Generative AI in Internal Audit: An Exploration of Visualization Applications

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Abstract: The rapid advancement of information technology and the exponential growth of enterprise data have posed unprecedented challenges to traditional internal audit methods. Against this backdrop, with its powerful capabilities in content generation and interaction, Generative Artificial Intelligence (AIGC) presents new development opportunities for the field of internal audit. This paper focuses on the visualization applications of Generative Artificial Intelligence (AIGC) in internal audit, aiming to conduct an in-depth exploration of this subject. It begins by briefly outlining the technical characteristics of AIGC and its current application status in the auditing domain. Subsequently, the article the various potential issues arising from the application of AIGC in internal audit. And finally proposes effective strategies to address these challenges. This study not only offers theoretical references and practical insights for promoting the deepened application of AIGC visualization in internal audit, but also contributes to enhancing the quality and value of audit practices, thereby laying a research foundation for the realization of intelligent audit.

Keywords: AIGC; Internal Audit; Visualization; Intelligent Audit

1. Introduction

As an integral component of corporate governance, risk management and internal control, internal audit plays a pivotal role in fostering the healthy and sustainable development of enterprises[1]. However, in the context of digital transformation, enterprise operational models are becoming increasingly intricate, accompanied by an exponential growth in data volume. Traditional internal audit methodologies, which rely heavily on manual experience and sampling techniques, struggle to comprehensively and efficiently address the challenges posed by massive data. Consequently, internal auditors frequently encounter obstacles such as protracted data processing cycles, imprecise risk identification, and static reporting formats. These limitations not only impede audit efficiency but also constrain the depth of audit insights and the effective dissemination of audit findings.

Advancements in Artificial Intelligence (AI) offer novel avenues for addressing these challenges. Generative Artificial Intelligence (Generative AI) technologies, represented by ChatGPT and DeepSeek, have achieved breakthrough advancements. This technology has demonstrated formidable performance in domains such as data analysis, pattern recognition, and intelligent interaction, and indicates its extensive application potential within the professional services sector. Particularly in terms of data representation and interpretation, the integration of AIGC with visualization technologies enables the transformation of complex audit data and analytical results into intuitive and accessible visual formats, thereby significantly enhancing the efficacy of audit information dissemination and decision support.

However, the application of AIGC in internal audit visualization remains in a nascent exploratory stage; not only is its full potential yet to be realized, but it also confronts numerous challenges. Accordingly, this paper aims to systematically review the core characteristics of AIGC and its feasibility for application within the auditing domain, conduct an in-depth analysis of key issues in internal audit visualization practices, and propose concrete countermeasures. Through this study, it is expected to provide valuable insights for the further development and deep integration of AIGC technology in the field of internal audit.

2. Overview of AIGC and Its Application Status in the Audit Field

2.1 Overview of AIGC

Artificial Intelligence Generated Content (AIGC) refers to a class of artificial intelligence technologies that leverage large-scale pre-trained models and extensive data learning to acquire capabilities in understanding, reasoning, and generating novel content. The core utility of AIGC lies in "generation", which can autonomously create text, images, audio, video, code, and even complex data structures and analysis reports based on user instructions or specific inputs[2].The critical technical foundations underpinning AIGC include deep learning (particularly the Transformer architecture)[3], Natural Language Processing (NLP)[4], Computer Vision (CV), and multimodal learning[5]. Distinct from traditional analytical AI, which primarily focuses on recognition, classification, and prediction, AIGC emphasizes creativity and content production, thereby facilitating advanced human-computer interaction and knowledge generation.

AIGC exhibits particularly significant potential in the realm of data visualization. Specifically, it enables:

(1) Automated Chart Generation: based on raw data or natural language descriptions, AIGC can automatically generate charts, dashboards, and other visual elements that meet specific requirements.

(2) Interactive Data Exploration: AIGC generates real-time visualizations in response to natural language queries, allowing users to efficiently derive insights from the data.

(3) Dynamic Narrative Reporting: AIGC presents data findings, evidence, and analytical processes in the form of visualized storylines, thereby enhancing the readability and persuasiveness of reports.

(4) Visualization of Complex Relationships: AIGC is capable of generating visualizations such as related-party transaction network graphs and fund flow path diagrams, thereby assisting relevant users in comprehending complex business relationships.

2.2 Current Application Status of AIGC in the Auditing Field

At present, the application of AIGC across the auditing domain remains in its nascent and exploratory phase. Nevertheless, it has demonstrated substantial potential in specific areas, particularly in enhancing auditing efficiency and deepening analytical insights.

