

An Analysis of Research Trends on Open Government Data in China (2011-2020): Postprint

Authors: Wang Mengyu, Wang Changjue, Li Yuhai

Date: 2023-10-08T00:00:00+00:00

Abstract

[Purpose/Significance] To comprehensively review the state of government data openness research in China from 2011 to 2020 across multiple dimensions, focusing on the distribution of research themes, temporal evolution patterns and characteristics, and the disciplinary distribution of research outputs, thereby revealing trends in Chinese government data openness research and providing references for relevant researchers. [Method/Process] Employing an integrated approach of literature survey, bibliometric analysis, and visualization to identify evolutionary pathways of hot topics in Chinese government data openness research, and conducting cluster and content analysis to summarize the distribution of research outputs. [Results/Conclusions] The research sample exhibits characteristics of policy orientation, thematic diversity, interdisciplinary integration, and relatively concentrated outputs. Future research trends may focus on: constructing value generation and safeguard mechanisms for government open data to enhance the economic value of data elements; developing measurement methods, frameworks, and indicators for government open data value to improve data utilization rates; increasing empirical studies on the relationship between user utilization and outcomes to enhance the supervision and management of open data; and formulating more granular laws, regulations, and policies to ensure secure sharing.

Full Text

Abstract

[Purpose/Significance] This study examines the state of research on China's government data openness from 2011 to 2020 from multiple dimensions, focusing on thematic distribution, temporal evolution, and disciplinary distribution of research outputs to reveal trends and provide references for scholars. [Method/Process] We employed literature survey, bibliometric analysis, and visualization to trace the evolution of hot topics in China's government data

openness research, conducting cluster and content analysis to summarize the distribution of research findings. **[Result/Conclusion]** The analysis reveals that the research sample exhibits characteristics of strong policy orientation, thematic diversity, interdisciplinary integration, and relatively concentrated outputs. Future research may focus on: constructing value generation and guarantee mechanisms for government open data to enhance the economic value of data elements; developing measurement methods, frameworks, and indicators for government open data value to improve utilization rates; increasing empirical studies on the relationship between user utilization and outcomes to improve open data supervision and management; and formulating more granular laws, regulations, and policies to ensure secure sharing.

Keywords: government open data; open data; quantitative analysis; government data openness

1. Introduction

Government data openness evolved from government information disclosure. The earliest specialized legislation on information disclosure was the U.S. Freedom of Information Act enacted in 1966. In 2007, China promulgated the Regulations of the People's Republic of China on Government Information Disclosure [1]. Government data openness represents a continuation of government information disclosure, originating from the 2009 open data movement when the Obama administration launched the first government data platform "Data.gov." Subsequently, the United Kingdom, Australia, Ireland, France, Japan, and other countries introduced government data openness initiatives, making global government data openness and sharing a prevailing trend. Since then, academic and professional communities both domestically and internationally have conducted extensive research and practice on government data openness.

A 2020 report titled "Research Report on the Utilization of Chinese Government Open Data," released by the School of Information Management at Central China Normal University and the Hubei Data Governance and Intelligent Decision-Making Research Center, points out that government open data has become an indispensable component in research across various fields, transitioning from "specialized utilization" to "ubiquitous utilization" [2]. Data has shifted from being samples to complete datasets. Against the backdrop of big data openness, data has emerged as a crucial new resource, fostering a new ecosystem characterized by flattening, networking, platformization, and datafication [3]. In this new socio-ecological environment, innovation in government governance logic and structural processes fundamentally hinges on the innovative development of data governance. Government data governance must rely on data itself—not merely governance of government data, but governance based on data. Government data governance capacity is closely related to government data openness, with open data sharing being a vital component of data governance. Government data openness serves as the prerequisite and foundation for government data governance [4], with its core lying in providing raw data

resources previously held exclusively by government to the public for access and use [5].

However, current government data openness practices in China have yielded unsatisfactory results, lagging behind countries like the United States and the United Kingdom in terms of significant data quality disparities, low user participation, and ineffective utilization rates [6-7], presenting multifaceted challenges for government data governance. To address these issues, scholars such as Huang Ruhua, Duan Yaoqing, Chen Chaobing, and Yang Zheng have conducted review studies on government data openness research (2005-2015) [8], analyzed research hotspots and frontiers in Chinese and foreign government open data using word frequency statistics, cluster analysis, and comparative methods [9], examined progress and trends (2013-2017) through distribution characteristics of publication time, authors, journals, and keyword clustering [10], and performed scientometric analysis of government data openness utilization using the Web of Science Core Collection [11]. Nevertheless, in-depth mining of the temporal evolution of thematic interconnections in Chinese government data openness research literature and analysis of research output sources and disciplines remain scarce. As research themes on government data openness deepen and expand, there is an urgent need to clarify and systematically review theoretical methods and practical applications in China's government data openness research over the past decade to provide reference pathways for theoretical research and practical application in the new era.

