Deeply understand, analyze and draw lessons from Hangzhou's urban brain construction paradigm

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Abstract. With the rise of smart city construction, the urban brain, as the infrastructure of smart city construction, is also driven up. As the forerunner of China's urban brain, Hangzhou's urban brain has developed from the initial conception to the present maturity, which has important reference value in the aspects of concept, basic conditions, core support, system guarantee and characteristic application. This paper attempts to sort out and analyze the construction history, process, overall structure and practical application of Hangzhou City Brain through the method of literature analysis, and analyzes the problems and solutions in the construction and application of City Brain from the perspective of technology empowerment and multi-governance, and puts forward suggestions for the future construction of City Brain to help the construction of smart city.

Keywords: Smart city; City brain; Hangzhou.

1. Introduction

The Third Plenary Session of the Eighteenth Central Committee of the Communist Party of China clearly pointed out that we should improve and develop the socialist system with Chinese characteristics, promote the modernization of the national governance system and governance capacity. The Fourth Plenary Session of the Nineteenth Central Committee of the Communist Party of China emphasized for the first time in the history of the Party that "social governance is an important aspect of national governance". Under the active advocacy of the state, the construction of social governance system and the promotion of modernization of social governance capacity have become a hot topic in academic circles. Looking at the overall situation of the times, how to make full use of artificial intelligence, big data and other emerging modern technologies has become the key point to improve the ability of governance, so that the precision, facilitation and globalization of governance have become the key points to break the situation.

IBM put forward the "Smart Earth" strategy in 2008, and pointed out in December of the same year that Smart City is the main form of Smart Earth. Since then, most countries have started their own "smart city construction". China's smart city construction has been piloted since 2012, and by mid-2018, more than 500 cities have come up with their own smart city construction plans. But generally speaking, the vast majority of smart cities are still in the "conceptual stage of smart city construction", in dealing with public events and maintaining the daily governance of the city, there are "widespread problems such as the mismatch between project construction and residents' needs, the lack of information sharing mechanism between departments, the situation of multi-subject collaborative governance has not yet formed, and the construction of smart cities has become a performance project".[1]How to solve these problems, promote accurate and effective governance, and effectively improve the "three senses" of residents' livelihood, namely, happiness, sense of acquisition and sense of security, is an important issue to be solved urgently.

Milakovich (M. E. Milakovich) once said that "the key to the success of smart cities is the invisible elements of icebergs below the water surface".[2]To solve the existing problems, we should not simply start from the governance structure and governance mode, but pay more attention to the important infrastructure in the construction of smart cities-urban brain. How to build, manage and maintain the urban brain has become one of the inevitable important issues in the construction of smart cities.

As the forerunner and demonstrator of urban brain construction in China, Hangzhou urban brain has great research value. Since its inception in 2016, Hangzhou's "Aliyun" urban brain has found its own new way from traffic guidance, and has played a greater role in resource allocation and event

decision-making through the collaboration of the government and enterprises, thus realizing the goal of "supporting a city with 10% of resources".[3]On March 31, 2020, Xi Jinping said during his visit to Hangzhou City Brain Operation Intelligence Center: "City Brain is an important measure to build" Digital Hangzhou ". Through big data, cloud computing, artificial intelligence and other means to promote the modernization of urban governance, big cities can also become more "smart". From informationization to intellectualization and then to intellectualization, it is the only way to build a smart city with broad prospects.

2. Hangzhou City Brain

2.1 History of development

Talking about the origin of Hangzhou's urban brain, this paper argues that it should be traced back to the difficulties Hangzhou encountered in urban transportation in 2012. Since 2012, Hangzhou's urban traffic congestion has become a huge problem, such as the poor coordination among multiple subjects, the inability of road supply to match the growing number of motor vehicles, and the large deviation between the practice of intelligent traffic management and expectations, which make the existing means unable to match the rapid development of reality. Based on this, in April 2016, Alibaba put forward the creative idea of building a city brain in Hangzhou, in July of the same year, a city brain command center was built in Yunxi Town, Hangzhou, and in October of the same year, Hangzhou released the city brain traffic 1.0 system, which can be realized by cooperating with the advantages of traffic control departments and Alibaba technology departments. To seek the best way to promote the modernization of social governance system and governance capacity.

