Understand the Key Factors and Combination Paths of Chinese Government Data Governance Performance

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Abstract. Countries around the world attach great importance to the performance of government data governance. However, existing research has not established a systematic analysis framework, and the interpretation of government data governance performance is limited. Therefore, from the perspective of institutional theory, public value theory and resource-based theory, this paper constructs an analytical framework for value goals, institutional environment and government capacity, and uses data service utilization variables, policy environment support, public demand pressure, government financial capacity and Leadership is highly valued as a condition variable. The fuzzy set qualitative comparison method is used to analyze the configuration of 31 provincial-level government data governance cases in China. The study finds that the performance of government data governance is affected by multiple factors, including three types of leadership-demand, system-goal, and comprehensive driving. The class combination path promotes high performance of government data, while the non-high performance 3-class generation mechanism is completely different.

Keywords: data governance · Chinese government · key factors · path analysis

1 Introduction

As an intangible asset, data has gradually penetrated into various fields such as politics, economy, culture and society. Due to the influence of the external environment and organizational resources, there are great differences in the level of government data governance among countries. At the same time, research on government data governance has gradually increased in the academic field. Government data contains huge resource value and technical value. However, the research mainly focuses on civil servants' behavior and perception [4], organizational culture [9], trust in government [7], institutional resources [8], and financial resources [2], etc. Existing research has not established a systematic analysis framework, the interpretation of government data governance performance is limited, and the interaction and combination conditions between various factors cannot be revealed. Therefore, this paper needs to further explore the influencing factors of government data governance performance.

2   Literature Review

Existing research has established an evaluation framework for government data governance from different perspectives, covering dimensions such as open data quality, collaborative participation, data governance, and user characteristics. Based on the perspective of resource-based theory, scholars discussed the mutual influence of various conditions on the construction of data open platform [8]. Zhang constructed a framework for evaluating the open quality of government data with a comprehensive integration method. With the deepening of government data research, the academic community has deepened its understanding of the role and value of open government data and government data governance. Moore proposed a strategic triangular model in which the public sector continuously seeks, determines and creates public value by gaining political empowerment upward, controlling organizational operations downward, and considering the external environment outward [5].

On the basis of reviewing previous studies, this paper summarizes the research space of this study from three aspects. First, the research focuses on a macro research perspective, such as government data open platforms or evaluation research [3, 6, 10], and lacks research on specific topics. Second, in the study of government data performance, most of them use a certain theory to analyze the advantages and obstacles, and there are few empirical studies. Third, it is difficult to identify the interaction between different factors, possible interaction and combination paths.

3   Theoretical Foundation and Research Framework

Existing research provides reasonable explanations for government data governance performance from different perspectives, and also recognizes the complex relationship structure among various government resources, institutional environments, and capability. This provides a unique perspective for this study. Therefore, this paper constructs the analytical framework of "value goal-institutional environment-government capacity".

From the perspective of the external institutional environment, it includes two dimensions: value goals and institutional environment. An important reason for the success of digital government projects is inseparable from the organization's pursuit of public value. The value target dimension mainly considers data service utilization variables. In the dimension of institutional environment, it mainly includes two variables: policy environment support and public demand pressure. Institutional theory holds that only when the existing institutional environment is compatible with organizational behavior can the obstacles of the original institutional mechanism and organizational structure be broken and the smooth implementation of the project be promoted. In addition, the pressure of public demand cannot be ignored. The tension between the increasingly diverse service demands of the public and the performance of government data governance has forced the government to improve the performance of government data governance.

From the perspective of internal resource capacity of the government, it is mainly the dimension of government capacity, including government financial capacity and leadership attach great importance to two variables. Resource-based theory (RBT) points out that the different resources an organization possesses determines the difference in

its competitive advantage [1]. As a cost-intensive systematic project, each provincial government allocates different attention to government data governance, and invests in different resource elements, and its governance performance is also different. Among them, financial resources and human resources are the keys to ensure the normal operation of the system. So a place's financial resources will determine whether the region can start digital projects and how sustainable the projects are. Similarly, as a digital project is a "top-in-command" project, the promotion and support of senior leaders is the key link to ensure the success of the project.

4   Methodology

Qualitative comparative analysis was developed by Charles C. Larkin in the late 1980s and can go beyond the one-way linear relationship of causal symmetry in traditional regression analysis. It can deal with the problem of degree change or partial membership. Given that the differences in the observed conditions and results in the case samples are continuous, a qualitative comparison of fuzzy sets can be used to analyze China's provincial-level government data governance.

4.1   Variable the Assignment

In this paper, 31 provincial government data governance indexes are used as the original data to reflect the government data governance performance of provincial governments (GDGP).

Government fiscal capacity (GFC). The per capita general public budget revenue of provincial governments was used as an indicator to measure fiscal capacity, with data from China Statistical Yearbook 2020.

