at different periods in the field of research performance evaluation in higher education institutions. The aim is to establish a knowledge map of research performance evaluation in Chinese higher education institutions over the past two decades, elucidating the research trajectory and providing insights for future development.

2. RESEARCH DESIGN

2.1 Research Methodology

This study utilized the visualization analysis software CiteSpace, version 5.8.R3. CiteSpace significantly reduces the subjective preferences of scholars when referencing literature in traditional literature reviews by analyzing information such as author groups, publishing institutions, and keywords from the database literature, thus enhancing objectivity and reliability. The focus of a research field evolves over time, and by analyzing academic literature, one can trace the developmental trends of scientific knowledge over time.

Using the scientific knowledge graph analysis method within the CiteSpace software, the time interval was set from 2002 to 2022, with a yearly time slice. Node Types were designated as Author, Institution, and Keyword. Selection Criteria were sequentially set as TOP20, 20, 50, and subsequently used to create collaborative authorship graphs, institutional collaboration graphs, as well as co-occurrence and clustering graphs for keywords. Building upon the co-occurrence and clustering graphs for keywords, additional analyses were conducted using Timeline, Timezone, and Burstness functions to generate timelines for keyword co-occurrence, timezone maps, and bursting keywords. Based on these analyses, the research progress, hotspots, and their evolution in the field of university research performance evaluation were systematically reviewed.

2.2 Data Source and Processing

In this study, the China National Knowledge Infrastructure (CNKI) was chosen as the sample source database. Given that the rationality of research on university research performance evaluation directly influences the conduct of research work in universities, a "topic" search method was employed to ensure the comprehensiveness of literature retrieval. The search terms were set as "高校科研" (university research) with "绩效" (performance), and "科研绩效" (research performance) with "评价" (evaluation). These search terms were based on literature from renowned scholars in the field of high-quality development of university research performance evaluation. After testing the inclusion of scholarly papers under different keyword combinations, the

combination yielding the optimal completeness was selected.

To eliminate interference from journals and other publications on the analysis results, Chinese core journals and those indexed in the Chinese Social Sciences Citation Index (CSSCI) from the years 2002 to 2022 were chosen as the source for journal articles. The search period started on January 1, 2002, and covered a span of 20 years, resulting in a total of 803 records. Following the search, each record was meticulously examined to ensure the validity of the selected papers. Invalid records, such as journal conference solicitations, communications, publications without authors, and those irrelevant to the topic, were excluded. Ultimately, 797 valid articles were obtained for analysis.

3. PROGRESS IN UNIVERSITY RESEARCH PERFORMANCE EVALUATION

3.1 Number of Publications

As depicted in "Figure 1", the trend in the number of high-quality development publications in the field of university research performance evaluation from 2002 to 2022 is illustrated. Analysis reveals a general trend of "relatively stable in the early years, followed by a fluctuating increase in the later years" in the publication count over the 20-year period. The year 2009 marks a significant turning point. Prior to this, the average annual publication count was around 20 papers. After 2009, the average annual publication count stabilized at over 50 papers. The number of publications increased from 47 in 2009 to a peak of 72 in 2017, representing a 3.20-fold increase compared to 2009. This surge can be attributed, in part, to the impact of the 18th National Congress of the Communist Party of China, the Third Plenary Session of the 18th Central Committee, and the implementation of relevant documents such as "Opinions of the Central Committee of the Communist Party of China and the State Council on Deepening the Reform of the Science and Technology System to Accelerate the Construction of an Innovation System" and "National Medium and Long-term Education Reform and Development Plan (2010-2020)." With the sustained advancement of university research performance reform, scholarly attention to research in this domain has grown continuously, gradually culminating in a research fervor.

