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Generative Artificial Intelligence and Cultivation of Auditing Professionals

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Abstract

Generative artificial intelligence (GenAI) is profoundly transforming the auditing industry, catalyzing the emergence of a new paradigm of human-AI collaboration. This paper systematically analyzes the opportunities this technology brings to auditing, such as enhanced efficiency and expanded risk coverage, while revealing multidimensional challenges including technical costs, data security, and model reliability. Focusing on auditing talent cultivation, it proposes a dual-axis framework integrating technical proficiency and ethical literacy, constructs a tiered curriculum system, and establishes industry-academia collaborative practice mechanisms. Research indicates that a cultivation pathway equally emphasizing intelligent tool operation and ethical decision-making can effectively drive the transition of auditing from manual verification to intelligent validation.

Keywords

Generative artificial intelligence; Auditing talent cultivation; Human-AI collaboration; Ethical risks; Intelligent auditing.

1. Introduction

On November 30, 2022, OpenAI launched ChatGPT, a GenAI product powered by the Transformer deep neural network model. ChatGPT achieved breakthroughs in language tasks such as free dialogue and content generation, gaining widespread user adoption and societal attention upon its application in conversational scenarios. By 2025, GenAI continued to evolve, with the open-source model DeepSeek-R1 released by the Chinese AI firm DeepSeek rapidly accumulating a large user base due to breakthroughs in deep learning and neural network technology. This advancement propelled GenAI into a mature phase of technological refinement and commercial implementation.

As early as 2017, China's State Council emphasized in the Next Generation Artificial Intelligence Development Plan that intelligent education should be implemented across all educational stages, urging departments to accelerate talent cultivation and pedagogical reform to build a new education system aligned with practical needs. Responding to ChatGPT's technical sophistication and commercial disruptiveness, the Cyberspace Administration of China issued the Interim Measures for the Management of Generative Artificial Intelligence Services in July 2023. These measures prioritize balancing development and security while fostering innovation within a regulated framework. As the education authority, China's Ministry of Education (MOE) has consistently advocated for deep AI-education integration. At the 2024 World Digital Education Conference, Minister Huai Jinpeng proposed an "AI Empowerment Initiative" to promote AI for education, advancing AI-supported learning, teaching, management, and research. In March 2024, the MOE formally launched the Artificial Intelligence Empowering Education Action Plan.

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As a cornerstone of economic oversight, auditing plays a vital role in fostering high-quality economic development and safeguarding societal stability. However, traditional auditing theories and practices face significant challenges in the digital intelligence era. AI technologies empower auditors to capture, organize, and analyze vast information, expanding the dimensions of audit evidence. Simultaneously, they enable more comprehensive and meticulous audit procedures, enhancing risk identification, efficiency, and quality. The advent of GenAI heralds a new paradigm of human-AI collaboration and brings transformative changes to auditing education.

2. What is Generative Artificial Intelligence?

2.1. Definition of Generative AI

Generative artificial intelligence (GenAI) refers to a class of AI technologies designed for generative tasks. It constructs models using existing data resources (e.g., text, audio, images) to autonomously produce novel content based on specific prompts. Unlike discriminative AI, which focuses on pattern recognition and classification boundaries, GenAI enables content creation and novel data generation, connecting existing knowledge to inspire new ideas and augment human cognition and innovation.

Technically, GenAI employs self-supervised learning mechanisms (e.g., masked content reconstruction) to train models on unlabeled data, enabling complex neural networks like Transformers or GANs to learn data distributions and generate contextually coherent content. Functionally, GenAI accepts multimodal prompts (text, speech, images) through human-AI interaction to creatively produce diverse outputs. In terms of value, GenAI transcends information organization by exhibiting innovative capabilities—supporting human decision-making, fostering higher-order thinking, and generating novel content like coherent text and hyper-realistic images—a value underscored by UNESCO and Deloitte.

2.2. Characteristics of GenAI

GenAI exhibits three core characteristics:

Emergent Capabilities:Model performance scales nonlinearly with size, surpassing random levels beyond critical thresholds. For example, GPT-3's arithmetic accuracy jumped from <60% (13B parameters) to >98% (175B parameters), enabling few-shot learning for new tasks. This property is influenced by scale, architecture, data quality, and training processes (e.g., smaller PaLM outperformed LaMDA and GPT-3 on some BIG-Bench tasks).

