

Discussion on the Role of Big Data in Improving Public Sector Governance

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Abstract: In the current era, big data technology has deeply affected the operational mode of society. Big data has gradually become a strategic resource and social asset and continues to penetrate the specific affairs of the government. Big data governance has been promoted to a national strategic level by an increasing number of countries worldwide. Therefore, the study of big data and government management of modernization will help us to understand the basic characteristics of big data technology, and the connotation of government management of modernization, it will also help to accelerate the transformation of China's governance concepts, explore the impact of big data technology on China's Government Governance Paradigm Innovation, and promote the government's use of big data technology to improve its governance.

Keywords: Big data; Public governance; Public sector.

1. Introduction

With the rapid development and comprehensive integration of information technologies such as the Internet, cloud computing, and mobile terminals, the growing volume of data shows an "exponentially increasing" trend, and all types of data are progressively being used in all aspects of life. Human society is about to face a social revolution that will be triggered by big data. During this revolution, the public sector will also face severe testing. Therefore, we must fully realize that against the background of big data development which has become a trend of the times, national governance will also be largely affected. Consequently, we should fully understand the importance of big data for the modernization of national governance, so that we can better use big data to promote this modernization process.

2. Research Content

This paper aims to explore how the increasingly wide application of big data has led to effective resources available in the public sector being greatly enriched. Big data has been used to improve work efficiency in the public sector which compensates for the low efficiency of the public sector under the traditional model. These changes have become a hot topic in current society. This paper discusses the main role and significance of big data in the process of public sector governance with reference to two examples: 1) traffic management in the Shenzhen region; and 2) anti-corruption governance in Singapore. It also anticipates the role that big data can play in public governance and offers suggestions for improvements in the future.

3. Research Methods

A literature search and data collection on the effectiveness of big data in public sector governance was conducted, mainly utilizing domestic and foreign journal papers, dissertations, and other related content. After summarizing the above literature, we discuss the effectiveness of big data in public-sector governance.

Case analysis method: Through the case analysis of traffic governance in Shenzhen and anti-corruption governance in Singapore's public sector, this study analyzes and summarizes the effective value of big data in improving public governance. Finally, we summarize the significance of big data in public sector governance.

4. Big data and Public Governance

4.1. The Concept of Big Data

Thus far, the concept of big data generally refers to the fact that "traditional software tools cannot capture data within a certain time range and managing and processing data collection requires a new processing mode. The huge high growth rate and diversified information assets have strong decision-making ability, insight, and process optimization ability." The definition given by the McKinsey Global Research Institute is, "the data collection is very large, which greatly exceeds the functions of traditional database software tools in terms of collection, storage, management and analysis. It has four characteristics: massive data volume, fast data flow, multiple data types, and low numerical density."

4.2. The Concept of Public Governance

In short, public governance requires that the public sector does not work simply to cope with work. It is hoped that the public sector will do its work well, and not enforce a social hierarchy, but instead focus on equal dialogue between various organizations in the network community, so as to coordinate the systematic cooperation of all parties. Public governance has the following characteristics in terms of governance subjects and governance methods: From the perspective of the subjects of public governance, it includes not only the state and government, but also public sectors such as industry associations and autonomous groups. From the perspective of governance, this model advocates following the public's actual needs for public governance; selecting social governance standards according to market priorities; and realizing diversification, democratization, and marketization.

5. Case Reference

5.1. The Application of Big Data in the Urban Traffic Management of Shenzhen's Special Economic Zone

Shenzhen is at the forefront of the application of big data, which is clearly reflected in the treatment of traffic problems. The transformation from experience to performance and from static service to dynamic service guidance makes it possible for precision traffic management, intelligent services, scientific decision-making, and centralized quality. Big data are utilized in the urban traffic management of the Shenzhen Special Economic Zone as follows:

Big data provides convenient transportation services for Shenzhen citizens. Urban traffic management departments have established sound information releases and access channels. For example, the Shenzhen Special Economic Zone has established a traffic hotline consulting platform. This is a networked transportation service platform using information technology, which is mainly used to provide traffic information on site. This is a traditional information service platform.

