

Research on the Application of Big Data Technology in Financial Accounting

Muyang Cheng*

George Mason University, Heilongjiang, 154004, China

*Corresponding author: ysy0454@163.com

Abstract: In the context of rapid development of the digital economy, big data technology has gradually penetrated the field of corporate financial accounting, profoundly impacting traditional accounting models, financial management methods, and enterprise decision-making systems. The application of big data technology not only improves the efficiency and accuracy of financial data processing but also promotes the informatization and intelligent development of financial accounting. This paper focuses on the application of big data technology in financial accounting. It first analyzes the definition, characteristics of big data, and its role in enterprise management, then explores the development direction of financial accounting under the big data environment, including the construction of a digital financial system, the evolution of information processing models, and trends in intelligent management. On this basis, the paper proposes paths for financial accounting reform, such as the construction of informatization infrastructure, financial data governance, and talent cultivation, aiming to provide references for the innovative development of enterprise financial management.

Keywords: big data technology; financial accounting; informatization; intelligentization; financial management

Introduction

With the rapid advancement of information technology, big data technology has become an important support for promoting enterprise digital transformation. Financial accounting, as the core link of enterprise business management, undertakes the functions of information collection, analysis, and decision support. However, traditional financial accounting models have limitations in data processing capacity, depth of analysis, and forecasting accuracy, making it difficult to meet the needs of modern enterprise management. Therefore, it has become an inevitable trend to introduce big data technology to innovate and upgrade financial accounting. The application of big data technology in financial accounting not only optimizes corporate financial management processes and improves data processing efficiency but also enhances the timeliness and accuracy of financial information, shifting financial analysis from post-event accounting to real-time monitoring and predictive analysis. By deeply mining the value of corporate financial data, managers can formulate financial strategies more scientifically, improve resource allocation efficiency, and thereby enhance the competitiveness of enterprises.

1. Overview of Big Data Technology

1.1 Definition and Characteristics of Big Data

Big data refers to a complex collection of data characterized by a massive scale, rapid growth, diverse structures, and high value, the processing of which exceeds the capabilities of traditional data management tools. The core of modern big data technology lies in efficient storage, intelligent analysis, and real-time processing to extract the potential value of data. Big data possesses five core characteristics, including a large data scale, high processing speed, diverse data types, stringent data authenticity requirements, and low data value density but high potential value. The large data scale is reflected in the enormous volume of information generated during enterprise operations, such as transaction records, financial data, market dynamics, and user behaviors. The high processing speed manifests in the increasing demand for real-time data flow and analysis. The diversity of data types encompasses structured, semi-structured, and unstructured data, such as financial statements, business logs, social media content, and multimedia files. The authenticity requirement emphasizes data quality and accuracy

to ensure the reliability of analysis results. Although the data value density is relatively low, valuable decision-making information can be extracted through efficient data mining methods ^[1].

1.2 The Role of Big Data in Modern Enterprise Management

Big data technology is increasingly applied in modern enterprise management, becoming a crucial tool for enhancing enterprise competitiveness and optimizing management processes. Data-driven decision-making gradually replaces traditional experiential judgment, assisting enterprises in improving operational efficiency, reducing costs, and strengthening market competitiveness. Enhanced data analysis capabilities enable enterprises to accurately predict market demand, optimize resource allocation, and formulate more scientific business strategies. Intelligent algorithms based on big data can analyze historical transaction data and market trends, thereby improving enterprises' adaptability to future market changes.

The improvement of operational management efficiency depends on the deep application of big data technology in areas such as supply chain optimization, customer relationship management, and financial management. Enterprises can optimize inventory management and reduce supply chain costs through data analysis, while simultaneously improving customer satisfaction and user experience. Big data-supported intelligent financial management systems can monitor cash flows in real time, optimize financial risk control frameworks, and enhance financial transparency and management levels. Risk control and compliance management are strengthened; the application of big data technology helps enterprises promptly identify financial risks, credit risks, and legal compliance issues. Through machine learning and data mining, enterprises can build intelligent monitoring systems that provide early warnings for abnormal financial transactions, fraud, and internal violations, ensuring the compliance and security of enterprise operations ^[2].

1.3 The Integration Trend of Financial Accounting and Big Data

The rapid development of big data technology drives the digital transformation of the financial accounting industry, gradually shifting traditional accounting models toward intelligent, automated, and real-time directions. The enhancement of data analysis and intelligent decision-making capabilities makes financial accounting management more precise and efficient.