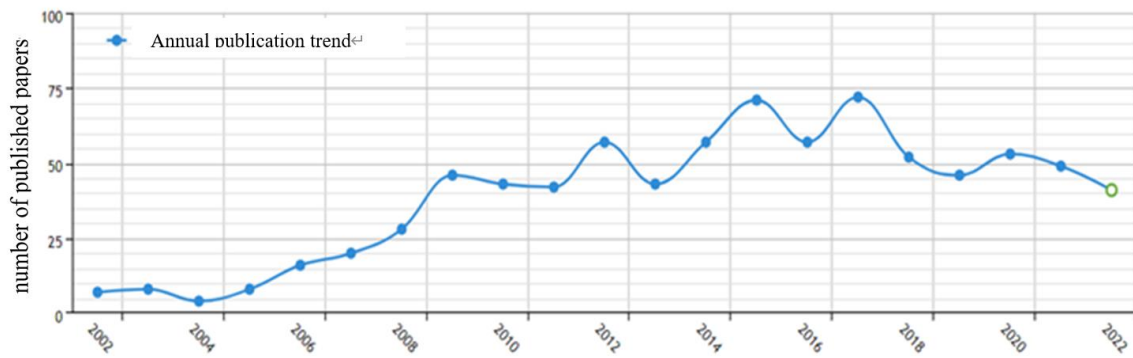


Figure 1 Number of papers published in the field of high-quality development of Research performance management in colleges and universities.

3.2 Analysis of Core Authors and Collaborative Relationships

Core authors reflect a certain level of influence within a specific field, and the collaborative network of authors can unveil the research interests and linkages among different authors in that domain. In the author collaboration graph (with a threshold of 2) depicted in “Figure 2”, 94 authors are connected by 46 lines, indicating the existence of collaboration relationships among these authors.

Following Price's Law in bibliometrics, which suggests that $(M=0.749(N_{\text{max}})^{1/2})$, the number of papers published by core authors in the field of high-quality development of university research performance evaluation is determined. Among the 803 papers analyzed, the author with the highest number of publications is Liu Xueli, with 7 papers (i.e., $(N_{\text{max}}=7)$), resulting in $(M=3.26)$ (rounded to 4 papers).

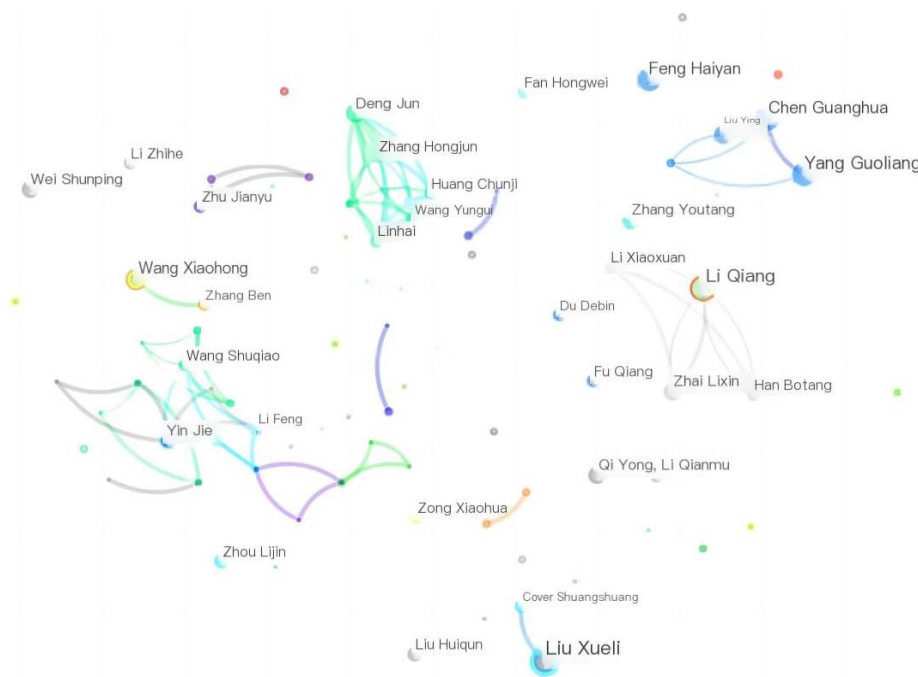


Figure 2 Author cooperation network in the field of high-quality development of Research performance management in colleges and universities.

