

Research on the Application of Artificial Intelligence in Audit Risk Identification and Response

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Abstract: Artificial intelligence (AI) has brought both new challenges and new opportunities to the audit profession. The use of AI technologies to identify and respond to corporate risks has become a new requirement for auditors. Through a theoretical analysis of AI's impact on auditing, this study adopts a case study approach to investigate how AI can be applied in audit risk identification and response. It identifies and analyzes corporate audit risks and proposes corresponding countermeasures. The findings indicate that AI technologies enable rapid and accurate identification of potential audit risk points, thereby facilitating the formulation of response strategies and enhancing audit efficiency. This study innovatively proposes application strategies for AI technologies in the field of audit risk. These strategies not only provide referential insights for audit practitioners and broaden the direction of auditing research, but also offer effective guidance for audit practice.

Keywords: Artificial intelligence; Audit risk; Risk identification; Risk response

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1. Introduction

Artificial intelligence (AI) in the auditing field presents both opportunities and challenges. In the AI era, audit risk has new characteristics and trends; for example, data security and privacy issues are increasingly prominent, audit data quality and integrity have become a focus of concern, and audit standards and methods need to maintain synchronization with technological development in order to adapt to the new audit environment. Integrating audit and AI is the necessary path for audit development in the new era and is a necessary change to adapt to the times. It can be seen that traditional audit methods have been unable to meet the audit needs of large-scale, high-speed, high-complexity data; how audit personnel will carry out audit risk identification and response is the challenge posed by the new era.

The research contributions of this paper are twofold. For theoretical researchers, it provides referential

insights and expands the direction of auditing research. For audit practitioners, the use of data analytics and AI technologies can assist audit teams in identifying risk factors that may have been overlooked in the past, enabling more comprehensive risk identification and assessment, thereby enhancing risk identification capabilities. It also facilitates the formulation of targeted response strategies, offering effective guidance for audit practice.

2. Literature review

There are already scholars studying the impact of AI on auditing, such as audit quality, audit efficiency, audit fees, audit responsibility, etc. Scholars believe that AI is likely to change the audit industry and has the potential to enhance audit quality and provide value-added services for audit clients, but AI adoption requires rethinking audit practice, considering that the lack of control in the AI “black box” may make audit practice more opaque and increase audit quality risks ^[1]. Some research explored the impact of client AI application on financial statement audit quality and found that companies implementing AI technology have higher audit quality, which is related to factors such as auditor’s IT background, auditor-client distance, client corporate governance quality, and whether the company belongs to the high-tech industry. In addition, research also found that AI application can reduce client audit lag and audit fees ^[2]. Research through Chinese A-share listed company samples from 2011 to 2022 empirically explores the impact of corporate artificial intelligence adoption on audit fees and its underlying mechanisms. Research results show that artificial intelligence application can alleviate information asymmetry, enhance accounting information quality, thereby reducing audit fees, which is particularly evident in state-owned enterprises ^[3].

Some scholars explored the influencing factors of audit professionals adopting data analysis and artificial intelligence. Through quantitative and qualitative analysis of 130 Spanish auditors, the results show that although people are very willing to implement artificial intelligence, the adoption level of data analysis and artificial intelligence still needs to be higher. In addition, the factor that has the deepest impact on implementation is the regulation of the use of these technologies ^[4]. Scholars explored the practical application and potential advantages of artificial intelligence in IT auditing through case studies and theoretical analysis and proposed an integrated framework that can simplify audit processes, reduce risks, and improve audit quality. This framework provides strategic guidance for organizations seeking to leverage AI capabilities to enhance IT audit effectiveness and adaptability ^[5]. Research reshapes internal audit through emerging AI technologies, develops an integration framework and assessment model, proposes implementation-oriented AI adoption recommendations, promotes the development of a knowledge system at the intersection of internal audit and emerging AI technologies, and puts forward practical, managerial, and theoretical contributions ^[6].

Research examines whether audit firms and their clients adopting AI affects audit efficiency; results show that when audit firms and clients respectively use artificial intelligence, there is a positive association between AI usage and audit report lag. However, when audit firms and clients jointly use artificial intelligence, there is a negative association between AI usage and audit report delay, thereby enhancing overall audit efficiency ^[7]. Some scholars, through surveying employees of the Big Four audit firms in Germany, analyzed the use of an AI tool that helps detect misstatements in management reports. Research results show that this AI tool improves audit effectiveness and efficiency ^[8]. Additionally, other scholars explored whether using artificial intelligence can mitigate the impact of independence conflicts on audit firm liability. Results from two experiments show that using AI significantly reduces the effect of independence appearance conflicts on jury judgments regarding

audit firm liability. When concerns related to independence conflict appearances arise, using AI helps maintain the perceived objectivity of auditors, which keeps greater trust in the audit process among jurors. This study enriches our understanding of determinants of auditor litigation risk and how technological change affects audit firm liability^[9].

