

# Research on the Influencing Factors of Heilongjiang Provincial Government Data Openness in the Era of Big Data

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**Keywords:** Big Data Era, Open Government Data, Influencing Factors.

**Abstract:** With the advent of the era of big data and the rapid development of science and technology and the Internet, government data openness is an important part of the digital transformation of the government. Government data disclosure has become an important means of government reform. This paper uses the fuzzy set qualitative comparison method (FSQCA) to analyze the factors affecting the data openness of the Heilongjiang provincial government from the perspective of configuration, so as to improve the level of the data openness of the Heilongjiang provincial government, improve the governance capacity of the Heilongjiang provincial government, and promote the digital construction of Longjiang.

## 1 INTRODUCTION

Government data openness is an important part of the government's innovative governance model in the big data environment, and it is also the key to building a digital government. Combined with the background of the era of big data, actively realize the openness of government data, improve the utilization rate of government data resources, and give full play to the value of government data resources. In recent years, the Heilongjiang provincial government has actively responded to national policies and continuously implemented the state's task of promoting government data openness. In the 2021 Heilongjiang Provincial Government Work Report, we continue to explore how to improve the level of government governance faster and provide more effective government services to the public. (Pu, 2022) This paper mainly studies the main influencing factors of Heilongjiang Provincial Government Data Opening and its development path model. Using some data from China Statistical Yearbook and Fuzzy Qualitative Comparative Analysis (FSQCA), the conditional configuration analysis of 12 prefecture-level government data open platforms in Heilongjiang Province was carried out. Exploring the influencing factors of

Heilongjiang provincial government data disclosure, exploring differentiated development paths according to the influencing factors, and improving the government's administrative efficiency and service quality are the key measures to promote Heilongjiang provincial government data openness.

## 2 THEORETICAL BASIS OF OPEN GOVERNMENT DATA

Government data, also known as public data or public service data, refers to the original data actively or passively collected by government departments or public departments in the process of exercising public power, such as information registered by individuals and organizations and collected statistics, population, geography, meteorology, medical care, social security, education and other data. (Shangguan, 2022) Data openness is a new trend in the field of information and communication technology, especially for the opening of government data, which has great potential in improving government transparency, strengthening supervision and accountability mechanisms, and stimulating economic growth. (Tan 2018)

Data openness is a new trend in the field of information and communication technology, especially for the opening of government data,

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which has great potential to improve government transparency, strengthen supervision and accountability mechanisms, and stimulate economic growth. Based on the optimistic benefits and positive effects of government data openness, more and more countries are turning their attention to creating greater social and business value and improving social governance through data openness. In the era of big data, government data openness has set off a wave of heated discussions in the field of public management. The research on the influencing factors of government data openness has received extensive attention from the academic community.

### 3 RESEARCH METHODS AND DATA SOURCES

#### 3.1 Research Methods

In this paper, 12 prefecture-level cities in Heilongjiang Province are used as case samples, and the fuzzy set qualitative comparison method (FSQCA) is used to explore the robust relationship between different explanatory variables and better explore the research details of typical cases.

#### 3.2 Data Sources and Calibration

Data cut-off date 2021. The data are mainly from the China Statistical Yearbook 2021 and the China Local Government Data Open Report 2021.

##### 3.2.1 Result Variable

Starting from the research logic of qualitative comparative analysis of fuzzy sets, the data openness level of each municipal government is the result variable that needs to be explained, and the government data openness index is selected as the result variable to discuss the effectiveness of government data openness. Using continuous variable assignment can better present the configuration effect of QCA analysis results.

##### 3.2.2 Condition Variables

The diversity factor of the level of data openness of the municipality is the conditional variable. In this paper, four representative conditional variables are selected, namely leadership support, public demand, financial support and human support, so as to facilitate the regular and comprehensive analysis and

interpretation of the effectiveness of government data opening.

##### a. Leadership support

This article uses whether the government has established a special data open management agency to measure the importance of leaders, and the data comes from the government's official website and public news reports. The attention of key government leaders has an important impact on the level of data openness of local governments. Existing studies have found that support from senior leadership can drive governments to choose data open strategies and promote sustainable development goals. Leadership authority can facilitate coordination and cooperation between groups, and the influence of individual leaders will affect the development of the organization.

##### b. Public demand

The era of big data has put forward new requirements for the opening of government data. The public's demand for government data has strongly promoted the process of data openness. The size of public demand is linked to the size of the population. This paper uses the year-end population of each province to express public demand, and the data is from the China Statistical Yearbook 2021.

##### c. Financial support

With limited resources, the organization's day-to-day administrative expenditures and necessary items for the provision of public services will be prioritized to meet basic public needs, while innovative activities similar to open government data will be limited. When the government's financial resource capacity is strong, there are enough surplus resources to invest in development areas such as open data, so as to realize economic and social value. This indicator is expressed in general public budget revenue per capita in each district.

##### d. Human support

Manpower is the backbone of improving the level of government data openness, and manpower is the most active and active production factor in an organization. Human resources are measured by calculating the proportion of employment in information transmission, software and information technology services in each province to total employment. Data from China Statistical Yearbook 2021.

