Discussion on the Construction Experience of Foreign Public Management in the Era of Big Data

Taking Singapore as an Example

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Abstract—**Taking Singapore's public management with application of big data as example, the paper analyzes the successful experience of Singapore's public management with the application of big data from three aspects: the application background of big data, the development process and typical cases in Singapore. It has made a reference value for the application of big data in China's public management.**

Keywords—era of big data; public management; Singapore; case analysis

I. INTRODUCTION

The rapid development of the Internet has changed the lifestyles of human beings. With the integration process of people's offline life and online life, there is a large amount of data recording human's life online. 2EB data every day publicly declare the arrival of the era of big data. Big data refers to a huge number of complicated data sets converging from different channels and with different methods. These data include but not limited to social reviews, browsing paths, visiting records, comments, geographic location information and temperature, humidity, chemical changes, vibration, displacement, etc. collected by digital sensors. The big data have the characteristics of large amount, large data flow, data diversification and value diversification.

The year of 2013 was called as "the first year of the era of big data" by a lot of media. Countries around the world have developed their own national big data strategies. The fuse was the "big data research and development plan" launched and invested by the government of the United States with an investment of $200000000 USD in March 2015. At that time, the world entered the era of big data. The term "big data" has existed for a long time. It first appeared in a book named The Third Wave written by Alvin Toffler in 1980. He said people would live in the era of big data in the future. In 2009, the term of "big data" was very hot in Internet technology industry. So far, "big data" frequently appears into the public's vision.

A remarkable feature of the era of big data is that every thing can be described and analyzed with data. Our government is our national macro control decision maker and execution center, so every decision is crucial to the fate of the people and the country. Therefore, it is very important to make every decision on the basis of actual data. The government of Singapore has made remarkable achievements in public government through big data.

II. CASE ANALYSIS

Singapore is a country of extreme shortage of natural resources. In the early days of the founding of the country, even the daily consumption of fresh water needs to be imported. However, Singapore has the opportunity to pull through with the arrival of the era of big data. In the era of big data, data are the most important resources. Singapore has made an overall layout on big data very early. Since 1980, the government of Singapore has promoted the "Computerized Country Plan" for ten years and implemented the computerized office in the governments, enterprises, business cycles, factories, hospitals and etc. After ten years, in 1992, the government of Singapore put forward the "IT2000 - Smart Island Plan". They used ten years to construct the high-speed broadband network all over the island and popularize common information technology, which has laid a solid foundation for Singapore. In 2006 the government of Singapore launched the program of "Smart Country by 2015".

The program content includes the realization of double increase of the economy based on the development of communication technologies, tripled increase of export earnings, newly increase of 80000 employment posts, the equipment of computer in every family with school-age children and more than 90% of households using broadband. As of 2013, the information industry in Singapore increase output value of $14810000000 SGD with annual increase of 44.6% and export growth of 72.7%. In 2014, the survey made by Accenture Consulting Company showed that Singapore's e-government ranked first in the world. Thus, it can be inferred that Singapore has completed the program of "Smart Country by 2015" before 2015. However, Singapore does not stop there. Facing all kinds of obstacles in the development of information industry, the government of Singapore launched the "Smart Country by 2025" Plan. Facing the interview of the reporter of People's Daily, Mr. Liu Benwei, Deputy Director of Singapore Information and Communication Development Authority in China District said frankly: "this is the first smart country blueprint in the

world. Singapore is expected to build the world's first smart country"2.

Singapore has made preparations and efforts to achieve the goal of world's first smart country in the following four aspects:

