

The Challenges and Countermeasures of Deepening the Development and Digital Transformation of Local Government E-government

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ABSTRACT

The deepening development and digital transformation of local government e-government are key to enhancing the efficiency of public services and building a modern governance system. This paper focuses on the interactive relationship between e-government and digital transformation, conducting a systematic analysis of the systemic challenges faced during their co-evolution. These challenges include concerns about data security, difficulties in system integration, technical application bottlenecks, and institutional lag, among other issues. Based on this analysis, a targeted governance framework is proposed. The study aims to uncover the intrinsic laws governing the development of e-government in the context of digital transformation, providing theoretical support for optimizing the model of government service provision. Its practical significance lies in addressing the challenge of integrating technological empowerment with institutional innovation, thereby promoting the modernization of governance capabilities.

KEYWORDS

Local government; E-government; Digital transformation; Challenges; Countermeasures

1 Introduction

In the current process of local governments promoting e-government, they face both the opportunities brought by technological advancements and the structural contradictions between traditional governance models and the demands of digital governance. The widespread phenomenon of information silos leads to low collaboration efficiency, service innovation is constrained by insufficient application of emerging technologies, and the digital expansion of public participation channels has yet to form an effective closed loop. These issues highlight that the innovation of technical tools and the transformation of governance systems are not happening in tandem. Building a government service system that adapts to digital transformation has become an urgent task. This article, from the perspective of enhancing governance effectiveness, focuses on exploring the practical paths for the deepening development of e-government. By analyzing the dialectical relationship between technology empowerment and institutional restructuring, it aims to provide theoretical references for addressing the real challenges in digital governance transformation, thereby assisting local governments in achieving substantial improvements in their governance capabilities during the digital transformation process.

2 The Relationship Between E-government and Digital Transformation

E-government refers to a new management model where government agencies comprehensively apply modern information technology, network technology, and office automation technology in their administrative activities to manage offices, conduct management, and provide public services to society. Digital transformation (Digital transformation) is a high-level transformation that builds on digital conversion (Digitization) and digital upgrading (Digitalization), aiming to establish a new business model by further engaging with the core business of companies. These two processes form a bidirectional empowerment mechanism in the modernization of local government governance: e-government, as a pioneering practice of digital transformation, has accumulated extensive experience in digital governance through the construction of standardized government service platforms, laying the technical foundation for data flow and business collaboration between departments. Meanwhile, the holistic governance philosophy brought about by digital transformation drives e-government to transcend the single service supply model, promoting a shift from process optimization to system reconstruction in government services. In this process, the physical boundaries of traditional government services are broken down, and the integration of online and offline service models gives rise to a new governance ecosystem, forming a Chinese-characteristic path of government digital transformation ^[1].

3 The Challenges of Deepening the Development and Digital Transformation of Local Government E-government

3.1 Data Security and Privacy Issues

The e-government platform stores a vast amount of personal information and social governance data. The collection, storage, and processing of this data involve collaboration between multiple levels of government departments and third-party technology providers. During cross-system interactions, the lack of unified interface standards and unclear permission divisions leads to uncontrollable risks in data flow. Some legacy systems, due to their flawed architecture, struggle to adapt to new encryption technologies, exposing sensitive information to potential attacks during transmission. The permission management mechanism of the e-government system has issues such as coarse role definitions and incomplete access logs. Management oversights, such as temporary accounts not being promptly canceled and keys not being fully recovered after employees leave, may provide opportunities for unauthorized internal access. The covert nature and difficulty in tracing permission abuse further increase the risk of data loss.

3.2 The Problem of Integration and Coordination of Information Systems

The integration and collaboration of information systems face multiple practical obstacles. The segmented management system leads to invisible barriers in data sharing between departments. The lack of unified planning during the initial development of business systems results in fragmented data standards and interface specifications. Historical legacy systems are incompatible with emerging technology architectures, creating a complex technical ecosystem where old and new platforms coexist. Differences in data collection criteria and business logic among different levels of government further increase the friction costs of system integration. In the process of reengineering cross-departmental business processes, unclear boundaries of authority and responsibility lead to insufficient collaboration motivation. Grassroots government personnel face the burden of repeated entry and verification when switching between multiple systems. The delay and completeness issues in data flow directly impact the response efficiency and decision support effectiveness of government services. When the public handles cross-regional and cross-departmental business, they may still encounter problems such as repeated submission of materials and poor information verification ^[2].

