



The Knowledge Mapping of Digital Governance Research: Bibliometric Analysis Based on Citespace

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Abstract

The era of big data has brought efficiency and convenience, and also spawned the wave of digital governance. This paper takes the main documents of digital governance included in CNKI database from 2002 to 2021 as the data source, and analyzes the research hotspots and development trends of digital governance with the help of the visualization software CiteSpace. Digital governance is developing rapidly and covers a wide range of topics, including the application of digital governance and digital governance. The research trend shows phased characteristics, and the research methods and contents need to be optimized.

Keywords; *insert digital governance; Citespace; big data; government*

1 INTRODUCTION

In the era of big data, digital plays a key role in society. Affected by the new epidemic, China's GDP growth rate is 3.6%, but the growth rate of digital economy GDP has reached 9.6%. The application of digitalization in epidemic prevention and control, urban governance and other fields also shows that we have entered the era of digital governance. In order to systematically grasp the research achievements of digital governance, this paper takes the digital governance theme literature collected by CNKI from 2002 to 2021 as the analysis object, and conducts keyword co occurrence analysis, cluster analysis, time zone analysis and emergence analysis through Citespace visualization software to analyze and summarize the research of digital governance in China, and displays the research theme, evolution trend and research frontier of digital governance with icons.

2 RESEARCH DESIGN

2.1 Research methods

This study uses the bibliometric method to analyze the literature of the two journals, and uses the quantitative analysis method to analyze the law of the literature, so as to understand the research hotspots and research trends in the field of social sciences. The software of literature

quantitative analysis includes CiteSpace, bibexcel, etc. CiteSpace is used in this study 5.8. R3 for literature visual analysis. CiteSpace is developed by Professor Chen Chaomei, an internationally renowned information visualization expert, in Java language. The prominent feature of the software is that "the vast literature data in a knowledge field is displayed on a knowledge map of citation network through a diversified, time-sharing and dynamic citation analysis visual language, and the evolution process of the field is displayed on a knowledge map of citation network through ingenious spatial layout; and the research frontier expressed by citation node literature and co citation clustering as the knowledge basis on the map is automatically identified and displayed the interpretability of the atlas itself. "

With the help of CiteSpace analysis, this study makes a visual analysis of all articles with the keyword "digital governance" retrieved in CNKI database from 1949 to 2021. By analyzing the keyword contribution of literature, we can understand the research hotspot; Understand the research focus of keyword analysis; Analyze the key words and time zone to get the research trend; Analyze the emergence of key words and understand the research frontier.

2.2 Data source

In this paper, the academic journals included in CNKI are used as the database for literature retrieval. The

retrieval conditions are "subject = synonym expansion (digital governance) or title = synonym expansion (digital governance) and between (19152021) (fuzzy matching)". A total of 540 related literatures were retrieved. Excluding 147 invalid documents such as speeches, Conference reviews and incomplete author information, 393 valid documents were obtained, covering the period from 2002 to 2021.

3 RESEARCH STATUS OF DIGITAL GOVERNANCE

3.1 Posting trend

As can be seen from Figure 1, in the nearly 20 years from 2002 to 2021, the annual number of documents issued by digital governance has shown a steady increase trend. Although the amount of increase in the early stage is small and the increase trend is slow, the subject research of digital governance has increased significantly since 2018, which shows that digital governance has received extensive attention and attention from the academic community, and the research heat is increasing. Especially since 2019, the subject research of digital governance has increased rapidly, This may be because the decision of the CPC Central Committee on several major issues concerning upholding and improving the socialist system with Chinese characteristics and promoting the modernization of the national governance system and governance capacity, deliberated and adopted at the Fourth Plenary Session of the 19th CPC Central Committee, clearly states: "Establish and improve the systems and rules for administrative management by using the Internet, big data, artificial intelligence and other technical means. Promote the construction of digital government, strengthen the orderly sharing of data, and protect personal information according to law." The high emphasis on policies has promoted the vigorous development of academic research. Therefore, since 2019, research on digital governance has emerged one after another.

