

Generative AI in Accounting and Auditing: A Literature Review and Future Agenda

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Abstract. Generative artificial intelligence (AI) have a unique value on helping people as a tool, it already show its outstanding advantage on some area, like data dealing, form the document and check risk on some level, this kind of tool not only bring the new development opportunity, but also face many challenge. In recent year, this change attract many people to focus and explore. However, there is still a lack of comprehensive analysis and research, and there is not enough in-depth discussion on key issues. This article adopts the methods of keyword retrieval and citation traceability to identify the literature related to the application of generative AI in accounting and auditing, and systematically analyze and summarize it. It aims to reveal the development trajectory of generative AI, the current application status and its great potential, while exploring solutions to the current key challenges. Solving these problems is of great significance to promote the efficient and reliable implementation of generative AI in the field of accounting and auditing. This will help accounting and auditing professionals adapt to technological changes, deepen the industry's understanding of emerging technologies, support the improvement of relevant policies and regulations, and provide guidance for future research.

Keywords: Generative AI, Accounting and Auditing, Development Process, Applications and Impacts, Analysis and Countermeasures

1. Introduction

Generative artificial intelligence is a kind of technology that can form the text,image,video and many new content. In the practical audit and account working process, it can analyse the invoice, contract and worksheet automatically, also it can make the analyse report, at the same time, screening the financial record and audit risk, it symbol the new direction about going beyond the RPA and traditional nature language dealing into more intelligent. In recent years, research in this field has expanded rapidly, and the technical path has shifted from early rule-based planning or expert systems to machine learning [1]. This technology has been widely used in a variety of accounting scenarios, including audit-related project risk screening and abnormal detection; enterprise financial applications, such as budgeting, business forecasting and cost control; regulatory agencies or rating agencies identify high-risk declaration subjects through risk scoring; and tax process automation, such as invoice coding. , contract review and tax compliance, etc. [2]. This technology brings practical economic benefits, including improving the quality of financial reports

and audits, enhancing operational efficiency, improving customer satisfaction, and improving the job satisfaction of senior employees. However, challenges are still facing at the regulatory, social and technical levels [3]. For example, the artificial intelligence audit model improves the accuracy of fraud detection by about 30% and significantly reduces manual errors in financial reports. The time spent by financial personnel on repetitive accounting tasks has been reduced by 60%, which has greatly alleviated the professional burnout problem of senior financial professionals. However, at the technical level, risks such as model illusion and algorithm non-traceability still exist, and a global unified financial artificial intelligence regulatory framework has not been established [4]. At the same time, some data show that human-computer collaboration tools can increase the overall productivity of employees by 40% on average, while customer service artificial intelligence shortens customer waiting time and improves customer satisfaction [5].

As for the practical application, the staff to real implement still exist some problems [6]. As for the industry perspective, also exist the shortage, we can not deny that the gap between the theory and practice. Some article refer that the importance and emergency of constructing the Real-time analytics and collaboration platform. As for the future direction, should strengthen the AI research Empirical quantitative research, model development, reliability assessment, and comparative analysis on different country system. It is necessary to build a model adapted to real accounting scenarios and establish a unified and standardized evaluation framework for artificial intelligence systems for auditing. This article systematically analyzes and comprehensively evaluates existing research and practice, presents the current development of generative artificial intelligence in the accounting and auditing industry, and summarizes the advantages and core challenges of artificial intelligence-assisted accounting and auditing compared with traditional methods from multiple angles. At the practical level, this study helps to improve accounting and auditing professionals' understanding of how new technologies affect the audit industry, encourage practitioners to evaluate and reduce related risks, keep pace with technological development, and ensure the effective implementation of technology in practical application. At the industry level, this study is expected to stimulate the public's thinking and attention to current issues, promote the academic community to pay more attention to the practical application of generative artificial intelligence, and promote the formulation and improvement of industry standards and policies. This article puts forward the core point: whether the value of generative artificial intelligence in the field of audit can be fully realized depends heavily on the construction of a systematic trust mechanism.