3.3 The Depth and Breadth of Digital Technology Application is Insufficient

In the context of government services, the introduction of cutting-edge technologies such as artificial intelligence and blockchain often remains at the surface level of functional module development. The insufficient integration of technical architecture with business processes leads to a marginal decrease in application efficiency. For instance, blockchain technology is often reduced to a data certification tool, failing to leverage its decentralized nature to optimize cross-departmental collaboration mechanisms. Machine learning algorithms are limited to simple work order classification and fail to develop proactive service models based on user behavior prediction. Some organizations exhibit a tendency towards path dependence when selecting technologies, overly relying on mature but slowly evolving solutions. They adopt a cautious and wait-and-see attitude toward emerging technologies that have the potential to reshape business processes. This technological conservatism makes it difficult for e-government platforms to meet the public's growing demand for personalized services. The homogenization of functions in government service apps undermines the expected value of digital transformation. The horizontal expansion of technology applications also faces the challenge of incomplete coverage of service recipients. Age-friendly adaptations often remain at the basic level of interface font enlargement, without developing deep interaction features like voice navigation and behavior guidance tailored to the cognitive characteristics of the elderly. The accessibility system for people with disabilities still relies on third-party plugins and lacks the technical inclusiveness of native design.

3.4 A Shortage of Skilled Personnel

There is a structural shortage of composite talents in the current government workforce who possess both public management skills and digital technology thinking. Grassroots staff often struggle to adapt to new technological tools, and the cognitive differences between technical and business departments hinder the efficiency of demand alignment and solution implementation. Government system operation and maintenance personnel have varying levels of proficiency in core technologies like cloud computing and big data. Some units rely on external technical support, which hinders the development of autonomous and controllable digital governance capabilities. The mismatch between the pace of technological iteration and knowledge updates makes existing technical solutions prone to periodic obsolescence ^[3]. Traditional personnel management mechanisms lack competitiveness in attracting high-end digital talent, and the career development paths and incentive mechanisms for technical positions have not been differentiated.

Young technical professionals are often constrained by administrative procedures and risk control requirements when innovating in government scenarios. Communication barriers frequently arise during cross-domain collaboration, further diminishing the expected outcomes of technology empowerment.

3.5 The Lag of Policy, Regulation and Institutional Guarantee

The current policy framework has significant institutional gaps in the legal authorization for data sharing in e-government. There is a lack of detailed standards to define the compliance boundaries for data access between departments. When market supervision departments request health information from enterprises within the health system, they often face challenges due to unclear data ownership. The provisions on public interest exceptions in the Personal Information Protection Law lack practical implementation guidelines at the grassroots level, making it difficult for window staff to determine which data fields can be used for cross-departmental verification and which must be anonymized due to personal privacy concerns. The lag in updating regulations leads to compliance disputes when applying new technologies. While facial recognition technology has improved efficiency in government service halls, current laws do not cover dynamic identification scenarios regarding the scope of biometric information collection and storage periods. For example, a local government App's addition of real-time facial dynamic verification features has raised public concerns about continuous identity monitoring. The poor alignment between local regulations and national standards further complicates enforcement. Cross-provincial mutual recognition of electronic certificates often faces issues with stamp validity recognition rules. When enterprises apply for setting up branches in other regions, they may be forced to reapply offline because the encryption algorithms of their electronic business licenses are not recognized by the other province. This institutional friction directly offsets the efficiency gains from digital transformation.

4 Countermeasures for Deepening the Development and Digital Transformation of Local Government E-government

4.1 Strengthen Data Security Management and Privacy Protection Mechanism

Government departments should refine the standards for data classification and grading at the institutional design level, develop differentiated encryption storage rules for sensitive data such as citizen identity information and health records, and clearly define the approval processes for accessing data of different security levels. Technical teams should regularly conduct vulnerability scans and penetration tests on government cloud platforms to promptly address security vulnerabilities in outdated systems. Dynamic desensitization tools should be deployed during data transmission to prevent excessive exposure of information during sharing. Staff operation permission management should incorporate a dual mechanism of biometric verification and operation log tracking. Key data retrieval actions must undergo multi-level review and retain complete audit records. The accounts of departing personnel should be immediately frozen after confirming personnel changes. For public participation channels, a simple and understandable privacy setting guide can be developed, and a data authorization withdrawal entry can be set up in the government service App, allowing users to manage the scope and duration of personal information collection independently. Grassroots government service halls should appoint dedicated data security officers to answer public concerns about personal information processing, regularly organize training for window staff on the latest privacy protection laws, and integrate data security awareness into daily service procedures.

4.2 We Will Promote the Integration and Connectivity of Government Information Systems

Local governments can establish a two-way consultation mechanism between business departments and technical teams during the integration of government systems. Business experts can outline the processing logic for high-frequency matters, while technical teams can customize data interface specifications based on actual needs, gradually migrating decentralized approval systems to a unified foundational support platform. To address the compatibility issues of legacy systems, a modular transformation strategy can be adopted, retaining core functions while stripping away unnecessary components, and using middleware technology to achieve automatic data conversion between the new and old platforms. A standardized work team, coordinated at the municipal level, should be established to regularly publish cross-departmental data sharing lists and update rules. Blockchain technology can be used to establish a credible data traceability mechanism, ensuring data security while opening up partially anonymized databases for multi-party access. Business personnel and technical staff should jointly conduct quarterly job rotation training, simulating cross-system collaboration scenarios to deepen their understanding of the overall architecture. Lightweight data validation tools should be configured at grassroots service windows to assist in manual verification, reducing redundant operations

caused by system switching. A digital capability evaluation system covering both city and county levels should be established, incorporating system connection smoothness and data reuse rates into departmental performance indicators, forming a continuous optimization closed-loop management mechanism ^[4].