2. Data Sources and Research Methods

This study selected articles from CNKI's China Knowledge Resource Database using "government data openness," "government open data," and "open government data" as subject terms. The publication period was limited to January 1, 2011, to December 31, 2020, with sources restricted to Chinese Social Sciences Citation Index (CSSCI) journals and Chinese core journals. After manually removing irrelevant literature, 622 articles were obtained as the sample for domestic government data openness research analysis. This paper employs literature survey and knowledge visualization methods, utilizing bibliometric analysis software such as BICOMB 2.0 and COOC 9.94 as primary analytical tools.

3. Development Trajectory of Government Data Openness Research

As shown in [Figure 1: see original paper], China's government data openness research publications experienced rapid growth from 2011 to 2018, stabilizing from 2019 onward. The years 2017 and 2018 marked domestic publication peaks, indicating that government data openness has gradually gained sustained research attention. Based on the temporal distribution of sample literature, government data openness research can be divided into three stages:

3.1 Initial Stage (2011-2014)

This stage featured relatively few publications with significant thematic variation. The most researched topic was e-government [12-14], with considerable focus on introducing foreign government data openness achievements, including data management and utilization [15], guarantee mechanisms [16], history and progress [17], and portal functions [18]. In practice, China established its first government data openness platform—the Shanghai Government Data Service Network—in 2012 [19].

3.2 Development Stage (2015-2018)

The State Council’s 2015 release of the “Outline for Promoting Big Data Development” marked the official launch of national top-level design for open government data. During this stage, research output grew rapidly. While e-government and studies of foreign government data openness theories and practices remained key focuses [20-22], research themes expanded to broader perspectives and more specialized areas, including big data [23], data governance [24], public services [25-26], policy [27-28], and metadata [29].

3.3 Stable Transition Stage (2019-2020)

Following the revised publication of the Regulations of the People’s Republic of China on Government Information Disclosure in early 2019, government data openness research growth slowed and stabilized. Scholars conducted more in-depth studies on key themes such as big data, e-government, data governance, policy, and metadata, including evolutionary analysis of policies [30-31] and thematic analysis. After achieving phased results in government open data research, more scholars focused on quality assurance and evaluation of data and platforms [7,32], particularly quality assessment of government open data in response to emergencies [33], while the construction of China’s government open data sharing standard system was put on the agenda [34]. On April 9, 2020, the State Council released the “Opinions on Constructing a More Perfect Market-oriented Allocation System and Mechanism for Factors of Production,” establishing data resources as a new type of production factor [35], making “data elements” a new research hotspot and marking China’s entry into a transformative period for government data openness research.

4. Analysis of Publication Sources

Using CNKI and BICOMB 2.0, we analyzed the sources of sample literature on China’s government data openness research, focusing on authors and institutions.

4.1 Author Analysis

From 2011 to 2020, ten authors published more than ten papers each (see): Huang Ruhua, Ma Haiqun, Chen Mei, Zheng Lei, Zhai Jun, Xia Yikun, Zhou Wenhong, Chen Chaobing, Duan Yaoqing, and Lin Yan. These scholars conducted sustained and in-depth research on the field, with their combined ten-year output accounting for 35% of total publications.

4.2 Institutional Analysis

Research output is relatively concentrated, primarily in information management schools and information resource research centers at universities. The top five institutions by publication volume are Wuhan University, Heilongjiang University, Hubei University of Technology, Central China Normal University, and Sichuan University. Details are shown in .

5. Analysis of Publication Venues

Using CNKI and BICOMB 2.0, we analyzed the disciplinary distribution and publication venues of sample literature.

5.1 Disciplinary Distribution

According to CNKI' s disciplinary analysis tool, the top five disciplines by publication volume are: administrative management and national governance, journalism and communication, library and information science, Chinese politics and international politics, and administrative law and local legal systems, accounting for 42%, 25%, 12%, 7%, and 5% of the total sample, respectively.

5.2 Journal Distribution

Thirteen journals published ten or more articles, with the top five being *E-Government* (59 articles), *Library and Information Service* (40 articles), *Information Theory and Practice* (37 articles), *Journal of Intelligence* (37 articles), and *Library* (30 articles). Among these 13 journals, 11 belong to library and information science, one to e-government, and one to government management. While *E-Government* published the most articles on government data openness, library and information science journals constitute the primary publication venues overall.

