Original Paper

Analysis of Hotspots and Trends in Domestic and International Data Asset Research: A Knowledge Graph Analysis Based on CiteSpace

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Abstract

The article summarized 363 literature on data assets in the CNKI and WOS databases and conducted a knowledge map analysis using CiteSpace. The research found that the study of data assets at home and abroad is continuously growing, but there are differences in origins, content, and hotspots. Foreign research focuses on areas such as big data, data governance, machine learning, and the Internet, while domestic research focuses on data assets, the digital economy, data transactions, and accounting. Domestic research is gradually expanding to include data middle platforms and asset confirmation, while foreign research focuses on the Internet and artificial intelligence. This analysis helps grasp the research trends and hotspots in the field of data assets, promoting cooperation and knowledge sharing.

Keywords

Data assets, CiteSpace, Visualization, Clustering

1. Introduction

Since the 18th National Congress of the Communist Party of China, the Party Central Committee has paid high attention to the digital economy, listing it as a national strategy, and emphasizing the development of the digital economy, integration with the real economy, and the construction of digital industry clusters. China has demonstrated outstanding performance in the field of the digital economy, possessing the world's largest e-commerce market, with mobile payment transactions amounting to 11 times that of the United States. At the same time, China has nurtured one-third of the world's unicorn enterprises, and the manufacturing industry is also actively undergoing digital transformation. Data, as an emerging factor of production, is driving innovation-driven development of industries, especially in the field of accounting, where data assets have become a new research hotspot. This article conducts an

in-depth analysis of domestic and foreign research on data assets, compiles a large number of literature, and conducts comprehensive literature analysis using CiteSpace software, aiming to reveal the current research status of the field of data assets and provide important references for future research on data assets in China.

2. Research Methodology and Data Sources

CiteSpace is a bibliometric visualization tool developed by Professor Chaomei Chen, specifically designed to analyze co-occurrence networks within literature. This article utilizes CiteSpace to analyze literature on the field of data assets both domestically and internationally, aiming to showcase its research development, hot topics, and future directions.

The article adopts two sets of data: foreign literature and domestic literature. Foreign literature is sourced from the Web of Science core collection database, covering the period from 2001 to 2022, with 193 valid articles after screening. Domestic literature, on the other hand, is from the China National Knowledge Infrastructure (CNKI) database, covering the period from 2006 to 2022, with 170 valid articles retained after screening.

3. Visualization Analysis Results

3.1 Analysis of Publication Trends

Overall, research on data assets has experienced a process of exploration and rapid development both domestically and internationally. Foreign research began as early as 2001, while domestic research started in 2006. Initially, the quantity of literature on data assets was relatively small both domestically and internationally, indicating an exploratory stage. However, with increasing attention from scholars and institutions in this field, research on data assets has seen rapid growth since 2019 both domestically and internationally. Although the outbreak of research on data assets in China lagged behind that of foreign countries, in recent years, research on data assets in China has been more active than that in foreign countries. In comparison, the growth in the number of publications in foreign journals has been relatively slow. In conclusion, research in the field of data assets both domestically and internationally is showing a fluctuating upward trend, attracting more and more attention and participation from scholars.

3.2 Analysis of Authors' Publications

The author's analysis holds significant importance in gaining in-depth insights into the dynamics of a particular discipline's research. The most prolific authors in foreign journals include Lee, JS, Nafilyan, Vahe, and Harkonen, Janne, among others; while in domestic journals, there are also high-producing authors such as Xu Xianchun, Guan Yang, Wei Yanlin, and Zhang Zhongwen. Collaboration among researchers in the field of data assets, both domestically and internationally, is relatively limited, but shows a fluctuating upward trend. Prolific authors have varied research directions and contributions, with a focus on applications in domestic research and on technology and model research in foreign

research. This diversity contributes to the comprehensive development of the field of data assets.

3.3 Analysis of Research Institutions

Research on data assets is mainly led by academic research institutions. Leading domestic universities include the School of Information Resource Management at Renmin University of China, the China Economic and Social Data Research Center at Tsinghua University, and the School of Economics and Management at Northeast Electric Power University. On the international front, universities such as University College London (UCL), Inha University, the University of Melbourne, and Monash University are also very active in research on data assets, demonstrating the significant role of universities in this field.

Furthermore, there are significant differences in the intensity of cooperation between domestic and international research institutions, especially as reflected in the graph. Collaboration among foreign research institutions is closer, with numerous graph nodes and more connections between nodes, forming a high-density research network. In contrast, domestic cooperation is relatively limited, resulting in fewer nodes in the graph and sparser connections between nodes, forming a lower-density research network. International cooperation is more closely knit, while there is room for improvement in domestic collaboration. Strengthening cooperation among domestic institutions will further promote the development of research on data assets.

4. Research Hotspots and Evolution

4.1 Analysis of Keyword Co-occurrence

Foreign journals cover research hotspots such as big data, data governance, data quality, data management, machine learning, and the Internet. These topics are closely related, indicating that foreign researchers have explored various key aspects in the field of data assets. Particularly noteworthy is the high intermediary centrality of topics such as big data, data governance, and data management, indicating that they play important roles in connecting other topics and forming a relatively complete research network.

