

# The Exploration of the New Path of Public Investment Auditing in the Context of Big Data

Youfa Wang

Audit Bureau of Lanshan District, Linyi City, Shandong Province, 276002.

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**Abstract:** Public investment auditing is an effective way to ensure the effective use of public resources. With the development of China's economy and social progress, the number and complexity of public investment projects are increasing, posing new requirements and demands for the auditing. This article studies how to make full use of big data technology to improve the efficiency and accuracy of public investment auditing in the context of big data. It's hoped that through the research in this article, the modernization and intelligence in public investment auditing can be achieved, thereby ensuring the rational use of public resources and achieving sustainable social development.

**Keywords:** Big Data; Public Investment Auditing; Strategy

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## 1. Introduction

In order to better respond to various risks and challenges, the Party Central Committee and governments at all levels regard public investment as an important policy measure for maintaining growth, promoting development, avoiding risks, and narrowing disparities. While vigorously promoting effective investment, a series of major projects with global, fundamental, and strategic significance are also being promoted. Therefore, auditing public investment work is also very cumbersome. So, how to better play its economic supervision function in public investment auditing, to promote the healthy and stable development of public investment, and how to better play its fundamental role in stabilizing the economy, and how to ensure that the most important decisions and tasks of the Party Central Committee and the State Council can be fully implemented and effectively executed are currently urgent issues to be solved.

## 2. Advantages of Public Investment Auditing Development in the Context of Big Data

### 2.1 Big Data Technology can Help Reduce Public Investment Auditing Risks

Traditional audit risks include two aspects: One is the risk of auditors themselves. Traditional audit work mainly relies on the judgment and subjective experience of auditing experts, and the authenticity, completeness, and effectiveness of its results are closely related to the professional ethics level of auditors. The second is the risk of audit methods. Auditors identify and reveal the existed problems in the process of audit through sampling surveys, and the content and method of sampling surveys have a significant effect on the audit results. In traditional audit methods, auditors may make unreasonable selection of samples and make inappropriate evaluations, resulting in differences in results and even contradictions. Due to the impact of these two aspects of risks, it is difficult to avoid audit risks in daily audit work. The new audit model integrates big data technology and traditional audit models, and applies big data analysis technology to analyze all the data of the audited entity. On this basis, using this model, auditors can analyze and infer all data and logic based on computer analysis capabilities, in order to reduce or avoid audit risks caused by subjective evaluation, as well as audit risks caused by factors such as the sample itself and sampling method.

### 2.2 Big Data Technology can Help Transform and Develop Public Investment Auditing

After the revision of the Audit Law, the Opinions on Further Improving and Standardizing Investment Audit Work issued by the General Office of the State Council issued has put forward higher requirements for China's public investment auditing

work, and there have been significant changes in both the audit objects and the audit contents. Under the existing public investment auditing model, an investment audit department can only audit 3-5 projects per year, and cannot achieve full process and coverage. The audit efficiency and quality can no longer meet the needs of public investment auditing in the new era. In this context, introducing big data technology into the traditional field of public investment auditing is an important condition for achieving the transformation and development of public investment auditing. Auditors can use SPSS software to associate transaction data of public resources with big data from multiple departments such as industry and commerce and social security, and analyze and investigate issues such as collusion and illegal subcontracting that are difficult to identify in traditional auditing.

### **3. Public Investment Auditing Methods and Strategies based on Big Data**

#### **3.1 Application of Visualization Technology in Audit**

Visualization technology is the use of charts, graphs, maps, and other forms to present data and information in an intuitive and easy to understand form. In the context of big data, research on visualization of public investment auditing is increasingly being valued. A visualization method can be adopted to enable auditors to have a more intuitive understanding of what has happened and the information collected in the project, so as to promptly identify problems and provide improvement suggestions. In public investment auditing, visualization technology can be applied to multiple fields. For example, auditors can present financial data such as income, expenditure, assets, and liabilities in a more intuitive way, thereby better understanding the financial situation and development trends of enterprises. In addition, using visualization technology, information such as project progress and risks can be presented to auditors in the form of charts, timelines, etc., enabling them to have a comprehensive understanding of the overall condition of the project. At the same time, the project partnership and fund flow were visually displayed. In various forms of cooperation projects such as intergovernmental and PPP, auditors can use visualization technology to present important information such as the power relationships and fund flows of the cooperating parties, thereby deepening their understanding of the true situation of the project. Finally, auditors can use visualization technology to present the audit conclusions and recommendations in the form of charts, enabling managers and policy makers to better understand the auditors' conclusions and recommendations.