Financial accounting information systems are progressively evolving toward intelligence. By combining cloud computing, artificial intelligence, and big data technologies, enterprises can achieve real-time financial data collection, automated processing, and intelligent analysis. The upgrade of enterprise financial management systems promotes the construction of financial shared service centers, enabling more efficient integration of financial data and improving the accuracy and timeliness of financial reporting. The enhancement of financial data analysis and forecasting capabilities shifts financial accounting work from traditional “post-event accounting” to “real-time monitoring” and “future prediction.” By leveraging big data modeling and artificial intelligence algorithms, enterprises can establish models for cash flow forecasting, profitability analysis, and financial risk assessment, thus improving the scientific rigor and accuracy of financial decision-making.

Financial auditing and compliance management are gradually becoming intelligent. Traditional financial audits rely on manual reviews and sampling investigations, whereas the application of big data technology transforms auditing models toward full-data analysis. Intelligent auditing systems can automatically detect anomalies in financial data, improving audit efficiency and accuracy while strengthening enterprise financial compliance management and reducing financial fraud and operational risks.

The training model for financial accounting talent faces new challenges. With the deepening application of big data technology in the financial field, the skill requirements for accounting personnel continuously increase. Financial professionals need to master not only traditional accounting knowledge but also capabilities in data analysis, artificial intelligence, and information technology. Therefore, enterprises and higher education institutions should strengthen the cultivation of digital financial talent and promote the development of accounting personnel toward multidisciplinary and technical directions.

2. Development Directions of Financial Accounting in the Big Data Environment

2.1 Construction of a Digital Financial Accounting System

The rapid development of big data technology has driven the transformation of financial accounting toward digitalization. Constructing a digital financial accounting system has become an important strategic choice for enterprises to improve financial management efficiency, optimize resource allocation, and strengthen risk control. The digital financial accounting system relies on technologies such as big data, cloud computing, artificial intelligence, and blockchain, promoting the shift of financial data management from traditional manual processing to intelligent, automated, and real-time processing.

A data-driven financial management model forms the core of the digital financial system. By building a big data-based financial management platform, enterprises can achieve multidimensional data collection, processing, and analysis, ensuring the comprehensiveness, accuracy, and timeliness of financial information. Meanwhile, the improvement of enterprises' financial informatization infrastructure, including cloud-based financial systems, financial shared service centers, and intelligent reporting systems, significantly enhances the efficiency of financial data processing and provides more precise decision support for management^[3].

The digital financial system also requires establishing a standardized data governance framework to ensure the normalization, traceability, and security of financial data. Enterprises need to optimize financial data standards, establish unified data interfaces and sharing mechanisms, and improve the transparency and usability of financial information. Furthermore, the introduction of blockchain technology guarantees the immutability of financial data and the traceability of transactions, enhancing the security and credibility of financial management.

2.2 Evolution of Financial Accounting Information Processing Models

Under the big data environment, financial accounting information processing models are undergoing profound changes, evolving from traditional manual accounting and informatized accounting to intelligent accounting, with comprehensive upgrades in accounting, analysis, and decision support functions. The accounting data collection mode is shifting from static to dynamic and real-time collection. Enterprises utilize big data technology to establish automated financial data collection systems, enabling instant entry, classification, and processing of financial information. The application of Internet of Things (IoT) technology allows financial data to be automatically obtained from enterprise operation systems, banking transaction systems, and market data sources, reducing manual input errors and improving the accuracy and timeliness of financial information.

The processing method of financial accounting data is transitioning from traditional linear processing to intelligent parallel computing. The application of cloud computing and distributed storage technologies enables financial systems to efficiently handle large-scale data. The integration of intelligent algorithms and machine learning technologies automatically identifies anomalies in financial data, facilitates automatic generation of financial statements, provides early warnings for financial risks, and optimizes cost structures intelligently.

Financial reporting and analysis models are gradually moving toward visualization and intelligence. Traditional financial reports usually adopt fixed formats, whereas big data analytical tools can provide dynamic and interactive data visualization platforms, enabling enterprise managers to obtain key financial indicators in real time and conduct multidimensional financial analysis. In the future, intelligent financial analysis systems will be widely applied in the field of financial accounting, helping enterprises deeply explore the value of financial data and improve the accuracy and scientific rigor of financial decision-making.

