## Data Sharing in Digital Government Construction

Subjects: Public Administration

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Digital government construction is a complex system project, and data sharing is its governance niche. Crosssectoral data sharing is the core issue of improving governance capacity in the construction of digital governments.

data sharing

cross-department coordination

data management

### 1. Introduction

With the advent of the Fourth Industrial Revolution, the digital economy is experiencing an extraordinary boom, leading to a similar transformation of digital government in the area of government governance <sup>[1]</sup>. In this context of development, the traditional discourse on production relations in the political economy is being further expanded, with data becoming a vital means of production <sup>[2]</sup>. The widespread adoption and application of digital technology has resulted in organizational and managerial changes, particularly in government departments in which information technology changes have brought a gradual shift in the paradigm of administrative governance toward governance in the digital age <sup>[3]</sup>. Compared to the deconstruction approach of new public management (NPM), which aims to create small, fragmented institutional governance, the digital government era focuses on reintegration and needs-based holism. This approach relies on digital technology to enhance collaborative governance across sectors, thereby re-governmentalizing and attempting to eliminate silos of public sector processes. This helps prevent administrative fragmentation dilemmas <sup>[4]</sup>. In the progress of building a digital government, realizing the convergence and sharing of data elements across departments, regions and fields has become a core issue in enhancing the governance capacity of digital government.

To achieve integrated data management and construct a collaborative and open digital government management platform, data management departments have been established in different regions of China. These departments can be classified into three types: independent government departments with data management functions, established departments that have added data management functions, and new divisions that have incorporated data management functions under one of the original departments [5]. A common challenge faced by different types of data management departments is the relationship with functional departments [6][7]. On the one hand, the degree of informatization varies from department to department. The digital literacy and competence of public officials varies, as does the degree of standardization and differentiation of data in the sector. On the other hand, regarding sharing data, decision makers in a department assess the risks involved and are torn between active and passive sharing, or even nonsharing, as they see data as core assets for maintaining power [8]. The priority of whether this

sharing affects the core interests of the department is clearly higher for departmental heads than the overall performance of the digital government <sup>[9]</sup>.

Cross-department data sharing is a dynamic and complex game process containing many uncertain and unstable factors. In order to analyze in detail the strategic paths of the different subjects in this game process and the influence of relevant factors, this research constructed a tripartite evolutionary game model and introduced Gaussian white noise to simulate the random disturbance environment, and the changes and stability conditions of the data sharing game strategy between the data management departments and the different government functional departments are discussed. Furthermore, researchers used a numerical simulation to analyze the trajectory of the evolution of the strategy of the different subjects under the influence of multiple factors in a stochastic environment. Researchers provide specific recommendations based on the findings of this study to promote smooth data sharing among different sectors with the expectation of advancing digital governance capabilities in the era of big data. From the existing studies, it can be seen that the role played by data management departments in data sharing and their influencing factors have received extensive focus, especially the relationship between data management departments and functional departments, which has also been somewhat elucidated from the qualitative research perspective. However, it should be emphasized that inter institutional relationships are not static. Especially in the complex environment of digital transformation, the behavioral performance and strategic choices of data management departments and functional departments change dynamically with the influence of different factors.

# 2. The Advantages and Dilemmas of Cross-Department Data Sharing

Achieving openness and the sharing of data are the basis for efficient, agile and intelligent collaboration to deal with complex social issues in the current era of digital governance [10]. Government data sharing includes two meanings: that government departments seek data sharing from other government departments due to the need to perform their duties, and that government department data are open for sharing with the public. The crossdepartment data sharing studied in this research falls under the first meaning, i.e., the act of data sharing among government departments. Data sharing requires the building of systems or platforms among different departments and the harmonization of different business data standards, as well as the transformation of business processes to meet access to data sharing [11]. Unlike the traditional hierarchy of departments, cross-department data sharing can break down the information barriers among the different departments and can improve the efficiency of the information transfer, policy coordination and public service provision within the government. In the current era of data explosion, the information resources of government departments are also growing at an explosive pace. How to achieve coordination and stability in sharing data across departments has become the key to enhancing the government's digital governance capabilities. A wealth of experience emerges from China's digital government reforms. By analyzing the "Visit Once" reform in Zhejiang, some scholars found that enhancing data sharing among departments can reconcile the contradiction between the fragmentation of administrative functions and the integration of public services, and it can improve the level of business collaboration among government departments <sup>[12]</sup>. Through the use of information technology to promote data storage in the cloud and the syncing of government services, this new type of administrative approval has achieved a change in governance by allowing data transmission instead of the masses seeking out different departments <sup>[13]</sup>.