From “Figure 2”, it can be observed that the size of names and nodes reflects the total number of publications by each author. The color of nodes

indicates the timeliness of an author's publications, with lighter colors suggesting more recent contributions. Based on the volume of publications,

scholars such as Liu Xueli (7), Li Qiang (6), Feng Haiyan (5), Chen Guanghua (5), Wang Xiaohong (5), among others, emerge as core authors in the field of university research performance evaluation. Additionally, considering the connection patterns, the limited number of lines between authors indicates that the majority of researchers in the field of university performance evaluation operate independently. Currently, only a few collaborative author teams are noticeable, highlighting the dispersed state of research. This decentralized research approach appears to impede the consensus-building on fundamental concepts and theoretical issues related to research development in the field of research performance evaluation. Thus, there is a clear need to strengthen communication and collaboration among scholars.

To further specify core authors and their specific research areas, the data on the publication counts and research domains of core authors in the field of university performance evaluation were compiled and organized (“Table 1”). The analysis reveals several key points: firstly, the research

focus of core authors is primarily centered around research performance evaluation, indicating the necessity for rational performance evaluation methods to truly reflect the value of research funding for scientific innovation. Secondly, core authors are involved in various research areas, such as macroeconomic management and sustainable development, university-industry collaboration, indicating that research in university research performance evaluation forms a comprehensive system that intersects multiple domains. Thirdly, there are a total of 13 authors with four or more publications, contributing to a collective of 61 papers. However, this only accounts for 7.65% of the total research papers on university research performance evaluation. This discrepancy, falling significantly short of the 50% standard for the proportion of publications contributed by core authors, highlights that the field of university research performance evaluation, as a nascent research topic, has yet to establish a stable core author group. There remains considerable potential and space for collaboration among scholars.

Table 1. Core authors in the field of university research performance evaluation

Number	Author	Count	Research Areas
1	Liu Xueli	7	Scientific Innovation, Performance Evaluation, Research Evaluation
2	Li Qiang	6	Research Performance Evaluation, Public Welfare Organizations, Agricultural Research Institutions, Graded Evaluation
3	Feng Haiyan	5	Research Performance Evaluation, Laboratory Technology and Management, Research Management
4	Yang Guoliang	5	Research Performance Evaluation, Enterprise-University-Research Collaboration Research
5	Wang Xiaohong	5	Research Performance Evaluation, University Research Management
6	Chen Guanghua	5	Research Performance Evaluation, Innovation Value Chain, Ownership of Enterprises, Enterprise-University-Research Collaboration
7	Liu Ying	4	Research Performance, Information Theory and Practice
8	Yin Jie	4	Performance Evaluation, Research Management
9	Zhang Yutang	4	Research Performance, Performance Indicators, Performance Audit
10	Qi Yong	4	Research Performance Evaluation, Research Management

a Note: The publication count, when compiled and tabulated, includes both the publications as the first author and those as the corresponding author (if not the first author).

3.3 Distribution of Institutions and Their Collaborations

Statistical analysis of the affiliations of primary literature authors reveals the prominent research institutions in the field of scientific research performance evaluation in China. This sheds light on the distribution of key research entities in this field. A network graph of institutional collaborations was constructed based on literature

data (threshold 2). The analysis indicates that out of 821 research institutions, there are 328 connections between them, reflecting a certain level of research collaboration. However, the current state suggests that there is room for further improvement in the extent of collaboration.

Further examination of the graph reveals a concentration of literature on scientific research performance evaluation from universities and

research institutions. Firstly, in terms of node size, research institutions that significantly contribute to the study of university scientific research performance evaluation include the School of Management at Wuhan University of Technology, the School of Economics and Management at Beijing Institute of Technology, the School of Management at Xi'an Jiaotong University, the School of Economics and Management at Jiangsu University of Science and Technology, and the Institute of Science and Technology Policy at the Chinese Academy of Sciences. A post-literature analysis suggests that these institutions focus on the performance evaluation of public research institutions, funding management for scientific funds, knowledge transfer, and outcome dissemination. Secondly, examining the connections between nodes, the School of Management and Economics at Beijing Institute of Technology, the School of Public Management at Tsinghua University, and the Institute of Policy and Management at the Chinese Academy of Sciences form a large-scale collaborative group. The Schools of Economics and Management at Jiangsu University of Science and Technology and Xi'an Jiaotong University each form smaller collaborative groups, however, based on publication volume, it appears that these collaborations have not yielded substantial research outcomes. Consequently, it can be inferred that while there are collaborative relationships between institutions, they have not

formed a tightly interconnected collaborative network. Other institutions may engage in collaboration either within the secondary departments of the same institution or independently. Therefore, in future research, it is crucial to strengthen collaborations between institutions, especially those that span multiple institutions and regions.