6. Thematic Distribution and Temporal Evolution

To more intuitively analyze the thematic distribution of China' s government data openness research from 2011 to 2020, we conducted keyword statistical analysis on the 622 sample articles, selecting keywords with frequency ≥ 10 for visual community clustering.

6.1 Thematic Distribution

The thematic distribution of sample literature is shown in [Figure 3: see original paper]. Research on “government data openness” is highly concentrated in e-government, government information disclosure, and public services, reflecting a public service demand orientation serving e-government information disclosure. Other themes in descending frequency include: big data, information disclosure, privacy protection, policy, data openness platforms, e-governance, information resources, government information, information security, Internet of Things+, and personal privacy.

[Figure 3: see original paper] indicates that researchers’ work on “government data openness” primarily focuses on open data platforms, data quality and evaluation, metadata and metadata standards, policy coordination and instruments, and related issues. The figure also shows that “government data” and “data openness” are key research foci, with content concentrating on data governance, government governance, data management, data sharing, open platforms, government data governance, policy systems, data security, openness policies, and laws and regulations.

6.2 Temporal Evolution of Themes

Through cluster analysis of thematic distribution in sample literature, we found that the research field of “government data openness” is broader than that of “open government data” or “government open data.” Scholars aim to improve the utilization efficiency of government data, conducting extensive theoretical research on policy laws, information security, and privacy protection. Research on “open government data” and “government open data” primarily revolves around practical and applied aspects including data platforms, data quality and evaluation, metadata and metadata standards, and policy instruments.

6.2.1 Annual Evolution of Themes We selected the top six keywords by frequency for each year from 2011 to 2020 for cumulative visualization analysis to identify important research themes and trace their development trajectories. shows these top six keywords. “Open government data,” “government open data,” and “government data openness” emerged as independent research themes in 2011, 2012, and 2013, respectively, indicating that applied research on government open data preceded theoretical research.

6.2.2 Cumulative Temporal Evolution Analysis (1) Initial Stage (2011-2014). During this period, scholars maintained research interest in themes such as “open data,” “open government data,” “e-government,” “information disclosure,” “linked data,” “data management,” “government open data,” “open government,” “government data openness,” “government data,” “government information disclosure,” “public services,” “guarantee mechanisms,” “big data,” “government,” “open data platforms,” “data services,” “empirical analysis,” “trade openness,” “data-intensive science,” “platform construction,”

and “big data industry.” However, attention to “data services,” “empirical analysis,” “trade openness,” “data-intensive science,” “platform construction,” and “big data industry” declined, lacking sustained research momentum.

(2) Development Stage (2015-2018). Scholars deepened research on initial-stage themes, with major hotspots including “local government,” “data governance,” “government governance,” “data openness platforms,” “data quality,” “data policy,” “privacy protection,” and “metadata.” Research hotspots gradually stabilized with continuity, yielding rich results in data openness platforms, data quality, data policy, metadata, and data utilization.

(3) Stable Transition Stage (2019-2020). During this period, research themes became generalized and interdisciplinary, with increased emphasis on social and market dimensions. New hotspots emerged, including “digital economy,” “data elements,” “fuzzy-set qualitative comparative analysis,” “new think tank construction,” and “market-oriented allocation.”

In summary, since 2011, scholars have continuously deepened research on policies, regulations, guarantee mechanisms, privacy protection, data management, data governance, data quality, and platform construction—issues that have remained central to the field. After 2019, scholars increasingly approached the topic from social and market dimensions, focusing on data value and utilization.

7. Content Analysis of Sample Literature

Using literature survey and analytical tools, we systematically analyzed research objects and content to present a comprehensive overview of hotspots and development trends in China’s government data openness research. Against the global backdrop of government data openness, Chinese scholars have addressed critical issues at different stages of China’s government data governance. Research primarily covers the entire process of government data openness across different governance stages, including data collection, organization, storage, processing, and sharing/utilization. Based on core authors (see), major institutions (see), thematic distribution (see), and temporal evolution (see [Figure 4: see original paper]), we found that while research scope is broad, studies concentrate on four aspects: guarantee mechanisms, scope, implementation paths and tools, and development goals. Combining thematic cluster distribution, we categorize research into four areas: policy and regulation, management and governance, platforms, and value and utilization.

