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Research on the Reconstruction of Government Audit Functions and the Logic of Intelligent Transformation Driven by Artificial Intelligence

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Abstract:

Against the backdrop of the continued development of digital government, new-generation information technologies such as artificial intelligence are profoundly transforming the operation of public governance and exerting a systemic influence on the functional structure and operational logic of government audit. Drawing on theories of technological empowerment and algorithmic governance, this paper constructs an analytical framework of "technology–institutions–power" interactions and systematically examines the theoretical foundations, internal logic, practical risks, and transformation pathways of the reconstruction of government audit functions under intelligent conditions. Artificial intelligence is extending the functions of government audit from ex post supervision to whole-process supervision, deepening them from outcome evaluation to process diagnosis, and expanding them from single-actor supervision to collaborative governance. At the same time, the transformation faces risks at the technological, institutional, and governance levels, including algorithmic opacity, institutional lag, and power imbalances. Accordingly, intelligent transformation should be advanced under the guidance of functional reconstruction. Institutional norms should be improved, accountability mechanisms clarified, and governance coordination strengthened to ensure the standardized operation of functional reconstruction and enhance its overall effectiveness.

Keywords:

artificial intelligence, government audit, reconstruction of audit functions, intelligent transformation, governance coordination

1 Introduction

As the development of digital government continues to advance, new-generation information technologies such as big data and artificial intelligence are profoundly reshaping the operational logic and modes of implementation of public governance. Algorithmic decision-making, data-driven approaches, and intelligent regulation are gradually being embedded throughout government governance, subjecting the traditional governance model, which relies on human experience and ex post correction, to systemic change. Against this backdrop, the functional positioning of government audit, as an important institutional arrangement for modernizing the national governance system and governance capacity, is also changing significantly. It is no longer confined

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to compliance oversight of fiscal and financial revenues and expenditures, but is gradually expanding toward risk prevention and control, performance evaluation, and governance improvement. However, while artificial intelligence enhances auditing efficiency and coverage, it also poses new challenges to the functional structure, operational logic, and power boundaries of auditing. How to reassess the functional connotations of government audit and clarify the internal logic of its functional reconstruction under intelligent conditions has become an important issue requiring urgent attention in auditing theory and practice.

At the theoretical level, existing research on government audit has largely been conducted within traditional institutional environments, and systematic discussion of artificial intelligence as a key technological variable remains relatively insufficient. Consequently, it is difficult to explain the new characteristics of the evolution of audit functions under intelligent conditions. Incorporating artificial intelligence into the analytical framework for audit functions can help expand intelligent explanatory approaches to functional reconstruction. At the practical level, audit institutions at all levels commonly face the dilemma of "technological application advancing first, with functional positioning lagging behind," and there is an urgent need to clarify "what auditing should do and how it should be done" during intelligent transformation. At the policy level, systematically revealing the logical foundations and directions for realizing functional reconstruction can provide a theoretical basis for the institutional design of auditing modernization.

2 Theoretical Foundations of the Artificial Intelligence-Driven Reconstruction of Government Audit Functions

2.1. Traditional Theoretical Definitions of the Functions of Government Audit

From the perspective of institutional evolution, theoretical definitions of the functions of government audit have consistently centered on the standardization of the exercise of public power by the state. First, the oversight function is the most fundamental and core functional form of government audit. It emphasizes examining the legality and compliance of fiscal and financial revenues and expenditures and related economic activities, with the aim of preventing the abuse of power and the flow of public resources[1]. Second, with the introduction of New Public Management, government audit gradually developed an evaluation function represented by performance auditing, extending its focus from "whether activities are compliant" to "whether activities are effective"[2]. Third, against the backdrop of the continuous improvement of the national governance system, government audit has been assigned a more prominent governance function. By revealing institutional deficiencies, promoting policy implementation, and standardizing the exercise of power, it provides institutional safeguards and promotes governance[3]. These three types of functions together constitute the basic structure of the traditional functions of government audit.

