The use of artificial intelligence in the field of auditing—a mini-study

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Abstract
The integration of Artificial Intelligence (AI) into control and auditing activities marks a fundamental transformation in the field of financial oversight. This article examines the strategic advantages and challenges associated with adopting AI in auditing processes, with a focus on automation, data analytics, error detection and predictive modeling. From a multidisciplinary perspective, the study highlights how AI is reshaping traditional auditing practices by enhancing accuracy, efficiency and real-time decision-making capabilities. The analysis draws on both current scientific literature and concrete examples implemented by established auditing firms, emphasizing the need to adapt the regulatory framework, strengthen professional competencies and define clear ethical principles and standards for the use of AI. The research methodology is based on the analysis of case studies that illustrate the application of artificial intelligence in auditing processes. The findings indicate that artificial intelligence does not replace the auditor's professional judgment, but acts as a transformative factor, facilitating the adaptation of the profession to the demands of a digitalized financial environment. The paper makes an important contribution through its multidisciplinary approach to the role of AI in auditing, combining theoretical perspectives with practical applications. This exploratory study provides insights into how emerging technologies are transforming auditing. The study's conclusions outline new directions for future research in the field, with relevant implications for professionals, the scientific community and stakeholders involved in the educational process.

Keywords: Data Analytics, Audit Reform, Professional Transformation, Risk Detection, Automation.

1. Introduction
Artificial intelligence has begun to significantly influence various aspects of modern life. From virtual assistants and personalized social media recommendations to autonomous vehicles and advanced medical diagnostic solutions, the impact of AI is deeply felt across human activities [1]. At the same time, artificial intelligence can contribute significantly to the organization of internal processes within public administration institutions, as well as to their development and/or transformation [2], by optimizing workflows and enhancing operational efficiency, and it could alleviate the workload of civil servants [3].

At the international level, there is growing concern regarding the shift in traditional paradigms of interaction with the environment, in the context of profound transformations driven by artificial intelligence.

Referring briefly to the areas of economic and social life most likely to fall under the influence of AI, it is evident that the financial sector already functions as a "living laboratory" for AI: credit-scoring models, trading algorithms, risk-monitoring systems, and fraud-detection tools. Danielsson et al. [4] warn that the extensive use of AI in finance may generate a new form of systemic risk: similar models trained on similar data tend to react in the same way under stress conditions, amplifying market movements and potentially triggering large-scale herd effects. Several critical directions emerge from these developments: (i) increased efficiency—faster risk assessments, lower intermediation costs, personalized financial products; (ii) new vulnerabilities—model opacity, algorithmic

bias in credit decisions, dependence on highly concentrated digital infrastructures; (iii) macro-level implications—the possibility that errors or shocks in one class of models may rapidly propagate throughout the entire financial system.

Therefore, the financial sector will be both the most direct "beneficiary" of AI (through efficiency and profitability gains) and one of the areas where regulation and oversight must adapt rapidly to prevent crises generated or amplified by algorithmic dynamics.

Equally important is the fact that public administration is undergoing a process of "AI-augmented transformation."[5] propose the concept of "AI-augmented government transformation," showing that the introduction of AI in the public sector does not simply mean the digitalization of procedures, but a profound reorganization of the interaction between technology, organizational structures, and decision-making processes. In line with this research, the sectors of public administration most exposed to AI include: (i) taxation and revenue collection—fraud-risk analysis systems, tax-compliance models, automated case selection for audit; (ii) social services—eligibility algorithms, case prioritization, integrated beneficiary monitoring; (iii) justice and public order—jurisprudence-analysis tools, drafting support, and risk-scoring systems (along with the associated issues of bias and lack of transparency); (iv) territorial planning and urban policies—predictive models for traffic, pollution, land use, and more. It must be emphasized that in this field, the influence of AI has a direct impact on the citizen–state relationship: it may increase efficiency and accessibility of services [6], but it may also amplify perceptions of opacity and "algorithmic governance" if transparency, explainability, and mechanisms for contestation are not ensured.

