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Application of Artificial Intelligence Technology in Financial Reporting

Manshan Lin*

International Business College, Dongbei University of Finance and Economics, Dalian, China
1617393487@qq.com
**Corresponding author*

Abstract: *Under the background of digital transformation and intelligent technological innovation, traditional financial reports are difficult to meet management and regulatory requirements due to problems such as low data processing efficiency and insufficient analysis depth. This study focuses on the application of artificial intelligence technology in the field of financial reporting, exploring the optimization path and value innovation of the financial reporting process empowered by technology. Firstly, the process and limitations of traditional financial reporting were analysed. Then, the advantages of artificial intelligence technology in financial reporting were expounded. Then, the connection between artificial intelligence technology and key financial businesses was pointed out. Finally, the application scenarios of industrial intelligence technology in financial reporting were proposed. Specific application scenarios include the intelligence and efficiency of financial data collection and processing, the automatic generation and review of efficient financial reports, and the in-depth analysis and value mining of financial reports. The research results provide important technical support for improving the quality of financial information, strengthening risk management and driving value creation.*

Keywords: *Artificial Intelligence; AI; Financial Reporting; Application Exploration; Application Scenarios*

1. Introduction

With the rapid development of information technology, human society is accelerating its entry into the intelligent era. Artificial intelligence (AI) technologies represented by big data, machine learning, natural language processing and knowledge graphs, with their powerful capabilities in data processing, pattern recognition, complex decision-making and predictive analysis, etc., are profoundly transforming the management models and business processes of many traditional industries. As a comprehensive reflection of an enterprise's economic activities, a key basis for investors' decisions, and an important means of market supervision, the accuracy, timeliness, relevance and transparency of financial reports in their preparation, auditing, analysis and disclosure have always been the core issues of concern in the accounting field. However, the traditional financial reporting process is facing unprecedented challenges: data explosion and a sharp increase in complexity, higher requirements for reporting timeliness, greater compliance and regulatory pressure, demands for information depth and insight, as well as labor costs and skill gaps. AI efficiently processes massive heterogeneous data, automatically executes clearly defined procedures, identifies abnormal patterns and complex correlations that are difficult for humans to detect, and even conducts predictive analysis based on historical data. From automated accounting processing and intelligent auditing to financial forecasting and risk management, the application exploration of AI in the financial field has taken shape and demonstrated remarkable results. Integrating AI technology deeply into the core link of financial reporting is not only an inevitable trend of technological development, but also an urgent need to enhance the value of financial information, reshape financial functions, and empower enterprise decision-making.

This research focuses on the application exploration of AI technology in financial reporting, which has significant theoretical significance and practical value. In terms of theoretical significance: By integrating cutting-edge AI technology with traditional accounting and financial reporting theories, exploring the new features and rules of the financial reporting process, content, form and value empowered by technology, it is conducive to enriching and developing the theoretical system of

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interdisciplinary fields such as accounting informatization and intelligent accounting. Exploring how AI can break through the limitations of traditional financial reports in terms of data scope, reporting frequency, information depth, etc., is conducive to deepening the theoretical understanding of the essence, function and future form of financial reports. In terms of practical significance: By automating the processing of a large number of repetitive tasks through AI, the reporting cycle is significantly shortened, human errors are reduced, operational risks are lowered, and the timeliness and reliability of reports are enhanced. By leveraging the complex analytical capabilities of AI, deeper and more forward-looking information can be extracted from massive amounts of data to enhance the decision-making relevance of reports. Free financial personnel from the cumbersome basic work, allowing them to focus more on high-value-added activities that require professional judgment, strategic analysis and business insight, and promote the transformation of the finance department into a value creation center. This study systematically reviews the application scenarios of AI technology in each link of financial reporting, analyzes the changes and potential value it brings, and explores the implementation paths and challenges, providing references for theoretical research and practical application.

