Development Status and Dynamic Analysis of Intelligent Accounting

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Abstract. Under the background of digital economy, intelligent accounting-born of the integration of artificial intelligence and the field of accounting-carries great significance for corporate financial management. However, both academia and industry exhibit numerous shortcomings in their research and practical application. By examining the current status of domestic and international research, this paper summarizes the scope and innovations of intelligent accounting, identifies key challenges-namely, the high technical complexity of applications, elevated risks to data security, a shortage of interdisciplinary talent, and inadequacies in legal and regulatory frameworks-and proposes corresponding solutions.

Keywords: Digital Economy, Intelligent Accounting, Financial Data Security

1 Introduction

In the midst of the vigorous development of the digital economy, intelligent accounting-emerging from the deep integration of artificial intelligence and the discipline of accounting-is reshaping the model and efficiency of corporate financial management. Not only can it reduce human calculation errors through automated processes, but it also leverages big-data analysis and forecasting capabilities to furnish enterprises with precise bases for strategic decision-making. It plays an irreplaceable role in enhancing corporate competitiveness, optimizing resource allocation, and driving high-quality economic growth.

Nevertheless, academic and industry research into intelligent accounting still exhibits numerous shortcomings. Existing studies tend to concentrate on technology development-such as the creation of financial robots and intelligent accounting systems-while discussions of how to embed intelligent accounting more deeply into corporate management and align it with business processes and strategic planning remain relatively sparse. At the same time, systematic and forward-looking solutions have yet to be developed in the areas of data security, talent-training frameworks, and the formulation of legal and regulatory standards. These research gaps give rise to challenges in practical implementation, including conceptual misunderstandings, limited application scenarios, and insufficient risk control.

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In view of the above issues, this paper analyzes the domestic and international research landscape in order to probe the key issues in the development of intelligent accounting, to explore how to establish a robust talent-cultivation mechanism, and to investigate innovative application pathways within corporate management. Through a systematic study, it seeks to offer new perspectives and solutions for both the theoretical advancement and practical application of intelligent accounting, thereby supporting the sustainable development of the accounting profession amid the tide of digital transformation.

2 Overview of Research at Home and Abroad

2.1 Domestic Research Overview

In current digital era, the rapid advancement of information technology is profoundly transforming operational models across all industries. As a new paradigm in the accounting field, intelligent accounting is gradually coming to the fore and has become an emerging trend in the industry. By integrating advanced technologies such as artificial intelligence, big data, cloud computing, and blockchain, intelligent accounting achieves automation, intelligence, and digitization of accounting tasks, significantly improving both the efficiency and quality of accounting work. It provides more accurate and timely information to support enterprise decision-making and risk management[1].

As the principal authority in macroeconomic management and social development, the government has successively issued a series of policies to support the informatization and digital transformation of accounting. In November 2021, the Ministry of Finance issued the "14th Five-Year Plan for Accounting Reform and Development," which set forth the overarching goal of "supporting accounting and auditing work through digital technologies, and promoting the expansion and upgrading of accounting functions via digital transformation," as well as the primary task of "vigorously accelerating the digital transformation of accounting and auditing." In December 2021, the Ministry of Finance released the "Accounting Informatization Development Plan (2021–2025)," which articulated a national framework for accounting informatization that meets the demands of the new era, and specified six concrete targets and nine key tasks for accounting informatization during the 14th Five-Year period. These policy directives have provided clear guidance and direction for the development of intelligent accounting.

To meet market demand for intelligent accounting professionals, many Chinese universities have launched undergraduate and graduate programs in "Smart Finance" or "Intelligent Accounting." For instance, Shanghai University of Finance and Economics and Jinan University have established specialized tracks that cultivate cross-disciplinary talent proficient in both accounting and information technology. In addition to traditional accounting courses, their curricula include subjects such as artificial intelligence, big-data analytics, and machine learning.

Meanwhile, a growing number of enterprises are experimenting with intelligent accounting technologies to enhance financial management efficiency and deci-

sion-making. Large corporations, backed by substantial financial and technological resources, are at the forefront of these applications[2]. For example, China National Petroleum Corporation has spent several years piloting and building a smart global financial shared-services platform. It has now largely completed the construction of this intelligent global financial shared-services system, which supports the group's strategic development, restructures financial management, boosts operational efficiency, and contributes to high-quality growth.

2.2 International Research Overview

Under the backdrop of economic globalization, foreign enterprises are actively expanding into international markets. Intelligent accounting systems enable them to adapt to diverse national and regional accounting standards and tax policies, offering multi-language and multi-currency accounting and reporting functions that strongly support internationalization.