Powerful Generalization and Transferability: GenAI continuously adapts to new data and tasks via in-context learning, transferring acquired knowledge to novel domains. This stems from automatic feature extraction via deep learning, knowledge transfer through pretraining-fine-tuning, and architectural enhancements like self-attention for language comprehension.

Cognitive Hallucination: GenAI may generate false information or plausible but incorrect responses to knowledge gaps, particularly under misleading prompts. Hallucinations manifest as irrelevant content, logical inconsistencies, or deviations from established facts.

3. Global Practices in AI-Education Integration

3.1. International Policies

AI has become a strategic focal point in global technology competition. Nations are racing to lead in innovation, application, and talent development through policy planning, capital investment, and education reform. Deep AI-education integration is now pivotal for cultivating future innovators and driving educational transformation. The U.S., China, and the EU lead this landscape, with Japan, South Korea, and Singapore actively participating.

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Table 1: Global Major Economies' AI Development Strategy

Country	Strategic Overview	Core Strategy
US	• Policy-driven funding: National AI Initiative Act commits $2.2B over five years to develop AI talent across government, academia, and industry. • Talent attraction: OPT policy allows international AI graduates to work for three years; 67% of U.S. AI Ph.D. graduates were international students in 2023 (34% Chinese).	Market-Driven+ Foundational Research
EU	• Talent-centric strategy: The 2025 AI Mainland Action Plan prioritizes talent cultivation, advancing interdisciplinary AI degrees in GenAI and ethical computing. •Governance focus: World's first comprehensive AI regulation, the EU AI Act.	Regulated Governance + Citizen Literacy
Japan	• Policy guidance: The Integrated Innovation Strategy 2023 promotes "Society 5.0," emphasizing exploratory, STEM, and entrepreneurial education. A ¥1T human resource investment supports corporate-university upskilling in mathematical, data, and AI-integrated education.	Government-Industry-Academia Collaboration

3.2. China's Policies

Since the State Council's 2017 Next Generation AI Development Plan, China has established a national AI education policy framework. 2024 was designated the "Year of Smart Education," with 71 policies issued by April 2025, reflecting intensified precision. Discipline development follows a tiered path: from "New Engineering" (2017) to "Four New Disciplines" (2020: engineering, medicine, agriculture, humanities), culminating in 2024's comprehensive AI-discipline integration across 535 universities.

Talent cultivation is advanced through interdisciplinary institutes (30 new), cross-disciplinary degree autonomy, and an "AI Credit Bank" (mandatory credit recognition). Technologically, MOST built 25 public AI computing platforms, while MOE created the "University Data Sharing Platform." Regionally, Beijing-Tianjin-Hebei, Yangtze River Delta, and Pearl River Delta pioneered AI curricula, with nationwide policy synergy reducing regional gaps by late 2024.

Table 2: China's AI-Education Integration (2017–2025)

Area	Policies and Developments	Key Data/Initiatives
Top-Level Design	2017: Next Generation AI Development Plan 2024: "Year of Smart Education"	71 national policies by Apr. 2025
Policy System	Multi-department coordination; MOE's Guidelines for Accelerating Educational Digitalization	"AI + Education" paradigms; deep model-education integration
Discipline Development	2017: "New Engineering" → 2020: "Four New Disciplines" → 2024: AI-discipline integration	535 universities offer AI programs
Talent Cultivation	30 interdisciplinary institutes; cross-disciplinary degrees; AI Credit Bank	Credits exchanged for cross-disciplinary courses
Technology Application	25 public AI computing platforms (MOST); MOE data governance platform	"University Data Sharing Platform"

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Regional Progress	Pioneering regions: Beijing-Tianjin-Hebei, Yangtze River Delta, Pearl River Delta	Policy synergy bridges regional gaps

4. Impact of GenAI on AuditingConclusion

4.1. Opportunities

GenAI revolutionizes auditing by enhancing efficiency and quality. It automates regulation retrieval, working paper review, and full-sample analysis (especially high-risk areas), cutting audit planning cycles by >50% (Liu, 2024) and enabling 100% risk coverage (Long et al., 2024). Its complex decision-making integrates multi-source heterogeneous data: parsing unstructured text (e.g., interviews) to generate risk maps (Yi et al., 2023), and cross-verifying transactions via satellite-supply chain data (Long et al., 2024). Knowledge management systems like FastGPT consolidate 8,500 cases for intelligent retrieval (Liu, 2024), while the "Four Resources Theory" (knowledge, scenarios, etc.) aids risk prediction (Yao et al., 2024). GenAI also expands auditing to novel domains: analyzing drone imagery for farmland assessment (Yang et al., 2025) and validating ESG-social media consistency (Long et al., 2024). AI-driven standardization improves quality control—auto-verifying report logic and regulatory citations (Yao et al., 2024)—while tools embedding 3,000 analytical models boost three-tier review efficiency by 70% (Liu, 2024).