2. Application progress and evolutionary trajectory

2.1. Technological evolution

Recently, AI develop rapidly and cover our daily life, gradually become more and more complex and mature. In general classification, we can divide it into three stages: The first is the professional system, its agenda rely on the specific area's knowledge and rule; the second is the machine learning, it good at modeling the complex figure and conduct the prediction, but it apparently exist the problem about hard to explain, the classical Black box problem, in highly regulated fields such as auditing It raises concerns about ethics and credibility, thus limiting its practical application. The third generation is explainable artificial intelligence (XAI), whose core is to generate explainable results, verify and optimize algorithms, make up for the shortcomings of the second generation, improve the credibility and traceability of the system, and expand the application scenario [3]. Specifically, the language model can encode text semantics and institutional rules, and use the attention mechanism of context perception to understand the implicit logical structure in the text.

From the perspective of auditing, traditional financial analysis software can only process structured numerical data and cannot interpret a large amount of unstructured text information such as contracts, meeting minutes and e-mail exchanges. And the Large Language Model (LLM) has overcome this limitation.

Nowadays, the global account company already implementing two mature business implementing successfully, the first one is the automatically comparing on contract terms, in detail, it can use the large language model to conduct the semantic matching on the after-revise purchase, derivative and sale contract, also automatically detect the income confirm, penalty for breach of contract that the ma kind of conflict and high-risk difference, contribute to decrease the human-audit working amount around 70%. The second is the intelligent generation of financial statement notes - the model integrates the distributed transaction data throughout the year and automatically generates a compliant and concise annual report disclosure text according to accounting standards, which significantly reduces the workload of repetitive document processing by senior auditors. At the same time, these two applications improve the accuracy of financial reports and shorten the overall audit cycle, so that experienced financial professionals can be freed from mechanical data collation and turn to strategic risk assessment, thus improving job satisfaction. However, the large-scale application of this technology still faces three major obstacles: the inconsistency of artificial intelligence regulatory policies in various countries, the transformation pressure brought to employees by the restructuring of the workforce, and the inherent "black box" characteristics and the illusion of the big model [7].

On the common situation, through the further exercise on the big amount data collection, the model already equip the function about inference, for instance, it can understand the financial report, contract and the ESG report effectively, conclude the content contemporary, catch the key information, this kind of change can hugely deduct the human working demand. Additionally, they can transform the text data into quantitative index. However, these model may easy to produce deduction, we cannot exam the result all the time, not doubt that this kind of limitation decrease the reliability, it still need the human checking, it has the potential risk about obeying the rule, duty and so on. Fraud detection is one of the most promising applications of artificial intelligence [2]. Machine learning can process massive transaction data and automatically identify patterns that may indicate financial fraud. These models can analyze millions of transactions at the same time, accurately locate suspicious anomalies, and quickly track potential fraud clues. Unlike traditional audit methods that rely on sampling and fixed rule matching, artificial intelligence-assisted audit can conduct full analysis of all transactions and support comprehensive data mining and predictive analysis [8]. In general, the technology is still maturing, with an increasingly wide range of applications and unique advantages. At the same time, there are certain limitations and challenges.

2.2. Industry evolution

The industry more and more pay attention the the AI function on data dealing, strategy predicting and decision making, it reflect on the support on the helping strategical identification, prediction and carrying [6]. Nowadays, the AI already apply on many account situations on the wide range; from backend identity authentication to front-end decision, as for the audit, can use it screening project risks and detect the abnormal factors; And then as for the enterprise finance, it help the budgeting, operational forecasting, and cost control, the third one is for the regulatory and rating agencies, it can help the risk evaluate and detect the high-risk reporting entity, the fourth is applied to tax and financial processes - automatically complete invoice coding, contract review and tax compliance [2]. In the future, people will pay more attention to reliability, adaptability to specific scenarios,

applicability, legality, attribution of responsibility, and internal control of enterprises and training of front-line employees.