In addition, by using the 4G network of mobile phones and tracking TV platforms along with public transport media and other new media channels, a large number of data are collected through WeChat public accounts, the "hand in hand" app, GPS navigation systems and other intelligent tools of mobile media. These tools are used as the data basis for releasing traffic information to obtain road conditions information and to give feedback and suggestions for improvement to relevant departments. In this way, it provides a system for helping to make citizens' journeys more convenient.

Following this example, the public sector should establish a standardized data system for data collection, storage, and management. According to the collection standard, data were collected on personnel, vehicles, and traffic environments to simulate future traffic operations. In this regard, the contribution of big data to the urban traffic management of Shenzhen not only provides information on the current traffic conditions and facilitates the travel of Shenzhen citizens, but also provides support for the future optimization of traffic and paves the way for the development of intelligent transportation in the future.

Big data can provide accurate services for urban traffic management in the public sector. Using big data, the Shenzhen Special Economic Zone has built a comprehensive traffic data center with GPS data, surveillance video data, traffic flow monitoring, Shenzhen Express, and four other types of data. The center is also a data-support center which ensures that the traffic management department can find and handle problems in advance or as soon as possible; provide more accurate data support and related services for traffic problems in public governance; create more diversified solutions in traffic problem governance; and guarantee improvements in the efficiency of public transport services.

Big data can build a bridge between Shenzhen's urban traffic management departments and other public departments and enterprises which serves to integrate resources, innovate technological concepts, promote the formation of a sustainable and harmonious traffic ecosystem, and form a benign industrial chain. The benign industrial chain formed by the public sector and enterprises could be used to form a

benign big data ecosystem which includes multiple mode systems, such as transportation awareness, data management, data analysis, and application systems. In this way, it is conducive to providing good public services for the public sector in Shenzhen and elsewhere. In addition, it is conducive to promoting the orderly development of social economy.

Based on the above case, we believe that in the era of big data, traffic management departments should change the traditional concept of "re management" and establish innovative ideas. The public sector needs to build information zed big data and provide convenient services, such as traffic monitoring, traffic light times, intelligent traffic guidance, visual command and dispatching systems, and intelligent parking for citizens. This not only provides convenient travel and high-quality transportation services for citizens, but also improves the work efficiency of the public sector in urban public transport governance.

Ultimately, big data and public sector governance in the information age are interdependent and complementary. On the one hand, big data provides data support for the governance of Shenzhen's public sector in urban transportation. On the other hand, the relevant public departments in Shenzhen can provide protection for the development of big data in informatization, contribute to social public services for big data, and improve efficiency in optimizing these services.

5.2. The Application of Big Data in Singapore's Public Governance

5.2.1. Anti-corruption governance in the public sector

Singapore has been rated as one of the cleanest countries by Transparency International and has performed well in maintaining public sector integrity and combating corruption. In its early anti-corruption strategy, it did not make explicit use of technology. In recent years, Singapore has actively used big data technology for anti-corruption purposes, and also to establish an effective institutional framework when selecting politicians and civil servants. Many public officials are recipients of public-sector scholarships. Based on this data, the public sector can track everyone's educational and political experiences and predict their probability of corruption. For example, in the public sector procurement system, big data has been introduced to perform a data-monitoring role. At present, in Singapore, public sector services and product procurement must be tendered through a centralized electronic system (GeBIZ). The bidding information for various products or services is controlled by the public sector's centralized online system. They can issue early warnings and stop loss in time to avoid unnecessary problems. Specifically, if there is always one company providing products or services for an organization, relevant reminders will appear, which will attract attention.

5.2.2. Interregional collaboration

Singapore not only applies big data technology to domestic affairs, but also applies it to transnational cooperation, which not only improves the work efficiency of the public sector in domestic affairs but also enhances the public sector's ability to work cooperatively with the public sectors of other countries.