This creative idea has been a great success in practice. Traffic congestion in Hangzhou dropped from No.2 in 2014 to about No.50 at the end of 2019, according to the Traffic Health List of Major Cities in China, compiled by Amap.

With the progress of science and technology, the traditional way of urban governance, which once relied on a large amount of resources, has become unsustainable. As the foundation of smart city construction, urban brain upholds the concept of "holistic wisdom governance", cooperates with multiple governance subjects, and constantly explores new governance directions.

After achieving great success in the field of transportation, Hangzhou City Brain began to seek practical exploration in other areas of urban governance. In May 2018, the Hangzhou Development and Reform Commission and the Data Resources Administration jointly issued the first urban brain construction plan in China, Hangzhou Urban Data Brain Plan, which points out the direction for the construction of Hangzhou Urban Brain in the next five years. It calls for the full coverage of the urban brain in the field of transportation in 2022, as well as the systematic construction and practical implementation of health care, housing security, education and other aspects. In December of the same year, the comprehensive version of City Brain was released in Yunxi Town, Hangzhou, covering parking, medical treatment and cultural tourism.

Nine measures for the convenience of the people, such as grass-roots governance, mark that the urban brain has changed from a single platform for traffic congestion control to a platform for people's livelihood services and decision support in various fields. In the same year, Hangzhou City Brain was selected as one of the top ten innovative governance cases in China.

In January 2019, with the implementation of the "Urban Brain Construction Management Standards" promulgated by Hangzhou Quality and Technical Supervision Bureau, Hangzhou began to build the urban brain as one of the most important urban infrastructure in the construction of smart cities.

In April 2019, Hangzhou City Brain Company (The CityOS) was formally established as a state-owned holding mixed ownership company, which is the first technology company focusing on the construction and operation of the city brain in China. In September of the same year, the "City Brain · Data Cockpit" developed by Hangzhou City Brain Company was released. Hangzhou City Brain Digital Cockpit mainly serves city leaders and government departments. Based on the data

resources generated by the city, it realizes real-time, online and accurate data, and is the daily work platform for city managers. By expanding the ability of real-time data control in business areas and the breadth and depth of comprehensive information services, we can better assist leaders in decision-making, effectively allocate public resources, constantly improve social governance, promote sustainable urban development, and escort Hangzhou to build "the first city of digital economy".

In terms of governance mechanism, city managers find problems through the digital indicators of the digital cockpit (digital process), determine the main business departments, divide business boundaries, and coordinate business work (business process) according to the actual situation. When the problem is solved, the digital indicators in the cockpit return to normal, and complete a set of closed-loop event processing.

As of April 1, 2020, the city brain firmly grasps the key to the service of benefiting the people and benefiting the people, starts with the facts of people's livelihood, continuously expands the social governance scenarios, and launches 48 application scenarios in 11 key areas, so that the people have a real sense of gain. Hangzhou has become the first city in China to implement "pole-free parking lot", realize "ambulance does not need to run red lights", "admission does not need to queue up" and "pay at most once for medical treatment".

2.2 Multi-subject co-governance

Multi-subject co-governance based on the rule of law is not only a summary of the experience of social governance practice in China, but also a new requirement formed in practice. As an institutional innovation of social governance, pluralistic co-governance mainly includes four characteristics: pluralistic subjects, open and complex co-governance system, dialogue, competition, compromise, cooperation and collective action as the co-governance mechanism, and common interests as the ultimate output. Pluralistic co-governance is not the withdrawal of the government, not the "small government, weak government", but the "small government, strong government, big society" co-governance model. [3]