Leaders attach great importance to it (LAGI). Through the retrieval of the official website of the government and the research results of scholars, the value of the unestablished provincial government data management institutions, non-administrative institutions, listed institutions, department management institutions and directly affiliated institutions can be assigned as 0–4 in sequence.

Public demand pressure (PDP). The ratio of the number of mobile Internet users to the number of permanent residents in provincial regions is selected as the measurement index to measure the demand pressure. The data comes from China Statistical Yearbook 2020.

Policy and institutional support (PIS). With "government affairs & data" as the key word, the paper searched the official website of the government, screened out the provincial government affairs data governance policy documents issued and effective by the end of 2020, and took the number of them as the measurement index.

Data service utilization (DSU). Select the data opening utilization layer index in the Report on China's Local Government Data Opening in the Second Half of 2020 released by Fudan. It can objectively reflect the utilization of data services.

Table 1. Variable calibration anchors

The variable name	Full membership	intersection	Totally unaffiliated
GFC	8109.02	6094.67	4642.27
LAGI	3	1.5	0
PDP	0.99	0.91	0.84
PIS	8	6	4
DSU	7	0.5	0
GDGP	6.01	4.40	3.87

4.2 Data Calibration

In this paper, the upper quartile (75%), median and lower quartile (25%) of sample data were selected as the calibration points of complete membership, intersection and complete non-membership respectively, and the variable calibration was completed with the help of fsQCA3.0. The calibration of each variable is shown in Table 1.

5 Data Analysis and Results

In order to test whether a condition is necessary for a particular result, a necessity analysis should be carried out before the condition configuration analysis. The results show that the consistency of all condition variables is less than 0.9, which means that a single condition is not enough to explain the results, indicating that the influencing factors of government data governance may be complex and concurrent. Considering the existing research and sample size, this paper sets the consistency threshold to 0.8 and the minimum case frequency to 1. After fsQCA3.0 calculation, as shown in Table 2, there are 5 configurations to achieve high government data governance performance. Overall, the total consistency is about 0.81, which is higher than the acceptable consistency level of 0.8, and the total coverage is about 0.67, indicating that the empirical analysis results are valid. Further analysis, it can be summarized into three driving modes for the generation of high data governance performance: leadership-demand-driven, system-goal-driven, and comprehensive-driven.

First, leadership-demand-driven. Configurations 1 and 2 show that, regardless of whether or not the provincial government has sufficient financial and institutional support, driven by the core conditions of high leadership and strong demand pressure, it can improve its government data governance performance, so it is named "leader-demand-driven". In configuration 1, about 30% of cases with high government data governance performance can be explained, while only about 4% of cases can be explained by this path, including Fujian and Chongqing; configuration 2 can explain about 9% of cases with high governance performance cases, of which about 3% are explained by this path alone, include Shaanxi. Taking Chongqing as an example, with good financial capacity, due to the large number of mobile Internet users, the Chongqing municipal government is also facing greater pressure from citizens'demands. The change of demand

Table 2. Configuration path of high government data governance performance

	1	2	3	4	5
GFC	●	⊗	⊗		●
LAGI	●	●		●	
PDP	●	●	⊗		●
PIS	●	⊗	●	●	●
DSU		⊗	●	●	●
Raw Coverage	0.30	0.09	0.23	0.46	0.31
Unique Coverage	0.04	0.03	0.06	0.10	0.07
Consistency	0.83	0.81	0.77	0.84	0.84
Solution Coverage			0.67		
Solution Consistency			0.81		

pressure affects the government's attention distribution from the outside of the organization, triggering the urgency and necessity of the Chongqing government's governance of data resources, which in turn affects the choice of government behavior. In 2018, Chongqing established the Big Data Application Development Administration. As a big data management organization directly under the departmental level and the provincial level, it means higher administrative power and status and stronger overall planning ability, reflecting the city government leaders' awareness of the importance of data governance. At the same time, Chongqing has promulgated a special comprehensive management method for government data to break the dilemma of government data resource management and improve the efficiency of administrative organs.

Second, system-goal-driven. Configuration 3 shows that when the provincial government lacks financial resources and weak demand pressure, institutional support and goal guidance are particularly important as the core conditions for promoting high performance, so it is named "institution-goal-driven". This path can explain about 23% of cases with high government data governance performance, of which about 6% are explained only by this path. Sichuan and Jiangxi can be explained by this configuration. For example, over the years, the Jiangxi provincial government has highlighted the importance of policy guarantees to government data governance. While strengthening the sharing and security management of government information resources, in 2018, it promulgated the "Work Plan on Accelerating the Promotion of Provincial Government Data Sharing", pointing out that the construction of intensive information system and integrated data sharing system will gradually realize the sharing and exchange of government affairs data and the "one-stop service" of government affairs services. In order to promote the socialized use of data, Jiangxi Province has held activities such as the Open Data Innovation Application Competition, and promoted the sharing and interoperability of "information islands" through the docking of the government data sharing

and exchange platform system. The goal of efficient utilization of data services leads the Jiangxi Provincial Government to effectively solve the problems of difficult business collaboration and low efficiency, and further promotes the improvement of government data governance. Although Jiangxi Province's fiscal revenue and demand pressure are relatively insufficient, and the status of data institutions in the nature of public institutions is not high, policy and institutional support and service utilization goals make up for the lack of ability elements and become the dominant factor in the high ability of government data governance.