In many overseas companies, Robotic Process Automation (RPA) has been extensively applied to accounting tasks. Take Volkswagen AG in Germany: its finance department has deployed RPA "financial robots" to automatically handle large volumes of repetitive, rule-based tasks such as supplier invoice processing, employee expense reimbursement audits, and financial-statement data entry[3]. Tasks that once required numerous finance staff and considerable time can now be executed swiftly and accurately according to predefined rules, greatly improving efficiency and reducing human error. Statistics show that, after adopting RPA technology, Volkswagen's finance department achieved a 70% increase in invoice-processing efficiency and a 40% reduction in costs.

Moreover, artificial intelligence and machine-learning algorithms play significant roles in financial analysis, forecasting, and risk assessment[4]. For example, Goldman Sachs in the United States employs machine-learning models to perform deep analyses on massive datasets-ranging from financial-market information to corporate financial statements-for trend prediction and credit-risk evaluation. These models enable Goldman Sachs to identify potential risks in advance and provide robust support for investment decisions. On one occasion, they used a machine-learning model to anticipate risks in a particular sector during market turbulence, promptly adjusted their portfolio, and thereby avoided potential losses amounting to hundreds of millions of dollars.

Additionally, blockchain technology, with its distinctive advantages, is gaining traction in foreign accounting circles. In Australia, some companies use blockchain to record and verify financial transactions. Each transaction is encrypted and stored across multiple blockchain nodes in an immutable, traceable manner. This approach effectively safeguards data security and transparency, while mitigating the risk of financial fraud.

3 Development and Innovation of Intelligent Accounting

3.1 Content of Intelligent Accounting

Intelligent accounting refers to a novel accounting paradigm built upon conventional accounting information systems by fully integrating modern information technologies-such as artificial intelligence, big data, cloud computing, and blockchain-to achieve automated data collection, intelligent processing, in-depth analysis, and precise decision-support. It overcomes the limitations of traditional accounting, which relies solely on manual data handling and calculation, and empowers accounting functions to become more efficient, intelligent, and accurate.

At present, intelligent accounting can automatically recognize and categorize various financial documents, greatly improving both the speed and accuracy of document processing. Leveraging big-data analytics, it can mine large volumes of corporate financial data to furnish robust data support for strategic decision-making. Moreover, by analyzing historical records, it can automatically issue alerts for anomalous transactions and perform intelligent forecasting of financial metrics, thereby providing forward-looking recommendations for corporate cash-flow management.

3.2 Innovations in Intelligent Accounting

3.2.1 Mechanism Innovation.

In the digital-economy era, the convergence of emerging technologies-blockchain, AI, and big data-has ushered in new opportunities for intelligent accounting. A "blockchain + AI + big-data" triune mechanism integrates the strengths of these three technologies to deliver an end-to-end solution for accounting entry, verification, and oversight.

Blockchain's decentralized, immutable, and traceable characteristics effectively ensure the authenticity and integrity of accounting data, preventing malicious tampering or forgery. This provides a solid foundation for the reliability of accounting information and makes oversight more efficient and transparent.

Big-data technologies enable the efficient storage, management, and analysis of massive, multidimensional accounting and related business datasets. By integrating and mining these datasets, enterprises gain valuable insights for cost control, risk warning, and strategic decision-making. For example, the Finance Bureau of Xiangyang City has built an intelligent financial-tax cloud platform that employs advanced OCR image-recognition technology. Platform users can rapidly and accurately extract invoice and document information, transform it into digital data, and then apply AI algorithms to classify and allocate entries to the correct accounting ledgers[5]. Moreover, by interfacing with external data sources such as tax-authority systems, the platform can verify the authenticity of documents in real time, substantially reducing the financial risk posed by fraudulent invoices.

3.2.2 System Innovation.

User-friendly intelligent accounting interaction systems combine AI, big data, cloud computing, and other advanced technologies in a user-centered design. They aim to deliver convenient, efficient, and intelligent interfaces for accountants, corporate managers, and other stakeholders. With intuitive dashboards, streamlined workflows, and powerful functionalities, these systems not only enhance the efficiency and accuracy of accounting operations but also furnish richer financial insights for corporate decision-making.

For instance, Kingdee's Cloud Star platform focuses on the core financial needs of small and micro-enterprises, covering financial management, supply-chain management, e-commerce operations, and more. Its intelligent feature set facilitates digital transformation for these enterprises[6].

Consider a small food-processing company that produces and sells various snack foods and employs only a handful of finance staff. Prior to implementing Cloud Star, the company relied on manual bookkeeping, which was both time-consuming and error-prone. In the absence of an effective inventory-management system, the company frequently experienced stock shortages or overstock, severely impacting production and sales. After adopting Cloud Star's intelligent accounting module, the company saw a marked improvement. The platform's smart-voucher generation uses predefined business-scenario templates-such as procurement, sales, and expense reimbursement-to automatically create corresponding accounting entries as soon as transaction data is entered, thus reducing manual input and errors.