It can be seen that there is little direct research on artificial intelligence and audit risk; only one paper found that the empirical conclusion is that AI investment significantly reduces audit risk, internal control quality is an important transmission channel for AI investment to reduce audit risk, and auditor industry expertise enhances the risk-reducing effect of AI investment^[10]. Some scholars have touched upon audit risk, for example, believing that using intelligent platforms throughout audit work integrates information and improves audit efficiency; intelligent analysis of audit risk increases the scientificity of decision-making^[11]. Some scholars study limitations of artificial intelligence in financial auditing, analyze barriers related to AI adoption, and evaluate the relevance of psychological and functional obstacles to adoption^[12]. No studies on AI and audit risk identification and response have been identified; how to use AI technology in audit risk identification and response has theoretical value and can also guide audit practice.

3. Key concepts and theoretical foundations

3.1. Concepts of artificial intelligence and audit risk

Artificial intelligence is the core branch of computer science, aiming, through algorithms, data, and computing power, to simulate human intelligence and achieve complex tasks such as visual recognition, language comprehension, decision learning, etc. In the audit field, artificial intelligence is promoting audit transformation from “after-the-fact inspection” to “pre-event early warning.”

Audit risk is the possibility of making a wrong judgment on financial statements containing material misstatements. The magnitude of audit risk is affected by inherent risk, control risk, and detection risk. The possibility that the audited entity’s accounting processing process and its internal control system cannot detect and correct material misstatements that have occurred is collectively called risk of material misstatement. The possibility that auditors cannot detect material misstatements when performing audit procedures is called detection risk. The audit risk model is shown in Formula 1:

$$\text{Audit risk} = \text{Risk of material misstatement} \times \text{Detection risk (Formula 1)}.$$

3.2. Theoretical foundations

Risk management theory. Risk management theory is a series of theoretical frameworks and systematic methods for risk identification, assessment, control, and response. It covers practices aimed at helping enterprises effectively manage risks to achieve corporate objectives. Core principles of risk management theory include risk identification and assessment: identifying potential risks that may have negative effects on the enterprise, assessing them to determine their likelihood and degree of impact, and determining their importance and priority to formulate corresponding response measures. In addition, risk response also involves taking appropriate measures to reduce or transfer risks. In order to cope with changing risks, risk management can also carry out continuous monitoring and adjustment of risk management strategies.

Information asymmetry theory. Information asymmetry theory means that in a market economy, there is information asymmetry between transacting parties, i.e., one party possesses more or more accurate information than the other. During the audit process, auditors need to recognize that the accuracy of risk assessment may

be affected by information asymmetry, leading to increased audit risk. Auditors can, with the assistance of intelligent technology, collect and process large amounts of data more quickly and conduct analytical processing, thereby improving audit efficiency and audit accuracy. However, even though auditors can collect more information using intelligent analytical tools, if the client is dishonest or deliberately manipulates data, the data may still be biased.

4. Analysis of the current status and problems of audit risk under artificial intelligence

4.1. Data complexity and inadequate data systems

In the course of their operations, enterprises generate vast amounts of data, including transaction records, user information, and supply chain data. The complexity and diversity of such data pose significant challenges to audit work. It is difficult for enterprises to build a comprehensive data system within a short period; consequently, many enterprises establish data systems only for data and information arising from key economic activities. However, various economic activities of an enterprise do not exist in isolation. Without a systematic and complete data system, the usefulness of the collected data cannot be fully realized, thereby failing to promote the overall healthy development of the enterprise.

4.2. Fictitious transactions and doubtful transaction authenticity

In the age of intelligence, financial processing systems and accounting information are all processed and recorded through electronic platforms, and some transactions are conducted via online paperless transactions, which produce more convenient electronic vouchers. These electronic vouchers can easily be tampered with, leading to the fabrication of corporate operating data, fraud, and other misconduct. When auditing these electronic vouchers, auditors are unable to determine whether the data are genuine. For instance, click farming (transaction brushing) often involves a large volume of fake transaction data.

Moreover, business diversification and the increasing complexity of revenue recognition policies can also cast doubt on the authenticity of revenue. For example, concerning revenue recognition methods, Meituan faces the risk of misapplying the gross method and the net method, as shown in **Table 1**. Such judgment biases may distort the authenticity of revenue.