2. The Process and Limitations of Traditional Financial Reporting

The traditional preparation of financial reports mainly relies on manual operation. Each link is closely connected but has many limitations. The specific process and limitations are as follows:

Step 1: Data collection. Financial personnel collect raw data through multiple channels, including revenue data from the sales department, cost data from the purchasing department, and transaction flows from the bank, etc. The data forms are diverse, including paper documents and electronic spreadsheets, etc., and are scattered among different systems and personnel. The collection process is cumbersome and prone to omissions.

Step 2: Data organization and accounting. Financial personnel classify, review and calculate the collected data in accordance with accounting standards and enterprise regulations. For instance, classify various expenses into corresponding accounts, calculate costs and profits, prepare accounting vouchers, and then record them in various subsidiary ledgers and general ledgers. This process relies on manual operation, involves a large amount of work, and is highly prone to calculation errors or improper classification of subjects due to human negligence.

Step 3: Report preparation. Financial personnel prepare financial statements such as balance sheets, income statements and cash flow statements in accordance with the prescribed format based on the data from the general ledger and subsidiary ledgers. During the compilation process, it is necessary to ensure the consistency and accuracy of the data, while meeting the information needs of different stakeholders.

Step 4: Report review and release. The completed financial reports need to be audited internally or reviewed by the financial supervisor to check issues such as data logic and compliance. After the review is passed, it will be submitted to the management, shareholders and regulatory authorities, etc. However, due to the long process and extensive manual participation, the timeliness of financial reports is poor, making it difficult to meet the real-time decision-making needs of enterprises. Moreover, the analysis depth is insufficient, making it hard to uncover the potential information behind the data.

3. The Advantages of Artificial Intelligence Technology in Ffinancial Reporting

AI technology has brought about all-round innovation and improvement to the field of financial reporting, becoming a key force in promoting the upgrading of financial management models. The development of AI will drive the transformation of financial reporting, leading future financial reporting to move towards intelligence and dynamics [1].

3.1 Improve the Efficiency of Financial Report Preparation

By introducing automation technology, AI can restructure financial activities, thereby reducing time and resource consumption [2]. AI is equipped with the function of automated data collection and processing, and can quickly connect to multiple data sources such as ERP systems, CRM systems and financial software. AI automatically identifies, extracts and integrates data from different systems, instantly completing the collection of massive amounts of data and significantly reducing the data

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collection time. In the data processing and report preparation stages, AI automatically classifies, summarizes and calculates the collected data based on preset financial rules and algorithms, and quickly generates the first draft of financial statements. AI can also update data in real time. When business data changes, it automatically refreshes financial reports to ensure timely access to the latest financial information.

3.2 Enhance the Accuracy and Reliability of Financial Reports

In the data processing stage, AI automatically identifies outliers and logical contradictions in the data and conducts a comprehensive inspection of the data through preset verification rules [3]. AI uniformly collects and processes scattered data to ensure the consistency of the same data across different reports and business scenarios. At the same time, it can also conduct a comprehensive scan of financial data to prevent the omission of key data and ensure that the financial report covers all necessary information. In addition, through machine learning algorithms, the patterns and patterns of the enterprise's past financial data are learned, and the current data is predicted and verified. Once the data deviates from the normal trend, a warning will be issued in a timely manner to help financial personnel thoroughly investigate potential problems.

3.3 Provide More In-depth Financial Insights and Decision Support

AI integrates internal and external data of enterprises, including market and industry data, financial information of competitors, and macroeconomic indicators, etc., and conducts correlation analysis through complex algorithms and models. By using machine learning algorithms, deep learning is conducted on historical financial data and related influencing factors to construct a prediction model. By simulating the financial results under different market environments and business strategies, it provides enterprises with forward-looking financial forecasts. Through visualization technology, complex financial analysis results are presented in intuitive and understandable charts, enabling managers to quickly understand the logic and trends behind financial data [4]. In addition, generative AI relies on its self-learning and continuous optimization and iteration capabilities to constantly improve the analysis model and continuously enhance the accuracy of prediction and decision support [5].