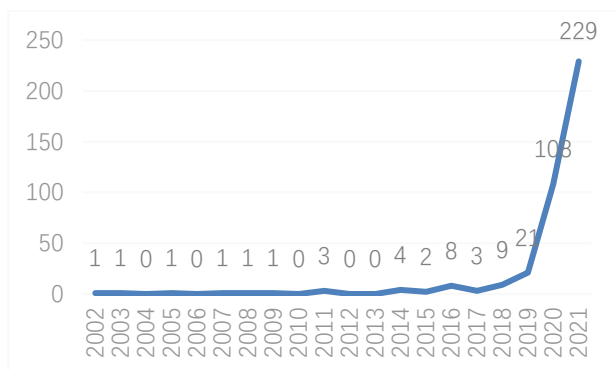


Figure 1. Annual document volume of digital governance from 2002 to 2021

3.2 Research on the number of articles published by authors and their cooperative relationship

In order to understand the documents issued by relevant scholars in this field, this paper analyzes the number of documents issued and cooperation of scholars in the research field of "digital governance" through CiteSpace. Select "author" in the node types in the function and parameter setting area of CiteSpace, adjust the time span to 2002-2021, and then run to get the author cooperation network analysis diagram as shown in Figure 2 (the threshold is 0, that is, the authors with the number of documents ≥ 1 are shown in the figure). Among them, the number of author nodes is 152, the number of connections between nodes is 50, and the overall network density is 0.0044. The connection between the authors shows that there is cooperation between the two. The thicker the connection, the closer the cooperation, that is, the more times of cooperation. From Figure 2, we can see that in the field of "digital governance", there is a close cooperative relationship between nodes, that is, the author of the document.

CiteSpace v. 5.8.R3 (64-bit)
April 27, 2022 12:41:44 AM CST
C:\P\2\workspace\7\1\workspace
Timestamp: 2002-2021 (Slice Length=1)
Maximum Q=0.95 (Mean Silhouette)=0.95
Network: G=0.15, Q=0.95 (Density)=0.0044
Largest CC: 4 (2%)
Nodes Labeled: 152
Printing: None



Figure 2. Analysis chart of author cooperation in the field of digital governance

In order to intuitively display the number of articles published by authors in this field, this paper draws a table of the number of articles published by authors, as shown in Table 1 (this table only retains authors with a number of articles ≥ 3). From table 1, we can see that Shao Chunbao has the largest number of documents.

TABLE 1 RANKING TABLE OF AUTHOR'S NUMBER OF DOCUMENTS (NUMBER OF DOCUMENTS ≥ 3)

Number	Authors	Count	Year
1	Shao Chunbao	4	2020
2	Wang Weiling	3	2020
3	Cai Yuezhou	3	2021
4	Li Yongjian	3	2021
5	Jiang Yukai	3	2020

4 HOT SPOT ANALYSIS OF DIGITAL GOVERNANCE RESEARCH

4.1 Keywords co-occurrence analysis

Key words are a high generalization of research contents and viewpoints. Visual analysis can investigate the research hotspots in a certain field [1]. Select "keyword" in the node types in the function and parameter setting area of CiteSpace, adjust the time span to 2002-2021, and then run to obtain the keyword co-occurrence knowledge map as shown in Figure 3.



Figure 3. Co occurrence of key words of digital governance theme research.

According to the top 13 high-frequency keywords in the research field of digital governance generated by CiteSpace (Table 1), it can be seen that the keyword with the highest frequency is "digital economy", up to 56 times; The second is "digitization" and "digital governance". This shows that "digital" has extended from the field of computer to the field of economy and management. The effectiveness of digital governance depends on the degree of digitization and the strength of digital governance. Several key words in 2020, such as "rural governance", "grass-roots governance" and "epidemic prevention and control", show that digital governance has become increasingly perfect and plays an increasingly important role in social governance and public crisis management.

TABLE 2 TOP 13 KEYWORDS OF FREQUENCY

Number	Keywords	Frequency	Year
1	Digital economy	56	2019
2	digitization	43	2014
3	Digital governance	36	2019
4	Data governance	21	2018
5	Rural Governance	20	2020
6	Digital Government	17	2020
7	Urban governance	16	2018
8	big data	14	2019
9	Social governance	13	2020

Number	Keywords	Frequency	Year
10	Grass roots governance	12	2020
11	rural vitalization	12	2020
12	Data resources	11	2020
13	Epidemic prevention and control	10	2020

4.2 Keywords cluster analysis

In order to further explore the research hotspot in the field of social organization party construction, this study clusters the keyword co-occurrence knowledge map through CiteSpace software to generate an automatic clustering label view. Based on the default view, the automatic clustering label view generates knowledge clustering through spectral clustering algorithm, and then extracts label words from the relevant cited literature of citation clustering through the algorithm, so as to represent the research frontier corresponding to a certain knowledge base [2].