Table 1. Differences in revenue recognition methods for Meituan's major business segments

Business type	Revenue recognition method
Meituan Waimai (Food Delivery)	Net method: merchant commissions, delivery fees; Gross method: online marketing
In-store, Hotel & Travel, Group Buying	Net method: merchant commissions, delivery fees; Gross method: online marketing
MeituanYouxuan (Community Group Buying)	Net method, Gross method
Shared Bikes, E-bikes	Net method: ride fees; Gross method: advertising revenue
Financial Services	Installment method: loan interest, payment processing fees

For example, Company A, a real estate enterprise, experienced inauthentic period expenses due to business diversification and complex revenue recognition, showing signs of inflated period expenses. As illustrated in **Table 2**, the growth rates of selling expenses, administrative expenses, and finance costs in the income statement all surged substantially compared with the industry average for the same historical periods, with the

largest increase occurring in 2023, thus suggesting a likelihood of inflated expenses.

Table 2. Growth rates of three major periods

Indicator	Entity	2022	2023	2024
Selling Expense Growth Rate	Company A	-26.40%	124.97%	101.45%
	Industry	26.32%	4.04%	-13.36%
Administrative Expense Growth Rate	Company A	1.05%	51.58%	17.70%
	Industry	-7.94%	2.14%	-19.05%
Finance Cost Growth Rate	Company A	-35.58%	257.49%	6.07%
	Industry	-12.51%	-0.37%	-2.83%

*Data sources: Financial statement data of Enterprise A and industry report

4.3. Outdated audit techniques and the need to improve audit risk identification and assessment models

In traditional audit work, auditors typically perform on-site inspections and other offline audit procedures and have relatively limited experience in online audit work. Most accounting firms and corporate internal audit functions still rely on conventional audit software tools, which are incapable of accurately processing new types of data. When carrying out risk assessments, auditors must evaluate the types of risk and their current magnitude, and then rank potential risks according to their severity. This inevitably leads to subjective judgment. Such a risk assessment model is relatively outdated and cannot support sound business decision-making.

4.4. Lack of digital and intelligent knowledge among auditors and the need to improve their competencies

The majority of auditors in Chinese enterprises are still engaged in simple financial data checking, and their software application skills need to be enhanced. Auditors lacking information technology skills may be unable to fully leverage intelligent tools and techniques, resulting in inefficient audit processes and a waste of time and resources. Auditors who lack data analysis skills and have not mastered intelligent technologies may fail to detect data anomalies and accurately identify risks, potentially overlooking significant audit findings or making erroneous judgments. This can degrade the quality of audit reports, impair the understandability and usefulness of audit results, and increase audit risk.

4.5. Inadequate audit legal and regulatory framework

Although information technology has been widely applied across various fields and has greatly enhanced work efficiency, the corresponding laws and regulations remain relatively outdated. Audit information is exposed to the Internet, threatening the security of large-scale data transmission. In China, under the backdrop of big data, cloud computing, and artificial intelligence, there is still a lack of standardized laws, regulations, and institutional requirements for audit work, and the application of blockchain technology also lacks the support of legal provisions and regulatory rules. To conduct audit work effectively under these new circumstances, the relevant legal and regulatory framework needs further improvement.

5. Application of artificial intelligence in audit risk identification and response

5.1. Application of artificial intelligence in audit risk identification: A case study of Suning.com

5.1.1. Identification of material misstatement risks

(1) Identification of material misstatement risks caused by business risks.

Auditing Standard No. 1101 points out that risks existing in the production and operation of the audited entity may affect the financial statements and are the focus of attention of certified public accountants.

As an e-commerce enterprise, Suning.com faces common risks of e-commerce enterprises such as long transaction cycles, data security, technological dependence, as well as problems such as improper or illegal operations by internal personnel. In addition, during its multiple mergers and acquisitions, many investment events occurred, such as investing in Evergrande Real Estate, Milan Club, and acquiring Tiantian Express, which aggravated its business risks. Taking the acquisition of Tiantian Express as an example: after spending 4 billion yuan to acquire it in 2017, in 2018 its revenue was only 1.811 billion yuan, but the net loss reached 1.296 billion yuan. Such mergers and acquisitions not only increase business risks, but also raise audit risks, providing possibilities for fraud.

(2) Identification of material misstatement risks caused by internal control risks.

The equity of Suning.com is highly concentrated. The actual controller, Zhang Jindong, holds 51% of the shares and has dominant and discretionary power. The company adopts a flat management structure, which affects the completeness of the audit and the authenticity of audit evidence.