Third, comprehensive driving. Configurations 4 and 5 show that although policy and institutional support and data service utilization play a prominent role, the linkage and coordination of the three elements of capability, environment and goals is the reason for the high efficiency of government data, so it is named "comprehensive-driven". In configuration 4, leadership attaches great importance, policies and systems are improved, and value goal guidance is a combination of conditions for high performance, which can explain about 46% of high-performance cases, and about 10% of cases are explained only by this path. As a typical case, Guizhou attaches great importance to the situational application based on modern information technology, takes the lead in promoting the big data strategy, and becomes one of the pioneers in the development of big data in China. Taking the development of big data as a "top-level project", establishing the first provincial-level data governance organization, and promulgating the first local regulations on big data, etc., fully reflect the high importance that provincial party committees and governments attach to data governance. In order to achieve data integration and sharing, and promote the improvement of government efficiency. In configuration 5, high performance is generated under the linkage and matching of demand pressure, financial capacity and two core conditions. This path explains about 31% of cases, while only about 7% is explained by this path. Shanghai and Guangdong belong to this category. Taking Guangdong Province as an example, in addition to abundant financial support, in terms of policies and systems, the 2019 "Guangdong Provincial Government Data Governance Special Plan (2019–2020)" proposed to promote the reform and construction of digital government with data governance, which is not only for the system. It provides guidance for the application of government affairs data, and also provides a feasible path for the construction of digital government. In terms of data service utilization, "the Open Guangdong" data platform, "Guangdong Provincial Affairs" mobile government affairs, and "Guangdong government affairs service network" have promoted the development, utilization, circulation and sharing of data resources, so as to provide efficient public services for the public and enterprises. value pursuit.

Compared to the high-performing configuration, as shown in Table 3, there are five distinct non-high-performing paths. Through the analysis of configuration N1, N2 and N3, it is shown that the lack of multiple factors such as capability, institution and goal is the reason for the low data governance performance. Take Tibet as an example. So far, Tibet has not set up a provincial data management agency, has not built a data open platform, and has not formulated relevant policy documents. Therefore, the lack of multiple factors is the main reason for the low capacity of government data governance in Tibet. Configuration N4 shows that despite facing a large demand from citizens, the insufficient financial capacity and institutional support of provincial governments make

Table 3. Configuration path of non-high government data governance performance

	N1	N2	N3	N4	N5
GFC	⊗		⊗	⊗	●
LAGI		⊗	⊗	⊗	⊗
PDP		⊗	⊗	●	●
PIS	⊗	⊗		⊗	●
DSU	⊗	⊗	⊗		⊗
Raw Coverage	0.42	0.31	0.34	0.17	0.09
Unique Coverage	0.09	0.03	0.07	0.03	0.05
Consistency	0.81	0.77	0.89	0.91	0.94
Solution Coverage			0.61		
Solution Consistency			0.82		

it difficult to improve data governance performance. Similarly, configuration N5 shows that even though the provincial government has strong financial capacity and public demand, the policy support is strong, but the generation of high-capacity is inhibited because the leaders do not pay enough attention and the data utilization is not high. The typical case is Inner Mongolia. In 2020, Inner Mongolia launched a data open platform. Although some data results have been achieved, due to the short time of launch, the service utilization effect is not high.

6   Conclusion and Discussion

Based on the existing research, this research establishes an analytical framework of "value goal-institutional environment-government capacity", and uses the fuzzy set qualitative comparison method to analyze 31 provincial government case samples to explore the generation path of local government affairs data governance performance. First, the high performance of government data governance is the result of the mutual cooperation of different conditions inside and outside the organization. It has three driving modes: comprehensive driving, leadership-demand, and system-goal. In the future, a holistic perspective should be established and synergistic effects should be exerted. Second, the combination of conditions that produce high performance does not necessarily reduce performance when it is lacking, which means that non-high government data governance performance has different generating mechanisms. In the future, differentiated strategies can be adopted to improve data governance performance according to local conditions. Third, provincial governments can promote the governance of government affairs data through value orientation, leadership, and policy and institutional arrangements to make

up for the constraints of objective factors. In the future, it is necessary to strengthen the orientation of public values, and strengthen leadership and institutional arrangements.

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