

The Impact of Artificial Intelligence on the Scope of Internal Audit: A Comparative Study Between Population-Based and Sample-Based Approaches

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Abstract: This study explores the impact of artificial intelligence (AI) on internal auditing, particularly its potential to transition from providing reasonable assurance to absolute assurance. By leveraging AI's capability to analyze entire datasets instead of relying on traditional sampling methods, the research examines both the opportunities and challenges of this paradigm shift. Using a mixed-methods approach, the study combines quantitative analysis, including reliability (Cronbach's Alpha: 0.85) and validity testing, with qualitative insights gathered from experts in the field, the research concludes that redefining internal auditing to imply absolute assurance is impractical and recommends a hybrid model combining AI's computational power with human expertise. These insights contribute to the growing discourse on AI's transformative role in auditing and its implications for stakeholders and practitioners.

Keywords: Artificial Intelligence, Internal Auditing, Reasonable Assurance, Absolute Assurance, Data Quality, Ethical Concerns, Auditor Training, Stakeholder Trust.

تأثير الذكاء الاصطناعي على نطاق التدقيق الداخلي: دراسة مقارنة بين النهج القائم على كامل المجتمع والنهج القائم على العينات

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المستخلص: تستكشف هذه الدراسة تأثير الذكاء الاصطناعي (AI) على التدقيق الداخلي، وبالأخص قدرته على الانتقال من تقديم تأكيد معقول إلى تأكيد مطلق. تُبرز الدراسة كيف يمكن للذكاء الاصطناعي، من خلال قدرته على تحليل مجتمع البيانات بأكمله بدلاً من الاعتماد فقط على طرق العينات التقليدية، أن يحدث تحولاً نوعياً في مجال التدقيق الداخلي. هذا التحول يتيح فرصاً هائلة لزيادة دقة وفعالية التدقيق لكنه يأتي أيضاً مع تحديات جوهرية تحتاج إلى معالجة دقيقة. الدراسة تستخدم نهجاً مختلطاً يجمع بين التحليل الكمي، الذي شمل اختبارات الثبات بمعامل ألفا كرونباخ التي بلغت قيمته 0.85، مع رؤية نوعية مستقاة من مقابلات مع خبراء مخضرمين في مجال التدقيق. من خلال هذا النهج المتكامل، خلص البحث إلى أن إعادة تعريف التدقيق الداخلي ليشمل التأكيد المطلق قد لا يكون عملياً في جميع السياقات. بدلاً من ذلك، توصي الدراسة بتبني نموذج هجين يستفيد من التقدم التكنولوجي الذي يقدمه الذكاء الاصطناعي ويدمج مع الفهم العميق والخبرة الإنسانية في التدقيق. هذا النهج الهجين قد يوفر التوازن المثالي بين الابتكار والموثوقية، مما يعزز من كفاءة التدقيق الداخلي ويسهم في تطوير الممارسات المتبعة في هذا المجال. وقد تسهم هذه الرؤية في تعميق النقاش المتزايد حول دور الذكاء الاصطناعي التحويلي في التدقيق وآثاره على جميع المعنيين والممارسين في هذا المجال. **الكلمات المفتاحية:** الذكاء الاصطناعي، التدقيق الداخلي، التأكيد المعقول، التأكيد المطلق، جودة البيانات، المخاوف الأخلاقية، تدريب المدققين، ثقة الأطراف المعنية.

1- Introduction:

The rapid advancement of artificial intelligence (AI) has reshaped numerous fields, offering unprecedented opportunities for efficiency, accuracy, and decision-making. In the financial and auditing sectors, AI technologies such as machine learning, natural language processing, and predictive analytics have begun to transform traditional methodologies, enabling real-time data analysis, enhanced anomaly detection, and predictive risk modeling (Ghafar et al., 2024). These developments have spurred discussions on whether AI can redefine the core principles of internal auditing, shifting its focus from providing "reasonable assurance" to achieving "absolute assurance." Internal auditing, traditionally defined as an objective assurance and consulting activity, has relied heavily on sampling methods to draw conclusions (Zakaria, 2021). However, with AI's ability to analyze entire datasets, it has the potential to reduce the limitations of sampling, offering deeper insights and broader coverage. Despite these advancements, challenges remain, particularly regarding the quality of input data and the ethical implications of AI systems (Alkhafaji et al., 2024). The lack of transparency in AI algorithms and the potential for biases in data processing have raised questions about the feasibility of achieving absolute assurance through AI-driven audits (Abdelouahed and Abdelmadjid, 2022). This study seeks to bridge the gap in understanding AI's transformative role in internal auditing. Specifically, it examines whether AI can facilitate a shift in auditing's fundamental objectives, or whether inherent limitations make such a transition impractical. By leveraging a mixed-methods approach, the research investigates AI's impact on audit practices, addressing both its potential benefits and the challenges that must be overcome. The findings aim to provide valuable insights for practitioners and stakeholders navigating the intersection of AI and internal audit.

