Bibliometrics and Knowledge Graph Analysis of Domestic Big Data Management Research

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Abstract. This article uses CiteSpace software to perform a visual analysis of the knowledge graph of the literature about the direction of big data management in the CNKI database using the method of document measurement. The analysis content includes: paper attention, author of the article, hot keywords, and the organization of the article, and big data is found. The hot research of management can be summarized into four categories: education management, information management, enterprise management and government management. The domestic scholars' research status on big data management is obtained, and the development trend of big data management research is revealed, with a view to providing reference for the research and development of big data management in various subject areas.

1. Introduction
"Big data" can be understood as an aggregation of massive amounts of data, which has the characteristics of large amount, rapid growth, complexity, and diversity[1]. With the advent of the era of big data, big data is playing an increasingly important role in education, information, enterprises, and government affairs. At the same time, big data management has also received key attention in various fields. Big data management has conducted in-depth research and analysis. At the same time, in the past two years, domestic universities have opened big data management and application majors, and there is an urgent need to clarify the main research directions. Therefore, in order to summarize the current status of big data management research in China and analyze future research trends, this article conducts bibliometrics and knowledge graph analysis of big data management research on the basis of searching Chinese core journal documents.

2. Research methods and data sources

2.1 Research method
The software used in this study is CiteSpace, a diversified, time-sharing, and dynamic citation visualization analysis software, dedicated to analyzing the potential knowledge contained in scientific literature, and gradually under the background of scientometrics, data and information visualization development of. CiteSpace software can analyze the cited documents of the literature, mine the knowledge clustering and distribution of the cited literature space, and provide the co-occurrence analysis function between the knowledge units. When interpreting the generated graph, it mainly focuses
on high-frequency nodes, clustering knowledge groups, advanced intermediary center nodes, and basic legend descriptions of the graph [2]. This paper uses CiteSpace software to sort out the research on big data management in the CNKI database, mainly through the author's co-authors, keywords, and institutional co-occurrence network diagrams, and further visualize the research characteristics of big data management on the basis of statistical analysis. Analyze and show the overall trend of big data management research in China.

2.2 Data Sources
This article collects journals in the CNKI database whose subject term is "big data management", the period is from 2013 to 2019, and the source category is CSSCI. The deadline is November 26, 2019, and a total of 2435 journals have been retrieved. In order to strive for "precision" in data processing, data cleaning and standardization of retrieved documents are carried out. In the database search, 1559 documents were selected with themes of "big data", "enterprise management", "big data industry" and "data management".

3. Analysis of the characteristics of my country's big data management research literature

3.1 Statistical analysis of paper attention
According to CNKI's search, the statistical results of the attention degree of big data management papers are shown in Tab 1. The article "Several Frontier Topics of Business Management Research in the Context of Big Data" by Feng Zhiyan et al. [3], starting from the challenges of the times faced by business management in the context of big data, described the innovation of business models based on big data, and achieved the highest. The number of citations and downloads exceeded 29000 times. Xu Zongben, Feng Zhiyan [4] "Frontier Topics in Management and Decision-Making Driven by Big Data" analyzes and summarizes the new characteristics of management decision-making research and practice in a big data environment. On this basis, the big data the frontier topics in four main areas of resource management and policy were sorted out, and the practical development and potential impact of some typical big data application areas were discussed, pointing out that big data has brought about management and decision-making scientific research and application Great opportunities and great challenges.

| Title                                                                 | Author             | Published Time | Cited  | Download |
|----------------------------------------------------------------------|--------------------|----------------|--------|----------|
| Several cutting-edge topics in business management research under the background of big data | Feng Zhiyan        | 2013-01-15     | 680(1) | 29 326(1) |
| The implementation background, connotation, and main content of the "Internet" action plan | Ning Jiajun        | 2015-06-20     | 551(2) | 18 221(4) |
| Analyzing the Reform of Learning from the Perspective of Big Data—Interpretation and Enlightenment of the U.S. Report "Promoting Teaching and Learning through Educational Data Mining and Learning Analysis" | Xu Peng            | 2013-12-01     | 462(3) | 21 329(2) |
| Discrimination of data analysis concepts in the era of big data | Zhu Jianping       | 2014-02-15     | 342(4) | 18 267(8) |
| MOOC and foreign language teaching research in the era of big data--challenges and opportunities | Chen Jianlin       | 2015-01-20     | 303(5) | 13 537(5) |

3.2 Statistical analysis of authors
In CiteSpace, set the "Time" to "2013-2019", with 1 year as a time zone, and select all from "Term Source". Select "Author" separately in "Node Types", and other parameters remain unchanged.

The results in Fig 1 show that Chen Chen, Zhang Xingwang, Ma Xiaoting, Li Tianzhu, Chao Lemen and other authors have large nodes and font sizes, indicating that the number of articles published is relatively large and they are the main researchers, but most of the authors are scattered and have no
connection. Line, which means they have no cooperative relationship, and a small number of authors have connections, which means they have a cooperative relationship.