The core themes of domestic research include data assets, big data, the digital economy, data governance, value assessment, data resources, data transactions, accounting confirmation, and accounting. Compared to foreign research, domestic research topics are more diverse, but the keyword connections are more scattered and the correlation is lower, indicating that research hotspots have not yet clearly converged.

Comparing the keyword co-occurrence graphs of data asset research between domestic and foreign journals, the co-occurrence of keywords in foreign journals is tighter, while that in domestic journals is relatively dispersed, reflecting that domestic research is more scattered and has not yet formed a clear research focus. In summary, there are differences between domestic and foreign data asset research. Foreign research is more concentrated, forming a tight research network, while domestic research is relatively dispersed, and research hotspots are still evolving. This comparison helps to deepen the

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understanding of the dynamics and trends of global data asset research, providing valuable references for future research.
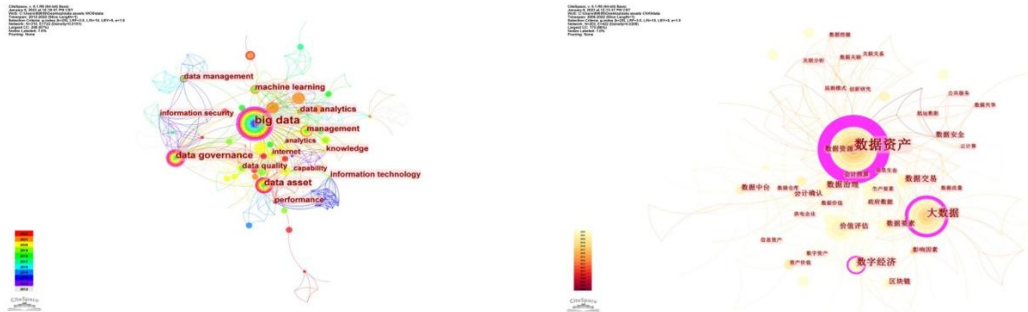

Figure 1. Keyword Co-occurrence Analysis of Domestic and International Literature

4.2 Keyword Cluster Analysis

Foreign research mainly focuses on eight major areas, including data assets, data governance, machine learning, text analysis, data management, security domain, data modeling, and econometric analysis. These areas cover the core aspects of data asset research, reflecting the foreign researchers' greater attention to technologies and methods such as data governance and machine learning.

Domestic research mainly focuses on nine major areas, including big data, the digital economy, tax governance, data governance, data elements, accounting, value assessment, data security, and data resources. Compared to foreign research, domestic research covers a wider range of fields, including the digital economy, tax governance, and accounting, reflecting domestic researchers' interest in the application and impact of data assets in various fields.

In general, keyword clustering analysis of data asset research both domestically and internationally shows that foreign research focuses more on the application of technologies and methods, such as data governance and machine learning, while domestic research places more emphasis on the application of data assets in different fields, such as the digital economy and tax governance.
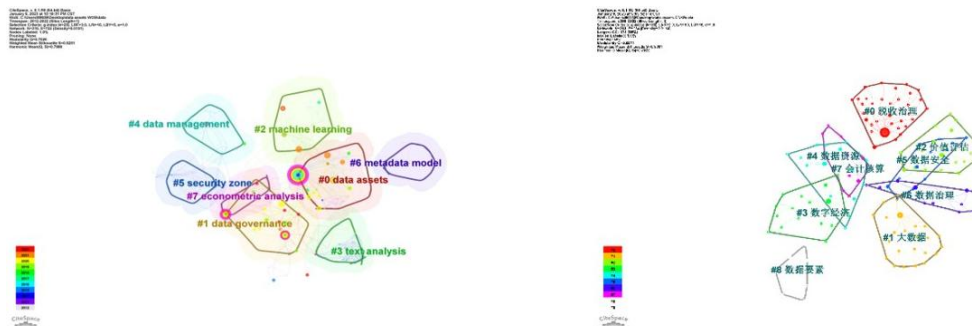

Figure 2. Keyword Clustering Analysis of Domestic and International Literature

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4.3 Keyword Emergence Analysis

Keyword burst analysis provides a powerful tool for insight into the evolution of key terms and research focuses within a field. The keyword burst analysis of data asset research both domestically and internationally reflects different research focuses and trends:

In foreign literature, burst keywords mainly focus on areas such as big data, data governance, frameworks, and data quality. Keywords related to management and data governance consistently maintain high levels of activity, indicating sustained attention from foreign researchers in data management and governance, emphasizing the exploration of technologies and methods.

Domestic keyword burst analysis results cover areas such as big data, data middle platform, and data security, reflecting the characteristics of domestic journal research on data assets. It is noteworthy that data security has been the keyword with the longest attention from domestic researchers, while big data has the highest burst intensity, indicating the significant importance of these two areas in domestic research. In addition, the data middle platform, as a hot keyword in recent years, continues to burst for two years, indicating it is a highly focused research hotspot and future development direction.

