Research on Grid Management Mode of Super-Large Cities Under Digital Background

Analysis Based on the Operation and Management of "Sui Zhi Guan"

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Abstract. The wave of digitization represented by technologies such as artificial intelligence, the Internet of Things, and big data is sweeping the world, profoundly affecting urban management and development. The Guangzhou Municipal Government took the initiative to adapt to the new situation and began to fully invest in the construction of the "Suizhiguan" urban operation and management center, dividing the entire urban area into nearly 20,000 data "grids", in order to solve the large-scale, multi-agent super-large city Management issues. This article will start from the technical analysis premise of digital empowerment of city management, and use the "one network and four platforms" smart management model constructed by "Suizhiguan" as the core of the research. Finally, it provides decision support for the current deficiencies in the digital grid management of super large cities.

Keywords: digital management · Super-large cities · Grid · Urban management · Sui Zhi guan

1 Introduction

The arrival of the new digital management mode represented by big data and intelligent governance has accelerated the society to enter the digital management mode. At present, there is no unified definition of digitalization in academic circles. Some scholars think: "Digitization emphasizes that everything is digital, and through the collection, storage, transmission, analysis and processing of data information, the comprehensive connection among people, people and things can be realized, and finally the data interaction and sharing can be realized" [1]. The convenience of gridding lies in its data sharing ability [2]. Some scholars have proposed that gridding management mode is the inevitable outcome of the development of modern digital technology [3]. The author thinks that gridding has significantly improved the information transmission and communication at all levels, saved working time, made the work more standardized and effectively improved the government service level and management efficiency. Therefore, under the current digital background, urban management tends to be gridded, refined and information-based, which has promoted the innovation of government governance to a

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certain extent. Guangzhou, as a super-large city with rapid development in high-tech field, actively uses digital city management information system to improve the level of city grid management, which can improve the modernization development of Guangzhou municipal government's governance capacity and promote the improvement of city smart governance capacity.

2 Analysis of Guangzhou Grid Management Mode Under "Sui Zhi Guan"

2.1 Guangzhou Grid Management Mode Construction Under "Sui Zhi Guan"

For the fast-growing mega-cities like Guangzhou, modern management is facing more complicated scenes, more levels and larger tasks. With the development trend of Internet and 5G technology, Guangzhou's "Guangzhou Smart Management" urban operation and management center has built an operation mode of "one map is unified and one network is co-governed" by using technologies such as big data, cloud computing and Internet of Things. "Sui Zhi guan" has built the grid management mechanism of four platforms: CIM platform, four standards and four realities platform, spatio-temporal cloud platform and video cloud platform. A total of 115 docking business systems, with more than 3 billion pieces of aggregated data, more than 300,000 high-definition videos and more than 110,000 sensing devices, formed 2,641 data items of urban signs, and built an evaluation system of urban operation covering 211 indicators in 8 categories including natural resources and traffic operation [4]. It established a collaborative system of urban management business with data as a bridge, which solved the problem of "unwilling, afraid and unable" to share data across departments, levels and fields in the past. Through Internet technology, "Sui Zhi Guan" makes the roles of different subjects in the urban management chain, such as government departments, social organizations and profit-making departments, clear, and breaks down the information barriers between departments and subjects. Weave an integrated data grid which is drawn by "digital government" and composed of "digital economy", "digital society" and "smart city" [5]. According to the process of management and disposal, the management mechanism of "Sui Zhi Guan" is as follows:

1) Information collection stage: "Sui Zhi Guan" uses the actual data measured by information technology, uses big data technology to fix the grid, and analyzes and integrates the internal data to improve the targeting and pertinence of management. 257 million pieces of urban basic data have been collected in the four standards and four real platforms, and the number of grids in the city has reached 19,000 [6].
2) Task dispatch stage: First, focus on the special issues in urban management, and make clear the management priorities and objectives. Secondly, "Sui Zhi Guan" will use the information of urban logistics, capital flow and transportation flow to find the meeting point and strength point of collaborative governance among the main bodies in Guangzhou urban management, and establish the linkage mechanism of each grid, draw up the action plan, and continuously divide the management space and time units into smaller ones and decompose them layer by layer.