4.3 Expand the Application Scenarios of Digital Technology and Improve Service Efficiency

At the grassroots level, when handling business registrations for individual entrepreneurs and other services, mobile terminals are used to conduct on-site inspections and simultaneously record electronic signatures. Geographic Information Systems (GIS) are utilized to mark the location of business premises in real time, forming a dynamically updated electronic archive of market entities. Technical suppliers can optimize voice interaction modules to meet the needs of elderly individuals, embedding dialect recognition and speech rate adjustment functions into intelligent customer service systems. For special matters that require assistance from family members, remote video authorization channels can be added, gradually bridging the generational gap in digital services. Community service stations can equip themselves with self-service terminals that integrate basic functions such as proof printing and policy inquiries, and introduce facial recognition technology to enable 'seamless roaming' for high-frequency matters like senior citizen preferential certificates. This is combined with offline assistance from staff to form a closed loop of age-friendly services. The government service network can add a dedicated section for the entire lifecycle of enterprises, integrating multiple departmental forms related to establishment, changes, and cancellation into a scenario-based Q&A process. Based on user choices, it automatically generates personalized material lists and pre-fills cross-departmental shared data. The technical operation and maintenance team should regularly collect operational bottlenecks reported by the public on message boards, addressing common issues such as failed photo uploads and unrecognizable electronic signatures by iterating system compatibility. Version update instructions should include graphic and text operation guides to reduce user learning costs.

4.4 We Will Strengthen Personnel Development and Technical Training

Government departments can collaborate with local universities to establish joint training bases for digital talent in government services. They can break down service scenarios into project-based modules, arranging key personnel from service windows to participate in full-cycle practical training courses, including demand analysis and process reengineering. Through real projects like the upgrade of the social security qualification verification system, they can master skills such as blockchain certification and OCR recognition. The training team designs phased capability enhancement plans based on job differences, developing three-dimensional simulation courseware for basic operations of the government cloud platform for new hires. This courseware simulates high-frequency operational scenarios like data entry and approval flow through a drag-and-drop interface. Business departments regularly organize cross-departmental joint task forces, selecting digital specialists from sectors like market regulation and civil affairs to focus on optimizing intelligent approval rule libraries. In specific tasks like automatic low-income eligibility review, they explore feasible paths for optimizing field validation rules ^[5]. Internally, the government establishes a mentorship system for digital professionals, selecting department-level officials with over five years of system operation experience to form a mentor pool. These mentors provide personalized growth manuals for grassroots window staff, covering topics such as permission management standards and handling abnormal work orders. Monthly case reviews are held to analyze the technical principles behind operational errors.

4.5 We Will Improve the Policy, Regulation and Institutional Guarantee System

Local governments need to establish a dynamic mechanism for updating policies and regulations as they advance e-government. This involves regularly reviewing the existing institutional framework in response to technological advancements and changes in service scenarios, organizing joint reviews of clause applicability by legal experts and business departments, and revising and supplementing detailed implementation rules to address issues such as unclear data sharing boundaries and ambiguous online service responsibilities. Regulatory bodies should proactively conduct on-site research at the street and community levels to identify institutional blind spots encountered by window staff and the public during operations. They should convert frequent feedback on obstacles to mutual recognition of electronic certificates and cross-departmental approval coordination into the basis for revising clauses, ensuring that policy texts remain relevant and effective. In the supervision phase, third-party professional institutions should be introduced to conduct regular assessments of the effectiveness of institutional implementation. This includes building quantitative evaluation models for typical business processes, such as enterprise registration and handling of livelihood matters, to identify bottlenecks in policy implementation through data tracking and optimize them accordingly. To address the common issue of insufficient motivation for cross-level collaboration reported by grassroots units, an inter-departmental

mutual recognition mechanism for e-government assessment results can be explored. This would incorporate data sharing contributions and business collaboration response speeds into performance evaluation indicators, breaking down resource silos caused by traditional administrative barriers.

5 Conclusion

The deepening development of e-government fundamentally involves the digital transformation of governance models. This requires breaking free from the mindset that is limited to mere technological application and instead establishing a new governance paradigm driven by the synergy of technology, systems, and humanistic elements. The three pillars of successful transformation are the enhancement of data governance capabilities, the improvement of system integration mechanisms, and the enhancement of public digital literacy. Among these, institutional innovation plays a decisive role in guiding technological empowerment. To achieve this, local governments should establish a policy supply mechanism that can dynamically iterate, focusing on overcoming institutional barriers to cross-departmental collaboration, while ensuring data security and expanding the application scenarios of smart services. Future research could delve into how new technologies like artificial intelligence can reshape government processes and explore the pathways to achieving service equality from a digital inclusiveness perspective. Only through the continuous innovation of governance concepts and the deep integration of digital technology can we achieve substantial improvements in the quality and efficiency of public services during the digital transformation.

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