At the 2024 OECD Global Anti-Corruption and Integrity Forum, which gathered more than 2,300 participants from over 125 countries, the magnitude and complexity of AI's impact on corruption and integrity risks were highlighted, while also emphasizing the potential of these technologies to combat fraudulent practices [7].

As early as five years ago, the OECD recommended exploring the use of AI and data analytics to support fraud detection and strengthen anti-corruption systems [7]. In such a context, the field of auditing is undergoing profound transformation, and the role of AI is becoming increasingly visible and necessary.

Our approach to this topic follows the structure of the present study: (1) Introduction, (2) Research Methodology, (3) Artificial Intelligence—A Transformative Tool in Auditing, (4) AI Technologies Applicable in Contemporary Auditing, (5) Insights from the Practice of Major Audit Firms, and (6) Conclusion. The research design is illustrated in Fig. 1.

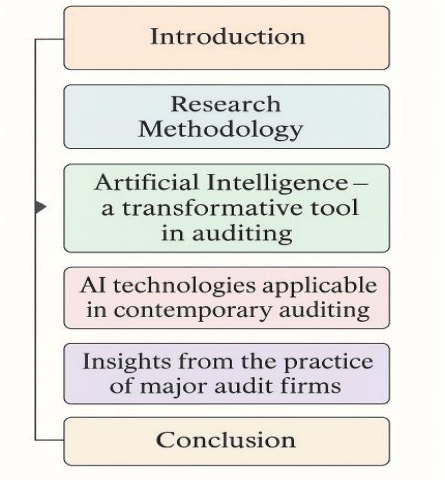


Fig. 1. Research design.
Source: Author's elaboration.

In this context of rapid transformations and systemic pressures generated by the emergence of artificial intelligence, auditing is shaping up as one of the fields in which adaptation is no longer optional, but a strategic necessity. Beyond its automation potential, AI is redefining the way risks are identified, data are analyzed, and professional judgments are formed, paving the way for a more proactive, predictive, and efficient audit process. Accordingly, this study seeks to investigate how AI can be integrated into audit activities to enhance the quality and integrity of audit procedures.

2. Research methodology

The methodology adopted in this study is qualitative and exploratory in nature, aimed at identifying and synthesizing contemporary trends in the use of artificial intelligence within the auditing field. The research falls within the category of conceptual mini-studies and seeks to integrate recent academic perspectives with examples drawn from the practices of major international audit firms.

In the first stage, a systematic and critical review of the relevant literature published between 2021 and 2025 was conducted, including scientific articles, books, technical reports, public policy documents (such as OECD recommendations), and professional analyses produced by international bodies. The purpose of this review was to identify the main directions in the evolution of AI technologies and to assess the extent to which they influence traditional audit processes.

Subsequently, the research incorporated a conceptual and comparative analysis of the technologies employed in auditing—such as expert systems, machine learning, natural language processing, fuzzy logic, and robotic process automation—in order to capture their maturity level, application potential, and associated professional implications. The entire methodological approach is supported by a visual conceptual framework (Fig. 2), which reflects the overall logic of the research design and highlights the transition from theoretical analysis to practical insights.

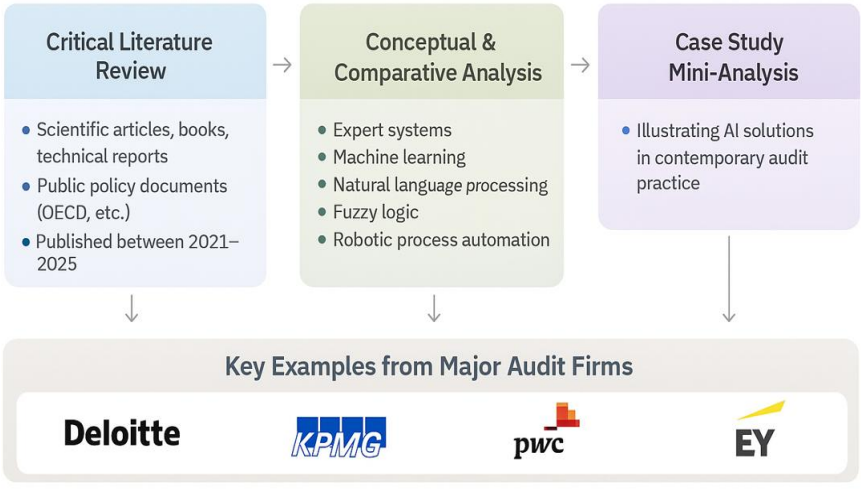


Fig. 2. The Conceptual Framework of the Methodological Approach.
Source: Author's elaboration.