4. The Connection Between Artificial Intelligence Technology and Key Financial Businesses

Table 1 The correlation matrix between AI technology and key financial businesses

No	Financial business process	Artificial intelligence technology support	Main empowerment directions
1	Preparation of financial statements	ML(Automated rule engine), NLP(Information extraction), CV(Bill identification)	Automated input and merging
2	Financial information disclosure	NLP(Text summarization and generation)	Write efficient and compliant disclosure documents
3	Data analysis and insight	ML(Prediction/Clustering), NLP(Notes/Report analysis)	Identify trends, drivers and hidden correlations
4	Financial audit	ML(Anomaly detection), NLP(Text analysis and comparison)	Automated testing, risk-oriented auditing
5	Financial Risk management	ML(Predictive model, risk model)	Forward-looking identification of credit/liquidity/market risks
6	Tax compliance	ML(Rule matching), NLP(Analysis of tax law)	Automatic tax calculation and preferential identification

The connection between AI technology and key financial businesses is reflected in the intelligent reconstruction and efficiency leap of the core financial processes. Among them, machine learning reshapes businesses such as fund management, revenue forecasting, customer credit assessment and risk monitoring through time series prediction, classification and clustering, and anomaly detection, upgrading historical data analysis into forward-looking insights. Natural language processing breaks the value of unstructured texts, achieving automatic extraction of key contract terms, intelligent generation of financial reports, in-depth interpretation of management discussions, and analysis of public opinion sentiment. It breaks down the semantic barriers between business texts and financial

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data, significantly enhancing the efficiency of information disclosure and the depth of information mining. Computer vision, with the aid of OCR and image recognition technology, realizes the automatic collection and structured conversion of invoice, document and table data, eliminating the bottleneck of manual entry from the source. In the specific business mapping, the correlation matrix between AI technology and key financial businesses is shown in Table 1.

This technological integration not only significantly enhances the efficiency and accuracy of data processing, but also promotes the transformation of financial functions from accounting and record-keeping to strategic decision support. By deeply exploring data correlations, identifying hidden risks, and generating dynamic insights, it builds a solid risk defense line for the organization and releases decision-making added value. Ultimately, under the framework of "human-machine collaboration", it achieves a leap in financial value.

5. The Application Scenarios of Artificial Intelligence Technology in Financial Reporting

By depicting several key and representative application scenarios, it clearly outlineshow AI technology is and will drive financial reporting to evolve in a more intelligent, efficient and insightful direction at a deeper level in the future, achieving true "cost reduction, efficiency improvement, quality enhancement and risk control", and leading financial reporting work into a new paradigm of intelligence and automation.

5.1 The Intelligence of Financial Data Collection and Processing

AI achieves deep integration of "Optical character recognition(OCR), Computer vision (CV), Natural language processing(NLP), and Machine learning (ML)"[6] has reconstructed the traditional data input, cleaning and integration processes that relied on manual labor, achieving a leap in full-chain automation: In the raw data extraction stage, the OCR engine based on deep learning quickly parses the key fields in paper or image files such as scanned invoices, bank receipts, and contracts, and uses CV technology to identify special signatures and table structures. The input efficiency is significantly improved, and digital copying errors are eliminated. In the face of unstructured business documents, NLP models demonstrate transformative value. By using named entity recognition and relation extraction techniques, they can automatically interpret the delivery conditions in complex commercial contracts, purchase orders, or liability clauses in legal documents, accurately capture the elements that affect accounting recognition, and automatically map them to the accounting standards framework to generate preliminary accounting entries. At the level of multi-source heterogeneous data integration, ML algorithms automatically align data from ERP systems, supply chain platforms, electronic bank statements, and market databases, clean outliers in real time, and supplement missing fields. The NLP engine achieves semantic unification across systems. For continuous data stream processing, reinforcement learning (RL) dynamically optimizes data collection rules. Overall, this scenario has transformed financial data from "manual handling" to "intelligent generation", ensuring data granularity,timeliness and consistency at the source, and laying a solid foundation for high-quality data in the preparation of back-end reports.