The government can improve the refinement and integration of its public services by improving the level of crossdepartment data sharing. On the one hand, cross-department data sharing within the government can enhance the accuracy of matching government public service supply with public demand. Cross-department data sharing has resulted in interdepartmental collaboration and functional integration, enhancing the government's ability to respond quickly and accurately to citizens' needs for governance [14][15]. On the other hand, data sharing can enable business integration and even parallel reinvention among different departments, enhancing the integration of government public services and reducing repetitive rule-based labor [16][17][18]. However, for a long time, the reality of inadequate government data sharing, such as "data chimneys", "data silos", and "data barriers", has always hindered cross-department business collaboration [19]. There are natural barriers to data sharing across sectors, industries, and hierarchies. The perception of data varies among different government departments, as does the perception of sectoral interests involving data. In addition, factors such as technical compatibility, the nonuniformity of the data structure, specialized operations and data security hinder the flow of data among government departments. The compartmentalization and weak correlation among business units also constrain the willingness of some departments to share data. In general, it can be simply summarized as technical factors, business factors, conceptual factors and management factors <sup>[20][21]</sup>. These problems arise due to the presence of a combination of factors, such as data-sharing inputs, data-sharing systems and unfavorable cross-department coordination <sup>[22]</sup>. Therefore, in further research, it is necessary to deeply explore the influence and effect of different factors on different subjects in the process of cross-department data sharing to provide theoretical support for analysis and to propose solutions.

### 3. Factors Influencing Cross-Department Data Sharing

In order to promote cross-department data sharing within the government, scholars from different disciplinary backgrounds have researched the issue of cross-department government data from different disciplinary paradigms, with two main disciplinary subdisciplines in general: public administration and intelligence <sup>[23][24]</sup>. Public administration scholars are more likely to study the data sharing mechanism based on government subjects and to focus on collaborative management among government departments from the organizational dimension. Cross-department data sharing needs to break down traditional administrative compartmentalization through building mechanisms <sup>[25]</sup>. A lack of trust among government departments is the cause of inactive data sharing <sup>[26]</sup>. This requires the development of appropriate systems to enhance positive incentives for cross-department data sharing, such as reward and punishment mechanisms. In the case of low levels of intersubjective trust and cooperation, top-down promotion by the central government is required <sup>[27]</sup>. The complex leadership mechanism and data interfacing model, resulting in "data chimneys" that are still standing <sup>[28]</sup>. The establishment of a dedicated big data management agency could be a good way to address this issue. This requires further realignment of the

responsibilities and competencies to facilitate effective cross-department collaboration through the operation of a professional digital agency <sup>[21]</sup>. The study of intelligence is based on data as intelligence and focuses more on the technical aspects of government data platform construction, data sharing processes and the integration of data elements. From the perspective of the subject, enhanced training in data collection and processing, data infrastructure maintenance, and development can improve the technical capacity and digital literacy of government personnel. The cost of inhibiting government willingness to share can be reduced by harmonizing data interfaces, developing sharing specifications, and streamlining the data-sharing process. From a technical perspective, a citizen-centric model of distributed data sharing has been proposed. Distributed document exchange networks offer advantages, such as security, transparency, cost effectiveness and trust, which can better improve administrative efficiency and reduce bureaucratic procedures <sup>[29]</sup>. Some scholars have also proposed embedding blockchain technology into cross-department data governance by leveraging the decentralized and de-trusting features of blockchain technology, thereby improving the security and reliability of cross-department data sharing <sup>[20][31]</sup>.

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