4.2. Challenges

GenAI adoption in auditing faces five key challenges:

4.3. Technical Costs & Resource Barriers

Training domain-specific LLMs requires massive computing power and high-quality annotated data, which local audit bodies cannot afford to develop or maintain (Liu, 2024; Long et al., 2024).

4.4. Data Security & Compliance Risks

Processing sensitive audit data risks national secret leakage. Opaque overseas models exacerbate cross-border data flow risks; even localized desensitization may fail due to employee misuse (e.g., 2.3% input company data into ChatGPT) (Yi et al., 2023; Yao et al., 2024).

4.5. Model Expertise & Reliability Gaps

General LLMs hallucinate (e.g., fabricating regulations), undermining evidence validity. Algorithmic black boxes reduce transparency, conflicting with audit verifiability (Liu, 2024; Long et al., 2024).

4.6. Talent Imbalance & Technological Resistance

Auditors' digital literacy gaps cause "algorithm aversion" (23% lower trust in AI vs. human advice). Skill shortages hinder adoption, while employees resist new tools (Zhang et al., 2025; Wu et al., 2024).

4.7. Ethical & Regulatory Lag

Unclear accountability for AI-generated content risks misinformation and legal disputes. Existing standards lack guidelines for digital forensics, causing practitioner hesitancy. Regulatory frameworks ignore algorithmic bias (Yao et al., 2024; Long et al., 2024).

5. Cultivating GenAI Talent in Auditing

This paper proposes the following framework:

Foundation: Mandatory courses (e.g., AI Principles & Ethics) demystify technology.

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Dual-Axis Capability: Tiered AI Literacy courses (e.g., Audit Data Visualization, LLM Tools) build technical and ethical judgment.

Interdisciplinary Integration: Core courses like Intelligent Audit Report Generation & Verification teach GenAI skills (RAG-based standard retrieval, prompt engineering).

Industry-Academia Practice: Desensitized audit working papers enable real-world applications (e.g., time-series anomaly detection, GNN-based related-party identification).

Ethics Sandbox: Simulations of algorithmic bias/fabricated evidence develop SOPs compliant with the EU AI Act.

This "Technology-Scenario-Ethics" pipeline produces auditors adept in AI application and ethical decision-making, driving the shift from manual to intelligent verification.