In summary, keyword burst analysis of data asset research both domestically and internationally indicates that domestic research focuses more on aspects such as data security, big data, and data middle platform, while foreign research pays more attention to data management and governance.

Top 15 Keywords with the Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	2001 - 2022
halogen occultation experiment	2007	1.29	2007	2009	
information system	2011	1.11	2011	2017	
information security	2013	0.9	2013	2017	
innovation	2014	1.07	2014	2016	
clinical trial	2001	0.85	2016	2018	
data access	2016	0.79	2016	2019	
big data	2014	2.39	2017	2019	
data quality	2017	1.61	2017	2020	
data analytics	2018	1.03	2018	2019	
cluster analysis	2018	1.03	2018	2019	
system	2019	2.24	2019	2020	
framework	2019	2.24	2019	2020	
management	2011	1.27	2019	2022	
analytics	2016	1.09	2019	2020	
data governance	2019	2.32	2020	2022	

Top 15 Keywords with the Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	2006 - 2022
数据安全	2006	1.21	2006	2015	
出版企业	2014	1	2014	2017	
数据管理	2015	1.17	2015	2016	
云计算	2015	1.02	2015	2017	
数据共享	2015	1.02	2015	2017	
大数据	2014	2.51	2017	2018	
影响因素	2017	1.54	2017	2018	
信息生态	2017	1.36	2017	2019	
价值挖掘	2017	0.9	2017	2019	
企业档案	2017	0.84	2017	2020	
计量	2018	1.12	2018	2019	
报告	2018	0.9	2018	2020	
确认	2018	0.9	2018	2020	
数据中台	2020	1.45	2020	2022	
数据	2020	1.09	2020	2022	

Figure 3. Keyword Burst Mapping Analysis of National and International Literature

5. Conclusion

Since the beginning of the 21st century, data research has garnered attention from scholars both domestically and internationally, with recent related studies showing explosive growth. Contrasting domestic and foreign research on data assets and their evolution, the following three points can be summarized:

Firstly, the differing origins and motivations of domestic and foreign research reflect the respective differences in national conditions and market demands. Due to its leading position in technological innovation, foreign research primarily focuses on the internet and its influence. In contrast, domestic research is inspired by digital technologies such as big data, as China rapidly develops in digital transformation and internet applications. This has led to diversification in research content and methods,

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with domestic research focusing more on data assets themselves while foreign research emphasizes integrating data with other fields.

Secondly, the evolutionary characteristics of domestic and foreign research differ as well. Foreign research progresses steadily, with new high-frequency terms emerging each year, indicating ongoing in-depth exploration. Conversely, domestic research exhibits sporadic jumps, possibly influenced by factors such as policies, lacking continuity in research. Although both have gone through three stages, the focus varies due to differences in countries and regions.

Finally, the research directions of domestic and foreign studies differ based on national conditions and market demands. Domestically, there's a focus on digital asset management platforms, data governance, and data asset accounting, reflecting the demands of China's digital economy. Internationally, there's a greater emphasis on data governance and management, focusing on areas such as data security, privacy, ethics, and law. Despite the differing directions, both domestic and foreign research emphasize the application of advanced technologies such as big data, the internet, and artificial intelligence, as they are crucial in data collection, processing, and application.

Drawing from the basic understanding of data assets and the current research status both domestically and internationally in this article, the following recommendations are proposed to promote the effective development of domestic data asset research:

5.1 Tracking Research Themes and Content

The practice of data asset both domestically and internationally is crucial for research. Academic research should integrate practical experience and case studies to better understand the real-world applications and challenges of data assets. Integrating data asset governance into China's digital economic theoretical framework can provide localized solutions, better adapting to China's specific environment and needs.

5.2 Regarding Research Methods

Increasing the proportion of empirical research is reasonable. Quantitative methods can provide more data and statistical support, delving deeper into the effectiveness of data asset governance and its influencing factors. This helps to enhance the scientific rigor and practical applicability of the research, providing better decision-making basis for policymakers and businesses. When implementing empirical research methods such as case analysis, it is essential to ensure a rational research design, representative samples, and the adoption of scientific data collection and analysis methods to ensure the credibility and effectiveness of the research.

5.3 About Collaboration Networks

Strengthening collaboration among researchers from different institutions and disciplinary backgrounds is crucial. Data asset research involves multiple fields and disciplines, and interdisciplinary collaboration can promote knowledge exchange and innovation. It is recommended to establish interdisciplinary research centers or platforms to facilitate collaboration and information sharing. Additionally, major research initiatives can drive data asset research and practice, providing support for

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in-depth analysis of data asset practices and promoting the development of China's digital economy and industrial digitization.

5.4 On Data Asset Accounting and Valuation

Establishing a support system for data asset accounting and valuation is crucial for fully realizing the value of data assets. This helps enterprises better understand the value of their data assets, enabling them to make wiser investments and decisions. Furthermore, developing rules, standards, and guidelines is key to ensuring the effectiveness of data asset accounting and valuation. These rules and standards should be adaptable to different industries and application scenarios while maintaining consistency and operability.

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