To ensure the accuracy of bibliometric measurements, a comprehensive statistical analysis was conducted on all secondary departments of institutions, and the top 10 research institutions by publication volume were identified ("Table 2"). Upon analysis, it is observed that in terms of publication volume, the School of Management at Wuhan University of Technology holds the first position with 11 publications, followed by the School of Management and Economics at Beijing Institute of Technology with 8 publications. The combined publication output of the top 10 research institutions accounts for only 7.65% of all institutions, indicating that the research institutions currently engaged in university research performance studies are relatively dispersed.

Examining the geographical distribution, the institutions with high publication volumes are located in Beijing, Hubei, Shaanxi, and Jiangsu. This suggests that the study of university performance is gradually gaining attention from various regions within China.

Table 2. Top 10 institution with the number of papers published

Number	Institution	Publications	Location
1	Wuhan University of Technology, School of Management	11	Hubei
2	Beijing Institute of Technology, School of Management and Economics	8	Beijing
3	Xi'an Jiaotong University, School of Management	7	Shanxi
4	Jiangsu University, School of Economics and Management	6	Jiangsu
5	Chinese Academy of Sciences, Institute of Science and Management	6	Beijing
6	Sichuan University, Business School	5	Sichuan
7	Tongji University, School of Economics and Management	5	Shanghai
8	Northeastern University	5	Liaoning
9	Hohai University, School of Business	4	Jiangsu
10	South China University of Technology, School of Business Administration	4	Guangzhou

4. UNIVERSITY RESEARCH PERFORMANCE EVALUATION RESEARCH HOTSPOT ANALYSIS

4.1 Overview of Research Hotspots Based on Keyword Co-occurrence

Further analysis of 797 research articles related to research performance evaluation generated a keyword co-occurrence and clustering visualization graph ("Figure 3"). In this graph, '#' represents the clustering results. The analysis reveals that out of 1629 keywords, there are 4593 connections, with a module value of 0.7182, exceeding 0.30, indicating significant differences between various research topics in university research performance evaluation. The average silhouette value is relatively high at 0.9625, suggesting a concentrated

perspective in university research performance studies with minimal differences in research paradigms. This lack of diversity and innovation in research perspectives is notable.

The analysis indicates a close connection between keywords such as performance evaluation, research performance, research management, and performance assessment. Moreover, there is an overlap between key clusters like research performance, performance assessment, research funding, and performance evaluation. This phenomenon implies an inherent logical relationship of mutual influence and intermingling among these themes, reflecting that the primary focus of university research performance evaluation research is predominantly on performance assessment and management.