An essential methodological component is the mini–case study analysis, built on examples provided by the major international audit firms (Deloitte, KPMG, PwC, and EY). These case studies were developed exclusively on the basis of existing documentation and literature and were used to illustrate how artificial intelligence solutions are being integrated into audit activities worldwide. By combining these approaches, the study offers a coherent, interdisciplinary, and well-grounded understanding of the transformative role of artificial intelligence in contemporary auditing.

3. Artificial Intelligence – a transformative tool in auditing

In this era of accelerated digitalization, auditing is being profoundly reshaped by the need to enhance the efficiency, accuracy, and relevance of its core processes. AI-based technologies empower auditors to adopt more comprehensive approaches to risk assessment, deficiency identification, and the formulation of audit conclusions. Numerous researchers have explored this topic [8], [9], [10], [11], and their findings are encouraging.

Across all sectors, business leaders are showing growing interest in artificial intelligence—especially its generative component—allocating significant resources to harness its potential. These technologies are projected to contribute between $5.5 and $7 trillion to global GDP over the next five years. However, integrating AI and machine learning solutions into audit activities introduces an elevated level of operational and professional complexity—something that was unimaginable until recently. Less than 18 months ago, these topics were mainly explored at the theoretical level during conferences, with little immediate practical applicability.

As illustrated in Fig. 3, elements once considered integral to the traditional audit process have now been replaced or supplemented by new requirements that demand advanced competencies and highly specialized expertise.

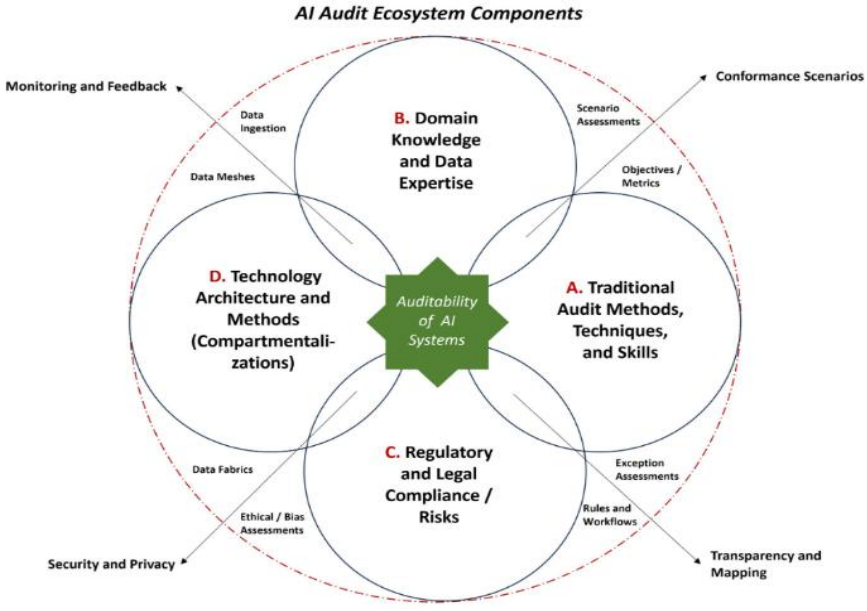


Fig. 3. Holistic AI adaptable audit framework.
Source: Reproduced from [12].

This challenge is further exacerbated by a relatively low level of interest among higher education graduates in pursuing auditing careers, combined with a significant outflow of experienced professionals from public accounting firms. This dual challenge—the shortage of new talent and the loss of valuable human resources—adds pressure on the sector's ability to adapt to the technological and regulatory demands triggered by the adoption of AI.