Research Problem:

The evolving capabilities of artificial intelligence (AI) have the potential to fundamentally transform the field of internal audit. Traditionally, internal audit has been defined as a process that provides stakeholders with reasonable assurance through systematic examination based on sampling methods. However, the integration of AI tools can enable auditors to analyze entire datasets, reducing uncertainties and potentially shifting the focus toward delivering absolute assurance. This shift raises critical questions about the adequacy of the current definition of internal audit and the implications of adopting AI-driven approaches. Despite the growing application of AI in auditing, limited research has addressed how AI might reshape the core objectives, methodologies, and assurance levels of internal auditing, creating a significant research gap.

Research Questions:

- How does the integration of artificial intelligence impact the traditional definition of internal auditing, particularly the concept of "reasonable assurance"?
- Can artificial intelligence enable internal auditors to provide absolute assurance, and what are the potential challenges and risks associated with this transformation?
- How does AI-driven auditing, with its capacity to analyze full populations instead of samples, influence stakeholders' trust, expectations, and the perceived value of internal audit?
- What are the practical implications of AI adoption for the methodologies, tools, and skills required by internal auditors in providing enhanced assurance?
- How can organizations align internal audit functions with the advancements in AI to meet evolving stakeholder demands while maintaining ethical and professional standards?

Significance of the Research:

- Theoretical Significance:
 - Expands the academic understanding of how artificial intelligence (AI) influences internal auditing practices and definitions.
 - Explores the transition from "reasonable assurance" to "absolute assurance" as a potential outcome of AI integration.
 - Provides a conceptual framework for analyzing the ethical and professional implications of AI adoption in internal auditing.
 - Contributes to the academic discourse on the evolution of assurance levels and auditing standards in the age of AI.

- Practical Significance:
 - Highlights the impact of AI on the accuracy, reliability, and comprehensiveness of internal audit processes.
 - Offers insights into the integration of AI-driven tools for auditing full datasets rather than traditional sampling methods.
 - Identifies the new skills and competencies required by internal auditors to effectively leverage AI technologies.
 - Provides recommendations for organizations to align their internal audit functions with the advancements in AI.
 - Assists policymakers, audit professionals, and organizational leaders in adapting to AI-driven changes in audit practices, ensuring compliance with ethical and professional standards.
 - Enhances stakeholders' trust and satisfaction by improving the transparency and effectiveness of internal audits.

Research Objectives:

- To analyze the impact of artificial intelligence (AI) on the traditional definition of internal auditing, particularly the shift from "reasonable assurance" to "absolute assurance".
- To explore how AI-driven auditing methods, such as full population analysis, can improve the reliability and accuracy of internal audits compared to traditional sampling techniques.
- To investigate the potential challenges, risks, and ethical implications of integrating AI into internal audit practices.
- To assess how the adoption of AI in internal auditing affects stakeholders' trust, expectations, and perceptions of audit value.
- To identify the new skills, tools, and methodologies required for internal auditors to effectively leverage AI in their work.
- To provide practical recommendations for organizations to integrate AI into their internal audit functions while maintaining compliance with professional standards.
- To contribute to the development of a framework that guides the implementation of AI in internal auditing, ensuring enhanced assurance and stakeholder confidence.

Research Hypotheses:

Hypothesis 1:

- The integration of artificial intelligence (AI) impacts the traditional definition of internal auditing, transitioning it from providing "reasonable assurance" to "absolute assurance."

Hypothesis 2:

- AI enables internal auditors to provide absolute assurance by facilitating comprehensive analysis of full populations, overcoming the limitations of sample-based methods.

Hypothesis 3:

- The adoption of AI-driven auditing methods positively influences stakeholders' trust, expectations, and perceptions of the value of internal audits.

Hypothesis 4:

- AI implementation in internal auditing introduces challenges and risks that require strategic management to align with professional and ethical standards.

Hypothesis 5:

- The integration of AI in internal auditing necessitates the development of new tools, methodologies, and skill sets for auditors to effectively utilize advanced technologies.

2- Theoretical Framework:

The theoretical framework of this study is built on the intersection of internal auditing principles and advancements in artificial intelligence (AI). The framework aims to analyze the implications of AI integration into internal auditing, addressing how it influences the definition, scope, methodologies, and assurance levels traditionally associated with the field.

1. Internal Auditing: Definition and Evolution

- Internal auditing has traditionally been defined as an independent, objective assurance and consulting activity designed to add value and improve an organization's operations.
- The core concept of reasonable assurance reflects the reliance on systematic, risk-based sampling methods to draw conclusions.
- This study revisits the traditional definition by examining whether AI can shift the assurance model toward absolute assurance through its capacity to analyze entire datasets.

2. Artificial Intelligence in Internal Auditing:

- Artificial Intelligence (AI) is defined as a branch of computer science dedicated to developing technologies and systems capable of performing tasks that require human intelligence. This includes learning, reasoning, planning, perception, and language. Systems based on artificial intelligence can learn from experiences and adapt their behavior based on environmental variables, allowing them to perform complex tasks with increasing efficiency and sometimes with greater accuracy than humans.
- AI technologies such as machine learning, predictive analytics, and robotic process automation (RPA) have the potential to revolutionize auditing practices.