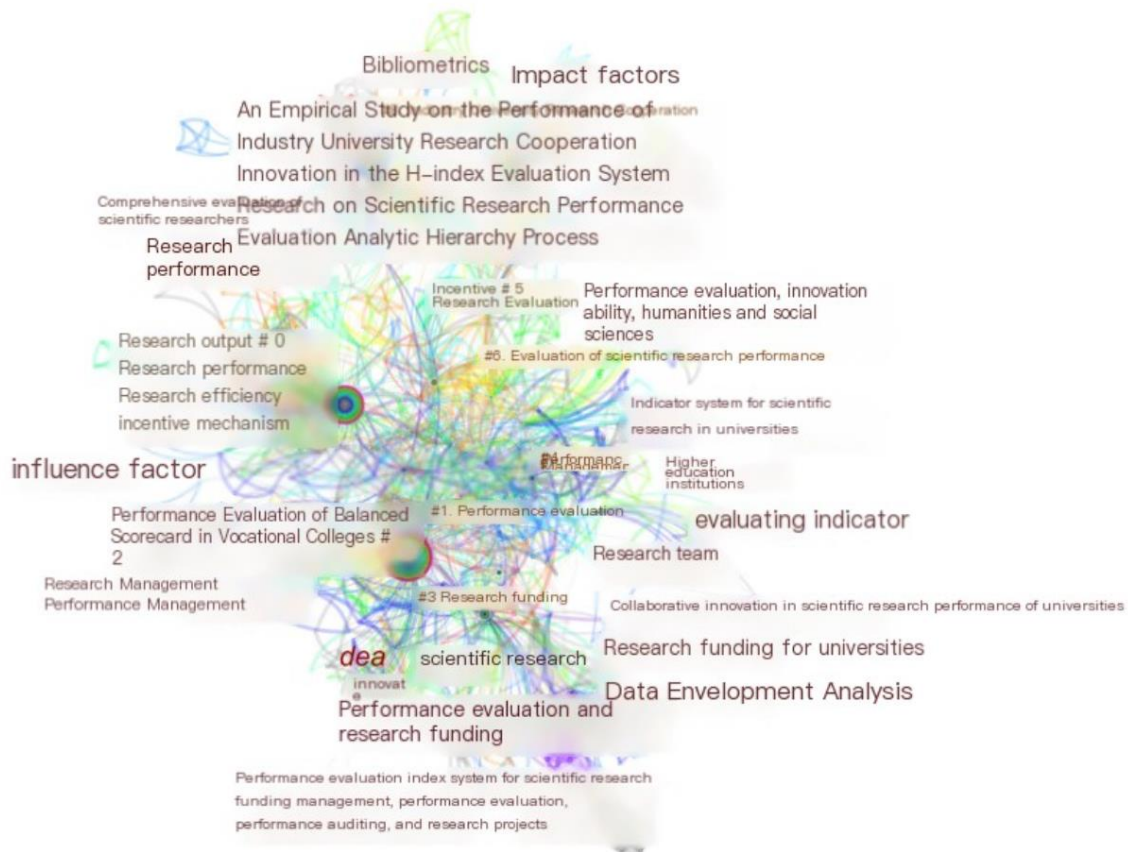


Figure 3 Keywords co-occurrence and cluster analysis in the research field of university scientific research performance evaluation.

In order to depict the relationships between clusters and their dynamic evolution, a timeline graph was created using CiteSpace. The analysis revealed that the hotspots of keywords in university

research performance evaluation have undergone continuous changes over time.

Firstly, in 2002, the primary clustered keywords were related to research performance, and this theme remained active until 2022. This suggests

that research on university research performance has consistently revolved around performance, branching into research hotspots such as data fitting, information technology, indicator systems, and dynamic efficiency.

Secondly, starting from 2003, the research hotspots began to focus on performance evaluation and universities. This indicates a growing concern for the rationality of research performance input and utilization. The achievement of research goals and the rationality of performance evaluation are closely related, giving rise to research hotspots in areas such as management models, system construction, and talent evaluation. In the same year, the research focus also zeroed in on "universities," revealing that researchers observed an imbalance in the national investment and output in university research. Although universities tend to prioritize basic research, research outcomes are not as direct as those of research institutions or enterprises, leading to relatively lower research efficiency at the university level [7-8].

Thirdly, from 2009 onwards, the research hotspots began to center around research funding. Research funding serves as a link between funding entities and recipients, with funding entities typically being national or local governments. Funding quotas reflect the current policy orientation, and recipients need to design the use of funds according to professional needs within the policy framework. Only when the research funding aligns perfectly between the funding entity and the recipient can research efficiency be maximized. This also gave rise to research hotspots in areas such as performance evaluation, policy systems, responsibility systems, and big data projection tracking.