2.3 Future Trends in Intelligent Financial Management

With the in-depth application of artificial intelligence, blockchain, and big data technologies, financial management is progressing toward intelligence, and intelligent financial management systems will become a crucial form of enterprise financial management in the future. The intelligence of financial decision-making is one of the core directions for future development. Big data-based intelligent financial systems can analyze historical financial data and changes in the market environment through deep learning algorithms, predict enterprise operating conditions, and optimize financial budgeting and capital allocation strategies. Intelligent financial robots will be widely applied in financial accounting, financial

analysis, and report preparation processes, increasing the automation level of financial work and reducing errors caused by manual operations.

Financial auditing and compliance management will rely more heavily on intelligent technologies. Traditional auditing methods mainly depend on manual sampling analysis, whereas big data auditing systems can conduct full-data analysis to detect potential financial risks and compliance issues. The application of blockchain technology ensures the authenticity and traceability of financial transaction records, fundamentally enhancing enterprise financial compliance and transparency.

The financial shared services model will occupy an important position in intelligent financial management. By establishing enterprise-level financial shared service centers, enterprises can centralize dispersed financial operations, improve financial operation efficiency, and reduce financial management costs. The application of artificial intelligence technology enables financial shared service centers to achieve intelligent processing, increase business response speed, and optimize financial process management. In the future, the development of intelligent financial management will also promote the role transformation of accounting personnel. The traditional focus of financial personnel on simple data entry and financial accounting will shift toward data analysis and strategic decision support. Multidisciplinary and technical accounting talents will become the core competitiveness of enterprise financial management ^[4].

3. Reform Paths of Financial Accounting under the Big Data Background

3.1 Construction of Financial Accounting Informatization Infrastructure

The in-depth application of big data technology promotes the development of financial accounting informatization infrastructure toward high integration, intelligence, and real-time capabilities. Enterprises should build financial accounting informatization platforms centered on cloud computing, artificial intelligence, and blockchain to enhance financial data processing capacity and management efficiency.

First, the construction of cloud financial systems is critical to the development of enterprise financial informatization. Cloud computing technology can provide enterprises with efficient, secure, and scalable financial management platforms, enabling real-time sharing and collaborative processing of financial data across departments and regions. Cloud-based financial management systems improve the accessibility and consistency of financial information, reduce data storage and computing costs, and enhance the flexibility and automation of financial operations.

Second, the application of intelligent financial systems can improve the accuracy and intelligence level of enterprise financial management. Intelligent financial software based on artificial intelligence and machine learning can automatically handle repetitive tasks such as voucher entry, accounting, and financial report preparation. It can also perform pattern recognition and anomaly detection on financial data, increasing the efficiency and accuracy of financial analysis. Furthermore, intelligent financial robots (RPA) can replace manual labor in daily financial operations such as invoice auditing and financial reconciliation, thereby optimizing financial processes and improving operational efficiency ^[5].

In addition, the introduction of blockchain technology helps enhance the security and traceability of financial data. Blockchain can realize encrypted storage and distributed management of financial transaction data, ensuring data authenticity and immutability, fundamentally improving the security and transparency of enterprise financial information systems. The application of blockchain technology in supply chain finance, asset management, and financial auditing will significantly raise the level of informatization in enterprise financial accounting.

3.2 Improvement of Financial Data Governance and Standardization Systems

In the big data environment, constructing financial data governance and standardization systems is crucial for improving financial data quality, enhancing data consistency, and optimizing financial decision support. Enterprises need to establish scientific financial data management systems to ensure the completeness, accuracy, and usability of financial data.

Unified financial data standards are key to enhancing data governance capabilities. Different enterprises exhibit variations in recording, processing, and analyzing financial data, resulting in inconsistent data structures and definitions that affect data sharing and decision-making. Enterprises

should formulate standardized financial data classification systems and data interface specifications to ensure data structuring and standardization, thereby improving data comparability and integration ability. Improving the financial data quality management system guarantees the reliability of financial data. Enterprises need to establish data cleansing and validation mechanisms, employing automated data verification tools to monitor financial data in real time, identify and correct data errors, and avoid decision biases caused by distorted data. The optimization of data governance processes requires integrating artificial intelligence technologies, using deep learning algorithms to analyze financial data patterns, detect potential financial risks and abnormal transactions, and strengthen financial risk control capabilities.