2.2. The Theoretical Logic of Artificial Intelligence Involvement in Public Governance

Technological empowerment theory holds that technology is not merely a tool; rather, by reshaping mechanisms for information acquisition, processing, and feedback, it amplifies organizations' governance capacity and scope of action. In the field of public governance, artificial intelligence has transformed the traditional governance model that relies on human judgment by improving data-processing efficiency and risk-identifi-

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cation capabilities. Algorithmic governance theory, in turn, emphasizes the structural influence of algorithms on public decision-making and oversight processes, maintaining that algorithmic rules participate in, and to a certain extent even reshape, the logic underlying the exercise of power. Meanwhile, the involvement of artificial intelligence has generated tension between technical rationality and value rationality. Algorithms' pursuit of efficiency and precision may weaken the prudent judgment that auditing should exercise, while the legality, impartiality, and accountability emphasized in public governance cannot be fully replaced by technological means. This tension constitutes an unavoidable theoretical premise for analyzing the intelligent transformation of government audit.

2.3. An Analytical Framework for the AI-Driven Reconstruction of Government Audit Functions

The reconstruction of government audit functions is not the result of the unidirectional effects of technology, but rather the product of the combined effects of technological variables, institutional arrangements, and power structures. As a key technological variable, artificial intelligence directly influences the structural forms and operational modes of audit functions by changing the sources of auditing information, methods of processing, and decision-support mechanisms[4]. At the same time, the degree to which the existing auditing institutional framework regulates technological application and the manner in which auditing power is allocated also impose important constraints on functional reconstruction. Accordingly, this paper constructs an analytical framework based on the interactive relationship among "technology, institutions, and power." Within this framework, changes in audit functions are reflected not only in adjustments to oversight, evaluation, and governance functions, but also in the reshaping of auditing's role within the national governance system.

3 The Internal Logic of the Reconstruction of Government Audit Functions Driven by Artificial Intelligence

3.1. Functional Extension from "Ex Post Supervision" to "Whole-Process Supervision"

Constrained by the means of information acquisition and technological conditions, traditional auditing has primarily taken the form of ex post supervision, focusing on compliance reviews of the outcomes of established economic activities. The introduction of artificial intelligence, particularly its capacity for the real-time collection and continuous analysis of multi-source data, has significantly changed the temporal structure and modes of intervention of auditing oversight. Through the dynamic monitoring of fiscal operations, project implementation, and fund flows, auditing oversight can shift from phased intervention to whole-process coverage. Intelligent early-warning mechanisms based on algorithmic models enable potential risks to be identified before they become manifest, thereby strengthening the forward-looking function of auditing. Consequently, auditing oversight is gradually shifting from an external, ex post correction model to forward-positioned supervision embedded in business processes and extending throughout operational stages, achieving a substantive extension of functions in the temporal dimension.

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3.2. Functional Deepening from "Outcome Evaluation" to "Process Diagnosis"

Traditional performance auditing primarily evaluates the effectiveness of policies or projects on the basis of outcome indicators, with evidence acquisition relying heavily on manual sampling and ex post analysis. With the application of artificial intelligence to data mining and pattern recognition, the sources of auditing evidence have become more diverse and the methods of acquisition more continuous, providing technological support for in-depth analysis of operational processes. Under these conditions, performance auditing is gradually expanding from the mere evaluation of the quality of outcomes to the systematic diagnosis of policy implementation mechanisms, management processes, and the operational status of institutions. The logic of auditing evaluation is also shifting from an outcome orientation toward greater emphasis on the rationality of processes and the effectiveness of institutions, thereby deepening the functions of government audit at the content level.

3.3. Functional Expansion from "Single-Actor Supervision" to "Collaborative Governance"

Traditional auditing has generally been conducted by a single supervisory actor, with pronounced information barriers between auditing and other regulatory authorities. As cross-departmental data-sharing mechanisms have gradually been established, the information resources and analytical results held by auditing have begun to circulate over a broader scope, creating conditions for multiple regulatory actors to perform their duties collaboratively. In this process, government audit is gradually changing from an independent supervisor into a hub node within a multi-actor regulatory system. By integrating information and revealing systemic risks, it promotes coordination and linkage among different regulatory forces. The governance function of auditing is consequently exhibiting a trend toward collaborative evolution. Its role is no longer confined to identifying problems themselves, but places greater emphasis on enhancing the overall effectiveness of the governance system.