2.3. Shift in accounting and audit focus

Accounting and audit will more and more improve the using frequency of advance tool, such as the AI and robotic process automation(RPA). As for the aspect of ability, there are bi difference between AI and RPA: AI good at dealing the unstructured and complex data, like the video, text, image and so on, RPA more suitable to deal with the repeat task,the standardized and structured data. Additionally, RPA is the foundation of complex automation. The industry trend reflected that the AI and RPA will deeply integrated, RPA will Integrating machine learning and cognitive computing capabilities, help human make the better decision [3]. The static annual budget will also evolve into a self-adjustable and adaptable budget system [9].

3. Implementation challenges and bottlenecks, future directions

3.1. Major issues faced

The technology also face the challenge and bottleneck. On the one hand, even though this kind of technique equip with advantage, but still can not totally replace the human in the working process, human stand for the unique role and value [10]. On the other hand, there are different problems on different dimension: first of all, for the ethical and regulation aspect, the transparency of the algorithm, the majority of the machine learning mpdel it is hard to trace, this kind of unclear process will form the obstacle to audit track recording and duty classification. In addition, there is a risk of algorithm bias; for example, if the historical financial data used for training itself contains systematic deviations or incomplete information, the model may produce distorted risk assessments and unreasonable audit recommendations, which may lead to misjudgment. The relevant white paper on the financial application of large-scale artificial intelligence models points out that when large language models are applied to financial tasks such as contract comparison and financial statement annotation generation, algorithm bias is easy to lead to the risk of audit distortion. The model may form inherent biases based on historical data such as enterprise scale, industry characteristics and regional factors, resulting in systematic deviations in the risk identification of small, medium and micro enterprises and emerging industries. In practice, the fairness test of large-scale models mainly includes four methods: hierarchical data set test, counterexample sample test, audit expert sampling review and model interpretability traceability analysis. The first three methods identify biases from the level of model output results, while the last one goes deep into the internal parameters of the model to explore the causes of bias.

The current industry standard practice include: Firstly, introducing the balance financial data in the process of exercise, contribute to improve the representativeness of small and medium-sized enterprises and emerging industries, cover their characteristic, Secondly, built the continue bias monitoring dashboard, in every day form the different indication for different group, according to their performance variation; Thirdly, implementing the alternative mechanism to conduct the human check points; fourth, alleviate the fix bias from the history though the figure correct by adjusting the model's weigh. In addition, there are also risks of network security and data privacy compliance. At the same time, there is still a lack of artificial intelligence governance framework. To effectively implement artificial intelligence, corresponding support mechanisms must be established, including internal enterprise control, accounting professional ethics standards, external industry supervision

and long-term continuous monitoring of artificial intelligence performance - these are key components of the comprehensive governance system [11]. In addition, there is also a data gap between large and small accounting firms [12]. It is necessary to formulate unified standards, introduce supportive regulatory policies as a guarantee, and take incentives to promote widespread adoption.

3.2. Changes in employee requirements

In terms of worker at the production line, will update the more strict requirements, like the professional knowledge govern, new technology understanding and the other kinds of soft skills integration. The related paper refer that it is crucial to cultivate the practitioner's professional ability, this is the core factor and driving force, also the detail constraint condition in different situation will be the important factor [13]. This transformation brings challenges and impacts at multiple levels: the micro level involves the evolution of accounting job responsibilities and roles; the medium level involves the restructuring of enterprise business processes and internal control systems; and the macro level involves the adjustment of accounting industry standards and regulatory frameworks [13]. Relevant literature emphasizes the key thinking ability required by practitioners: first of all, technical proficiency - proficiency in digital technology is the basic threshold for implementing generative artificial intelligence and managing related risks, although technical knowledge is updated quickly and easy to be outdated; secondly, the soft skills valued by enterprises, such as communication ability, adaptability Ability, teamwork, personal professional brand building, proactive problem-solving thinking, work enthusiasm and self-confidence [6].