4.2 Analysis of Research Hotspots and Development Trends Based on Keyword Co-occurrence

4.2.1 Performance Evaluation

Among the 797 sample documents, 'performance evaluation' appears 133 times, ranking first in frequency at 16.69% of the total sample, indicating that performance evaluation is the core focus in this field. The performance evaluation of universities is a comprehensive assessment of research professionals. It is not only directly related to the income of researchers but also strongly connected to promotion, personal development, and societal recognition. The core of performance

evaluation lies in ensuring fairness and rationality in assessment [9].

Fairness is reflected not only in the presentation of research outcomes but also in the process assessment. For instance, in a provincial-level natural science project, typically assessed over a 3-year period, the evaluation should be conducted in stages, dynamically adjusting research performance based on the progress at each stage. Despite the introduction of mid-term assessment methods for research projects by many local governments and functional departments, they often remain rudimentary, making policy implementation challenging. Rationality, on the other hand, requires the department responsible for research performance evaluation to establish operational evaluation guidelines that guarantee fairness. Depending on the prevailing circumstances, these guidelines should be quantified. For example, between 2002 and 2010, when the policy orientation leaned towards basic research, the quantification of performance assessment could appropriately favor basic research. In contrast, between 2011 and 2022, when the policy orientation shifted towards applied research, the quantification of performance assessment could tilt towards applied research. It is crucial to note that performance evaluation assesses the achievements of researchers over a specific time period. Therefore, the evaluation method should be based on the initiation time of the project, following the principle of 'old methods for old projects, new methods for new projects.' This ensures both the rationality and fairness of performance evaluation.

4.2.2 Research Funding

In the 797 sample documents, 'performance funding' appears 46 times, ranking fourth in frequency at 5.78% of the total sample. Conducting research requires financial support, and the output of research results is directly related to the level of research funding. However, whether a larger funding support leads to more research outcomes is still inconclusive. The key lies in whether research funding can be allocated reasonably. According to literature analysis [10-11], the allocation of research funding should be considered from both macro and micro perspectives.

At the macro level, the allocation of research funding should focus on regional characteristics. For example, economically developed areas in the eastern and coastal regions of China have better research capabilities and foundations, making

research output more achievable. In contrast, underdeveloped regions in the western part of the country may have relatively weaker research capabilities and smaller research output. Therefore, policy measures can be implemented to maintain research funding in developed regions while appropriately increasing research funding in the far-western regions. This approach is beneficial for reducing regional disparities, alleviating research pressure in developed regions, and enhancing the overall national research output.

At the micro level, the allocation of research funding is reflected in the control and design capabilities of universities and individuals. The current major issue is the excessive administrative control of research funding by universities, leading to significant constraints on the implementers of research projects in terms of fund usage. This not only hampers the progress of research but also impacts the legitimate use of research funding. As analyzed, a considerable amount of literature began to focus on research funding 'responsibility systems' and 'streamlining administration and delegating powers' in 2017. This involves decentralizing the distribution and usage rights of research project funds to project leaders, while administrative departments such as universities play more of a supervisory and auditing role. This is advantageous in increasing the autonomy of researchers over funding, reducing constraints in the research process, and improving overall research efficiency.

4.2.3 Universities

Within the 797 sample documents, the term 'universities' appears 75 times, ranking third in frequency at 9.41% of the total sample. Through the analysis in this paper, it is noted that research clusters related to research performance emerged around the keyword 'universities' starting from 2009. This indicates that the primary target of research performance reform is the collective body of universities. Although the national allocation of research funding is not limited to universities, the evaluation methods for research performance in universities are considered the most complex. According to literature analysis [12-13], the main reasons for this complexity can be broadly summarized into two aspects:

Firstly, there is significant diversity in the attributes of universities in China. Currently, universities can be broadly categorized as comprehensive general undergraduate institutions, specialized undergraduate institutions such as

medical universities and teacher training universities, and higher vocational education institutions such as XX Medical Vocational School. The diverse attributes of universities result in substantial differences in research platforms. For instance, comprehensive undergraduate institutions often have a wide range of disciplines, broad research scopes, ample funding, and, in the quantification of research performance, need to consider a multitude of factors. As a result, they tend to lean more towards direct quantifiable indicators such as publications, patents, and awards. On the other hand, higher vocational institutions often lack national-level research platform support, struggle to obtain national project funding support, and focus more on applied research, with collaborations primarily with local businesses and industries. The outcomes of their research are more inclined towards industrial transformation. Therefore, attempting to align the research performance evaluation of higher vocational institutions with that of comprehensive undergraduate institutions is evidently unsuitable.