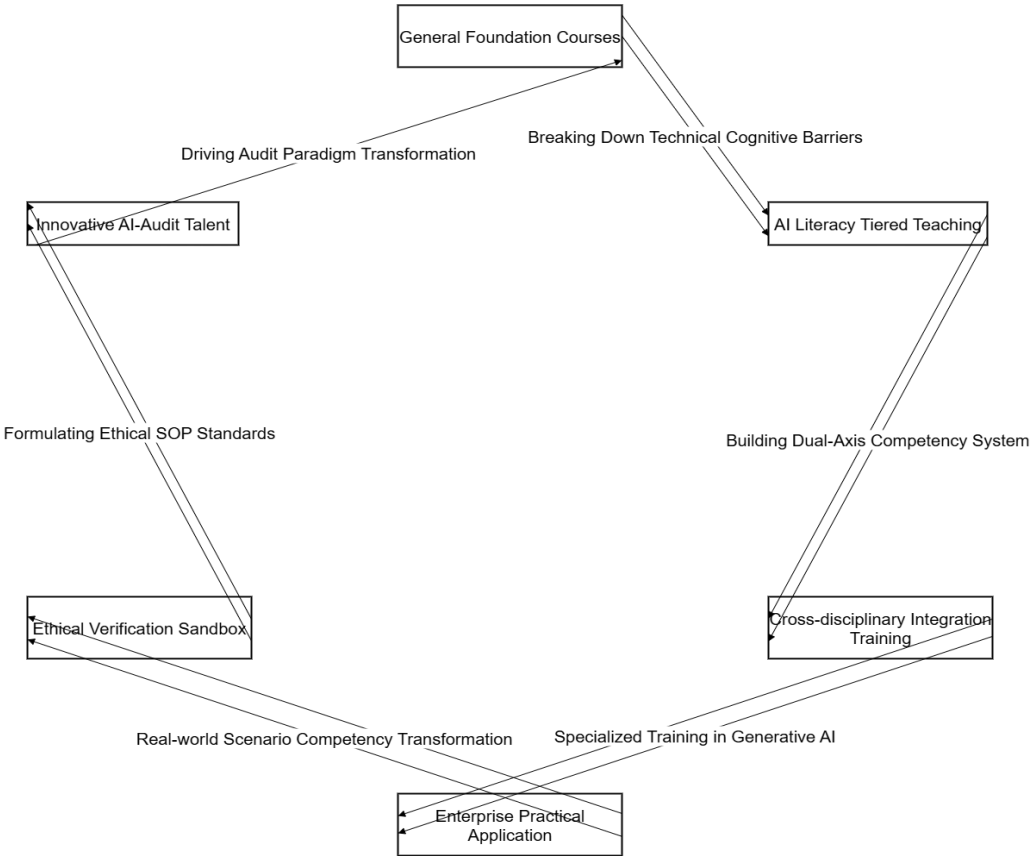

Figure 1: AI-audit integration model

5.1. Framework

A dual-axis "Technology-Ethics" system is proposed. The technology axis trains AI toolchain operation (e.g., NLP financial analysis, anomaly detection). The ethics axis strengthens bias identification and audit integrity (e.g., evaluating risks of AI-fabricated evidence).

5.2. Curriculum

A three-tier "Foundation → Literacy → Integration" structure:

Foundation: University-wide AI Fundamentals courses debunk misconceptions (e.g., risks of AI-forged evidence).

Literacy: Tiered courses like Audit Data Processing & Python Visualization, Computational Auditing: LLM Fundamentals, and Algorithmic Bias & Audit Integrity foster "data thinking + critical thinking."

Integration: Core courses (e.g., Intelligent Audit Report Generation & Verification) teach RAG and prompt engineering. Audit Agent System Design integrates knowledge bases and risk models for end-to-end audit simulation.

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5.3. Practical Training

A dual-track "Real-World + Ethics Sandbox" mechanism:

Industry Collaboration: Accounting firms provide desensitized working papers for students to apply time-series models and GNNs, addressing industry demand for interdisciplinary problem-solving.

Ethics Simulation: Scenarios emulate AI hallucinations and bias amplification. EU-style "ethical dilemma simulators" develop ethics SOPs aligned with the EU AI Act.

5.4. Technical Support

Table 3: Development of Auditing-Specific AI Platforms

Capability	Auditing Application	Technology Source
Unified Computing Engine	Codeless financial analysis → Python model advancement	Low-code/full-code integration
Domain-Specific Agents	Audit standard retrieval + risk alert generation	LLM-small model cascading
Privacy Computing	Secure training on desensitized enterprise data	GPU virtualization
This platform enables seamless transition from tool operation to system design, supporting the "Data Governance → Algorithm Adaptation → Domain Validation" loop.		

5.5. Faculty & Evaluation Innovation

Faculty Development: Dual-teacher teams (audit faculty + AI engineers) enhance educators' AI literacy.

Dynamic Evaluation: Beyond traditional credits, assess corporate project impact (e.g., Deloitte system optimization adoption rate) and ethical decision reports (e.g., robustness against adversarial testing), addressing industry critiques of GPA's inadequacy for AI skills.

6. Conclusion

This study demonstrates that GenAI's emergent capabilities and generalization drive auditing toward full-sample analysis, though model hallucinations and black boxes remain critical challenges. Global education policies diverge, with China emphasizing scale-oriented training and industrial application through a tiered system. For auditing talent, a dual-axis framework balancing technical application and ethical decision-making is essential. A three-phase curriculum (foundational, literacy, integration) combined with dual-track training (industry practice, ethics sandbox) cultivates versatile professionals adept in intelligent tools and risk governance. Faculty dual-qualification and dynamic evaluation ultimately enable auditing's transition to intelligent validation.

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