Analysis and Research on the Development and Application of Big Data in Foshan

Weigang Guo[1, a *], Jianqin Xie[1, b], Zhen Zhu[1, c]

Qiuming Lin[1, d] and Xiaohua Li[1, e]

[1]School of Electronic and Information Engineering of Foshan University, China

[a]wgguo@qq.com, [b]34603770@qq.com, [c]augustjune@fosu.edu.cn

[d]qmlin8809@qq.com, [e]380125779@qq.com

Keywords: Big data; Government governance; Open data; Data sharing; Data governance

Abstract. With the progress of technology and consciousness, big data has been rapidly developed and applied in various fields. In this paper, through questionnaires, seminars and colloquia, 5 districts and 67 government departments in Foshan were investigated. A large amount of data of various departments on the development and application of big data are collected. The construction of organization and mechanism, the main achievements, the current situation of development and application, the main problems and so on are also analyzed and discussed. The results show that Foshan has excellent information infrastructure for big data application, and has launched government data integration, data sharing and data opening. The big data applications of several government departments are also unique. The big data industry chain is being formed. The main problems are including the lack of strong municipal big data leading organization, weak awareness of sharing data, the data sharing mechanism not really having been established, lack of talents who having both big data applications techniques and management skills, and the government's data governance system having not yet been formed. It is suggested that Foshan should focus on constructing big data management organization, data sharing mechanism, talent team, data governance system and original creative applications.

Introduction

In recent years, big data has been developed and applied rapidly all over the world. Many cities in the United States, France, Japan and other countries have carried out the application of big data to support the construction and management of smart cities. Seattle made a big data energy-saving project. The project analyzed hundreds of data sets from four urban construction management systems to identify viable energy saving measures. New York City Fire Department focused on monitoring and inspection objects according to the measured urban building fire risk index, so that the number of fires dropped significantly. The decision support system optimizer in Lyon, France, can detect and predict traffic congestion based on real-time traffic reports. Fukuoka, Japan, uses smart phones to detect "human traffic" information for a variety of basic analyses [1].

In China, Guizhou has made remarkable achievements in big data industry and big data application in rural e-commerce development [2][3]. Jiangsu has also done a lot of work in the development of big data industry [4]. Hangzhou has a lot of innovation in big data applications in government management and services [5]. Guangzhou carried out the application to enhance market services and regulatory capabilities based on big data [6]. Shenzhen city carried out the "knitmesh Project" construction. Based on the concept of whole-data-driven, the design idea and implementation path of intelligent government are put forward [7]. Nanhai District Government in Guangdong first launched the "big data" experiment. They pioneered the establishment of the country's first county level data co-ordination agency, and became the pathfinder for the national government data governance. Their focus is to break the "data island", and to effectively explore the development and application of big data [8]. Shanghai has made a useful exploration in advancing the application of big data decision making [9]. Beijing Municipal Planning and Land Resources Management Committee has been actively explored and practiced the

information construction, created a wisdom land development framework of "comprehensive, dynamic monitoring and intelligent services covering city-district- country three level", and explored the intensive development of "Big Co-ordination, Big Data, Big Integration" [10].

It can be seen that from above review, at present, the research on the development and application of big data mainly focus on various application fields. The overall research on the development of big data in a city is relatively small. Through investigation and research, this paper tries to make a whole analysis and Research on the development and application of big data in Foshan. The research of this paper has better originality, and is helpful to understand the whole city big data development.

Methodology

The main research method adopted in this paper includes questionnaire survey, seminars & colloquia and the on-the-spot investigation.

Questionnaire. On the basis of literature research and communicating with the leaders and technical staff of five districts and several departments, two questionnaires were compiled, including "Foshan big data development and application questionnaire"(77 questionnaires were sent out, and 67 valid questionnaires were recovered) and "Big data development and application questionnaire in five districts of Foshan"(5 questionnaires were sent out, and 5 valid questionnaires were recovered). Questionnaires were collected to collect data from functional departments and districts. These questionnaires are issued through the channels of the government departments, and the data filled with them have higher credibility.

Seminars & Colloquia. The leaders, staff members and technical personnel of the various functional departments of the government are invited to have a discussion. The current situation of Foshan's informatization, the development and application of big data, the recent development plan, the existing problems and difficulties, and suggestions for solving problems are exchanged.

On-the-spot Investigation. The main methods are going to the five districts to get a real hand materials including information infrastructure, big data application demonstrations, data openness and data sharing.

Analysis of Survey Results

The following is mainly analyzed from six aspects, including overview of information talents, overview of Information system, overview of business data, development of big data of own unit, government data sharing, the feasibility and necessity of the development of big data.

Overview of Information Talents. According to the investigation and statistics of the talents in 67 government departments, the total number of information technology talents in other departments is 202 except the Public Security Departments and the Municipal Economic and Information Bureau with higher informatization levels. Most of the talents' education background is undergraduate, and the average number of each government departments only about 3 people, and there are 14 departments not having any information technology professionals. Although the vast majority of government departments believe that information technology is very important to them, there are only 21 departments that set up special information departments, less than 1/3. Information technology personnel in most government departments are scattered in various sections. High-level talents who can understand both business and information technology are rare. This situation has led to the fact that construction and management of government information systems are seriously dependent on third party companies, and lack of autonomy and controllability in information system cognition and data development and utilization.