Secondly, the workload of university teachers is multifaceted. In addition to research responsibilities, the daily work of most university teachers includes teaching tasks. Furthermore, the administrative levels in various universities differ, leading to teachers having to handle administrative tasks alongside research and teaching responsibilities. These tasks often intertwine and overlap. To ensure the smooth running of work, a common practice in universities is to projectize these administrative tasks, ultimately merging the workload in research performance evaluations. This creates a situation where teachers, in order to achieve sufficient research performance scores, need to simultaneously manage teaching, research, and administrative tasks. The end result is often a misplacement of priorities, making it challenging to attain ideal research outcomes [14-15].

5. EVOLUTION OF RESEARCH THEMES IN UNIVERSITY RESEARCH PERFORMANCE EVALUATION

CiteSpace's temporal map, derived from the analysis of the interactive relationships between keywords, provides a dynamic perspective and developmental context in the studied field. It assists in predicting future directions in the domain. Therefore, to analyze the evolutionary trends of research themes in university research performance

evaluation, a co-occurrence temporal map from 2002 to 2022 was generated based on CiteSpace's keyword co-occurrence analysis. Additionally, emerging keyword detection was conducted on the co-occurrence map of keywords in the study of university research performance development to assist in frontier research analysis. The intensity of keyword emergence is illustrated in "Figure 4".

In general, the research hotspots in the development of university research performance have evolved from classical themes focused on research performance to emerging themes centered around performance evaluation and research efficiency. As the hotspots evolve, the development of university research performance is imbued with richer connotations and higher requirements [16-19].

Observing "Figure 4", the research on university research performance evaluation can be broadly divided into two phases: the first phase (2002-2008), where the research hotspots primarily included performance evaluation, research management, performance assessment, and indicator systems. It essentially revolved around the evaluation of research performance, with a focus on exploring how to establish a rating system for research performance. However, these keywords were more centered on the macro level, not effectively integrating research performance and innovation. Performance evaluation mostly lingered on how to establish evaluation indicators and failed to reflect the essence of research funding, which is to enhance research efficiency. Performance evaluation cannot be solely presented using fixed quantitative indicators [20-23].

In the second phase (2009-present), there are two major research hotspots: performance assessment and collaborative innovation. During this period, there is a growing trend in the number of publications, and keywords demonstrate diversification. However, they still revolve around themes such as 'streamlining administration and delegating powers' and 'research efficiency.' Keywords like performance evaluation, performance assessment, research teams, and collaborative innovation reflect that research on university research performance evaluation has started to consider research efficiency as a core aspect. This means a greater emphasis on whether the funds spent have achieved the expected results, and the autonomy in fund utilization is more in the hands of project implementers. Research

performance assessment is directly linked to research outcomes [24-26].

"Figure 4" also illustrates that from 2002 to 2008, university research performance evaluation was dedicated to using research publication quantity (SCI) as an assessment metric. Starting in 2009, there was a gradual shift towards developing new evaluation indicator systems and strategies for universities. By 2014, research performance began to consider collaborative innovation and research efficiency, while simultaneously accelerating the implementation and execution of the 'streamlining administration and delegating powers' policy for research funding. This reflects the transformation of university research performance evaluation from a relatively singular and fixed form to a more flexible and diverse approach [27-28].