In a context where modern auditing requires advanced skills in data analysis, algorithm interpretation, and managing the ethical risks associated with AI usage, the lack of qualified human capital emerges as a major strategic vulnerability. Moreover, the tendency of younger generations to favor careers in fields perceived as more dynamic or innovative—such as fintech, technology consulting, or software development—further amplifies the imbalance between labor supply and demand in the auditing sector. The lack of appeal of the auditing profession is reinforced by its reputation for being rigid, bureaucratic, and relatively slow in adopting innovations—characteristics that contrast sharply with the expectations of young professionals who seek rapid impact, autonomy, and continuous development.

These structural issues were also examined at the YES Young EUROSAI Conference held in June 2024, which brought together young auditors and experts from across Europe interested in the impact of AI on auditing practices [13]. The event emphasized not only the technological implications of these changes but also the ethical and human dimensions of the transformation process. It highlighted the urgent need to reform professional training programs and recalibrate organizational culture to meet the expectations of the new

generation and to create an environment in which digital skills are valued and actively developed [13]. The advantages of leveraging AI in auditing are illustrated in Fig. 4.



Fig. 4. Advantages of leveraging AI in auditing.
Source: Reproduced from [14].

Nevertheless, it must be stated that AI is no longer perceived merely as a technological tool, but is increasingly becoming an active partner in decision-making processes and in addressing complex problems. In this regard, AI's ability to handle large volumes of data and learn from identified patterns contributes to greater accuracy and continuous innovation in auditing.

At the same time, accounting professionals and auditors are actively exploring the applications of these technologies to strengthen internal controls, prevent fraud, and ensure better compliance with regulations.

4. AI technologies applicable in contemporary auditing

Among the most widely used AI tools in auditing are Expert Systems (ES), which can replicate the reasoning of human specialists by simulating how they solve specific problems. These systems are valuable in audit planning, evidence collection, risk assessment, and drafting the final report, as well as in cost analysis, inventory control, and the evaluation of managerial control systems[15].

Another key concept is continuous auditing, which involves the systematic collection of electronic evidence to form an opinion on financial statements. Decision Support Systems (DSS) complement these efforts by providing interactive support for decision-making, simulating various scenarios, and adjusting recommendations based on dynamic conditions.

Neural Networks (NN), inspired by the structure of the human brain, represent another promising research direction. They are used for analytical reviews and pattern recognition in accounting data. Machine learning plays a crucial role in classifying tr nsactions subject to audit, while Natural Language Processing (NLP) (see Fig. 5) enables the automatic analysis of unstructured documents and the identification of risk areas [16].

A technology with specific applicability in risk assessment is fuzzy logic, which brings AI systems closer to human reasoning by allowing for a gradual interpretation of truth values, rather than relying solely on binary (true/false) logic. This approach is particularly valuable in auditing, where uncertainty and subjectivity often play a significant role in evaluating financial and operational risks. By handling imprecise or incomplete information in a nuanced way, fuzzy logic enables auditors to better model real-world situations and make more informed judgments [15].

Robotic Process Automation (RPA) complements this intelligent ecosystem by automating repetitive, rule-based tasks, such as data preparation, routine audit testing, or transaction reconciliation. These tools significantly reduce the time and effort required for manual processes, increase accuracy, and free up auditors to focus on more strategic and analytical activities.

