Government Governance in the Era of Big Data: Opportunity, Challenge and Innovation Path

Guowei Li[1,2a]*, Zhe Luo[1b]

* Corresponding Author 1607059985@qq.com[a], sculuozhe@126.com[b]

[1] Sichuan University, Chengdu, China
[2] Civil Aviation Flight University of China, Guanghan, China

Abstract: The essence of embedding big data into government governance is to put forward new requirements for the administrative methods and thinking of government organizations, emphasizing the importance of "speaking with data, making decisions with data, managing with data, and innovating with data" in government management, and putting forward higher requirements for the application of government organizations. The government's big data capabilities have evolved from big data capabilities, and have emerged from the application of big data technology to government work. It is the government's ability to obtain, process, and apply data to ensure scientific decision-making and efficient operation. The data and big data capabilities of an organization depend not only on the quantity and quality of its data assets, but also on its ability to develop and apply massive amounts of data. The requirements of big data for data capabilities are no longer limited to specific professionals, but to every member of society and organization. Quantitative research has been conducted on the main obstacles faced by organizations in applying big data, and a ranking of obstacles has been obtained. Inadequate employees and skills are the main challenges faced by organizations in utilizing big data. Due to the embedding of big data into all aspects of social operations, data capabilities will no longer be just a special skill in the data field, but will gradually become a fundamental skill for any organization member or even citizen in the era of big data. In the era of big data, whoever is good at capturing, timely mining, and utilizing the potential value of data resources can make more scientific and effective precise decisions. It can be seen that whether organizational employees can handle big data has become a common challenge faced by any organization in the era of big data. Managing data and big data bureaus is an important skill in responding to the era of big data and its rapidly changing environment.

Keywords: Big Data Era; Government Governance; Innovation Path

1 Introduction

With the extensive and in-depth application of the concept, thinking, resources, methods and technology of Big data in society, Big data is embedded in the basic layer of social operation and becomes the basic means of production and life to drive social operation. Social change is increasingly entering the era of Big data. In the face of the trend of the era of Big data, adapting to and competing to develop Big data strategies has increasingly become an inevitable choice for governments to lead social transformation, change and governance innovation. [1] The Big data strategy is a booster for the acceleration of the arrival of the Big data era, which will accelerate the embedding of Big data thinking, methods and technologies

into various fields of society, change the data base and superstructure on which social operation depends, and become the fuse for the reform and innovation of government, enterprises, Voluntary sector and the private sector. For the government, the co change of the Big data era and strategy will also profoundly affect the external environment of government governance, which is a powerful external force to promote the change of government governance capability.

2 Opportunities for government governance in the era of Big data

In the era of Big data, the internal and external data resources of government governance are growing explosively, bringing unprecedented data opportunities for government governance to apply Big data. Big data resources available for government governance are being formed through the following ways:

Firstly, traditional and new information technologies are constantly embedded in administrative processes, generating a large amount of government data resources. With the deep embedding and upgrading iteration of information technology in China's government management, the informatization and digitization of government management have entered an advanced stage.[2] In addition to the in-depth use of traditional information technology, innovative applications of new information technologies continue to emerge in government management processes. The digitalization and informatization practices in micro fields of government management and services such as intelligent regulation, intelligent law enforcement, smart public transportation, smart healthcare, and smart courts have been deeply implemented. The innovative application of emerging technologies such as Internet 2.0, Internet 3.0, Internet of Things, mobile internet, smartphones, microprocessors, sensors, and mobile terminals in government management is gradually accelerating. The continuous transformation of digital government is creating unprecedented electronic government data through information technology, providing a rich data base for the aggregation and formation of large-scale government Big data resources.[3]

Second, the continuous convergence and sharing of government data has accelerated the formation of government Big data resources. Data aggregation refers to the process of integrating data resources from different sources, which is a necessary condition for the formation of government Big data. The production and management of traditional government data are decentralized, resulting in the phenomenon of government data silos due to inconsistent organizational administrative boundaries and technical standards. In response to this issue, a package of data aggregation and sharing systems to crack the towering data chimneys have been successively promulgated, and breakthroughs have been made. In 2016, the State Council issued the "Interim Measures for the Management of Government Information Resource Sharing", which clarified the responsible parties, basic principles, management framework, and implementation path for data information sharing and aggregation within the government system. In 2017, the General Office of the State Council issued the Implementation Plan for System integration and Sharing of Government Information, proposing the idea of building a "big platform, Big data, and big system" for data aggregation and sharing. The 13th Five Year National Informatization Plan also proposes to establish a national governance Big data center.[4] With the sharing, flow and aggregation of

government data between vertical administrative superiors and subordinates and horizontal cross departments, decentralized government data resources and government Big data resources can converge into larger and higher quality government Big data resources.