### 3.2.3 Data Calibration

In this paper, direct calibration was chosen to convert the data into fuzzy membership scores. The calibration standard for the intersection of leadership support, public demand, financial support, and

human support is 0.5 percentile, 0.75 for fully subordinate and 0.25 for fully unaffiliated calibration standards. (Yang, 2020) Table 1 summarizes calibration information for each condition and results.

Table 1: Selection and Calibration of Variables.

Conditional and result variables	Calibration information		
	Full affiliation	Intersection	Not affiliated at all
Open level of government data	41.645	11.723	6.625
Leadership support	1	/	0
Public demand	7732.7	4959	3223.8
Financial support	0.7629	0.5724	0.463
Human support	0.005	0.0032	0.00265

## 4 EMPIRICAL ANALYSIS AND MODEL BUILDING

### 4.1 Empirical Analysis

#### 4.1.1 Necessity Analysis of Conditional Variables

Before performing a conditional configuration analysis, analyze how well a single condition variable explains the outcome variable. When the

consistency is greater than 0.9, the condition variable is considered necessary for the result, and vice versa, when the consistency is less than 0.9, the variable needs to be interpreted in combination with other variables. (Yang, 2020) The consistency and coverage of each condition variable are shown in Table 2. The level of agreement for all conditional variables is below the cut-off value of 0.9 and therefore does not constitute a necessary condition for affecting the level of openness of government data.

Table 2: Requirements analysis.

Condition variables	consistency	Coverage
High leadership support	0.874623	0.623784
Low leadership support	0.118267	0.132008
Strong public demand	0.540920	0.500027
Weak public demand	0.478231	0.478900
High financial support	0.612180	0.673512
Low financial support	0.492388	0.402817
High manpower support	0.692187	0.682630
Low human support	0.492039	0.412987

#### 4.1.2 Adequacy Analysis of Conditional Variables

The adequacy analysis of the conditioned configuration attempts to reveal the influence of different combinations of conditions on the results. 0.75 is the minimum acceptable consensus threshold. In addition, frequency threshold is also an important analysis and evaluation indicator. In this paper, the consistency threshold is determined to be

0.8 and the frequency threshold to be 1. To reduce the potential contradiction configuration, the PRI (Proportional reduction in inconsistency) threshold is introduced to filter the configuration. Truth table rows with PRI greater than or equal to 0.75 are taken into account. The intermediate and simplified solutions that generate high-level data open paths in FSQCA are shown as follows, as shown in Table 3 and Table 4.

Table 3: Intermediate path results for high-level government data openness.

Model: Open data=f (leader, public, fiscal, human)			
Algorithm: Quinc-McCluskey			
---INTERMEDIATE SOLUTION---			
Frequency cutoff 1			
Consistency cutoff:0.896211			
	Raw	unique	
	Coverage	coverage	consistency
~fiscal*~human*~leader	0.177239	0.177239	0.177239
fiscal*~public*~leader	0.27239	0.0257295	0.929176
fiscal*~human*~public	0.0428255	0.0428255	0.921811
*~leader			
solution coverage: 0.628876			
solution consistency: 0.864399			

Table 4: Produces simple path results that produce a high level of government data openness.

Model: Open data=f (leader, public, fiscal, human)			
Algorithm: Quinc-McCluskey			
---INTERMEDIATE SOLUTION---			
Frequency cutoff 1			
Consistency cutoff: 0.896211			
	Raw	unique	
	Coverage	coverage	consistency
human*~leader	0.628173	0.543211	0.879665
fiscal*~public*~leader	0.155538	0.0611132	0.977654
solution coverage: 0.728192			
solution consistency: 0.842938			

Table 5 results show that the path to a high level of government data openness is diverse, with three different conditional configurations. The consistency of the solution is 0.864399 and the coverage of the solution is 0.628876, both above the critical value.

The three configurations can be regarded as sufficient combination of conditions, and the high degree of government data openness is a differentiated synergy relationship of common path and multiple concurrency.

Table 5: Configuration analysis of high-level government data openness.

Condition variables	untie		
	Configuration one	Configuration two	Configuration three
Leadership support	✓	✓	✓
Public demand	✗	✓	✓
Financial support	✓	✗	✓
Human support	✓	✓	✓
consistency	0.934793	0.915572	0.9
Original coverage	0.27239	0.177239	0.0428255
Unique coverage	0.0257295	0.198843	0.0428255
Consistency of solutions	0.864399		
The coverage of the solution	0.681967		

Note: ✓ indicates that the condition exists, ✗ indicates that the condition is absent.

Condition 1 shows that for the government with both good financial resources and human resources, if more leadership attention can be devoted to the

behavior of data openness, the government can also have good data open performance.

Condition 2 shows that leadership support plays a central role, and the existence of public demand

plays a supporting role. For the topic of government data openness, if the government does not have sufficient financial resources and human resources support, relying on the great attention of the main leaders to the government data openness, it can bring a higher level of government data opening performance, thereby bringing better data opening performance.