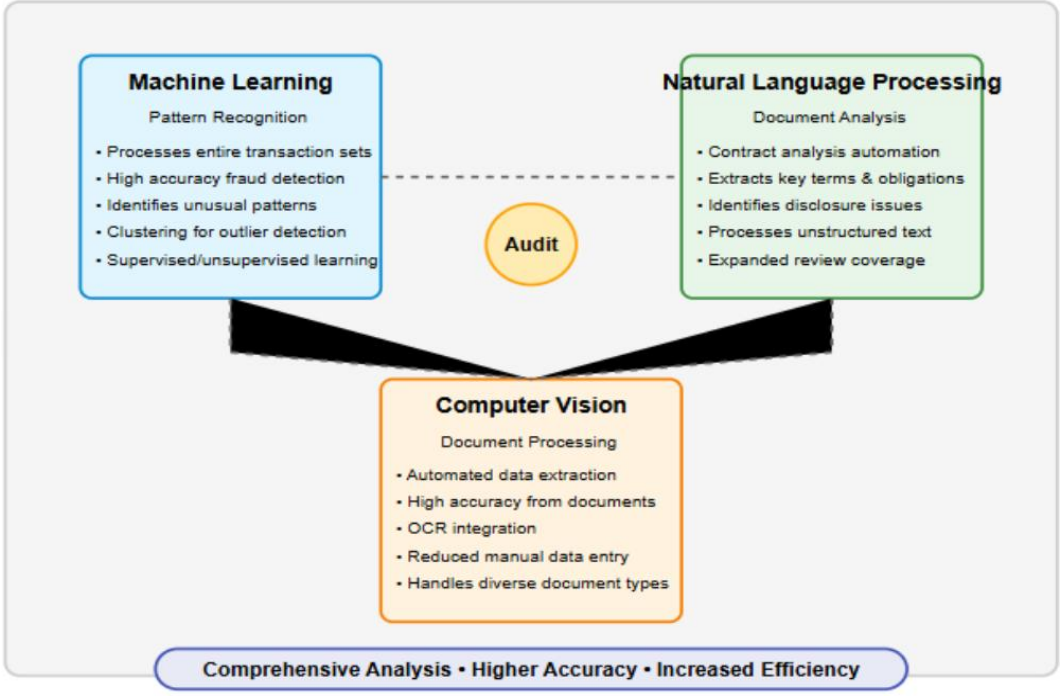


Fig. 5. AI-Driven Technologies in Auditing.
Source: Reproduced from [17].

Furthermore, the specialized literature increasingly highlights the advantages of hybrid systems, which integrate multiple AI technologies—such as fuzzy logic, machine learning,

expert systems, and natural language processing. These systems are considered among the most effective tools in auditing because of their ability to address both quantitative and qualitative dimensions of audit processes.

Hybrid models offer adaptability and flexibility, enabling auditors to manage the complexity of modern audit environments, where data sources are vast, heterogeneous, and often unstructured. By leveraging the strengths of various technologies in combination, these systems enhance the depth, precision, and contextual relevance of audit conclusions.

5. Insights from the practice of major audit firms

Research in the field has highlighted significant results achieved by the Big Four audit firms in recent years regarding the application of artificial intelligence in day-to-day activities. One illustrative example is Deloitte's cognitive auditing tool, developed alongside a risk assessment assistant. In order to contextualize these examples and highlight the diversity of AI-driven innovations across the profession, Table 1 offers a comparative synthesis of the main technologies and audit functions supported by the Big Four firms.

Table 1. AI Implementations across major audit firms

Audit Firm	AI Tools & Technologies Used	Main Audit Functions Supported	Key Benefits	Limitations / Risks
Deloitte	• Cognitive auditing tool • Machine learning for data structuring • Intelligent chatbot • RPA robot "Edgy" • Contract analysis AI system	• Risk assessment • Data structuring & integration • Advisory services • HR automation • Contract review	• Faster risk comparison • High-volume processing • Automation of repetitive tasks • Decision support	• Model opacity • Dependence on data quality • Need for upskilling
KPMG	• Unified AI platform • Cognitive computing • Advanced risk model • Tax analytics engine • Payroll tax automation	• Risk mapping • Tax audit automation • Reporting & analytics	• High processing speed • Consistent tax assessments • Enhanced risk visualization	• Implementation complexity • Misclassification risk • Cybersecurity vulnerabilities
PwC	• GL.AI robot • Machine learning classifiers • Automation tools for reconciliations • Anti-bribery AI tools	• Journal entry testing • Financial analytics • Fraud detection • Compliance screening	• Emulates expert decisions • Automation of routine tests • Enhanced fraud detection	• Need for retraining • Bias in fraud detection • Infrastructure reliance
EY	• AI anomaly detector • Predictive analytics • Pattern recognition engine	• Fraud identification • Scenario analysis • Predictive financial analysis	• Early fraud detection • Improved efficiency • Strengthened digital audit model	• Pattern misinterpretation • Transparency concerns • Governance needs

Source: Author's elaboration based on Deloitte, KPMG, PwC, and EY publicly available reports.