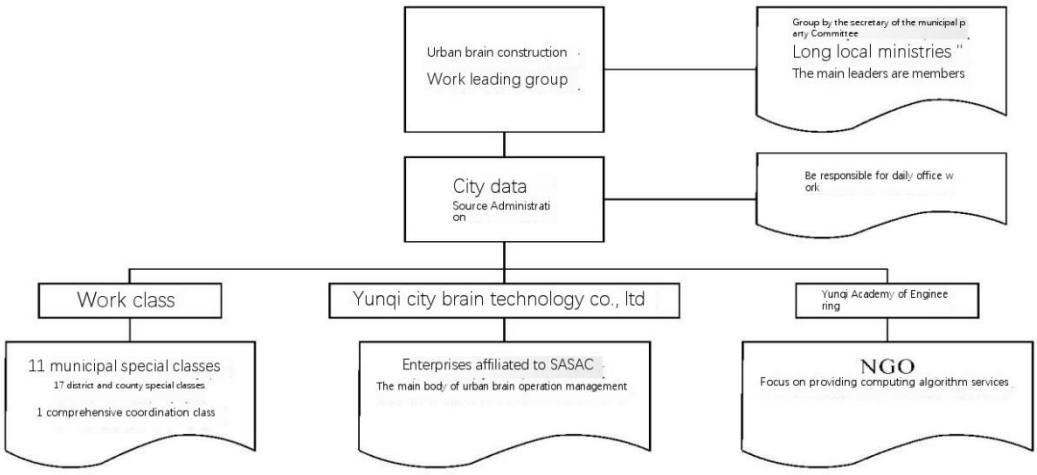

Figure 1. Hangzhou City Brain Governance Structure

The reason why Hangzhou City Brain has made great achievements can not be ignored is that it comes from the joint efforts of the government and enterprises. Since the beginning of the preparation of Hangzhou's urban brain in 2016, the Hangzhou Municipal Party Committee and Municipal Government have broken the fragmentation caused by the division of traditional functional departments in the past, and set up a leading group for the construction of "urban brain" with the Secretary of the Municipal Party Committee as the group leader and the Standing Committee of the Municipal Party Committee as the deputy group leader, bringing together all forces such as enterprises, government and public security, and gathering construction committees and finance. The formation of joint efforts to build the urban brain project also marks the basic realization of the urban brain project in terms of technical and organizational support. In terms of enterprises, Aliyun and

other 13 top intelligences have been involved from the very beginning, and in April 2019, Hangzhou City Brain Company, a state-owned holding company, was established, which is mainly responsible for the daily construction and operation of the city brain. The two cooperate with each other to form a multi-governance structure in which the government provides experience and enterprises provide technology, which provides a top-level guarantee for the development and construction of the urban brain. Socially, in the process of Hangzhou's urban brain construction and governance, there is an NGO organization, Yunxi Academy of Engineering, which is mainly composed of volunteers from various technology companies and is mainly responsible for the research and development of the central system and the iteration of data processing. Hangzhou City Brain has gradually established the organizational structure of "Party Committee Leadership: Government Leadership, Social Coordination" in practice and exploration, thus realizing the transformation of business from decentralization to centralization, space from division to integrity, and ultimately realizing the transformation of governance from fragmentation to integration, which is an important support for the modernization of social governance system.(Graph)

From the analysis of Hangzhou's urban brain construction, we should grasp three aspects to realize the co-governance of multiple subjects. First, we should adhere to the principle of rule of law and improve the rule of law. The second is to enhance the governance ability of multiple subjects such as governments at all levels, market subjects and social organizations. We should straighten out the boundaries of power and responsibility within and between governments, promote the separation of government and city, government and society, clarify the division of functions and power boundaries among government, market and society, decentralize power to the market and society, and create more space for multi-subject co-governance. Thirdly, we should develop and upgrade co-governance technology to provide technical support and platform support for multi-subject co-governance.

2.3 Central Architecture

Hangzhou Municipal Government has innovatively put forward the concept of "central architecture" in the practical exploration of building urban brain management architecture. The so-called central architecture can be briefly summarized as "one whole, two links, three synergies and direct access"(30), that is, taking Hangzhou City Brain as the central plaorm, collecting massive data from surrounding cities, districts, counties and townships at all levels, and then collecting them through cloud computing, big data, artificial intelligence and other technical means to promote system interoperability and data interoperability. Promote data collaboration, business collaboration and government-enterprise collaboration. After processing, the resource allocation scheme goes directly to the data cockpit at all levels, and finally realizes the data exchange of the whole society, the comprehensive coordination of digitalization, and the process reengineering across departments. As of April 1, 2020, Hangzhou Municipal Administration has completed the 3.0 version of the city brain, with an average daily collaborative data of 120 million. Vertically to the end and horizontally to the side, the four levels of city, district, county, township and community, 96 departments and 317 information system projects are interconnected, making the coordination and interaction of public data resources possible.