Condition 3 shows that the performance of the government with a high degree of open data development is in the forefront in all aspects, which is generated by the joint efforts of various conditional elements. The superior conditions in all aspects have laid a solid foundation for good government data opening performance. If the main leaders attach more importance to the open data work, a special data open management organization has been established. Governments governed by the dynamics of competition and cooperation will enhance the autonomy and initiative of governments to develop the region's economy. The formation of open government data platforms with high levels of utilization is possible.

#### 4.1.3 Robustness Test

Fuzzy set qualitative comparison studies may vary depending on the threshold, so a robust test is required for the above results. Drawing on the existing research experience, this paper adjusts the PRI threshold to perform a robust test. The difference between the necessity analysis results of a single condition and the original result is small, and there are only slight changes between the consistency and coverage of the single configuration and the overall solution and the original result in the analysis results of the conditioned configuration. In view of this, we can judge that the impact of the above combination of conditions on the level of local government data openness is robust.

#### 4.1.4 Study Results

According to the core conditions contained in the above three condition combinations, this paper further determines the differentiated matching relationship to promote a high level of government data openness. Combined with the actual situation, two data opening paths of the Heilongjiang provincial government are summarized: organization-driven and coordinated with guarantee elements.

## 4.2 Model Building

### 4.2.1 Organization-Driven

Organized-driven governments are able to demonstrate a high level of data openness even without good economic and human resources. The support of government leaders and the needs of the public In the process of government public governance, the support and decision-making of leaders will promote the effective solution of many things. (Zhou, 2017) Therefore, leadership support can be understood as a realistic form of governance. The government's implementation and continuous promotion of data openness is a good demonstration of leadership. Government actions are always rule-based and lack sensitivity and responsiveness to the needs of the public. Harbin has built a unified data open platform for the whole city, opened 53 government functional departments, 3.17 million data in 14 fields, and led the level of openness, basically achieving full coverage of data openness, thanks to the government's great attention to the construction of the data open platform.

### 4.2.2 Guarantee Element Coordination

The performance of government data openness is mainly facilitated by rich financial support and human support, and appropriate resource redundancy provides the government with flexibility to seize opportunities and grasp the market. Government data openness is a new public governance activity aimed at promoting the development and utilization of data resources, better meeting high-level needs, and enhancing public interests, whether such interests are political or economic. Government data openness is a kind of government innovation, which requires financial support. At the same time, considering that innovation does not happen overnight, especially in the short term, and that organizations need to be strong and able to bear the risks and costs associated with it, financial investment is essential.

## 5 RESEARCH CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusion of the Study

Based on the above analysis, the following conclusions can be drawn.

First, local government data openness is a coordinated development of multiple factors, and leadership support, market demand, financial support and human support cannot be used as necessary conditions for influencing local government data openness alone. The behavior of local government data openness is the result of a combination of conditions. There are three different paths to promote high-level local government data openness, and each path is composed of multiple factors, and the effective integration and interaction between different factors have increased the degree of government data openness.

Second, organizational drive is a key condition for promoting local government data openness. That is, the support of government leadership and the needs of the public play an important role. The emphasis on senior leadership brings innovation to the public policy agenda, and the two work together to implement open government data. The overall level of data opening of the Heilongjiang provincial government is not high, and it is still in the early stage of high-quality development as a whole.

Third, ensuring resources is an important driving force for promoting the opening of local government data. Any local government can be regarded as a resource aggregate, and appropriate resource redundancy enables the government to seize more innovation opportunities and better promote the implementation of local government data openness.

The government's own diversified organizational resources, the attention and support of senior leaders, and the external environmental pressure jointly drive the implementation of data openness behavior and promote sustainable development.

## 5.2 Suggestion

In order to promote the opening of government data in Heilongjiang Province, this study puts forward the following two suggestions.

### 5.2.1 Optimize the Differentiated Decision-Making Mechanism of the Government

For Harbin, Qiqihar, Mudanjiang, Jiamusi, Daqing and Jixi in Heilongjiang Province, the key factor of government data openness lies in the integration and optimal allocation of resources. For the underdeveloped areas of Shuangyashan, Yichun, Qitaihe, Hegang, Heihe and Suihua cities, the attention of government leaders is crucial due to the lack of support from resources and capacity.

Government data openness is a kind of government innovation, and the government needs to base on the actual situation, choose a suitable development path and targeted measures according to its own resource conditions and external development conditions, and ultimately realize the balanced development of governance capacity in Heilongjiang Province.

### 5.2.2 Improve the Supply Capacity of Guarantee Factors

The performance of government data openness is mainly promoted by rich financial support and human support, so the construction of the government's own ability to guarantee factors is crucial. The government is not only concerned with opening up capabilities, but also emphasizing the use of capabilities. First of all, the government needs to regulate the open data work, ensure the smooth development of relevant work, and promote the implementation of the open government data work with the normative and mandatory force of the law. Secondly, the government explores an informatization promotion system suitable for the city, integrates data resources and comprehensively coordinates the data sharing and application of multiple subjects by establishing a special big data management organization. Finally, the government needs to improve the data capabilities of department personnel, improve the performance appraisal and supervision mechanism of data openness, and promote the digitalization process of local governments in the above ways.

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