4 Challenges and Risks of Functional Reconstruction in the Intelligent Transformation of Government Audit

4.1. Technological Risks

Technological risks are manifested first in the opacity of algorithmic logic. Algorithmic systems operating on complex models often exhibit "black box" characteristics, and their reasoning processes and bases for judgment are difficult to explain fully, thereby weakening the comprehensibility and verifiability of auditing conclusions. Meanwhile, intelligent auditing relies heavily on data resources. Insufficient data quality, inconsistent data definitions, or embedded biases may all be amplified by algorithms and directly affect the objectivity of auditing judgments. In addition, excessive reliance on technological tools may weaken auditors' professional judgment, causing auditing activities to shift from being "led by professional judgment" toward "reliance on technological outputs"[5]. This indicates that, while improving auditing efficiency, technology may also pose a potential challenge to the professionalism and prudence of audit functions.

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4.2. Institutional Risks

Compared with the rapid evolution of technology, adjustments to auditing institutions often lag behind, exposing intelligent transformation to pronounced risks of institutional adaptation. Current auditing laws and regulations have largely been designed around traditional auditing models and lack explicit provisions on algorithm use, data governance, and the allocation of responsibilities in intelligent auditing. Against this backdrop, the boundaries of auditing powers and responsibilities face pressure for redefinition, and clear institutional arrangements have yet to be established for such issues as the status of algorithmic judgments in auditing decisions and the attribution of responsibility for failures of technological systems. When technological application advances significantly faster than institutional development, a governance dilemma of "having technology but lacking norms" can readily arise. This not only constrains the standardized operation of functional reconstruction, but may also generate new institutional risks.

4.3. Governance Risks

At a more macro level, artificial intelligence-driven functional reconstruction may also entail governance risks. As technological capabilities increase, auditing exercises ever greater control over information resources and analytical results. In the absence of effective constraints, this may lead to the combined expansion of technological power and auditing power, giving rise to power imbalances. Meanwhile, the extensive collection and analysis of data in intelligent auditing pose new challenges to the lawful rights and interests of auditees, including their rights to be informed, to present defenses, and to privacy. If mechanisms for protecting these rights are not improved concurrently, the foundation of legitimacy for auditing activities will be weakened. How to safeguard the public trust and institutional legitimacy of auditing while advancing intelligent transformation has become a governance issue requiring urgent attention in the process of functional reconstruction.

5 Transformation Pathways for the Artificial Intelligence-Driven Reconstruction of Government Audit Functions

5.1. Advancing the Intelligent Transformation of Auditing Under the Guidance of Functional Reconstruction

The key to advancing the intelligent transformation of government audit lies not in the comprehensive rollout of technological applications, but in clearly defining the direction, depth, and boundaries of technology introduction under the guidance of the reconstruction of audit functions. First, the core functional positioning of government audit under intelligent conditions should be reaffirmed. Although artificial intelligence has significantly enhanced auditing's data-processing capabilities, the fundamental functions of government audit remain to safeguard the standardized exercise of public power and the effective allocation of public resources. Intelligent transformation should serve the forward positioning of the oversight function, the deepening of the evaluation function, and the expansion of the governance function, rather than simply pursuing "technological sophistication." Second, an intelligent auditing system commensurate with the objectives of functional reconstruction should be established. Technological components such as data collection, analytical models, risk

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identification, and feedback on results should be embedded in the oversight, evaluation, and governance functions of auditing, forming an operational logic in which "functional requirements guide technological configuration." Institutional design should also explicitly establish the auxiliary status of technological support in auditing decisions. Finally, vigilance is required against the instrumental-rationality tendency for "technology to replace functions." Auditing must not, through an excessive focus on efficiency, neglect the value rationality and institutional responsibility it bears as a mechanism for overseeing public power[6]. The central role of auditors in value judgment, the determination of responsibility, and the formulation of governance recommendations should be strengthened.

