

Research and Application of Governance System Development of Digital Government

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Abstract. Digital government is an important content and task of national governance modernization. Nevertheless, the existing research lacks the systematic consideration regarding digital government governance system, which is the key to the development of digital government. Thus, this paper adopts the analysis method of holistic governance, focuses on the technology governance system, business governance system and operation management system of digital government. Moreover, this paper puts forward the trinity of governance system practices, that is, intensive sharing technology governance framework, open and integrated business governance structure, and operation management system of collaborative development. On this basis, this paper further summarizes the specific suggestions to promote the coordinated development of digital government.

Keywords: Digital government, governance system, big data, block-chain, artificial intelligence.

1. Research background

The report of the 20th National Congress of the Communist Party of China proposes to build a network power, digital China and digital society, and promotes the deep integration of Internet, big data, artificial intelligence and real economy, and develops digital economy and sharing economy, and cultivates new growth points and form new driving forces. With the implementation of the national big data strategy and the acceleration of the construction of Digital China, digital government has become a new focus for the implementation of national network power, digital China, digital society and other strategic actions.

Supported by the new generation of information technology, digital government is a new model to comprehensively improve the government's ability to perform its duties in the fields of economic regulation, market supervision, social governance, public service, environmental protection, etc. by building a new government mechanism, platform and channel driven by big data, reshaping the management architecture, business architecture and technical architecture of government informatization. At present, a number of cities in China have carried out pilot projects of digital government construction, promoted a variety of innovative applications of government affairs including "one Internet access", mobile government services, and network management services(Digital Government Development Report,2019; Wang &Xu, 2020), effectively improved the level of public services, enhanced management capabilities, and promoted urban economic development.

With the development of big data, block-chain, artificial intelligence and other technologies, digital government is now entering a new stage of smart government with the core of government data sharing and opening, highlighting integrated services, fine governance, and intelligent decision analysis. A new model of modern government governance featuring "dialogue, decision-making, service and innovation with data" is being formed (Liu&Zhu,2019).

2. Analysis on the development status and problems of Digital Government

2.1 The Development of Digital Government

Digital government is an evolving form of government. Under different technical conditions, the forms of digital government are different(Liu&Zhu,2019). From the perspective of technology,

digital government can be divided into three forms: e-government version 1.0, network government version 2.0 and intelligent government version 3.0.

The main feature of e-government version 1.0 is that the government service is moving from the traditional offline service mode to the electronic mode, and the typical representative is the government website.

The main feature of network government version 2.0 is that the government service is further developed to advanced technology forms such as networking, data centric and complete data.

Intelligent government version 3.0 is mainly characterized by more intelligent digital government, more transparent information, stronger innovation ability and more scientific decision-making.

2.2 Problems in Digital Government Governance

The transformation and upgrading of digital government has become a new direction leading the modernization of national governance system and governance capacity, but there are still the following major problems in our digital government construction.

2.3 Technical System Lacks Standards

The information construction of government departments at all levels lacks standards and norms of technical system.

Technical standards are not uniform, which makes it difficult to connect networks, systems, data and uneven development.

Data standards are not unified, which makes it difficult to gather and share data and businesses. The utilization rate of digital resources needs to be improved, which cannot meet the requirements of the development of big data.

Information security risks of government information resources: are prominent. In the process of data sharing and exchange between departments at all levels and within departments, there are data security problems that need to be solved urgently.

2.3.1 Business System Lacks Top-Level Planning

The business system of digital government lacks top-level planning, especially the new mechanism to promote the business integration and application of multiple departments.

The construction process of business and application system: The lack of top-level planning leads to decentralized business system, inefficient application, and a lot of repetitive investment and construction.

Low efficiency of inter-department business collaboration: The existing business system has problems such as vertical strength, horizontal weakness and block segmentation.

2.3.2 Management System Lacks Clear Boundary

There are unclear job responsibilities and boundaries between departments at all levels in government.

It lacks a unified government big data integration mechanism, and it fails to give full play to the role of government data governance and data decision-making, and platform, and lacks all-round data mining and analysis application ability.

Through the above analysis, our digital government urgently needs to strengthen the construction of governance system, and targeted to promote the ability of technical governance, business governance, management system improvement, in order to promote the development of digital government.

3. Research on the governance system of Digital Government

The research of digital government governance system is still a relatively vague and difficult to define concept of public management theory(Zhu,2019). The existing research on the governance

system of digital government mainly focuses on the following aspects: first, the research on the theoretical model, conceptual structure and model of digital government (Yang,2018; Wu&Tang,2023); Second, research on Digital Government Technology Architecture and new technologies(Huang,2018;Cui,Liu&Tang,2018;Li,Xia&Ding,2019); Third, the public service mode and case study of digital government(Yu el.,2019; Wu&Yan,2020; Zhai,2019). With the acceleration of the measures of “Internet plus government services” and “letting off services”, it is particularly urgent to study and analyze the governance system of digital government from a practical perspective(Wang&Wang,2018).