First, develop step by step. Singapore's information industry is a national strategic industry. Due to the lack of material resources, Singapore was forced to abandon the development of material resources based economy and tend to service oriented economy. 1980 is the beginning era of personal computer. Singapore has grasped the important beginning of the development of the global information industry. Along with the development of large-scale integrated technology (LST), the realization of thousands of transistors per square centimeter integrated on silicon chip greatly shrunk the volume and price of computer. The micro processor allows everyone to have a computer. With insufficient hardware, IBM cooperated with Bill Gates and has re-written the Operating System Disk. A new version of MS-DOS was sold bundling with computer. Soon, the MS-DOS dominated the operating system market for personal computers. It was the era of Internet commercialization after Singapore promoting the "Computerization Country". Singapore has launched "National IT Plan" and "IT2000 Plan" successively. With portable and compact internet-surfing tools, the government of Singapore has allocated one billion SGD to build a next generation of national broadband network (Next Gen NbN), and reform rules and regulations of related industries. In 2006, the government of Singapore launched the Wireless Singapore Project of "wireless@SG" and deployed more than 7500 hot spots in order to achieve wireless network coverage in Singapore. After 35 years of information construction, Singapore's information hardware facilities have been matched with its strategic development.

Second, apply the mode of the government leading enterprises and the enterprises participating. There is a very huge investment in smart hardware facilities. The government of Singapore has been fully felt this in the first 35 years of hardware construction. The government of Singapore introduced the mode of "government leading and enterprise participation", so that the private capital can be fully used in the country's major strategic decisions. On the one hand, it can reduce the government's financial allocation pressure; on the other hand, the national strategy led by the government has ensured the long-term interests of enterprises, so as to actively mobilize private capital and promote the healthy development of the national economy and create more jobs. Furthermore, the government has dominated the interests of each other after the industrial segmentation. Singapore's government had divided its industrial chain into three types, including retail service providers, active equipment operators, and passive infrastructure design constructors, to avoid the monopoly or unfair competition of the inter-sectors after industrial segmentation and build a fair and efficient platform. The government of Singapore knows that it is necessary to "challenge the law personally" so that the public and enterprises dare to participate actively. The electronic government is an electronic government system with the

public as the center which was proposed by IDA and established by the government. Singapore citizens can access the government online upon more than 1900 services (including more than 300 mobile services) all day long. Up to 93% of the people of Singapore handle business with the electronic mean.

Third, share data and release the innovative productivity. The building of platform for Smart Country requires three modules: collection, connection and understanding. The collection is to obtain real-time data from sensors distributed across the country. The connection is to provide a safe, high-speed, and expansible national communications infrastructure that transmit collected real-time data to the data processing center. Understanding is to better describe the previous status quo through the screening, mining, processing and analysis of real-time data, so as to improve service status and forecast audience demand. In order to better promote the smart country plan, the government of Singapore launched the one-stop service of government data at "Data.gov.sg". Through the data platform, the public can access to more than 7000 public data (including the data provided by foreign audiences) in all walks of life.

In the release of innovative productivity, the government also encourages people to create diversified application programs through data published by the government, and encourages enterprises to actively participate in the development of related software and hardware and system. The IAG developed by Singapore ST Electronics is the best case of the public management decision. IAG is important software and hardware system based on Singapore's Smart Country policy, with the comprehensive ability to FTTx/3G/4G/TVWS and other types of network. It can distribute network connection and network deployment intelligently according to the communication needs of all kinds of equipment, so as to reduce the time and cost on network deployment and sensors' network allocation. IAG can be assembled in the bus station, traffic intersection, highway and other places. Use the built-in intelligent network management system to monitor and manage the IAG box in the distribution areas. At present, the IAG system has been very mature. Shinco Electronics is promoted this technology in overseas.

Four, improve the relevant laws. With the government's disclosure of data, the risk of leakage of sensitive information, such as personal privacy and other sensitive information has been increased. In order to better protect the privacy of individuals, Singapore has formulated the relevant laws to restrain correlation behavior. For example, on October 15, 2012 Singapore passed the "Personal Information Protection Act". The act was officially entered into force in January 2013. The highlight of the law is to set up the registry of "Do Not Call" in the country, and the natural person can refuse any marketing information through registration in such registry. From the view of Singapore people, they are not very reluctant to the collection of private information. It is a good condition, but other countries do not have to promote big data.

III. Conclusion and Enlightenment

However, the implementation of Smart Country Program is not smooth in Singapore. In 2008, Singapore suffered from SARS. They did not set up an effective contingency plan in advance, resulting in the decline of 4.2% in the chain relative ratio within a few months that year. It is a rapid and heavy blow to promote the major change in the public management decision-making system in Singapore.