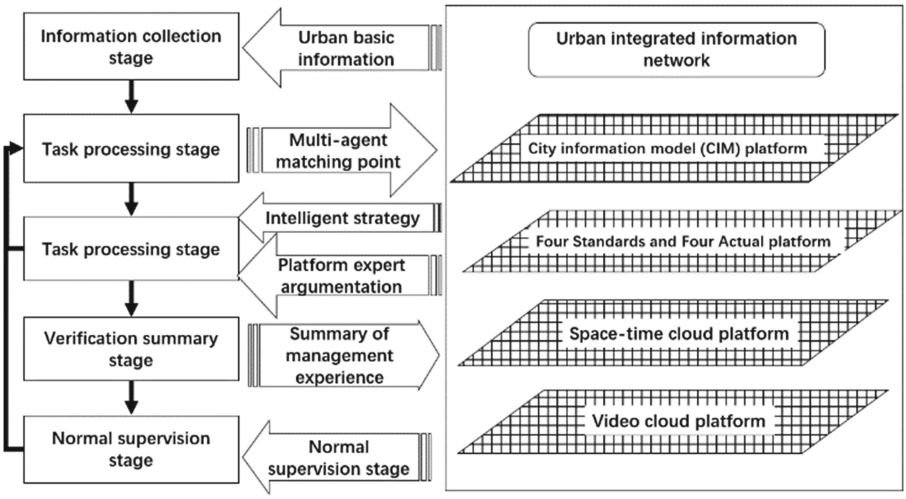

Fig. 1. Flow chart of management and disposal of "Sui Zhi Guan"

3) Task processing stage: experts on all platforms will take the intelligent digital strategy given by "Sui Zhi Guan" system as a reference, and make a comprehensive demonstration in combination with the actual situation. During the implementation of management work, Sui Zhi Guan will also play the role of the intelligent algorithm in predicting beyond time and space, and timely adjust and optimize the strategies for emergencies in the grid, so as to accurately deal with the problems in the process. In the problem of waterlogging in Guangzhou, the smart water sector monitored the waterlogging-prone points, and at the same time, made time-sharing and grid statistics on rainwater, thus achieving the purpose of fine management.
4) Verification and summary stage: After the management is finished, Sui Zhi Guan will also check and replenish the resources and summarize the management experience in time. The AI intelligent middle station established by "Sui Zhi Guan" will incorporate all the management work that has been done into the training set, so as to find out the best scheme through repeated learning and serve as a reference for the next similar management activities.
5) Normal inspection stage: In daily work, "Sui Zhi Guan" will also carry out the work of "internet plus Supervision", carry out the normal inspection and supervision mechanism by grid, and gradually form an efficient development system with inspectors as the core (Fig. 1).

2.2 Performance Analysis of "Sui Zhi Guan" in Guangzhou Grid Management

1) Strengthen the effect of collaborative management in super-large cities:
With a large number of management activities transferred to online, the governance field is gradually expanded from offline to online, and "Sui Zhi Guan" will realize a management mode covering a wide range, effectively improving the degree of multi-agent collaboration in solving complex governance problems. In the operation of

megacities, each internal management field has a professional division of labor, and the work is complicated, involving different fields and departments. However, "Sui Zhi Guan" builds a large-scale virtual network of cooperation, uses digital technology to break the traditional management barriers in the past, and gradually forms a "multi-center governance structure" with multilateral cooperation and intra-grid coupling. The Internet of Things has become a catalyst for chemical reactions among government departments, and has strengthened the joint efforts of government service data management bureau in mega cities, which can promote the development of related industries while managing.