Third, as the object of government governance, enterprises and the public are becoming more and more data-driven, and Big data resources in the social field are being formed, enriching the external data resources available for government governance. At present, the digitalization level of enterprises and citizens who are the objects of government administration and service is also rapidly improving.[5] The forming enterprise Big data and social Big data have the data value of observing and recording the government's administrative behavior and administrative effect. In the The Internet Age, the channels for public participation in public governance are increasingly networked and digital, and social media, government websites, etc. have become important platforms for public production and life. Enterprises are pioneers in the application of Big data technology. Enterprise Big data records the production functions and operating effects of enterprises, as well as the interaction and effects of government and enterprises. [6] Enterprise Big data resources provide the most authentic data support for the government's macro-control and economic development function decisions.

3 Challenges to government governance in the era of Big data

The explosive growth of data resources not only brings unprecedented development opportunities to government governance and application of Big data, but also brings new challenges to government governance. Big data is bringing new challenges to the social environment, strategy, analysis and technical capabilities of government governance, mainly in the following aspects:

First, Big data has reconstructed the external environment of government governance. How to accurately perceive the rapidly changing governance environment is a challenge for government governance in the new era. The environment provides the basic background, resources, problems and other Initial condition for government governance. In the final analysis, the change of governance mode is driven by the change of social environment.[7] The environment of government governance is inherently characterized by high complexity, rapid variability, and high uncertainty. Big data has accelerated the speed of era change and social transformation, and the speed of thinking switch, technological innovation and knowledge update in the whole society is faster. With the Internet of Things, mobile Internet, and Internet technology deeply embedded in various fields of society, Big data makes the environment of government governance more complex, more rapidly changing, more uncertain, rather than simpler. Therefore, government governance in the era of Big data is facing a more diverse, diversified and changeable administrative environment. How to perceive and capture these governance environments and the problems in the environment are testing the government's governance ability.

Second, government governance in the era of Big data faces the challenge of thinking and concept transformation. Traditional management and decision-making are based on the information foundation of small data analysis. Small data is structured data formed through sampling surveys, and based on this, causal logical thinking and statistical algorithms are established to infer the overall population. However, with the remarkable growth of people's

data recording ability and data acquisition ability in the era of Big data, it is gradually breaking the data production mode and information construction logic of small data. Big data is a concept of full sample data collection. By making use of the excellent comprehensive recording ability of Big data, Social phenomenon, organizational phenomena and individual phenomena that could not be quantified and observed before can now be truly and comprehensively recorded through multi-source heterogeneous Big data perception technology and data form. Therefore, the emergence of Big data has subversively solved the problem that traditional small data is not representative.

Third, the era of Big data has brought challenges to government governance and utilization of massive data resources. With the in-depth application of the Internet, the Internet of Things and mobile Internet, qualitative changes have taken place in the data base of both the Private sphere and the public sector. With the innovation and development of information technology, people's ability to collect data has increased significantly. Massive data has been generated. Data types, data generation methods, and data scale have changed significantly, and available data resources have grown Geometric series. The Big data resources formed in the advanced stage of informatization exceed the data scope, data volume, data form and other standards of traditional data. The era of Big data has brought practical challenges to how to effectively use massive data resources. The same is true for the government. With the widespread use of mobile Internet, Internet of Things and cloud computing, the internal management data, government affairs data, social data and public data collected and produced by the government will grow explosively. The government must face the reality of data change as the basis of Means of production, and the challenge of how to use massive data resources to reconstruct its governance process and methods.[8]

Fourth, the Big data era has brought challenges to the government's ability to control Big data technology. Big data is not only a data revolution, it also means a profound technological revolution. In the era of Big data, all organizations, including the government, are faced with the reality of being surrounded by massive data. The large volume, diversity, rapidity, value and complexity of Big data make it a significant challenge for the recipients of data resources to efficiently mine the value of data resources. To this end, organizations need to have the ability to analyze more and different types of data to obtain the strategic value of Big data. In the era of Big data, many advanced data technologies for massive data have emerged. Big data technology includes Big data perception and collection technology, Big data analysis and application technology, Big data screening and classification technology, Big data communication and dissemination technology. These Big data technologies are characterized by efficient digitization, wide information aggregation, deep data mining, and flat network transmission.