(1) Document Processing and Information Extraction: AIGC facilitates the rapid reading and comprehension of unstructured documents, such as contracts, regulatory filings, and meeting minutes, enabling the precise extraction of core information and the generation of concise summaries. This capability provides robust support for audit evidence collection and compliance verification.

(2) Assistance in Standardized Audit Processes: AIGC aids in drafting initial content for audit workpapers and generating templates for audit enquiry letters. Furthermore, by leveraging predefined logic and data analysis outcomes, it can pre-organize relevant content for audit reports, thereby enhancing the efficiency of foundational operational tasks.

(3) Risk Identification and Intelligent Alerting: Through the analysis of historical case data and industry data, AIGC assists audit teams in detecting potential fraudulent activities, identifying operational issues, and pinpointing compliance risks. It issues alerts in visualized formats, such as risk heat maps. This approach not only improves the efficiency of risk identification but also allows auditors to focus on strategically valuable domains.

(4) Intelligent Q&A and Knowledge Support: Serving as an intelligent assistant to audit experts, AIGC delivers rapid and accurate information in response to queries regarding auditing standards, regulatory updates, and historical cases. This real-time responsiveness significantly optimizes on-site decision-making processes, ensuring the accuracy and efficiency of audit work.

(4) Visualization Analysis and Interactive Presentation: Upon integration into existing audit tools, AIGC enables users to generate refined charts and dashboards via natural language instructions. For instance, an auditor might input a query such as "Visualize the travel expense trends and anomalies across subsidiaries over the past three years", the system will automatically process the data and produce bar charts, line graphs, scatter plots, etc, and automatically annotating significant anomalies. This integration concurrently elevates both the speed and precision of data analysis.

Unlike external auditing, internal auditing focuses on organizational risk management, governance structures, and the optimization of management processes. Consequently, the application of AIGC in internal audit

necessitates a strong emphasis on deep integration with business practices and the enhancement of support functions for managerial decision-making. Enterprises can leverage visualization technologies to convey internal audit results to management and board members in more persuasive formats, thereby elevating communication quality and amplifying the value of internal auditing. Nonetheless, it is crucial to note that data in internal auditing is characterized by high confidentiality and multidimensionality, which imposes more stringent standards on the security requirements and processing capabilities of AIGC applications.

3. Analysis of Problems Faced by AIGC's Visualization Application in Internal Audit

Although AIGC offers promising prospects for visualization in internal audit, its practical promotion and implementation encounter numerous problems.

3.1 Issues Arising from Data Quality and Acquisition Difficulties

The training and practical application of AIGC models heavily rely on large-scale, high-quality data support. However, in the domain of internal audit, the involved data types are diverse, encompassing financial, operational, business, and human resources aspects. These data are typically dispersed across various systems with heterogeneous formats and inconsistent quality. Data silos are prevalent[6], and issues such as data incompleteness, errors, or inconsistencies are common, directly undermining the accuracy and reliability of AIGC-generated visualization content[7].

Moreover, Given that much audit data is highly sensitive and private, such as financial sensitive information, customer personal information, trade secrets, etc., its access permissions are subject to strict compliance management and multi-level approval processes, which greatly limits the data scope and analysis depth that AIGC models can obtain, thus hindering their deployment and application in broader, more refined audit scenarios.

3.2 Issues Arising from Technical Integration and Personalization Adaptability

Effectively embedding AIGC-driven visualization tools into an enterprise's existing internal audit systems, ERP platforms, and various business systems represents a complex systems engineering endeavor. Disparities in interface standards, data structures, and security mechanisms across systems lead to intricate integration processes and elevated implementation costs, often accompanied by substantial governance and compliance considerations.

Concurrently, generic AIGC models often fail to fully align with an enterprise's specific audit scenarios and unique business workflows, thereby demanding extensive optimization, domain adaptation, and customized development. This personalization reinforces the need for rigorous validation, performance benchmarking, and continuous monitoring to prevent drift between the model’s outputs and evolving expectations. Therefore, it places high demands on the enterprise's technical capabilities, resource investment, and cross-departmental collaboration.

3.3 Issues Arising from Compliance, Ethics and Security Concerns

Internal audit procedure involves substantial commercial secrets and employee personal sensitive information, so AIGC must ensure data security and compliance during processing and visualization generation. Mismanagement could precipitate risks of data breaches or misuse. This is particularly critical when utilizing third-party AIGC services, where security safeguards in data transmission and storage warrant rigorous evaluation and control.

