Big Data-Enabled Intelligent Pathways for University Financial Auditing: Evidence from Guangdong "Yue-Style Applications"

Peitian Su, Xiongwei Wu*

Guangzhou Institute of Science and Technology, Guangzhou, Guangdong, China

Abstract: Big data is reshaping university financial management and internal auditing. Using Guangdong Province and its distinctive "Yue-style applications" as a case, this paper examines how data-driven technologies transform the foundations, processes and outcomes of university financial auditing. It first reviews the current use of big data in university financial management and identifies the limitations of traditional, sample-based audit approaches. It then explains why Guangdong provides a representative case, highlighting its strong higher-education system, digital campus construction and supportive policy environment. On this basis, the paper proposes an implementation pathway for intelligent auditing that integrates data warehouses, indicator systems, analytic models, process automation and visual dashboards. Typical practices in Guangdong universities, including smart audit platforms, risk-warning models and RPA-based "audit robots", are used to illustrate improvements in efficiency, coverage and risk prevention. Finally, the paper discusses future trends toward cross-domain data ecosystems and more explainable algorithms, arguing that big-data-enabled auditing offers a viable route to modernising financial governance in Chinese universities.

***Keywords*:** big data, university financial auditing, intelligent pathway, Yue-style applications.

1. Introduction

In recent years, the digital transformation of higher education has accelerated, and university financial activities have become increasingly data-intensive and complex[1]. Traditional internal auditing methods that rely on manual sampling and ex post checking struggle to cope with large volumes of heterogeneous financial data and with the growing requirements for real-time risk prevention and governance support[2]. Against this background, big data technologies offer new possibilities for building intelligent audit systems that combine full-population analysis, automated rule checking and model-based risk evaluation[3].

Guangdong Province is at the forefront of both economic development and higher-education reform in China, and has taken a proactive approach to applying big data and artificial intelligence in university financial management and auditing[4]. Drawing on this "Yue-style" practice, this paper addresses the following questions: how can universities integrate multi-source financial data to support intelligent auditing; what system designs and implementation pathways are needed; and what effects can be observed in terms of efficiency, coverage and risk prevention[5]. By answering these questions, the paper seeks to provide a replicable reference for other regions and institutions that aim to modernise their financial governance.

2. Big-data-enabled financial audit methodology in universities

Big data technologies provide a technical foundation for intelligent university financial auditing by enabling multi-source data integration, large-scale storage and high-performance analysis[6]. In practice, universities first need to break down "data islands" by building data warehouses or data lakes that consolidate information from financial, personnel, research and asset systems, while converting paper vouchers into structured data using OCR and related tools. On this basis, indicator systems can be developed for budget execution, cost analysis, performance evaluation and compliance monitoring.

From an auditing perspective, feature extraction is the core link between raw financial records and analytic models. In budget auditing, relevant features include execution rates by department, deviations between budgeted and actual expenditure and the concentration of suppliers. In expense auditing, useful features include the frequency and amount distribution of travel, meeting and training expenses, and the consistency between reimbursement items and project objectives. By transforming transactional data into interpretable indicators, auditors can apply rule-based checks, statistical tests and machine-learning models to identify anomalies and potential risks in a systematic and transparent manner[7].

3. Guangdong "Yue-style" implementation pathway

Guangdong has built a relatively complete policy and infrastructure environment for applying big data in university financial governance. At the policy level, the province has promoted digital-campus construction and encouraged universities to explore new models of internal control and auditing based on data-driven technologies. At the infrastructure level, many universities have deployed data-middle-platform architectures that support unified identity authentication, data standards and interface management, thereby reducing the cost of cross-system integration[8].

Within this environment, a typical implementation pathway for intelligent auditing in Guangdong universities can be summarised in four stages. First, universities conduct a requirements analysis to clarify audit objectives, key risks and priority scenarios. Second, they design modular, micro-service-based audit platforms that incorporate data access, rule engines, model libraries and visual dashboards. Third, they implement RPA to automate high-frequency tasks such as data extraction, reconciliation and routine report generation. Fourth, they carry out pilot operations, collect user feedback and iteratively optimise rule sets and model parameters, gradually expanding from single-scenario pilots to integrated platforms that cover budgeting, revenues and expenditures, assets and research funds[9].

4. Practical effects of big-data-enabled auditing

Practical experience in Guangdong universities shows that big-data-enabled audit platforms can substantially improve both efficiency and quality. In terms of efficiency, integrated platforms are able to retrieve all financial records related to a specific project or department within seconds, replacing time-consuming manual searches. Automated association analysis can detect patterns such as frequent purchases just below bidding thresholds or clusters of small reimbursements near project deadlines, which then trigger targeted verification by auditors[10].