4 Innovative path of government governance in the era of Big data

The essential function of Big data is to cause a management revolution and drive government governance to a new stage of numerical governance. Data has always been the foundation of national governance and government management. In traditional society, the government is regarded as the largest organization in the production, collection, organization, and application of data and information in society. In the information society, government administration In

the era of Big data, government management decisions have more abundant and diverse data sources.[9] The government also has extensive power and ability to collect data information. The government relies more on massive data resources for management decisions. With the extensive and in-depth application of Big data resources and Big data technology in various fields of government organization administration, government decision-making, implementation and supervision are increasingly dependent on data analysis and use, and government governance is more dependent on data. After embedding Big data resources and technologies into government management, it can promote more accurate identification of problems, make more scientific decisions, and promote government management to move towards an accurate, intelligent and intelligent path of change.

First, Big data helps to make government governance decisions more precise. Part of the responsibility of government governance is to collect high-quality data, extract valuable decision-making information through the analysis of massive amounts of data, and implement effective public decision-making. Based on facts and respecting facts should be the primary principle of government governance decision-making. The advantage of Big data is to provide a systematic, objective, real and timely fact. The transformation of information technology has led to machines increasingly surpassing humans' ability to observe, perceive, and record facts and problems. Various sensors and recorders have unprecedentedly strengthened their ability to perceive and record facts, and the accuracy, sensitivity, and precision of human observation and perception of facts have been improved. More data types, wider data scope, and larger data entities make the records of Big data approach to all the facts of complex public problems. By mining and analyzing massive amounts of data, it helps governance entities accurately identify public issues that require decision-making, analyze the causes, evolution, trends, and crux of the problems. The quality of information such as timeliness, integrity, objectivity and comprehensiveness of information produced based on Big data will achieve a qualitative leap, and high-quality government information will support scientific decision-making and management of government organizations.

Second, Big data will promote the efficient implementation of government governance. The execution process of government governance is a process of exchanging data, information, and resources with other entities. The application of Big data technology can make the data flow, information flow, resource flow and business flow behind the government governance run more quickly, efficiently and accurately. Big data can monitor the whole process of organization implementation and provide the whole process operation data of the organization before, during and after the event. Therefore, Big data promotes the government to have a more comprehensive understanding of the governance implementation process and dynamics. Big data can be used to analyze the behavior of individuals and teams, track the work trajectory of individuals and teams through the application of sensors and tags, analyze the movement trajectory of work, or analyze the time when workers interact with other subjects, or complete a task. By digitizing execution, the organization's execution process can be effectively supervised. It can be seen that Big data provides efficient data and technical support for the operation of government governance.

Third, Big data promotes scientific government governance supervision and evaluation. Big data has a strong ability to record and restore facts and accurately record the evolution track of government governance behavior, results and performance. By digitizing the work performance of the organization and its members, the process and results of creating

performance value for the organization and its members can be accurately calculated at each process step and time node.[10] By comprehensively recording and analyzing the performance data of the governance process, it is possible to accurately depict the performance status of government organizations, identify the specific reasons for the deviation between organizational behavior and results, and achieve precise performance supervision and control. Big data can be used to gain insight into the organization's process, dynamic changes and opportunities in minutes and days, rather than limiting the organization to a performance evaluation snapshot, such as quarterly or annual or longer cycle input and output evaluation. The comprehensive, continuous and real-time recording of details by Big data enables government governance to more accurately discover the details and changes of performance behavior and results, which in turn can support government governance to make rapid and effective performance improvement and adjustment.

5 Conclusions

To sum up, the improvement of government governance and national governance capability driven by Big data is becoming a reality. Through the use of Big data, government governance is increasingly moving towards a new stage of digital government and data governance, and government governance is moving towards a new stage of precision, intelligence and science. In the era of Big data, digital governance and data governance are the new stage of government scientific management based on data. The embedding of government Big data into the government governance process will certainly promote the modernization and scientific level of government governance capability, and promote the effective realization of many goals of government governance.

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