As a result of monsoons, smoke from rubber tree plantations in Indonesia often floats into Singapore, causing serious air pollution. Because it is difficult to identify which farm or factory has burnt banana trees resulting in this smoke, the public sector often cannot punish the culprits accordingly,

resulting in continued problems year after year. To cope with cross-border smog, Singapore has cooperated with other countries in the region to develop the ASEAN sub-regional haze monitoring system (ahms). Based on satellite imaging technology, cross-border smoke monitoring systems can detect forest fires in time and accurately locate them. The haze monitoring system accumulates a large amount of data, which, by monitoring the weather and other data, provides a basis for predicting the occurrence of haze.

6. Enlightenment and Significance of the Research Conclusion

With the rapid development of the Internet, cloud computing, the Internet of Things, and other information technologies, the collection and use of data has become the most important feature of this era. The data thinking mode and big data technology have triggered profound changes in economic and social fields, and their importance has attracted increasing attention in the political field. The change in thinking and technology brought about by big data will promote the transformation of public sector concepts, management methods, and operation mechanisms, and will also provide a good opportunity to promote the reform of public sector administrative management systems. From our research on administrative system reform in the era of big data, the following conclusions have been drawn:

Promoting reform of administrative systems is unarguably a requirement for development today. The economic base determines the superstructure. The arrival of the era of big data not only requires the administrative management system to change and adapt to the new era of data opening, sharing, and application but also provides new ideas and technologies for the reform of administrative management systems.

The reform of administrative management systems in the era of big data should be promoted. We have focused on the value of big data and how it has been actively used to create opportunities for administrative system reform. However, we cannot ignore the new challenges and drawbacks of big data in public-sector management. Only under the premise of effectively overcoming and reducing the negative impact of big data on public sector management, can we give full credit to the value of big data in the reform of administrative systems.

The use of big data to promote administrative system reform should be actively learned from the experiences of developed countries. The important value and strategic significance of big data have received increasing attention from many countries. Developed countries have been scrambling to lay out National Development Strategies for big data, making every effort to use it to promote innovation in economic, social, and political fields, and have so far been ahead of China. Therefore, when China uses big data to promote the reform of administrative systems, it should actively learn from the advanced experiences of developed countries with the aim of equalizing actual nation-wide conditions an infrastructure in China, giving full credit to the great value of big data, and effectively promoting the reform of China's administrative systems.

China needs to establish an action plan for administrative system reform in the era of big data. We should actively use the concepts and technology of big data to promote administrative system reform. To achieve this aim, we should acknowledge the value of people-oriented, procedural justice and administrative efficiency; make the construction of an

intelligent service-oriented public sector the reform goal; establish the concept of big data management; build a big data management platform; optimize the administrative organization system; improve the operation mechanism with data as the core; strengthen the construction of big data technology and talent teams; improve the laws and regulation systems of big data management; and promote further optimization and improvement of the administrative system.

7. Future Development of Big Data in the Field of Public Governance

First, big data can have a broader application in education and medical services. Compared with other complex systems, big data technology is technically difficult to promote in public service fields, such as education, health care, and environmental protection. Therefore, promoting big data technology in these fields is very important. The public sector should actively organize and plan the use of big data in the fields of education, medical treatment, and the environment so that high quality resources for education, medicine and health services can be more evenly provided to the public.

Second, we should establish a multi-participant big data governance institution and an open data sharing mechanism. In the era of big data, information is scattered and distributed in every corner of society. Therefore, other social participants are required to participate in big-data governance. Currently, Baidu, Alibaba, and other big data companies own a large amount of data and are building a multi-governance mechanism of "data +" in the era of big data.

Third, professional and technical talents in big data are a prerequisite for improving the governance of the public sector in the era of big data. We need to build a bridge for data and information exchange between entities; strengthen big data technology; develop talent training and data information collection systems; and provide talent protection for big data to play a greater role in the public sector and future social development.

Finally, in the future development of big data, the public sector must improve its laws and regulations on data protection and information security. Maintaining public information security is a good foundation for big data to play an effective role in the public sector. Establishing and improving relevant laws and regulations can help to effectively maintain public information security, make big data play a safer and more effective role in the governance of the public sector, and contribute to the provision of safe, accurate, and authentic data and information.

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