In terms of quality, some universities have combined big-data platforms with intelligent recognition and blockchain technologies. OCR and image-recognition tools extract key fields from electronic invoices and supporting documents, while models check their consistency against procurement and contract data. For key vouchers and contracts, blockchain technology is used to ensure traceability and tamper-resistance. At the same time, RPA "audit robots" handle routine cross-checking tasks, allowing auditors to focus on risk diagnosis, system evaluation and governance consulting. Evaluation indicators, such as the proportion of transactions covered by automated checks, the number of irregularities detected and the reduction in audit cycle time, all point to clear improvements after the adoption of big-data-enabled systems.

5. Conclusion

This paper, taking Guangdong's "Yue-style applications" as a case, has analysed how big data can support the intelligent transformation of university financial auditing. The analysis shows that, under appropriate policy and infrastructure conditions, universities can integrate multi-source financial data, construct indicator systems and analytic models, and build intelligent audit platforms that significantly enhance efficiency, coverage and risk prevention capabilities.

Looking ahead, several challenges and opportunities remain. On the one hand, universities must further improve data quality, strengthen privacy and security protection and ensure the transparency and interpretability of audit models. On the other hand, there is considerable potential to expand cross-domain data integration with banks, tax authorities and research funding agencies, and to apply more advanced algorithms for scenario-adaptive risk assessment. Future research could also examine the organisational change and capacity-building required for auditors to effectively use intelligent systems. Overall, big-data-enabled auditing offers a promising pathway for modernising financial governance in Chinese universities and for providing stronger support to the high-quality development of higher education.

Acknowledgments

This paper was supported by the following funding projects: 2024 Ministry of Education Industry-University Cooperation and Collaborative Education Project "Research and Practice on the Integration of AI Technology into University Financial Auditing under Digital Empowerment" (Project No.: 2412133544); 2024-2025 Key Project of Guangdong Provincial Audit Department "Research on the 'Guangdong-style Application' of University Financial Auditing in the Artificial Intelligence (AI) Era" (Project No.: 24GDSJZC077222); 2024 General Project of Guangdong Human Resources Research Association "Research on the 'Introduction-Cultivation-Application' Model of High-Skilled Talents in Economic Management in Guangdong Province Oriented by New-Quality Productivity" (Project Approval No.: GDHRS-24-02-062); 2024 Key University-Level Scientific Research Project of Guangzhou University of Technology "Research on the 'Guangdong-style Application' of University Financial Auditing in the Artificial Intelligence (AI) Era" (Project No.: 2024KZ022).

References

[1] Chen C. Problems and countermeasures in university financial auditing under the new situation [J]. Shanghai Commerce, 2022(12):113–115.

[2] Li HJ. Impact of the new financial accounting system on university financial auditing in China [J]. Science-Technology Economy Market, 2020(10):27–29.

[3] Zhou YL. Construction and application of a knowledge graph in university financial auditing [J]. Research on Economic and Social Development, 2023,25:59–61.

[4] Wang WY. Problems and countermeasures in university financial auditing under the new situation [J]. Research on Economic and Social Development, 2020,28:284–285.

[5] Kong Y. Problems and countermeasures of university financial auditing in the new era [J]. Economic Research Guide, 2022(19):131–133.

[6] Feng J. Problems and countermeasures in university financial auditing under the new situation [J]. Management and Technology of Small and Medium-Sized Enterprises, 2019,3(33):148–149.

[7] Lyu C. Pathways and practice of financial audit system innovation and improvement in transformed undergraduate universities [J]. Research on Economic and Social Development, 2024(1):272–274.

[8] Zhan FY. Construction of a university financial auditing information system oriented to the new accounting system [J]. Journal of Wuhan University of Technology (Information & Management Engineering Edition), 2018,40(2):240–244.

[9] Deng K. Impact of the new financial accounting system on university financial auditing in China [J]. World of Labor Security, 2018(5):62.

[10] Wang YP. Application and optimization of DeepSeek in university financial auditing [J]. Brand Research, 2025(15):256–258.

Author Bio

First author: Peitian Su (1984—), male, born in Quanzhou, Fujian Province, Doctor, Associate Professor, whose research interests include Economics and Management, Digital Economy, and Law.

Corresponding author: Xiongwei Wu (1981—), male, born in Tianmen, Hubei Province. Associate Professor, whose research interests include financial management, digital finance, and intelligent finance.