3. Risk from the Perspective of Multi-subject Governance

3.1 The government is weak

In the era of artificial intelligence, the main body with huge data and huge data analysis technology will gradually occupy an advantage, and thus derive the power with data and algorithm technology as the core.(34)Countries and governments with public power and public resources have significant advantages in using AI technology to improve governance, that is, to collect citizen data and regulate citizen behavior. However, the government is only the user of AI technology application, not the designer and developer, and lacks technological ability and technological foresight, so the technological enterprises that master the core technology often have technological initiative. Alibaba

Cloud is the "leader" of cloud computing in China. It has a self-developed Feitian operating system and the world's leading artificial intelligence technology. In addition to ET City Brain, it also has a series of powerful artificial intelligence plaorms such as ET Environment Brain, ET Industrial Brain and ET Medical Brain. Alibaba Cloud relies on its powerful technology to have more say in government governance issues, and it is impossible for the government to use its powerful technology and ensure that the top-down single decision-making power is not affected. In the use of artificial intelligence technology to achieve the supervision and control of public individuals, technology giants have used technological advantages to encroach on public power. For example, during Trump's campaign, Cambridge Analytics, a British company related to his campaign team, embezzled millions of users'Facebook usage data and used the Facebook usage data it obtained to help Trump's campaign, exposing Facebook's lax use and sharing of information. With the gradual promotion of the technological monopoly status of scientific and technological enterprises, the technological weakness of the government will gradually become obvious, and the technological power will also challenge the authority of public management.(35)

Digital Divide refers to the information gap and the trend of further polarization between the rich and the poor caused by the differences in the ownership, application and innovation ability of information and network technology among different countries, regions, industries, enterprises and communities in the process of global digitalization. How to reduce the government's weakness caused by the digital divide between the government and enterprises in the construction and operation of the urban brain is a problem worth pondering.

3.2 Misjudgment brought about by artificial intelligence

In the commercial context, "urban brain" is gradually touted as omnipotent urban governance, which actually reflects people's deification of artificial intelligence, while ignoring the formation of deeper logic.

Face recognition is a common technology in the operation of urban brain, but there may be obvious racial discrimination. In 2019, the National Institute of Standards and Technology tested 189 algorithms from 99 companies, covering more than 18 million photos of 8 million people, and found that the elderly, children, women and minorities were more likely to be mistaken, with the false alarm rate of Asian and African Americans 100 times higher than that of white Americans.[8]This not only involves the problem of original feature extraction, that is, the process of defining "what is human face" unconsciously objectifies ethnic and racial prejudice; It also involves the visibility difference behind the data supply, and ethnic minorities are difficult to be "seen" because of their disadvantaged position, which makes them more vulnerable to misrecognition. In the algorithms developed by Asian countries, the rate of yellow race being misidentified has been significantly reduced. [9]

The formation of artificial intelligence is still caused by human intervention. There is no completely "emotionless" artificial intelligence [10]. When we deify artificial intelligence as "Laplace demon" and fully believe in its omniscience and omnipotence, it will have a huge negative impact on our lives.

4. Future outlook

The author believes that the construction of urban brain has brought tremendous impetus for the government to improve its governance capacity, promote the modernization of governance system and capacity, and also laid a solid foundation for the construction of smart cities. When we still need to pay attention to the current difficulties and risks faced by the urban brain, how to break out is an important issue that follow-up cities must pay attention to and think about when following Hangzhou.

The author believes that the most important thing is that the government needs to play a more important role in this process, first of all, legislation first, legislation on data, technology, personal information protection. When data becomes a resource, AI applications will become an infrastructure of the future society. When personal information is in a naked state, the definition of ownership and

responsibility relationship needs legal guarantee, and legislation must go ahead. Legislation needs not only national legislation, but also local laws and regulations.[11]

Secondly, we should improve the prevention and control system, local governments should prevent and control the loss of voice caused by technological weakness, and technology enterprises should guard against the risk of data being attacked. Local governments should properly reserve some talents who understand business and technology, and establish a prevention and control system for data collection, storage, classification, analysis and utilization, and security within the government. Enterprises using big data to develop artificial intelligence applications should establish a strong information security defense system to ensure the security of data provided by the government.

Finally, we should establish and improve a pluralistic, open and balanced governance system. Artificial intelligence technology promotes the opening of government information, and also promotes the cooperation between local governments and society. With the extensive application of artificial intelligence, the problems faced by society will also show a more complex trend, which must rely on a pluralistic, open and balanced governance system to achieve multi-subject participation, open discussion and balanced relationship maintenance.

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