Financial data security control is a vital part of enterprise financial informatization construction. In the big data environment, financial data face high risks of information leakage and cyber-attacks. Therefore, enterprises need to enhance data encryption storage, access control, and log tracking management to ensure financial data security and privacy. By combining blockchain technology and distributed ledger technology, enterprises can further strengthen the tamper resistance of financial transaction data, improving the credibility and transparency of financial reports ^[6].

3.3 Digital Talent Cultivation Mechanism in Financial Accounting

The rapid development of big data technology raises new requirements for the competency structure of financial and accounting personnel. Enterprises need to build digital financial and accounting talent cultivation mechanisms to meet the demands of intelligent financial management. The knowledge structure of financial personnel should evolve toward a “finance + technology” composite model. Traditional financial personnel mainly focus on financial accounting, cost management, and financial analysis, whereas in the big data environment, financial personnel need capabilities in data analysis, information system management, and intelligent financial technology application. Enterprises can improve financial personnel’s understanding and application of big data, artificial intelligence, blockchain, and other technologies through on-the-job training, online learning platforms, and practical exercises, enabling effective use of intelligent financial systems for data analysis and management decision-making.

Universities and vocational training institutions need to accelerate curriculum reform for financial and accounting majors and build interdisciplinary talent cultivation systems. Currently, most financial and accounting curricula still focus on traditional accounting standards and financial management theories, lacking courses on big data, cloud computing, and intelligent finance. Universities should strengthen collaboration with enterprises and offer courses such as big data financial analysis, intelligent financial system development, and blockchain financial management to cultivate high-end financial talents with digital thinking and data analysis skills.

Digital financial talent certification systems can promote the transformation and upgrading of enterprise financial teams. Industry associations and enterprises may jointly launch professional qualification certification systems such as Intelligent Financial Manager and Big Data Accounting Analyst to enhance the professional competitiveness of financial personnel. Through qualification certification and skill assessments, enterprises can identify and select high-level digital financial talents, driving the intelligent transformation of enterprise financial management.

With the continuous development of big data technology, the cultivation of enterprise financial and accounting talents will emphasize the combination of practice and technology. Financial personnel will no longer be mere financial report preparers but active participants in enterprise financial strategy and data analysis experts, promoting the advancement of enterprise financial management toward intelligence, data-driven processes, and strategic orientation.

Conclusion

This paper studies the application of big data technology in financial accounting, analyzes the role of big data in enterprise financial management, explores development directions of financial accounting in the big data environment, and proposes optimized reform paths for financial accounting. Research indicates that the application of big data technology can promote the informatization and intelligence transformation of financial accounting, improve the efficiency and accuracy of financial data processing, and enhance real-time analysis and decision support capabilities in enterprise financial management. In the future, big data technology applications in financial accounting will deepen further, particularly in

integrating big data with artificial intelligence to enhance financial analysis and forecasting capabilities. Meanwhile, enterprises will strengthen financial data governance, establish standardized and regulated data management systems, and ensure compliance and accuracy of financial data. Talent cultivation will focus on enhancing financial personnel's data analysis and intelligent management capabilities. As data security and privacy protection issues increasingly surface, enterprises should establish comprehensive data security management systems. Through these measures, big data technology will exert greater value in financial accounting, facilitating digital upgrades and high-quality development of enterprise financial management.

References

- [1] Peng Jingsong. *Modern Interpretation and Application of Event-based Accounting Theory in the Big Data Era* [J]. *China Agricultural Accounting*, 2025, 35(05): 22-25.
- [2] Chen Li. *Exploration of Big Data Technology Application in Enterprise Business-Finance Integration* [J]. *Vitality*, 2024, 42(18): 112-114.
- [3] Cao Kangrui. *Pathways of Digital and Intelligent Transformation in Enterprise Financial Accounting* [J]. *Taxpayer*, 2024, 18(19): 55-57.
- [4] Song Weigang. *Risks and Prevention of Accounting Informatization under Big Data Background* [J]. *China E-Business News*, 2025, (04): 111-113.
- [5] Sun Hongxia. *Research on Enterprise Accounting Transformation under Informatization Background* [J]. *Economic Research Guide*, 2025, (01): 109-112.
- [6] Cui Baiye. *Integration of Financial Accounting and Management Accounting under Informatization Background* [J]. *Economist*, 2024, (12): 91-92.