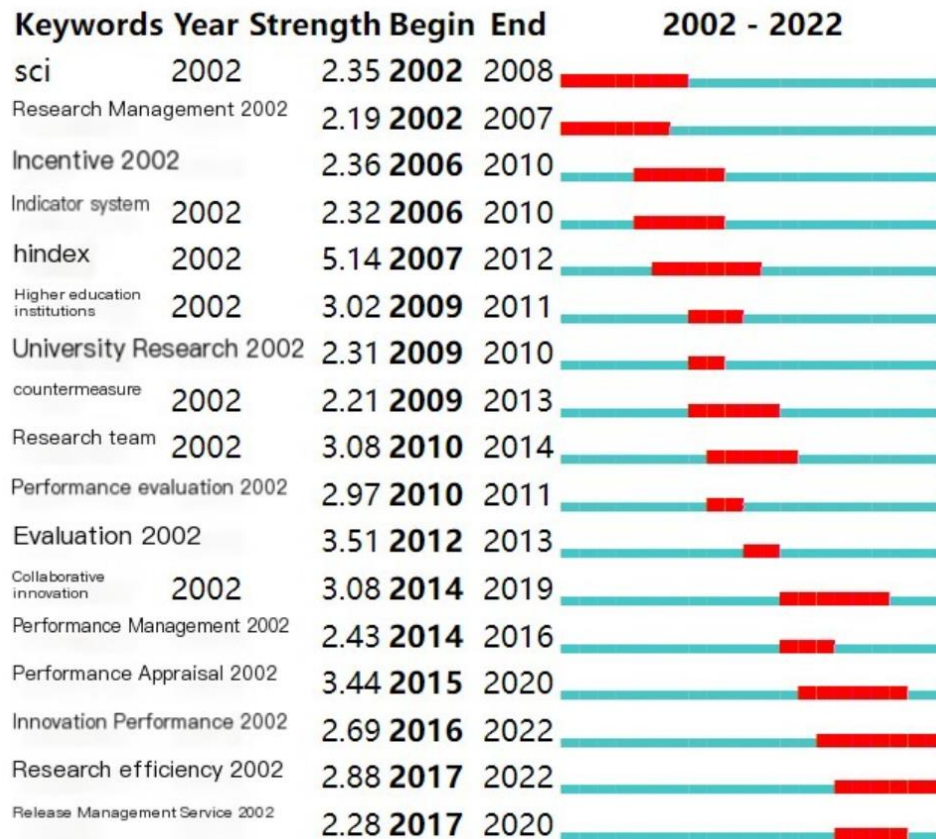


Figure 4 Top 17 keywords of university scientific research performance evaluation.

6. CONCLUSION

Through a systematic review of domestic university research performance evaluation research, coupled with data mining, statistical analysis, and knowledge graph visualization of relevant research progress, hotspots, and the evolution of key themes using CiteSpace, the following main conclusions were drawn.

Firstly, the publication volume in the field of university research performance evaluation showed an overall trend of 'relatively steady in the early stages, followed by a subsequent fluctuating increase,' while author and institutional collaborations displayed characteristics of 'localized concentration and overall dispersion.' Specifically, before 2009, the volume of publications on university research performance evaluation was relatively stable. After 2009, there was a sharp increase in the number of publications, forming a research boom. Scholars such as Liu Xueli, Li Qiang, Feng Haiyan, Chen Guanghua, and Wang Xiaohong emerged as core authors in the field, with significant contributions. Notable research institutions included the School of Management at

Wuhan University of Technology and the School of Economics and Management at Beijing Institute of Technology. However, the collaboration between core authors and institutions is limited, with only a few forming stable research teams. Most researchers and institutions still operate independently, indicating a need for strengthened collaboration.

Secondly, performance evaluation, research funding, and universities emerged as the three major research hotspots in the field of university research performance evaluation. Research on performance evaluation primarily focused on aspects such as management models, system construction, and talent evaluation. Studies on research funding concentrated on the formulation and implementation of the 'streamlining administration and delegating powers' policy, internal control, and driving innovation. Research on research performance evaluation for universities emphasized collaborative innovation and research teams.

Thirdly, the research hotspots in university research performance evaluation can be roughly

divided into two phases. Before 2009, the focus was more on establishing indicators and systems for research performance evaluation, with evaluation metrics not entirely aligned with actual research efficiency. After 2009, the research entered a second phase, with a greater emphasis on the actual effects of research inputs, driving research innovation and efficiency. Performance evaluation began to adopt a perspective that gradually streamlined the handling of research funds, providing greater autonomy to university researchers and facilitating the smooth progress of research [29-30].

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