7.1 Policy and Regulation Research

Since 2013, Chinese scholars have conducted extensive research on government data openness policies and regulations in four main areas:

(1) Studies on foreign guarantee laws. Wang Xincan et al. [36], Sun Xupei et al. [37], and Long Fei [38] examined the application of the Freedom of Information Act in the United States, Australia, and Germany and its implications

for China.

(2) Research on guarantee mechanisms for government data openness and sharing. Huang Ruhua et al. conducted sustained in-depth research on policy and regulatory guarantees in the UK [39], Denmark [40], US [41], and France [42], as well as policies and standards for openness and sharing [27], policy problem construction [43], policy frameworks and content [44], policy system building [45], and standard system construction [46].

(3) Privacy protection research. Chen Mei et al. studied personal privacy protection policies and measures in Germany [47] and Australia [48], and privacy risk assessment and prevention experiences in France [49], UK [50], and New Zealand [51]. Zhang Xiaojun et al. [52] analyzed the balanced, mutually reinforcing relationship between government data openness and personal privacy protection, reviewing relevant policies, laws, and regulations in China and the US.

(4) Status and problem analysis. Ma Haiqun et al. have conducted comparative studies on open government data policy and governance since 2015 [53-54], using the WSR (WuLi-ShiLi-RenLi System Approach) methodology for structural analysis of policy frameworks [55], policy evaluation [56], and research on factors affecting policy implementation [57]. Liu Xiping et al. [58] examined potential risks and countermeasures using Shanghai as a case study, while Tan Biyong et al. [59] studied local government openness policies across 15 sub-provincial cities.

Currently, China's government data openness legal and policy systems remain imperfect, lacking personal privacy protection laws and regulations, with inadequate supervision posing potential risks. Local government open data policy system construction varies significantly and remains in its infancy.

7.2 Management and Governance Research

Research on management and governance issues in government data openness can be divided into two stages by attention level (see [Figure 3: see original paper]). From 2011-2014, scholars focused on “data management,” while after 2015, more research addressed “e-governance,” “government governance,” and “data governance.”

First Stage: Xu Huina et al. [60] studied international government data openness literature from a public management perspective, arguing that “government data openness” primarily involves data-level and management-level governance. The former includes data accuracy, confidentiality, integration, background description, ownership, location, and user capability to use and interpret data, while the latter involves power structures, organizational frameworks, departmental interests, organizational culture, and personnel awareness—factors that interact dynamically. Hou Renhua et al. [61] conducted a case study of the US www.data.gov, analyzing data characteristics, collection methods, management

strategies, utilization patterns, and advantages to reveal how the US manages and utilizes data information resources in information disclosure.

Second Stage: Scholars such as Xia Yikun, Zhai Jun, and Zhao Longwen conducted in-depth research. Xia Yikun examined the generation background [62], conceptual framework [24], governance dimensions and models [63-64], and international experiences [20] of government data governance, while also exploring the government chief data officer system [65]. Zhai Jun and Zhao Longwen focused on data-level research, including quality evaluation [66-67], metadata core sets [68], schemas [69], ontology design [70], and tracking of US and EU metadata standard DCAT progress [71-73]. Zhao Longwen et al. conducted research on resource description [74-76], retrieval [77], implementation methods [78], and models [79] for government data openness based on semantics and linked data.

Currently, China's government data openness strategy and systems are inadequate, with low integration of domestic and international standards and technologies, and insufficient research on data value attributes.

7.3 Platform Research

From 2014-2020, scholars consistently focused on themes such as “open data platforms,” “platform construction,” “data openness platforms,” and “government data openness platforms,” generating substantial research output in five main directions: platform guarantee policy research, platform data research, platform software development and functionality, platform quality and evaluation, and platform development status analysis. To avoid repetition, we focus on the latter three directions.

(1) Platform software development and functionality. Qian Xiaohong et al. [80] constructed a government data openness platform based on dataset openness and extracted five technical features. Li Pan et al. [81] and Chen Mei [82] proposed using Drupal and CKAN (the Comprehensive Knowledge Archive Network) to build China's government data openness platform framework.

(2) Platform quality and evaluation. Ma Haiqun et al. conducted in-depth research using multiple methods: (a) establishing a six-dimensional measurement model for government open data website service quality evaluation based on structural equation modeling [83]; (b) building an evaluation index system using neural network BP (Back Propagation) algorithms to determine overall evaluation results [84]; (c) evaluating the efficiency of eight representative Chinese government open data websites based on DEA (Data Envelopment Analysis) [85].

(3) Platform development status analysis. Tang Zhiwei et al. [86] conducted empirical analysis of 18 government data openness platforms nationwide, concluding that influencing factors include the number of data openness policies, local economic development level, and information industry development level.