In terms of information systems, Suning.com's research and development focuses on backend construction. The shopping APP and website platform have insufficient stability, resulting in errors in coupon amount labeling and out-of-stock products still being displayed as in stock. This not only damages the company's reputation and revenue, but also misleads consumers and increases the risk of misstatement in areas such as revenue recognition.

Modern enterprises require that transaction data be managed in detail and backed up. Digital and intelligent positions need to have accurate information verification capabilities and big data processing skills. However, Suning.com has not equipped such professionals. The storage security of electronic vouchers and audit evidence is insufficient, and there is a risk of tampering or deletion, which brings great difficulties to the audit work.

5.1.2. Detection risk

In recent years, Suning.com has been audited by PricewaterhouseCoopers as its external auditor. The firm has four intelligent audit tools, namely Aura, Halo, Connect, and Extract, which can efficiently and accurately complete online audit work and precisely process data from the enterprise database. At the same time, PricewaterhouseCoopers conducted a comprehensive audit of various data of Suning.com. The audit personnel have relatively high overall quality, and the work has progressed relatively smoothly. However, only through the annual report of Suning.com, it is impossible to know the disclosure of key audit matters and specific audit procedures in the audit report.

5.2. Application of artificial intelligence in audit risk response: Taking Meituan as an example

5.2.1. Establishing an audit risk identification system

At present, enterprises are improving the risk identification and management mechanism, optimizing the organizational structure, using data analysis tools to timely identify and assess potential risks, and formulating

response strategies to ensure the sustainable development of enterprises in the digital era. Auditors need to implement overall control in various links such as data collection, risk identification and assessment processes, and subsequent continuous supervision, clarify audit priorities and directions, and conduct targeted risk prevention on key points such as management integrity.

5.2.2. Constructing a multi-dimensional information prevention and control system

Meituan's business operations are highly dependent on information systems, and its potential risks pose dual challenges to the quality of financial information and audit work. By constructing a prevention and control system through four dimensions, namely system assessment, hardware supervision, development review, and data security management, it can effectively reduce the audit risks related to technical systems and data security. See **Figure 1**.

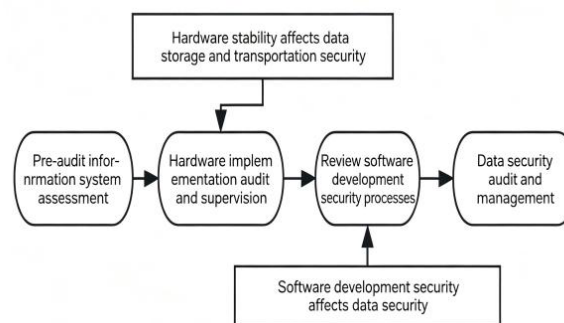


Figure 1. Comprehensive information prevention and control system

5.2.3. Introducing and cultivating audit talents

Meituan has established an audit team composed of experts in multiple fields such as financial auditing, strategic analysis, legal compliance, etc. Among them, financial audit personnel focus on the authenticity and accuracy of financial data, industry analysts assess the alignment between strategic decisions and industry trends, and legal compliance advisors review the legality of business activities. Through information sharing and collaborative work among team members, they break through the limitations of a single perspective, conduct comprehensive and multi-level audit supervision over Meituan's strategy implementation, and accurately identify audit risks. See **Figure 2**.

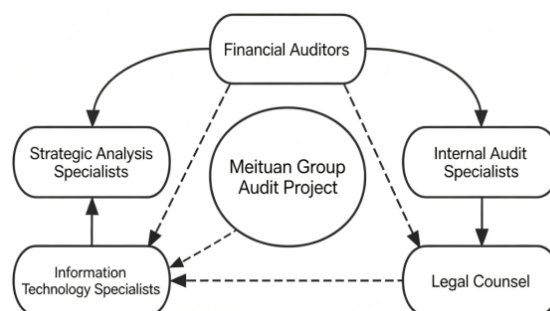


Figure 2. Cross-domain collaborative audit

The training of practitioners should take into account two aspects: first, enhancing the ability to operate intelligent tools and technologies; second, strictly complying with data usage regulations to protect the security of digital information. Auditors need to master computer skills and be able to operate intelligent audit platforms, and no longer engage in repetitive tasks such as account bookkeeping and indicator calculation, but focus on the application preparation of artificial intelligence platforms. They should actively learn intelligent software systems, be proficient in selecting appropriate analysis and forecasting tools, correctly interpret and calculate data, and ensure that the results are true and scientific, so as to provide reliable business recommendations for the economic activities of enterprises, thereby facilitating scientific decision-making by enterprises.