2) Improve the targeting of mega-city management:
Digitalization will transform the complicated and changeable information in the management of mega-cities into measurable data. Focusing on massive data analysis, through statistical analysis and expert evaluation of data, the management feasibility scheme tends to be rational, scientific and refined, eliminating the mistakes and deviations of decision makers in "perceptual and extensive governance" and finding the best working scheme in comprehensive analysis. In view of the severity and complexity of this epidemic prevention and control, "Sui Zhi Guan" has set up a comprehensive management topic of "epidemic prevention and control", which uses dynamic data to build a data network integrating people and regional grids, to accurately lock the diagnosed patients and close contacts, and to promote the fixed-point supply of materials.
3) Optimize the allocation of resources in megacities:
"Sui Zhi Guan" quantifies all kinds of resources and accurately fixes the grid area where the resources are located, effectively avoiding the disadvantages of inaccurate decision-making such as unreasonable resource allocation and low resource utilization efficiency in traditional super-large cities in the past, effectively reducing management costs and continuously promoting the development of urban modernization management. In the prevention and control of epidemic situation, the hotel monitoring module of "Sui Zhi Guan" accurately isolates the geographical grid of distribution, occupancy and isolation personnel of hotels. Through the precise directional service grid of the integrated command and dispatch platform of "Sui Zhi Guan", the problems of pollutant detention, food distribution and room arrangement can be efficiently handled.

3 Deficiencies in Grid Management of Mega-Cities Under Digitalization

3.1 Data Ownership Needs to Be Clarified

Guangzhou Municipal Government Service Data Management Bureau is responsible for the construction of the "Sui Zhi Guan" urban operation management center. At present, it has connected the business systems of more than 30 departments and collected over 2.9 billion pieces of urban operation data. There are many legal and technical data barriers between government and enterprises, between large enterprises and small enterprises, and between industries [7].

1) At the level of personal data, the grid mode in "Sui Zhi Guan" means that the administrative area of a city is vertically cut into a large number of unit grids. To what extent does personal data belong to citizens and to what extent does it belong to the center of "Sui Zhi Guan", which still needs further definition.
2) In terms of government data, based on the background of government information disclosure, it remains to be solved whether "Sui Zhi Guan" can guarantee the smooth exercise of every citizen's right to know about the data generated by digital government in the process of performing public duties.
3) In the process of deep integration of "Sui Zhi Guan" and real industry, the attribution of intellectual property rights in business data needs to be clearly defined, and the protection system of trade secrets in "Sui Zhi Guan" is not yet perfect.

3.2 A Risk of Algorithm Failure in the Operation Process of "Sui Zhi Guan"

Since 2020, Guangzhou has made every effort to build the "Guangzhou-Zhiguan" urban operation and management center. Now, it has built more than 20 theme application scenarios such as urban construction traffic operation and emergency management. Since May 1st, 2021, it has been put into trial operation and officially put into use in June, 2021. During this period, it took less than half a year. The initial artificial intelligence algorithm and the improvement of mining ability still need to be based on the practice of a large number of data samples and algorithms. On the one hand, the platform currently carries a total of 19,000 grid data information, with many types and large quantities. Moreover, the management of mega-cities is complex, and the requirements for data mining ability are strict. On the other hand, low quality and incomplete analysis caused by unbalanced development of regional digitalization and imperfect intelligent equipment terminals will easily lead to deviation of decision-making, and even endanger personal and property safety and social and economic order.

3.3 The Supporting Rules of "Sui Zhi Guan" Still Need to Be Improved

In May 2021, "Key Points of Guangzhou Digital Government Reform and Construction in 2021" pointed out the general direction of digital city development, focusing on key areas of digital development such as digital economy, digital society and digital government, focusing on key links such as new infrastructure system construction, efficient allocation of data elements and industrial digital transformation [8]. The management measures and specific supporting rules in the operation of "Guangzhou-Zhiguan" urban operation and management center have not yet been published, and the system and mechanism of data use and the basic system and standards of privacy protection still need to be improved. Moreover, in the grid operation platform, the ambiguity of grid division rules will lead to the problems of different collection time of data information in the grid, overlapping and dislocation of collection contents.