Scholars such as Dong Fang [87] and Wang Ping et al. [88] conducted surveys and reviews of domestic and foreign government data openness platforms.

China's government data openness platform research has yielded rich results, forming a hierarchical distribution pattern of "provincial–sub-provincial–local" levels [88]. However, problems persist, including single functionality, low user participation, uneven quality, vague resource description, untimely operation management, and unclear permission management [10,35,89]. Scholars have addressed these practical issues by focusing on integrating platform software development technologies with international standards and linking quality and evaluation with user utilization improvement.

7.4 Value and Utilization Research

The US Open Government Data Act (effective 2019) and EU Open Data Directive (2019) have set global benchmarks [90]. On April 9, 2020, China's State Council released the "Opinions on Constructing a More Perfect Market-oriented Allocation System and Mechanism for Factors of Production," proposing data resources as a new type of production factor [35], providing new research directions. From 2019-2020, scholars including Wang Wei, Duan Yaoqing, Fu Xiwen, and Zheng Lei concentrated on government data openness value and utilization.

Wang Wei et al. studied guarantee mechanisms [90], implementation theories and frameworks [91], and influencing factors [92-93] for open government data value realization. Duan Yaoqing et al., taking open data itself as the entry point, analyzed static utilization status [94], identified factors influencing public initial acceptance behavior based on situational theory [95], established an evaluation index system for government open data service levels from data and user perspectives [96], and found that service levels correlate highly and hierarchically with data usability. They also constructed a remedial timing strategy model for government open data service failures using variables such as user data sensitivity, remedy timing, and user perception versus expectation [97] to enhance service levels and utilization value.

Fu Xiwen and Zheng Lei argue that current research on government open data value concentrates on exploring expected value, including value types, generation mechanisms, and measurement methods. The ultimate indicator for evaluating open government data effectiveness is assessing value generated after data openness and utilization, with research conducted along theoretical and practical paths [98-100].

Currently, research on government open data value and utilization lacks empirical studies on expected value, with few results on value generation and guarantee mechanisms, measurement methods, frameworks, and indicators. There is also insufficient research on dynamic utilization status and lack of testing between utilization and outcomes.

8. Conclusions and Future Trends

Our review of 2011-2020 literature reveals that research samples exhibit policy orientation, thematic diversity, interdisciplinary integration, and concentrated outputs.

(1) Policy influence and three-stage development. Publication volume and research themes are heavily influenced by national laws, regulations, and policies. The research divides into three phases: Phase 1 (2011-2014) had low volume and limited domestic attention; Phase 2 (2015-2018) saw exponential growth after the State Council's 2015 "Outline for Promoting Big Data Development," peaking in 2018; Phase 3 (2019-2020) experienced stabilization after the 2019 revised information disclosure regulations and 2020 "Opinions on Factors of Production," with scholars focusing on data value and utilization.

(2) Thematic generalization. Research evolved from early concerns with concepts, characteristics, technology, and organizational construction to deeper exploration of policy, data, users, platforms, value, and utilization. New technological concepts like big data, artificial intelligence, digital economy, and data elements have introduced new research angles.

(3) Interdisciplinary nature. Researchers primarily come from universities, applying theories, methods, and technologies from administrative management, information science, public management, computer software and applications, and system dynamics to analyze government data openness, showing multidisciplinary integration trends.

(4) Concentrated research outputs. Publication venues concentrate in library and information science, e-government, and government management fields. Prolific authors are concentrated at Wuhan University School of Information Management and Information Resource Research Center, Hubei University of Technology School of Economics and Management, Central China Normal University School of Information Management, Sichuan University School of Public Management, and Heilongjiang University School of Information Management and Information Resource Management Research Center. High-quality research concentrates in library and information science and public management.

(5) Future trends. Current gaps include exploration of data value attributes, dynamic utilization, and unified standards for local government open data policies. Future research may focus on: constructing value generation, guarantee, and market allocation mechanisms for government open data under the digital economy framework to enhance overall quality control and data element value; developing value measurement methods, frameworks, and indicators to improve utilization rates; conducting empirical studies on user utilization and outcomes to strengthen supervision and management; and formulating more granular laws, regulations, and policies to ensure secure sharing.

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Author Contributions:

Wang Mengyu: Data collection and paper writing;

Wang Changjue: Proofreading, revision, and polishing;

Li Yuhai: Research design and paper review and finalization.

Note: Figure translations are in progress. See original paper for figures.

Source: ChinaXiv –Machine translation. Verify with original.