In terms of inventory management, Cloud Star provides real-time updates and intelligent analytics[6]. Warehouse staff need only input stock movement data, and the system instantly updates the inventory ledger, reflecting current quantities and values. Through big-data analysis, the system also offers inventory-warning notifications: when stock levels fall below a safety threshold, it alerts the user to replenish; when levels exceed a reasonable maximum, it recommends stock adjustments. As a result, the company's inventory turnover ratio improved significantly, and inventory-holding costs fell by approximately 20%, thereby boosting operational efficiency and profitability.

Furthermore, Cloud Star delivers multi-dimensional financial-analysis capabilities. Management can generate financial reports and visualizations-such as profit-analysis tables and cost-analysis charts-to gain intuitive insights into financial performance. The system also supports custom analytical dimensions, enabling companies to examine financial data by product category, sales region, customer segment, and more, thus providing comprehensive data support for strategic decision-making.

4 Key Challenges in the Development of Intelligent Accounting

In recent years, as intelligent accounting has been increasingly adopted by enterprises, several issues have emerged during its development, constraining its further promotion and application.

4.1 High Technical Complexity

On the technical front, heterogeneous data sources and varying format standards necessitate the construction of robust ETL pipelines. This involves extensive development work for data mapping, quality validation, and the like, and data-governance rules are difficult to unify-resulting in considerable implementation complexity[7].

For example, Haier Group-one of the earliest domestic explorers of intelligent accounting-encountered significant technical obstacles when it introduced financial robots into its shared-services center[8]. Its legacy accounting information system had been incrementally built over many years, with relatively independent modules that proved incompatible with the new robots' data interfaces. When the robots attempted to extract sales-order data to generate accounting vouchers, interface mismatches led to transmission errors and incorrect vouchers. This forced repeated manual verification and correction, severely impacting efficiency and driving up labor costs.

Moreover, small and medium-sized enterprises (SMEs) feel this pressure even more acutely. With limited budgets, many SMEs cannot afford the high costs of system upgrades or staff training, making it difficult for them to keep pace with technological advances. As a result, they gradually fall behind competitors in financial-data analytics and decision support, hindering their own growth.

4.2 Elevated Data Security Risks

Intelligent accounting systems typically centralize vast amounts of corporate financial data in data centers or cloud platforms, and require frequent data transfer among internal modules, external systems, and various enterprise nodes. Such centralized storage and high-frequency transmission amplify security vulnerabilities, increasing the risk of data breaches or theft[9].

Take JD.com, a leading e-commerce enterprise: its intelligent accounting system processes large volumes of customer payment information and corporate financial data. In one incident, hackers exploited a system vulnerability to infiltrate several customer accounts, stole payment credentials and transaction records, and even altered portions of the company's financial statements. This breach inflicted substantial economic losses and severely damaged JD.com's reputation, triggering a crisis of confidence in its data-security measures.

4.3 Shortage of Interdisciplinary Talent

Because intelligent accounting merges technologies from multiple domains, talent with expertise in a single traditional discipline is no longer sufficient; the market urgently needs professionals who combine accounting knowledge with IT and data-analytics skills. However, current university curricula remain misaligned with industry requirements, resulting in a severe mismatch between supply and demand.

For instance, when ZTE Corporation established global financial shared-services centers and built its intelligent accounting framework, it urgently required candidates proficient in both accounting and information technology, with strong data-analysis

capabilities. Yet qualified applicants were extremely scarce, causing delays in some strategic projects due to the lack of appropriate talent.

4.4 Inadequate Legal and Regulatory Framework

As an emerging field, intelligent accounting has limited practical application experience in China. Legislators are unable to gain a comprehensive understanding of all the issues and potential risks involved, making it difficult to craft precise regulations that address emerging gaps or real-world problems.

For example, when data from an intelligent accounting system is illicitly obtained and used for commercial competition or other unlawful purposes, there may be no clear legal provisions regarding how to define the infringement, calculate losses, or penalize the perpetrator. This legal ambiguity prevents enterprises and individuals from fully safeguarding their rights in matters of data security.

5 Conclusion

This paper has explored the digital transformation of the accounting profession by reviewing the domestic and international research status of intelligent accounting and by deeply analyzing the key challenges encountered in its development-namely, technical integration difficulties, elevated data-security risks, and a shortage of interdisciplinary talent. In addition, it has explored how to establish a comprehensive talent-training mechanism and investigated innovative application pathways for intelligent accounting within corporate management.

However, the present study is confined to the manufacturing and e-commerce sectors and lacks analysis of other industries. Nor does it propose concrete solutions for the identified challenges. Accordingly, future research should extend to additional industries to identify further limitations in the application of intelligent accounting, and should seek low-barrier technical approaches and tailored talent-training frameworks to help bridge the technology-application gap.

Overall, the future of intelligent accounting research must place greater emphasis on interdisciplinary integration. Only through the coordinated advancement of technological innovation, talent development, and institutional reform can the bottlenecks currently impeding intelligent accounting be overcome, thereby positioning it as a central driver of corporate value creation and high-quality economic growth.

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