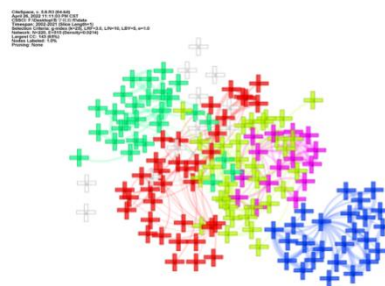


Figure 4. Keywords cluster diagram of digital governance theme research

In the picture, the cluster label with label 0 is "digital governance"; the cluster label with label 1 is "digital economy"; the cluster label with label 2 is "digital"; the cluster label with label 3 is "data governance"; the cluster label with label 4 is "I government service" and the cluster label with label 5 is "governance";

As shown in Figure 4, the digital governance research cluster obtains six cluster labels. This paper integrates the high-frequency keyword information and clustering results, and divides the research on the subject of digital governance into two themes: digital governance and the application of digital governance. The digital governance includes three cluster labels of "digital governance", "digitization" and "data governance", The application of digital governance includes three cluster labels of "digital economy", "government service" and "governance".

1) Digital governance. Digitization is not only the engine of modern social change, but also an important opportunity to promote the modernization of social

governance. The Fifth Plenary Session of the 19th CPC Central Committee further proposed that China should speed up "digital development". Coordinate the coordinated development of digital economy, digital government and digital society, and digital governance plays an indispensable role in enabling all-round digital transformation. However, at present, China's digital process is not satisfactory. There are some problems, such as inadequate facilities, disordered data, shortage of funds, inadequate policies and so on. Solving the above problems has become the key to promoting digital governance. In addition, in the process of digital governance, there are also some difficulties, such as digital deviation risk in the whole process dimension, digital suspension risk in the collaborative dimension, digital involution risk in the new development dimension, digital illusion risk in the strong application dimension, digital sand dune risk in the real foundation dimension, which also poses a great challenge to China's digital process.

2) *Application of digital governance.* Digital governance is no longer limited to the computer field, but is widely used in finance, social governance, government management and other related fields. When simulating the trading process of financial derivatives, digital governance governs market failure through screening data, mid-term analysis data and post generation Trading Scheme [3]; In the era of big data, digital governance innovation helps to improve rural autonomy and realize the digitization of industry, ecological construction and people's life [4]. Digital governance is a new growth pole to promote the modernization of urban governance system and governance capacity. In order to adapt to the increasingly intelligent era, the intelligent revolution of the government is inevitable. Digital governance not only provides a new paradigm for government service innovation and function transformation, but also promotes the construction of e-government and government data governance.

5 EVOLUTION TREND AND FUTURE PROSPECT OF DIGITAL GOVERNANCE

The focus of academic research on the party construction of social organizations is not invariable, but shows phased differences. Therefore, mastering the evolution logic and cutting-edge trend of research focus is of decisive significance to keep up with the development trend of research. Based on the time zone distribution map and keyword emergence map of digital governance theme drawn by CiteSpace software, this paper analyzes the phased characteristics and evolution logic of digital governance research.

5.1 Keywords time zone distribution map

According to the time zone distribution map, this paper divides the research of digital governance into the following three stages [5]:

The first stage is the embryonic period (2002-2013). At this stage, there are few documents and keywords involved in the research of digital governance, but it can be seen from the connection between nodes that the research at this stage provides an insight basis for the follow-up development of digital governance.

The second stage is the deepening period (2014-2017). At this stage, researchers have conducted a full and detailed study on digitization, and the academic community has a relatively perfect understanding of the concept of "digitization". The keyword "digitization" has become a high-frequency keyword at this stage. The research at this stage plays an important leading and diffusion role in the follow-up development of digital governance research.

The third stage is a period of vigorous development (2018-2021). At this stage, the research on digitization has been very mature. Digitization is no longer limited to the computer field, but really integrated with "governance", which is widely used in finance, social governance, government management and other fields. Therefore, many emerging research topics and keywords emerged at this stage, such as "urban governance", "digital government", "government services", "public data" and so on.