Furthermore, biases in the training data underlying AIGC models may compromise the neutrality of outputs. For instance, in depicting risk distributions across departments or business processes, inherent algorithmic biases could yield misleading judgments, thereby jeopardizing the objectivity and impartiality of audit work.

Additionally, the most important issue is the attribution of responsibility. If errors in AIGC-generated visualizations lead to inaccurate audit conclusions or misguided decisions, who bears the responsibility? Currently, AIGC (particularly deep learning-based models) exhibits "black-box" characteristics[8], with opaque reasoning processes that conflict with the fundamental auditing requirements for traceability and verifiability.

3.4 Issues Arising from Auditors' Skills and Acceptance Levels

The application of AIGC-driven visualization tools imposes new demands on the digital literacy and data analysis competencies of internal audit teams[9]. These tools not only generate complex visualizations but also demand that auditors actively engage with them, including the formulation of precise model parameters, iterative refinement of outputs, and rigorous validation of analytical results to ensure accuracy and relevance. Such interactions necessitate a foundational understanding of AI algorithms, data processing pipelines, and interpretive frameworks, which extend far beyond conventional auditing expertise.

However, many traditional auditors, shaped by decades of reliance on manual and rule-based methodologies, may lack the requisite technical background in AI and data analytics, and even harbor doubts or resistance toward the application of new technologies due to perceived risks in accuracy and job security. Such skill gaps and low acceptance levels could emerge as primary barriers, potentially leading to suboptimal implementation and underutilization, thereby impeding the realization of AIGC's full potential in audit work.

3.5 Issues Arising from Cost-Benefit Analysis and Return on Investment

The introduction of AIGC technology into internal audit entails a series of cost investments, including but not limited to software acquisition or development, hardware upgrades, talent cultivation and routine system maintenance. These upfront expenses can strain organizational budgets, particularly for smaller enterprises with limited resources.

Although AIGC technology promises long-term benefits through enhanced audit efficiency, strengthened risk management, and increased audit value, these advantages are often difficult to quantify and observe in the short term. For instance, efficiency improvements may reduce manual review times by 30%-50%, but such outcomes typically emerge only after prolonged implementation.

Therefore, when considering the adoption of AIGC, enterprise must carefully balance potential returns against upfront investments to ensure that selected technical solutions deliver genuine value. Enterprise should develop cost-benefit analysis models to forecast return on investment, such as evaluating whether cost savings from automated data analysis can offset initial training expenses. Failure to address these input-output issues may result in underutilization of AIGC technology, potentially exacerbating financial risks rather than mitigating them.

4. Optimization Strategies for AIGC's Visualization Application in Internal Audit

To address the aforementioned issues, corresponding countermeasures should be implemented from multiple dimensions to promote the further development of AIGC in internal audit visualization application.

4.1 Strengthening Data Governance to Consolidate the Data Foundation

High-quality data serves as a prerequisite for the effective application of AIGC, Enterprises should establish and refine an internal audit data governance system, standardize data collection, cleansing, storage, sharing, and security management processes.

Enterprises should establish unified data standards to ensure the accuracy, completeness, and consistency of data, while promoting data interoperability between business systems to break down data silos.

Moreover, Enterprises should establish a unified internal audit data lake or data hub to provide rich data resources for AIGC.

In addition, a data quality assessment and continuous improvement mechanism should be implemented to strengthen data quality monitoring, ensuring that the data fed into AIGC models meets required standards.

4.2 Promoting Technological Integration and Innovation to Enhance Applicability

Enterprises should prioritize selecting AIGC tools and platforms that support private deployment, possess excellent scalability and integration capabilities, ensuring both data security and system compatibility.

Subsequently, AIGC tools and platforms should be integrated with existing systems through API interfaces, data synchronization, and other mechanisms, thereby achieving seamless connectivity between AIGC visualization tools and enterprise platforms.

Finally, the generic AIGC model should be fine-tuned and optimized in alignment with the specific requirements of internal corporate auditing and the distinctive characteristics of the

industry. This involves integrating specialized auditing knowledge and expertise to enhance the professionalism and practicality of the generated visualization outcomes. Furthermore, exploring technical pathways such as "AIGC + knowledge graphs" can deepen the analytical capabilities of visualization processes[10].

4.3 Establishing Ethical Norms and Regulatory Frameworks to Ensure a Compliant and Secure Environment

Internal guidelines for AIGC application should be formulated, clearly delineating the scope of AIGC use in internal audit, data access permissions, privacy protection requirements, result validation processes, and accountability mechanisms.

Visualization results generated by AIGC must undergo review, validation, and interpretation by professional auditors to ensure their accuracy and reliability, thereby mitigating over-reliance on automated judgments.