In this paper, starting from the practice, the ideas of digital government governance system research are as follows: Taking citizen demand as the governance orientation, taking information technology as the governance means, highlighting the intensive sharing of technology governance system; Focusing on business integration and opening, it highlights the opening and integration of business governance structure; To coordinate and integrate the fragmentation of governance levels, functions, public-private sector relations and information systems with operational management objectives. In order to promote the governance of digital government “from decentralization to concentration, from part to whole, from fragmentation to integration”.

This paper adopts the analysis method of Holistic Governance(Wu&Yan,2020), focusing on the research and analysis of the important problems in the practice of technology governance, business governance and operation management system related to digital government.

3.1 Digital Government Technology Governance System

3.1.1 Technology Governance Framework of Digital Government

Aiming at the problems existing in the existing technology governance system, this paper constructs an intensive and shared technology system of digital government, which includes four different levels: infrastructure, platform support, intelligent application and security system, as shown in Figure 1.

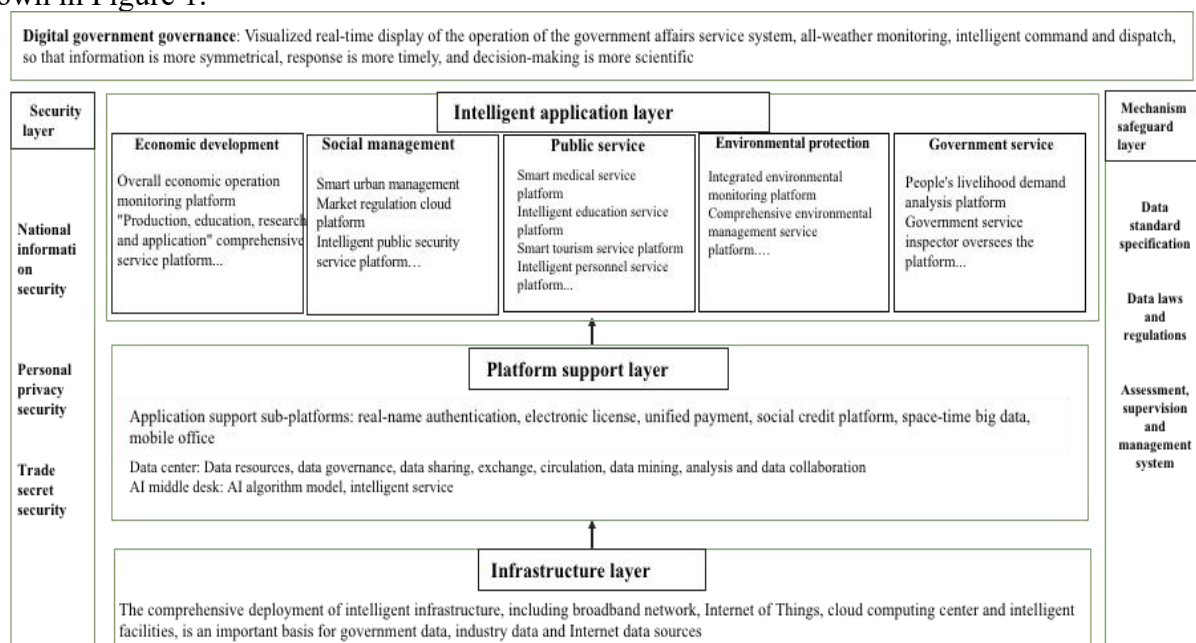


Figure 1: Digital government governance system.

First, in terms of infrastructure governance, it is necessary to accelerate the unified construction and sharing of information infrastructure, cloud interoperability of information systems, and promote the integration of cloud and digital;

Second, in the governance of the support platform, we need to build a big data center, promote data resource aggregation and sharing, business application collaboration, and provide strong support for social management and public services. At the same time, in order to improve the

efficiency of the support platform, we need to introduce new technical means, such as data platform and AI platform, to maximize the sharing and reuse of common capabilities;

Third, in the level of smart application, create technical standards and specifications of smart application related to digital government, and realize the innovation of smart application through the opening of API technology interface. Fourth, we should strengthen the construction of security system and highlight the construction of security and mechanism. The main contents of each level of digital government technology governance are analyzed as follows:

Infrastructure layer: it mainly provides the basic support environment for the business operation of digital government, adopts the technical architecture of “cloud + Management + end”, and “cloud” refers to the network, storage and computing resources related to cloud computing; “Tube” refers to communication channels and networks, including the Internet, mobile Internet and Internet of things; “Terminal” refers to intelligent terminal facilities, including intelligent terminal, various sensors and personal computers.