Overview of Information System. According to the survey, 67 government departments have 326 operating information systems, of which 95 are vertical systems (national or provincial). Among this large number of systems, only 13 departments have achieved unified identity authentication and single sign on. And only 8 have achieved data exchange and sharing between all information systems. There are 33 departments whose core operating information systems are unified applied within the city. Thus,

most of the information systems are still in isolation, and cannot achieve interoperability with other systems; there are urgent needs for the system transformation and upgrading to meet the needs of the big data era.

Overview of Business Data. According to research statistics, most government departments have a certain amount of business data precipitation. The accumulation time is different. Among them, 6-10 years accounted for 46%, 1-5 years accounted for 27%. However, there are 33 departments with no statistics on data storage and storage capacity, accounting for about 50%. The reason may be that the vertical system data used by some departments has no reflow or statistics, or has left the data lying aside without statistical attention. In the field of core business data analysis and data mining, only 4 departments have in-depth application and produce good results. Most departments still need to improve their awareness of the data and the awareness of their development and utilization

Development of Big Data of Own Unit. The statistics of the big data collection and storage, management and application are shown in Figure 1. As can be seen from the figure, although some government departments have collected a certain size of data, but big data management is still in the experimental stage or below, big data applications are in a more initial stage.
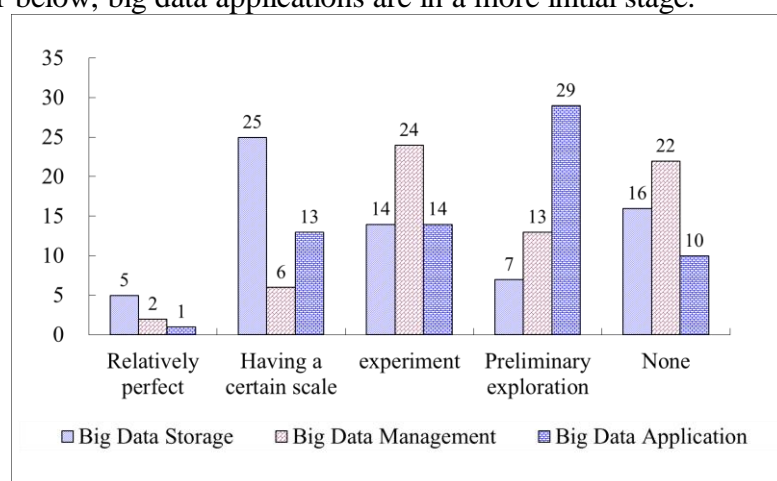

Figure 1. Present situation of big data storage, management and application

Government Data Sharing. At present, Foshan has set up a platform for sharing government data resources, and has developed relevant operational mechanisms. But from the survey situation, the satisfaction degree of the current sharing mechanism and platform for the whole city and all the government departments' big data application is not optimistic. As shown in Figure 2, most government departments believe that the current sharing mechanisms and shared platforms do not meet the needs generally or well. Moreover, the more important of information technology in the departments and the higher level of data needed for other departments, the more current sharing platform cannot meet their needs.

Feasibility and Necessity of the Development of Big Data. The result showed that big data awareness of the city government departments continue to improve. More than 90% of all the departments think that there are necessity and feasibility in the use of big data to improve the administrative environment, strengthen grassroots social governance, promote the upgrading of the city and meticulous management of industrial transformation.

Achievements, problems and suggestions

The informatization level of Foshan is in the forefront of all cities in China. Foshan ranked second In the country's 80 " information Huimin pilot cities". In recent years, the application of information has become a flourishing and distinctive feature, and great progress has been made in the application of big data.
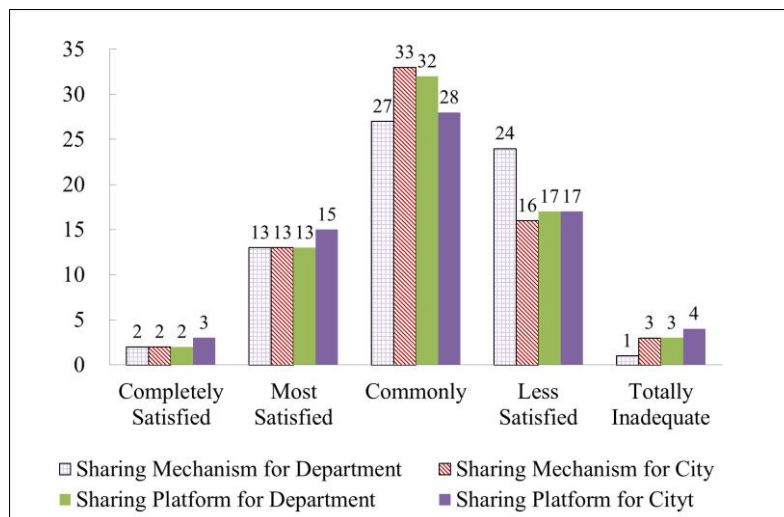
Figure 2. Sharing mechanism and platform satisfaction

Major achievements. In the aspect of big data management institutions, Nanhai District, Chancheng District, Sanshui District, Gaoming District have set up the data co-ordination bureau. Although Foshan has not yet established a comprehensive data management organization, but under the management of the Municipal Bureau of economic and information technology, in general, it also ensures the development and application of big data.