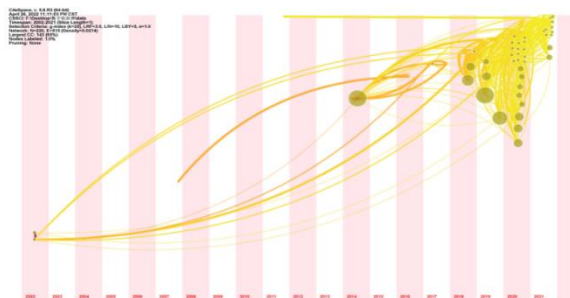


Figure 5. Time zone distribution of digital governance theme research

5.2 Keywords emergent analysis

393 literatures were sorted by CiteSpace software according to the year of emergence, and the keywords with rapid growth or decline in a short time were detected. It can be seen that the research focus of domestic digital governance from 2003 to 2021 can be divided into three stages: the first stage is from 2003 to 2017. IT Governance and digitization are the research focus of this stage. Among them, the emergence time of "it governance" is long and the emergence intensity of "digitization" is high. The second stage is 2018-2019, and relevant research is mainly focused on data governance,

data standards, blockchain and other topics. The third stage is 2020-2021. Global governance, governance and artificial intelligence have become research hotspots in the field of digital governance, which is worthy of attention in the next research.

TABLE 3 TOP 8 KEYWORDS WITH THE STRONGEST CITATION BURTS

<i>Keywords</i>	<i>Strength</i>	<i>Begin</i>	<i>End</i>
<i>IT governance</i>	<i>1.24</i>	<i>2007</i>	<i>2016</i>
<i>Digitization</i>	<i>1.76</i>	<i>2014</i>	<i>2017</i>
<i>Data governance</i>	<i>1.73</i>	<i>2018</i>	<i>2019</i>
<i>Data standard</i>	<i>1.22</i>	<i>2018</i>	<i>2019</i>
<i>Blockchain</i>	<i>0.8</i>	<i>2018</i>	<i>2019</i>
<i>Global governance</i>	<i>0.77</i>	<i>2019</i>	<i>2021</i>
<i>Governance</i>	<i>0.6</i>	<i>2019</i>	<i>2021</i>
<i>Artificial intelligence</i>	<i>0.6</i>	<i>2019</i>	<i>2021</i>

6 CONCLUSION

Taking the digital governance research literature published in CNKI source journals from 2002 to 2021 as the research object, this paper analyzes and discusses the hot topics and research trends of digital governance research by using CiteSpace visual analysis tool. In terms of research hotspots, the research focus of digital governance can be roughly divided into two themes: digital governance and the application of digital governance. Scholars have conducted detailed and in-depth research on the problems of digital governance, the risks of digital governance and the response of digital governance in various fields. In terms of evolution trend, the research in the field of digital governance shows phased characteristics, with the continuous increase of documents and the continuous enrichment of research content, indicating that the research in this field has become more and more mature. At the forefront of research, "global governance", "governance" and "artificial intelligence" and other keywords remain prominent for a long time and high intensity, which implies that the relevant research on digital governance will focus on these parts in the future. At present, the research on digital governance has been relatively mature, but there are also some deficiencies, such as single research method and homogeneous research content.

REFERENCES

- [1] Xu, H.Z., Liu, Y. (2020) Hotspot analysis and evolution path of agricultural land right confirmation in my country: Knowledge graph analysis based on CiteSpace. *Arid Area Resources and Environment*, 34(02):1-9.
- [2] Shi, X.C., Li, M.L. (2016) Hotspots and Trends of International MOOC Research—Based on Citespace Visual Analysis of Literature from 2013 to 2015. *Open Education Research*,22(01):90-99.
- [3] Liu, B.Q. (2008) Financial Derivatives, Market Failure and Digital Governance. *Economic latitude and longitude*, (04):151-154. R.
- [4] Su, Y.J. (2020) Rural digital governance path under the background of big data. *Sanjin Grassroots Governance*, (01):31-36.
- [5] Hu, X.F., Liu, L.T. (2020) Knowledge Graph Analysis of Social Organization Party Building Research Based on CiteSpace. *Journal of Shanxi Provincial Committee Party*, 43(02): 40-46. DOI:10.13964/j.cnki.zgsxswdx.2020.02.008.

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