This solution was created to support auditors in comparing risk strategies and integrating data efficiently. Machine learning technologies are used to facilitate the structuring and integration of data, while the implementation of an intelligent chatbot provides guidance on audit rules, laws, and standards. Studies also show that Deloitte has integrated AI

technologies across various sectors. For instance, the intelligent robot Edgy is used for robotic process automation (RPA) in the human resources field, while a self-learning application can read and analyze contracts, supporting risk advisory services [16].

At the same time, KPMG is adopting an extensive set of AI capabilities through a unified platform. The company has implemented cognitive computing technologies and developed a new risk assessment method, which identifies and describes risks based on criteria such as severity, likelihood, interconnectivity, and speed. KPMG has also developed a tax analysis program capable of evaluating thousands of transactions in just minutes and uses tools for payroll tax automation and automatic exchange of information reporting [16].

As for PricewaterhouseCoopers (PwC), the firm offers a wide array of data- and analytics-driven solutions, employing technologies to gather information, determine entity statuses, review financial statements, and convert data into tax bases. In collaboration with a technology partner, PwC created the robot GL.ai, which integrates AI technology into financial-accounting practices.

This robot uses machine learning to absorb PwC's knowledge and experience, facilitating reasoning and drawing conclusions in a manner similar to that of an experienced auditor. PwC has also developed technologies that automate audit processes, including cash flow balance checks, bank reconciliations, bank confirmations, currency exchanges, and more. The company has also introduced AI tools for anti-bribery and anti-corruption reporting, as well as for journal entry analysis [9].

Ernst & Young (EY) has designed and implemented a tool that uses AI algorithms to detect erroneous or fraudulent entries in accounting journals. This tool helps rapidly identify anomalies and reduce financial fraud risks. EY also uses AI to perform predictive analytics, identify financial behavior patterns, and support decision-making by evaluating various scenarios. Through these applications, EY strengthens its position in the field of digital auditing, promoting a transition toward a model based on technology, data, and operational efficiency [16].

6. Conclusion

The findings of this mini-study confirm that artificial intelligence is becoming a structural driver of transformation in the auditing profession. By integrating technologies such as machine learning, natural language processing, expert systems, fuzzy logic, and robotic process automation, AI enables a shift from traditional, sample-based procedures toward more comprehensive, predictive, and data-driven approaches. Insights drawn from the practices of the Big Four firms further illustrate that AI is no longer an experimental tool but a core component of modern audit strategies, supporting risk assessment, anomaly detection, evidence analysis, and the automation of routine tasks.

However, the potential of AI is accompanied by significant strategic and ethical considerations. Effective implementation requires substantial investments in digital infrastructure, rigorous governance of algorithms and data, and continuous upskilling of auditors. The profession must also navigate challenges linked to model transparency,

algorithmic bias, cybersecurity, and the preservation of public trust—issues that increasingly shape the regulatory agenda at both national and international levels.

Importantly, this study shows that AI does not diminish the relevance of human auditors; rather, it enhances the value of their judgment. As audit processes become more technologically intensive, professional expertise shifts toward interpreting complex analytical outputs, ensuring ethical use of AI systems, and providing higher-order insights that machines cannot replicate. Artificial intelligence acts as a catalyst for reinventing audit practice. Its impact is most powerful when combined with human expertise, robust governance, and a forward-looking approach to professional education.

The transition toward AI-augmented auditing is not optional but essential, positioning the profession for greater accuracy, transparency, and relevance in an increasingly complex financial ecosystem.

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