Big data development and application mechanism initially formed. For sharing and promote open public data resources, economic and Information Bureau organized the preparation of the e-government information resources sharing directory, issued a series of normative documents, straighten out the ambiguous problems existed in the districts and departments about the ownership and management rights, security duties, exchange programs, open range and public trust the effect of public data resources.

Foshan's data sharing and opening is in the forefront of the country. In 2014, the Nanhai District make data open test through the website "Data Nanhai", and has high popularity throughout the country. In 2015, Foshan started the development and construction of "Foshan data bank".

Foshan big data application areas are very broad, and the application is also very distinctive. There are many successful cases of Foshan in big data application. The main applications include assisting government decision-making, applying big data to social governance, using big data to enhance the level of government services, and using big data to provide better services for the people and enterprises.

Big data industry chain initially formed. Foshan actively introduce Alibaba, HUAWEI, ZTE, Langchao group, Digital China and other big data related enterprises. The big data industry chain prototype of data acquisition, processing and application of the terminal is taking shape.

Existing Problems. Although great progress has been made in the development and application of big data in Foshan, there are still many problems in the development and application of big data. The problems in the basic environments mainly include: the lack of strong leadership and management mechanism of big data, data sharing mechanism not really implemented, lack of big data application and management talent, data open and sharing ideas to be further strengthened, serious information fragmentation phenomenon, not yet formed a complete set of data governance system, low level of big data application, small scale of big data industry, etc. In government service areas, big data standards are not uniform and at the municipal level, data aggregation is difficult. In social governance areas, Foshan city has not yet formed a unified information platform and is lack of top-level design. And the development gap among five districts is big. There are risks and difficulties in data standard and data acquisition.

Related Suggestions. The first is to strengthen the construction of big data related laws and regulations. The second is to construct a strong municipal big data co-ordination department. The third is to strengthen the training and introduction of big data talents. The fourth is to build the government's

big data governance system to ensure data quality from the source. The fifth is to develop the big data industry and enhance the whole society's big data application level.

Conclusions

Foshan has excellent hardware infrastructure for big data application. Government data integration, data open and data sharing have been carried out. Big data applications of several government departments are also unique, and big data industry chain is being formed. The main problems include the lack of strong municipal big data leading bodies, weak awareness of sharing data, the data sharing mechanism not really been established, lack of talent in big data applications and management, the government's data governance system not yet been formed, etc. It is suggested that Foshan should focus on building big data management organization, data sharing mechanism, talent team, data governance t system and original application.

Acknowledgements

References

[1] Z. Wang, Z.H. An, Enlightenment of Foreign Typical Case on Uses of Big Data in Urban Management. Journal of Modern Information, Vol. 36(2016) No.9,168-172.

[2] N. Wang, Policy implications of big data development in developed countries and major regions of China. China Management Informationization, Vol.20(2017),No.4,159-160.

[3] Z.N. Mu, S.B. Du, On the Development Situation of Big Data in Guizhou Rural E-commerce and Its Measures. Value Engineering, Vol.35,(2016),No.8,38-39.

[4] L. Qian, L.Y. Shang, Z.P. Pi, Research on the present situation, trend and countermeasures to big data industry in Jiangsu. Jiangsu Science & Technology Information, Vol.24(2017)No.12,8-10.

[5] N.G. Deng, Research on Government Management Service Innovation in Big Data Era. Journal of Tianjin Administration Institute, Vol.18(2016).No5,18-25.

[6] X.Y. Zhang, L.Q. Chen, Research on improving the service and supervision ability of market players based on big data. Chinese Market, Vol.23(2016),No.28,152-154.

[7] D.P. Chen, Practice and exploration on Shenzhen " knitmesh Project" based on integrality data BIG DATA RESEARCH,Vol.2(2016),No.2,56-67.

[8] Y.X. Chen, The Second Information Revolution in Nanhai District of Foshan City. Decision-Making, Vol.23(2016)No.8,52-53.

[9] R. Wang, Z.C. Chen, Research on the Path and Counter Measures to Promote the Decision Application of Big Data in Shanghai, Vol.10(2017)No.5(25-31).

[10] J.Q. , M. Yin, J.L. Li, Big Co-ordination, Big Data, Big Integration, Exploration and Practice of Beijing's Wisdom Land. Land and Resources Informatization, Vol.16(2016)No.6,7-10.