Platform support layer: it mainly provides platform level support for business applications of digital government, and the core includes data center, AI service center and application support service platform. The data center mainly provides data governance services related to data collection, metadata management, data quality, data standards, data blood relationship, etc; AI service center mainly provides machine learning, neural network and other related AI algorithm and model services; The application support platform mainly provides support for the upper application of digital government, including unified identity authentication, electronic license, social credit, electronic payment and other platform support.

Intelligent application layer: it provides a variety of integrated services and applications for digital government, including economic development, social management, public services, environmental protection, and government services.

Security layer: it mainly provides technical support related to national information security, personal privacy security and business secret security;

Mechanism safeguard layer: it is the mechanism guarantee, which mainly provides the construction of standards, laws and regulations, and management system related to digital government.

3.1.2 Key Technologies of Digital Government Construction

The technology governance of digital government needs to be combined with new technology means to improve the modernization level of digital government governance ability:

(1) Blockchain technology

Blockchain is a new application mode of distributed data storage, point-to-point transmission, consensus mechanism, encryption algorithm and other computer technologies. Blockchain technology has the characteristics of decentralization, security and trust, tamper proof and traceability. Due to the problems of mutual trust, mutual recognition, mutual operation and standard data format consistency among government departments and systems, how to confirm the rights and responsibilities of government data is a key problem in digital government data governance.

Based on the blockchain technology, it plays a very important role to build a secure intelligent exchange system for government information resource sharing, as well as a decentralized digital certificate or trust system(Li,Xia&Ding,2019). The blockchain technology provides a new solution for building a government information resource sharing platform with high security, trustworthiness, real-time exchange, data consistency, traceability and wide range of sharing.

(2) Component based middle platform technology

The core idea of component-based middle platform technology is to integrate operation data capability, product technology capability and external standardized service capability through software component-based method. The typical representative is Alibaba's middle platform strategy(Wang,2019).

(3) Data center technology

This technology is an effective way to comb and standardize the management of government data. It can abstract the data storage, computing and application capabilities it needs, integrate them into a shared "platform", and provide unified requirements for the front desk business departments, such as rapid response to decisions, refined operation and application support. Data center can logically isolate data and business, and precipitate common services and functions of various departments by formulating standards and specifications, so as to reduce communication costs, improve collaboration efficiency, and make any business line use the core competence of data services.

(4) AI middle platform technology

This technology provides step-by-step architecture and whole life cycle management services for algorithm models needed by digital government, so that government departments can continuously sink their business applications into AI algorithms and models, so as to achieve the purpose of reuse, combination innovation and large-scale construction of intelligent services. AI has become a new infrastructure for building large-scale intelligent services.

(5) Digital twin technology

Digital twin technology refers to the technology of building a virtual entity consistent with the real entity in the virtual space through digital means(Zhong,2017).

3.2 Business Governance System of Digital Government

The core of the business governance system of the digital government is to make all functions of the digital government operate in coordination with each other by means of the connection of things, interconnection and intellectualization. It is a new development model mainly characterized by the high integration of smart technologies, high-end development of smart industries, efficient and convenient smart services.

Aiming at the shortcomings of the existing business governance system, an open and integrated business governance system of digital government is proposed. The system is divided into three different levels, as shown in Figure 2.

The first-level business includes six functions, including market regulation, economic operation, social management, public service, environmental protection and social appeal. Secondary services mainly include intelligent applications and services; Tertiary services are scenario-based applications.

3.3 Operation and Management System of Digital Government

The operation and management system of digital government involves many aspects, such as partners, system operation, application services, performance evaluation and so on. It has become an important consensus at home and abroad to promote the construction of digital government governance system through the innovation of operation and management system. From the management innovation of digital government at home and abroad, it has the following important characteristics:

First, it actively introduces third-party organizations as partners of digital government. For example, the construction of digital government usually adopts the cooperation mode architecture of "government + enterprise alliance", in which the "enterprise alliance" is coordinated by a leading enterprise for daily construction management, and assists the member enterprises to carry out relevant engineering construction.

Second, it adopts the management mode of "separation of management and operation", that is, the government establishes a professional management organization to manage the digital government as a whole, and establishes a digital government operation center to be responsible for the unified operation and service of government services.

Third, it establishes an open performance evaluation and assessment mechanism. The public as the service object of the government, the quality of the services provided by the digital government should be evaluated by the public, and the public participation in the satisfaction evaluation of the digital government is conducive to reflect the concept of user centered digital government governance.