Building upon the aforementioned approach, it is advisable to select or develop AIGC models that incorporate a degree of interpretability (XAI), or to employ auxiliary explanation techniques, in order to assist auditors in comprehending the underlying logic of the visualization results.

At the same time, Enterprises should conduct routine monitoring and evaluation of the AIGC system's data security, algorithmic biases, and related aspects on a regular basis, promptly identifying and mitigating potential risks.

4.4 Enhancing Auditors' Digital Literacy to Foster Human-Machine Collaboration

Enterprises should conduct systematic training for internal auditors, covering foundational AIGC knowledge, data analysis skills, and visualization tool operations, to enhance their digital literacy and practical capabilities.

Enterprises should encourage auditors to acquire data science competencies or recruit hybrid professionals with expertise in both auditing and AI technologies, forming interdisciplinary audit teams.

Enterprises should encourage auditors to actively experiment with the application of new technologies, share both successful experiences and lessons learned from failures, foster an organizational culture that embraces change and continuous learning, and create a cultural environment that encourages innovation.

4.5 Exploring Economically Efficient Implementation Pathways to Focus on Value Realization

Enterprises should prioritize selecting appropriate internal audit scenarios (such as expense reimbursement audits or procurement process visualization analysis) to pilot AIGC applications, accumulating experience and verifying effectiveness before gradually expanding the scope of implementation.

Beyond short-term efficiency gains, enterprises should emphasize the long-term value of AIGC visualization in enhancing risk insights, optimizing internal controls, and elevating governance standards.

Enterprises can also explore collaborations with universities, research institutions, or specialized technology companies to jointly develop and promote AIGC visualization solutions tailored for internal audit, thereby achieving cost-sharing and outcome mutualization.

5. Conclusion

AIGC presents transformative opportunities for internal auditing, demonstrating significant potential particularly in the realm of visualization applications. This technology not only enhances the intuitiveness of data analysis results but also improves interactive experiences, as well as the professionalism and persuasiveness of audit reports. However, the practical application of AIGC still faces numerous challenges spanning multiple dimensions, including data quality, technical adaptability, ethical risks, talent reserves, and cost-effectiveness. When introducing AIGC technology to advance visualization practices in internal auditing, enterprises should fully recognize these practical issues and implement corresponding optimization strategies. For instance, enterprises should strengthen data governance, promote technological innovation and integration, establish a comprehensive ethical and regulatory framework, enhance the digital capabilities of auditors, and explore robust implementation pathways, among others. Through human-AI collaboration, by fully leveraging the advantages of AIGC in visualization, internal audit will be able to more effectively fulfill its core functions in risk management, internal control, and corporate governance, thereby creating greater value for the enterprise.

Looking ahead, with the evolution of technology

and the accumulation of practical experience, AIGC will propel internal auditing into a new stage of intelligent development.

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References

[1] Han Zhanli. Analysis of the Transformation and Challenges of Artificial Intelligence in Internal Auditing. Zhangjiang Technology Review, 2025, (03): 116-118.

[2] Zhao X. Application of AI and Big Data in Internal Auditing. China Township Enterprise Accounting, 2024, (12): 55-57.

[3] Cheng Ping, Yu Chang, Gong Yue. Research on Intelligent Internal Auditing Based on ChatGPT. Accounting Friend, 2023, (20): 7-12.

[4] Yi B X, Liu S Q, Wang Z Y. Application of AIGC in the Auditing Field. China Certified Public Accountant, 2023, (11): 69-73.

[5] Shan Wentao, Wang Yongqing. Research on Automatic Generation of Audit Reports Based on Generative Artificial Intelligence. Finance and Accounting Monthly, 2024, 45(24): 16-21.

[6] Fu Dongsheng. Research on the Application of Artificial Intelligence Technology in Hospital Internal Auditing. Financial Forum, 2025, (10): 102-104.

[7] Ma Zhihua. Preliminary Study on Generative Artificial Intelligence Technology Enabling Enterprise Internal Auditing. Modern Marketing, 2025, (28): 127-129.

[8] Zhang D, Zhou J .Implications of generative AI technology on auditing practice and research–a commentary. Managerial Auditing Journal, 2026, 41(1):153-162.

[9] Hu X Y. Research on the Application of Artificial Intelligence Technology in Bank Internal Auditing. China Exhibition (China Conference), 2025, (10): 147-149.

[10] Hu Xueying. Research on the Application of Artificial Intelligence Technology in Bank Internal Auditing. China Convention & Exhibition, 2025, (10): 147-149.