The advantages of big data to the public management decision-making system are reflected in two aspects. Big data clearly and visually show the decision makers what is happening and what the situation is. This is an advantage that past statistical data analyses does not possess. The traditional statistical data analysis is not able to include all of the data, only to make a sample survey, so the analysis results have certain one-sidedness. In addition, the data obtained from the statistical analysis are the past data, and can't be used to analyze or analyze the dynamic and real-time state. Past data are more accurate in describing things in the past, and can only be used as a reference, because it is not very accurate to describe current state of things. On the other hand, it can be used to predict the future trend through real-time data analysis based on the algorithm. In the case of Singapore, big data analysis shows that the people of Singapore have strong feelings of "nostalgia" and inimical emotion on too fast development of Singapore, and the rise of housing price and the decrease of wage caused by the increase of foreign immigrants. Therefore, the government has formulated the relevant policies to reduce foreign workers and achieve public opinion control. Finally, big data analysis is the best way to support the traditional empirical analysis. In the condition of real-time and dynamic analysis and forecast, we can support the empirical analysis with big data, so as to achieve accurate and forward-looking public management decision.

China has seen the benefit of big data, catching up with all our strength. In 2012, China's relevant ministries and administrations (NDRC, the Ministry of Science and Technology, the Ministry of Industry and Information, etc.) have launched and supported a series of research work related to big data. In 2014, the Government Work Report clearly stated that the big data are the country's important industrial innovation platform. On September 5, 2015, the State Council issued the "Action Framework for Developing and Promoting Big Data" which marked that China has entered into the era of high-speed development of big data industry. The framework includes the government data resources sharing and opening project, overall development of national big data resources project, and the government management with big data project; at the same time, it made clear that China should form a trans-department data resource sharing pattern before the end of 2017 and achieve the goal of unified open big data platform among governments. However, it is worthy to discuss how to realize the fixed goal efficiently, safely and stably. China starts late in the construction of big data, so we shall use the time difference with other countries to develop big data, learn and use the successful experience of other countries (e.g.

Singapore). In this way, we can catch up the rapid development pace of the global big data fast.

In summary, China can learn the experience of Singapore's public management with big data from the following three aspects:

First, improve the hardware facilities. The advent of the era of big data is the result of technological change. The hardware comes first in the technological era. The hardware facilities are very essential to better achieve data acquisition, transmission and processing. But because of the high cost of inputs and large loss rate of the hardware, both the governments and enterprises nurse a grievance on it. However, the government, enterprises or individuals must recognize that the era of big data has come. It is better to proceed with determination and give full play to the initiative rather than escaping. Therefore, we can take the mode of the central government making policy and the local governments, enterprises and individual cooperating to gather the power of all parties to complete the investment in hardware facilities.

Second, actively cultivate the relevant professional personnel. The lack of relevant professional talent is the problem of global data management. China should strengthen the training of relevant professional personnel, set up relevant majors in universities and colleges and vocational colleges, and encourage people to actively participate in the study of big data to achieve the universal data analysis. China should strengthen big data talent exchange with other countries and learn the successful experience and talent cultivation from other countries. On the basis of extensive learning and communication, we cultivate big data talents to meet our domestic needs based on our current development situation and fixed goals, pay attention to improve the incentive mechanism for talent innovation, and actively give appropriate reward to them, so as to help our country to realize the process of big data at an early date.

Third, improve the relevant laws and form a sound mechanism. In our country we have some precedents on personal privacy data leakage, which has caused very serious consequences to individual and relevant organizations. Therefore, we should accelerate the legislation to protect personal privacy. In addition, we need to notice that it is inevitable to collect personal information in the process of data acquisition. Therefore, we should build a sound protection system with legal protection, innovative technical desensitization, and public understanding. We can propaganda through official channels, strengthen public's understanding and use technical desensitization to protect personal privacy and protect the public's interests through laws. At the same time, we should strengthen the relevant security laws and increase the protection strength of intellectual property rights.

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