#### **3.2 Application of Machine Learning and Artificial Intelligence Technology in Auditing**

In the context of big data, machine learning and artificial intelligence technologies have provided new ideas for public investment auditing. Firstly, using machine learning methods to identify and evaluate risks and utilizing machine learning algorithms to classify, cluster, and perform association analysis on massive amounts of data. This system can automatically identify potential risks in the project, provide decision-making basis for project audit work, and establish corresponding databases. Secondly, using artificial intelligence technology to achieve automatic auditing. Through machine learning, natural language processing and other technologies, it is possible for artificial intelligence to automatically identify, analyze, and evaluate audited targets, thereby achieving automation of the entire process and improving its efficiency and accuracy. Thirdly, using artificial intelligence technology to analyze and mine data: Artificial intelligence technology can utilize technologies such as deep learning and reinforcement learning to automatically learn and decompose information and patterns from massive data, thereby providing more comprehensive and in-depth data support and decision-making for audit work. Fourthly, using artificial intelligence technology to predict and warn bank risks. Through machine learning and artificial intelligence, risk prediction and early warning models can be constructed to predict and identify potential risks in projects, providing a basis for risk control and management for executives and decision-makers.

#### **3.3 Application of Cloud Computing and Block-chain Technology in Audit**

Integrating cloud technology with block-chain technology to apply more in public investment auditing. These technologies can provide powerful computing and storage capabilities, while also possessing the characteristics of decentralization and tamper resistance, providing more efficient, secure, and reliable technical support for audit work. One is to use cloud computing technology for data storage and processing. Cloud computing technology can provide powerful computing and storage capabilities for auditors, efficient computing and storage services, and achieve data sharing and collaboration. The second is to use block-chain technology to achieve data storage and sharing. Block-chain technology can

ensure the security and trustworthiness of information due to its characteristics of dispersion and non manipulation. Auditors can store audit data and results through block-chain, making the audit process more transparent and trustworthy. The third is to use block-chain technology for the management and storage of audit evidence. Audit evidence plays a crucial role in audit work, and its safety and reliability are related to the correctness and effectiveness of audit results. On this basis, using block-chain technology, auditors can effectively manage and store the obtained audit evidence, thereby enhancing its credibility and security. The fourth is to use block-chain technology to achieve risk control. Block-chain technology can achieve information exchange and transparency, providing more comprehensive and real-time information support for engineering management and risk control.

### **3.4 Changing Traditional Concepts to Establish the Concept of Big Data Auditing**

To adapt to big data auditing, auditors must abandon traditional concepts and inherent biases, constantly keep up with the times, innovate in organization and work methods, establish a reality based big data auditing concept, identify entry points and methods for digital public investment auditing, and study the three key issues of “what data is needed”, “how data comes from”, and “how to obtain data”. To establish the concept of “big data auditing” among auditors, the primary manifestation is to improve their understanding of data security. Currently, due to the lack of knowledge on information security, confidentiality, and other aspects among auditors, it has brought great risks to audit work. Secondly, in terms of data application, auditors apply the “big data” concept to the entire audit process of engineering projects based on the comprehensive audit approach of “big data”, and learn to use big data systems and analysis tools to analyze the execution of investment audits in previous years, identify issues with high attention and universality. Finally, by leveraging the data fusion effect and learning and understanding the Implementation Plan for Investment Project Big Data Audit and other relevant planning documents, auditors actively innovate big data audit methods, deeply integrate the Investment Audit Data Plan and Investment Project Data Collection Standards with government auditing, and improve the quality and efficiency of audit work.

### **3.5 Accelerating the Establishment of a High-quality Professional Team with both Traditional Audit Capabilities and Big Data Audit Capabilities**

In the context of big data auditing, the concepts and professional qualities of auditors have also undergone changes. To address the audit challenges in the big data environment, key issues that need to be addressed include: training existing auditors in awareness, training current auditors in big data application skills to improve their innovative application ability in public investment auditing, promoting knowledge updates, changing their thinking patterns, and achieving a level that combines traditional audit capabilities with big data capabilities, so as to transform their thinking patterns from traditional to big data. The second is to strengthen the team building of big data audit professionals. Currently, the audit team of public investment projects in China mainly focuses on engineering, finance, and other majors, lacking professional talents related to big data. In terms of talent reserves, it is necessary to actively introduce professional talents in the field of big data, optimize the knowledge structure of the investment audit team, and build a new type of investment audit team that integrates modern investment audit skills and modern information technology thinking methods.

## **4. Conclusion**

In summary, in the big data environment, public investment auditing work is facing new opportunities and challenges. This article conducts research by focusing on the development advantages of public investment auditing in the big data environment, as well as the audit methods and strategies. It's hoped that this research will contribute to a deeper understanding and response to public investment auditing issues in the context of big data, so as to improve the efficiency and quality of public investment auditing.

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