4 Countermeasures and Suggestions for Improvement

4.1 Clarify the Issue of Data Ownership

The vigorous development of big data has also brought about major data ownership problems, which to a certain extent affects the development of big data industry. In

order to avoid the problem of data ownership in the development of big data, we should closely combine the problem of data ownership with grid, and divide the data of different subjects such as individuals, governments and businesses into different grids to facilitate management and standardization, and we should do the following:

1) In terms of personal privacy, we should avoid the conflict between personal privacy and public privacy, increase the protection of personal privacy, strengthen laws and regulations, and prevent the leakage of personal privacy and the reselling of personal privacy in the black industry chain.
2) When performing public duties, the government should not only give an effective warning to the potential security risks in the process of government data disclosure, but also improve the residents' right to know and use data, so as to improve the service ability and credibility of the government [9].
3) In terms of business data, we should first analyze all kinds of application scenarios, so as to avoid enterprises enjoying too much data ownership, and at the same time, we should strengthen the protection of business data and pay attention to the disclosure of business secrets.

4.2 Improve the Digital Platform

The construction of mega-city data platform should emphasize data governance, technology integration, resource integration and other aspects. Through unified standard system, unified technology platform, unified security protection, unified operation and maintenance supervision, centralized management of information data and centralized provision of content services, the optimization and integration of government website resources, platform integration security, mutual recognition and sharing of data, standardized overall management and convenient and efficient services are required [10]. Therefore, Guangzhou should constantly improve the platform construction by formulating reasonable grid management measures, realizing the balanced development of data sharing within the grid, strengthening grid supervision, establishing scientific and reasonable supervision standards and improving technical means.

4.3 Adhere to the Policy Guide

Although Guangdong Province has issued various related policies on smart cities, detailed policies for urban operation and management platforms such as "Sui Zhi Guan" need to be improved. Some scholars have pointed out that in order to ensure the actual effect of digital transformation of local governments, it is necessary to clarify policy orientation, promote management optimization, stimulate technological innovation and improve the digital transformation guarantee system of local governments [11]. Therefore, Guangzhou should adhere to the policy guidance, speed up the formulation of relevant implementation regulations, introduce supporting data security laws and regulations, ensure the data security network problems that "Guangzhou Smart Management" system may face, standardize the operation of relevant management center systems, and improve the data use mechanism.

4.4 Improve the Operation Mechanism of Grid Management

Ensuring the smooth operation of the grid management mechanism is particularly important in improving the smart governance system in Guangzhou, so we should start with the following points to enhance the important role of grid in social governance in Guangzhou:

1) All departments in Guangzhou should actively cooperate, closely link with each other, optimize the grid coordination mechanism, clearly define various functions and powers, and strictly implement various main responsibilities.
2) Improve the training of the grid team, ensure the specialization and standardization of the grid team, and regularly train the grid team personnel to improve the business level.
3) Strengthen the guarantee of grid management, optimize and upgrade the integrated management information system on a regular basis, and improve the intelligent level of the system. Strengthen capital investment, optimize the structure of capital use, and ensure that there is sufficient financial support for grid operation.

5 Conclusion

As an important form of the development and transformation of mega-cities in the future, smart cities have been recognized and adopted by many cities by connecting data and information in many fields in series through technical means. Guangzhou Smart Management Operation Center combines information technology with urban management, which provides convenience for Guangzhou's extensive urban construction, saves a lot of manpower and material resources, and provides a reference for future smart city construction. However, it still needs to be noted that there are still obvious defects and deficiencies in data ownership, digital platform and supporting policies, and operation mechanism of grid management. It is necessary to further break through the bottleneck to ensure the realization of management objectives.

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