5.2 Automatic Generation and Review of Efficient Financial Reports

AI achieves a fully automated closed loop from underlying data processing to final draft output through the deep integration of intelligent rule engines, natural language generation technology and dynamic analysis models. In the structured report generation stage, based on the pre-set accounting standard templates, the general ledger and the cleaned data are automatically connected. The rule engine is applied to fill in the account balances in real time and complete complex calculations. For the intelligent synthesis of unstructured content, generative NLP analyzes standardized financial data to automatically generate note texts that comply with industry terms and disclosure standards. Based on the operational focus framework preset by management, it extracts key insights from massive operational data and automatically writes the initial draft of "Management Discussion and Analysis". In the field of compliance review, the NLP semantic similarity algorithm is used to compare the reports of the same industry to detect the differences in abnormal disclosures. For the visualization presentation layer, the AI-driven dynamic dashboard is no longer a pile of static charts, but automatically configitates key indicator cards based on user roles, generates forward-looking trend lines using time series prediction models, and supports natural language interactive queries. In terms of audit efficiency, AI-driven audit automation [7] enables review tools to make a leap from format proofreading to

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substantive risk identification. CV is used to identify report layout errors, combined with NLP sentiment analysis to capture overly optimistic statements in management discussions, and unsupervised learning is applied to cluster annotation paragraphs to identify potential "hidden mines" of ambiguous disclosures.

5.3 In-depth Analysis and Value Exploration of Financial Reports

AI can penetrate the surface of static data, identify complex patterns, predict potential risks and generate strategic insights from massive structured financial data and unstructured text, enabling financial reports to leap from historical record tools to forward-looking decision-making engines: In the dimension of rich mining of unstructured text, high-order semantic parsing is achieved based on the NLP model. Through deep semantic disambiguation and entity relationship extraction, the key signals ignored by traditional analysis are systematically captured, the frequency migration of strategic keywords in management discussions is tracked, and sentiment analysis is used to quantify the expression tendency. In the predictive modeling layer of structured data, a time series machine learning model integrating macro factors, industry trends, and real-time public opinions is integrated. Through dynamic attribution analysis, revenue drivers are disassembled, the probability of quarterly cash flow gaps is predicted, and a three-dimensional portrait of customer credit risks is constructed. In the field of cross-modal correlation analysis, GNN technology builds a full-dimensional relationship graph for enterprises, connecting financial report items, non-financial data and market behaviors, and identifying hidden infectious risk chains. At the deep value insight generation end, generative AI enables intelligent narrative analysis, automatically benchmarks against key indicators of peers, generates management action suggestions, and outputs visualization-driven investment memos. This scenario expands the decision support capabilities of financial analysts to a new dimension, from explaining "what has happened" to predicting "what is about to happen" and guiding "how to respond", reshaping the underlying logic of capital allocation and risk control.

6. Conclusions

AI has demonstrated strong potential throughout the entire life cycle of financial reporting, driving the enhancement of core value. Automated processing significantly reduces basic operation costs and enhances speed and report timeliness. The accuracy of the algorithm significantly reduces human errors and enhances the reliability and compliance level of the reported data. The ability of in-depth analysis and prediction enhances the insight and decision support value of the report. Meanwhile, AI has liberated the energy of financial personnel, prompting them to shift towards more strategic value creation activities and achieving an essential upgrade of the financial function. This research still has certain limitations. Currently, the application of AI technology in financial reporting mostly relies on structured data. The processing ability for unstructured data still needs to be improved, and the interpretability of the algorithm also affects the in-depth application of the technology in complex financial scenarios. Furthermore, issues such as ethical risks and data security risks brought about by the application of AI technology have not been explored in greater depth in the research. In the future, we will further overcome technical challenges, enhance AI's processing capabilities for unstructured data, and increase the transparency and interpretability of algorithms. At the same time, in the future, we should also pay close attention to the ethical and safety issues caused by the application of AI, build a complete risk prevention and control system, and promote the safety and reliability of AI technology in the field of financial reporting.

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