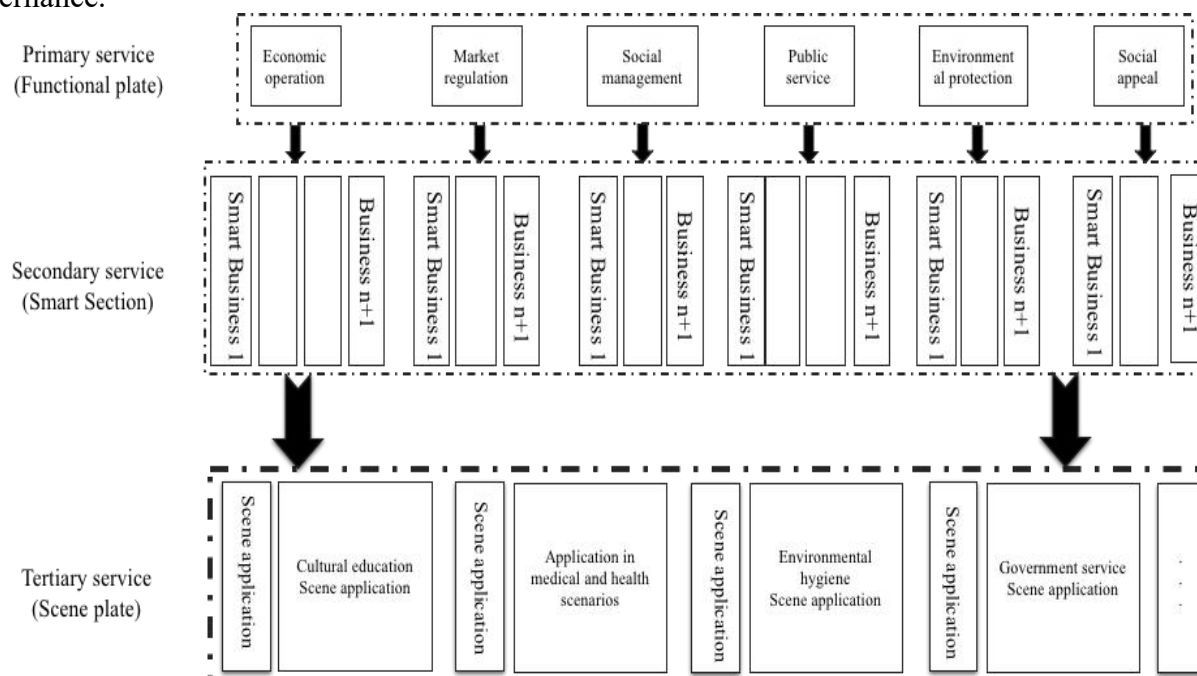


Figure 2: Digital government business governance system.

4. Guarantee mechanism to promote the coordinated development of Digital Government

In order to accelerate the transformation and upgrading of digital government, this paper puts forward the following suggestions:

Overall coordination mechanism. The construction of overall coordination mechanism is conducive to avoid a series of problems, such as multi-disciplinary, independent, repetitive construction, waste of investment and so on. In the process of promoting the construction of digital government, we should focus on strengthening the construction of overall coordination mechanism in planning, policies, projects, funds and other aspects, so as to ensure the formation of joint forces for development and realize the overall layout and coordinated promotion.

(2) Sharing and opening mechanism. The construction of sharing and opening mechanism is conducive to improving the utilization efficiency of innovation factor resources and releasing the innovation dividend of factor support as much as possible. The construction of digital government should focus on strengthening the opening and sharing of advanced infrastructure, data resources and innovation platform, and provide more support for digital government innovation elements.

(3) Coordination and linkage mechanism. The construction of collaborative linkage mechanism is conducive to better promote the construction of digital government. In the process of digital government construction, we should focus on strengthening the collaborative linkage of social governance, people's livelihood services, project planning and construction, and really improve the overall government's collaborative operation ability.

(4) Innovative experimental mechanism. The construction of innovation experiment mechanism is conducive to reducing the cost of social innovation and better stimulating the society to take advantage of the opportunities of digital government construction to carry out innovation and entrepreneurship. We will focus on strengthening the mechanism construction of innovation

experimental fields, data development and utilization, and system innovation experiments, so as to maximize the vitality of urban development to drive innovation.

5. Conclusions

Digital government, as a strategic support for the modernization of China's governance system and governance capacity, is an important part of digital China. The research on the digital government governance system is beneficial to accelerate the construction of digital government and serve the construction of local economy.

This paper first analyzes the current situation of digital government; Then, in view of the problems existing in the digital government governance system, this paper focuses on the technical governance system, business governance system and operation management system of the digital government. Finally, from the perspective of promoting the sustainable development of the digital government, specific suggestions are given.

Facing the new historical opportunities of the transformation and upgrading of the information society from the information age to the intelligent age in the future, we are required to further improve and optimize the governance structure of the digital government, so as to promote the capacity and level of all work, and constantly improve the modernization level of the national governance system and governance capacity.

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