As for the suggestion for the practical application, it can construct the professional team to coordinate the whole operation, at the same time, pay attention to the staff's real willing and trust. Also the system can become more and more multilevel and combine with the the normal supervise system, adapt to the change, through the external audit and internal audit departments output the result independently, further ensure the reliability, authenticity and fairness; The technical developer should closely communicate with the audit, together face the ethical risk, alleviate algorithm resistance, improve the acceptance of auditors, and ensure that the system can support real application scenarios; The organize of regular all-round performance evaluation is necessary, it can protect the stable operation of system on some level; Obeying the industry rule strictly, attach the importance of public and internal trust, ensure the figure source, privacy protect policy and figure safe regulation [3]. Through concrete and feasible improvement measures, the implementation of this technology can be effectively promoted and its influence can be enhanced.

3.3. Future directions

In the future, we need to focus on the objective, privacy protection, transparency, accountability, reliability, regulation frame, industry innovation, staff situation, the factual demand. The related paper point out, exist sic potential advance research task: Firstly, using the empirical quantitative methods to measure the direct effect on different kind of audit quality indication; Second, insist the model explore and develop, construct the system that can provide explain evidence and clear path trace; Third, evaluate reliability consideration to optimize the data accuracy and effectiveness, improve the ability to remark the figure forming; Fourth, compare the differences in the application of artificial intelligence in enterprise accounting systems of different countries; Fifth, build a theoretical model of accountant and artificial intelligence collaboration in the actual accounting environment; Sixth,

establish a unified work in the field of financial reporting and audit, Standardized artificial intelligence system evaluation framework [3].

The long-term government and industry collaboration must be workable. First of all, the daily process should consider the new kind of risk and factors, like the ethical problem; Next, the internal control and policy should achieve the balance, look at the operation performance and compliance level, so as to enhance the confidence of stakeholders. Third, we should work with regulatory agencies, professional associations and academic circles to formulate standards and improve best practices, so that new technologies are consistent with social ethics and professional ethics. Fourth, focusing on the ultimate value, through end-to-end process control, it can reduce moral risks, significantly improve the trust in AI and RPA in the field of accounting and auditing, and improve the acceptance of employees [3]. Through continuous discussion, attention and in-depth research on key issues, the practical application of this technology can be further improved and improved.

4. Conclusion

This article points out the definition, change and suggestions. Focusing on the core argument, this article puts forward three major contributions: the full realization of the value of generative artificial intelligence in audit largely depends on the establishment of a systematic trust mechanism. First of all, the first contribution is to build a four-dimensional (situation-application-challenge-impact) analysis framework, which reveals the evolution of artificial intelligence from a rule-based system to interpretable artificial intelligence (XAI) and large language models. The framework links technological progress with the trust mechanism - explainability is the prerequisite for building trust; the second contribution is to point out the key research gaps that reflect the three dimensions of lack of trust: first, the lack of empirical comparison of artificial intelligence performance under different accounting systems; second, the lack of bias assessment for small and medium-sized enterprises and emerging industries. Framework; Third, the governance standards put forward by the artificial intelligence audit are insufficient. The third contribution is to directly support the construction of a systematic trust mechanism to address the three major obstacles of algorithm transparency, talent skills gap and regulatory fragmentation, and to provide practical guidance for practitioners and policymakers. Future research should focus on: verifying the reliability of artificial intelligence through empirical case studies, carrying out interdisciplinary talent training to strengthen human-computer collaboration, establishing a unified evaluation framework to regulate artificial intelligence behavior, and integrating adaptive governance of ethics and compliance from the beginning of design. Only through a multi-dimensional and multi-level systematic trust mechanism can generative artificial intelligence fully realize its audit value, improve the reliability of financial reports, and enhance the confidence of stakeholders.

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