Fig 1 Big data management author co-authored network largest sub-network

3.3 Keyword statistical analysis
Keywords represent the core of the content of the paper, a high degree of generalization and condensing of the content of the literature [1]. Set the Node Types to "Keyword". Set the threshold to 10 and observe the co-occurrence network diagram of big data management keywords (see Fig 2). The keyword "big data" is the core of the entire research field, including "library" and "data management", “Cloud computing” and “government governance” are relatively more frequent. Based on Fig 2, the research hotspots of big data management can be summarized into the following categories: (1) Education management: colleges and universities, ideological and political education, talent training, etc.; (2) Information management: information services, cloud computing, artificial intelligence, etc.; (3) Enterprise management: enterprises, corporate management, public management, etc.; (4) Government affairs Management: e-government, national governance, social governance, etc.

Fig 2 Keyword co-occurrence network diagram of big data management
3.3.1 Education management

Education is the top priority of national development. Many domestic scholars have conducted research on the innovation path and system structure of big data and education. Tao Haofi [5] and others believe that universities are important participants in big data, they can combine ideological and political education with big data, pay attention to the individual development of students, explore new paths and new methods of education, and innovate ideological and political education and the development of big data. Wang Sha [6] and others used big data to accurately portray "data portraits" for college students' thoughts, restore students' information, and "visualize" and "dataify" students' thoughts.

3.3.2 Information management

Information management is an important part of big data management. In the information age and big data age, everything and everything will "speak" with data. In the aspect of information management, researchers mainly use various technologies and ideas to combine big data with information management.

Zheng Erli [7] and others believe that big data technology incorporates everything into the algorithm, while artificial intelligence is using various algorithms to learn to extract data and form an analysis model. He believes that the future world may be the world of artificial intelligence, and artificial intelligence must be based on data. Li Hui [8] conducted research on the business value of enterprise big data based on cloud computing, and conducted in-depth analysis and case analysis, and finally reached a conclusion.

3.3.3 Enterprise management

Enterprise management is the focus of this article. At the same time, it is widely used in big data management in enterprises, public management, and big data industries. The use of big data for management, research and analysis is the trend of business management in the new era.

Dai Mingyu [9] combed and discussed the current research status of information security in enterprise management at home and abroad in the era of big data. Combined with the research results, he proposed that big data should adopt a distributed architecture and conduct big data mining to ensure information security. At the same time, it also puts forward the following aspects of information security research prospects for the future: corporate human resource management, different types of enterprises and corporate accounting.

3.3.4 Government management

With the advent of new technologies and new eras, my country's national governance and government administration are gradually relying on big data. In recent years, researchers have done more and more research on big data and government management.

Chen Peng [10] studied how government governance should be transformed in the era of big data, and found that big data has played an increasingly active role in government governance, and even triggered revolutionary changes. Finally, three aspects are proposed to propose transformation methods: conceptual transformation, structural transformation, and method transformation.

4. Research conclusions and reflections

In the information age, big data management is a new pursuit in various fields. This article uses CiteSpace software, uses bibliometric methods, and takes big data management as the theme to visualize the knowledge graph of CSSCI journal articles in the CNKI database, and analyzed the author and hot keywords, draw the following conclusions:

First, through the analysis of domestic big data management research attention, it is found that in recent years, scholars have continued to increase their research and attention on big data management. Next, we need to pay more attention, integrate theory with practice, and integrate big data management with various fields.
Second, through the visualization research on the authors of domestic big data management, it has been obtained that authors such as Chen Chen, Zhang Xingwang, Ma Xiaoting, Li Tianzhu, and Chao Lemen have published relatively many articles in the direction of big data management, but the cooperation relationship between them is not strong. Therefore, in order to obtain more extensive and precise research, authors should also cooperate to achieve mutual benefit and win-win results.

Third, through the visualization of keywords in the domestic big data management field, we have obtained hot keywords in this field, including big data, library, data management, cloud computing, government governance, data mining, data governance, big data Industry, knowledge services, artificial intelligence, ideological and political education, e-government, national governance, universities, business management. Combined with literature survey and research, big data management is playing an increasingly important role in education management, information management, business management, and government management. Research on big data management is focusing on the combination of knowledge management and big data analysis. For the node of enterprise management, it is often combined with financial management, accounting, and enterprise. Big data management is facing new opportunities and challenges. With the development of information technology, the form of data management will be continuously improved to meet various needs. In future research, we can also set foot in more fields to better promote the development of big data management.

Fourth, the research on big data management will continue to show diversified research directions. The new research direction of big data management is timeliness. The time attention model that has been developed is not suitable for handling the new features of big data. The big data management methods and recommendations need to be further updated[11].

Due to sample limitations, the research on domestic big data management in this study is still in the "primary stage", and there are many shortcomings. In the future, it is necessary to further expand the sample size and the scope of sample collection, and combine other methods and theories to do further the study. For example, I will compare the research of foreign big data management with that of China to better grasp the future development trend.

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