5.2.4. Full-process prevention of accounting risks

In terms of financial risk response, Meituan has carried out prevention of financial risks from multiple dimensions such as financial accounting, expense allocation, and internal control, as shown in **Table 3**.

Table 3. Financial risk prevention dimension table

Dimension	External audit
Financial Accounting	Customized audit plan, focus on external revenue
Expense Allocation	Risk-oriented, optimize audit methods
Internal Control	Focus on key control points, test control effectiveness
Personnel Quality	Deepen data analysis technology, dynamic risk warning
Target	Ensure accuracy of financial reports, reduce accounting risks

5.2.5. Detection risk response

Based on the characteristics of Meituan's billions of user behavior data and millions of merchant transaction data, build an AI audit system of "data collection–risk modeling–real-time warning" to realize automatic execution of smart contracts; use blockchain technology to build a full-process audit chain covering "merchant entry–order generation–rider delivery–user confirmation–fund settlement" to adapt to high-frequency small-amount and multi-node business; use Internet of Things technology to realize real-time audit monitoring of "people, goods, and places" for offline scenarios such as store visits, warehousing, and instant delivery. In audit testing, AI monitors internal control links such as order inventory and payment in real time, automatically generates log records, and helps auditors evaluate the effectiveness of internal control.

6. Conclusion and implications

6.1. Improving the digital-intelligent audit risk identification system

Enterprises should establish a full-process digital-intelligent management system covering data collection, storage, processing, and sharing, with clearly defined audit objectives and scope, so as to identify potential risks including data security, algorithmic bias, and model selection. A risk identification framework should be constructed in alignment with business processes, with key control points identified to reduce the risk of material misstatement. Meanwhile, internal control elements such as the control environment, risk assessment, control activities, information and communication, and monitoring mechanisms should be evaluated to ensure the effectiveness and reliability of the internal control system.

6.2. Reducing risks through multi-party communication

Close communication between enterprises and audit firms is essential, with continuous monitoring and review of data usage to promptly address anomalies. Market surveys should be conducted to stay abreast of industry trends, and regular communication with government authorities should be maintained to facilitate timely adjustments to corporate strategies in response to policy changes. Information sharing and collaboration with customers and partners should also be strengthened. At the same time, attention should be paid to industry dynamics and competitors' initiatives, so as to draw on successful experiences, maintain keen competitive awareness, and make timely adjustments to audit strategies and measures as appropriate.

6.3. Strengthening data security protection

Data security controls should be reinforced through measures such as encryption technologies and strict access restrictions to prevent unauthorized access, and regular data security training for employees should be conducted. A comprehensive protection system encompassing both hardware and software—including firewalls, intrusion detection, and data backup—should be established, with timely patching of security vulnerabilities to enhance system responsiveness. Critical data should be backed up periodically, and a data recovery mechanism should be put in place to prevent irreversible loss due to accidental loss or equipment failure.

6.4. Vigilance against compliance risks

In the context of digital-intelligent transformation, auditors need to stay updated on regulatory changes in areas such as data protection and antitrust, ensuring that audit work complies with the latest requirements. The extensive application of artificial intelligence in audit risk identification should be pursued, leveraging techniques such as machine learning and data mining to analyze financial data and identify anomalous transactions, irregular operations, and potential fraudulent activities. Meanwhile, natural language processing technologies should be utilized to automatically analyze and interpret textual information—including audit reports and financial announcements—to extract possible risk factors.

6.5. Reasonable use of artificial intelligence to enhance audit efficiency

Auditors should explore ways to apply big data, AI, and machine learning technologies to improve audit efficiency and accuracy while reducing audit risks. Intelligent tools can be used to cleanse data and filter out useful information, thereby enhancing the accuracy of assessment outcomes. Appropriate AI models should be selected based on audit scenarios and data characteristics, with model training conducted on historical data, followed by interpretation and analysis of model outputs to support auditors' professional judgment and better address potential audit risks. In this way, AI can effectively identify latent risks and improve both the quality and efficiency of audit work.

In conclusion, leveraging artificial intelligence technologies enables rapid and accurate identification of potential audit risk points, and utilizing digital and intelligent approaches to respond to audit risks can improve audit efficiency, better control audit risks, and enhance corporate value.

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Author contributions

Yunhao Zhang and Caijie Zhu conceived the idea of the study and wrote the paper. Chunzeng Fan performed the case study. Miao Xia, Shaowei Du, and Xiaoqi Jia wrote the paper.

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