5.2. Ensuring the Standardized Operation of the Reconstruction of Audit Functions Through Institutional Development

Institutional development is a key support for ensuring that intelligent transformation proceeds in a standardized and orderly manner. First, the laws, regulations, and institutional framework relating to intelligent auditing should be systematically improved. The current legal and institutional framework for auditing lacks explicit norms governing new auditing methods such as data-driven approaches, algorithmic analysis, and intelligent decision-making. It is therefore necessary to revise legal provisions and formulate supporting regulations and technical standards to establish institutional rules governing the data sources, scope of technological application, procedural requirements, and use of results in intelligent auditing, thereby providing a clear regulatory basis for functional reconstruction. Second, the responsible actors and accountability mechanisms for algorithmic auditing should be clarified. The deep involvement of algorithmic models in auditing judgment places pressure on the traditional accountability system centered on auditors. Institutional design should clarify the boundaries of responsibility among audit institutions, auditors, and technology providers in the use of algorithms and the acceptance of results. In particular, it must be emphasized that algorithms serve only as technological support tools for auditing decisions, and their outputs cannot replace the responsibility for judgment borne by auditing actors. Third, sound ethical norms and review mechanisms for intelligent auditing should be established and improved. The application of artificial intelligence in auditing involves multiple ethical issues concerning data use, algorithmic bias, and constraints on power. In the absence of effective regulation, these issues may erode the foundation of legitimacy for auditing activities[7]. Fairness, transparency, and accountability should therefore be adopted as important value principles for intelligent auditing, and an ethical review mechanism should be used to conduct prior assessments and ongoing oversight of key algorithmic models and major technological applications.

5.3. Enhancing the Overall Effectiveness of the Reconstruction of Audit Functions Through Governance Coordination

The effectiveness of the reconstruction of government audit functions also depends on whether it can be effectively embedded in the overall governance system. First, cross-departmental mechanisms for auditing data sharing and coordination should be established. Intelligent auditing relies heavily on data resources, yet data are dispersed across multiple departments, including fiscal, taxation, and financial regulatory authorities. It is therefore necessary to clarify the scope, methods, and responsibilities of data sharing at the institutional level and to promote the orderly flow of auditing data among regulatory authorities through standardized

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data interfaces and security management rules. Second, the coordinating role of government audit within the intelligent regulatory system should be strengthened. As regulatory actors become increasingly diverse and regulatory methods increasingly intersect, government audit can integrate auditing findings with intelligent analysis results to support other regulatory authorities in risk identification, problem feedback, and institutional improvement, thereby avoiding duplication or gaps in regulation. Finally, the deep integration of audit functions with the modernization of national governance should be promoted. The outcomes of intelligent auditing should be systematically incorporated into policy evaluation, institutional improvement, and governance decision-making, making auditing an important support for governance improvement and achieving a positive interaction between functional reconstruction and the modernization of national governance.

6 Conclusion

Primarily employing normative analysis and logical deduction, this paper has conducted a systematic analysis of the artificial intelligence-driven reconstruction of government audit functions and reached the following conclusions. First, artificial intelligence has become an important exogenous variable driving the reconstruction of government audit functions. By reshaping the methods of acquiring auditing information, analytical techniques, and decision-support mechanisms, artificial intelligence has profoundly changed the operating conditions and boundaries of action of government audit functions. Functional reconstruction does not arise from the spontaneous adjustment of internal institutions, but constitutes a structural transformation driven by changes in the external technological environment. Second, the reconstruction of government audit functions exhibits an overall trend toward the forward positioning of oversight, the deepening of evaluation, and governance coordination. Auditing oversight is shifting from ex post correction to whole-process embedding; performance evaluation is expanding from an outcome orientation to process diagnosis; and auditing's coordinating and hub roles within the multi-actor regulatory system are becoming increasingly prominent. Together, these three developments constitute the basic picture of the reconstruction of government audit functions driven by artificial intelligence. Third, the intelligent transformation of government audit must be advanced prudently within institutional and governance frameworks. Only by clarifying functional positioning, improving institutional norms, and strengthening governance coordination can intelligent transformation genuinely enhance the effectiveness of auditing governance. Neglecting institutional constraints or relying excessively on technological means may weaken the public trust in auditing and even generate new governance risks.

Artificial intelligence technology continues to evolve. Future research should continuously track technological development trends and examine the potential impact of new technological forms on audit functions, auditing institutions, and governance models, thereby providing forward-looking theoretical support for the long-term intelligent development of government audit.

Author Contributions

Conceptualization: M.J.; T.Y.; Methodology: M.J.; Validation: T.Y.; Formal analysis: M.J.; T.Y.; Investigation: T.Y.; Resources: M.J.; Writing – original draft preparation: M.J.; Writing – review and editing: T.Y.;

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