These technologies enable:

- **Comprehensive Analysis:** Full population testing instead of relying on sampling.
- **Real-Time Insights:** Continuous monitoring and anomaly detection.
- **Enhanced Accuracy:** Reduction in human error and subjectivity in audit processes.

3. Assurance Levels: Reasonable vs. Absolute

- **Reasonable Assurance:** The traditional level of assurance based on the assessment of samples and available evidence.
- **Absolute Assurance:** A potential shift enabled by AI tools, providing near-perfect accuracy by evaluating all available data and minimizing uncertainty.
- The theoretical framework examines whether AI can realistically achieve this level of assurance or if practical and ethical challenges limit its application.

4. Stakeholders' Trust and Expectations

- Stakeholders, including management, investors, and regulators, rely on internal audit reports for decision-making.
- AI's ability to enhance reliability and transparency could reshape stakeholders' expectations and trust in internal audit outcomes.

5. Challenges and Ethical Considerations

The integration of AI raises several challenges:

- **Ethical Implications:** Data privacy, algorithmic biases, and transparency.
- **Skill Gaps:** The need for auditors to acquire technical skills to understand and operate AI systems.
- **Operational Risks:** Dependence on AI could introduce new vulnerabilities, such as system errors or cyberattacks.
- **Alignment with Existing Auditing Standards:**
- AI-driven changes must align with established auditing standards and frameworks, such as the International Standards for the Professional Practice of Internal Auditing (ISPPA) and the Three Lines Model.

3- Research Methodology:

A mixed-methods approach combining qualitative and quantitative techniques will be used to explore the research questions comprehensively.

Purpose:

To analyze how artificial intelligence (AI) influences the definition, methodologies, and assurance levels in internal auditing.

1. Data Collection Methods

Primary Data Sources:

- **Conference Feedback:** Responses and discussions from the specialized conference will serve as a primary data source.
- **Surveys:** Design and distribute structured surveys targeting internal auditors, stakeholders, and professionals experienced in AI applications in auditing.
- **Interviews:** Conduct semi-structured interviews with experts and practitioners to explore insights that expand on the conference findings.

Secondary Data Sources:

- Review relevant academic literature, reports, and case studies on AI applications in internal auditing.
- Analyze existing standards and frameworks such as the ISPPIA and the Three Lines Model to identify gaps and align findings.

2. Data Analysis Techniques

- Qualitative Analysis:

- Use thematic analysis to examine the qualitative feedback from the conference, interviews, and open-ended survey responses.
- Identify recurring themes, challenges, and opportunities related to AI adoption in internal auditing.

- Quantitative Analysis:

- Perform statistical analysis on survey data to measure the significance of AI's impact on stakeholders' trust, assurance levels, and internal auditing practices.
- Use correlation and regression analyses to explore relationships between AI capabilities and perceived changes in audit outcomes.

3. Population and Sample

Target Population:

- Internal auditors, audit stakeholders, and AI specialists working in organizations that have integrated or are considering integrating AI into their auditing functions.

Sample Selection:

- A purposive sampling method will be used to select participants with relevant expertise, including conference attendees who provided feedback.
- Feedback has already been collected from 15 experts who participated in the conference. The survey received responses from 150 participants, providing valuable insights for the research.
- **Review of Current Standards and Frameworks:**
 - **ISPPIA:** Examine the current standards set by the Institute of Internal Auditors (IIA) which detail the fundamental requirements for the professional practice of internal auditing and how it deals with evolving technology.
 - **Three Lines Model:** Review the roles and responsibilities as defined in the model—management control, risk management and compliance functions, and internal audit independence—to see how AI influences each line.
- **Identification of Gaps:**
 - **Technological Adaptation:** Identify any gaps in these frameworks regarding their adaptation to and integration of AI technologies. This could involve looking at how AI's capabilities in data analytics and risk prediction are currently addressed or not addressed in the standards.
 - **Guidance on AI Use:** Determine if there are sufficient guidelines on the ethical use of AI, data governance, and control over AI tools within audit functions.

- **Alignment of AI Capabilities with Audit Requirements:**
 - **Enhancing Audit Methodologies:** Explore how AI can enhance traditional audit methodologies mentioned in the ISPPIA, such as risk assessment, monitoring, and control evaluation, to provide a deeper level of assurance.
 - **Operational Efficiency:** Assess how AI can streamline operational efficiencies and improve accuracy in data analysis and fraud detection, which are core components of the Three Lines Model.
- **Proposing Amendments or Additions:**
 - **Update Standards:** Propose necessary amendments or additions to the ISPPIA and the Three Lines Model to incorporate AI technologies effectively. This could include new standards for AI audit trails, data integrity checks, and the auditor's competency in technology.
 - **Ethical Framework:** Suggest an ethical framework for using AI in internal auditing that addresses potential biases, data privacy concerns, and the reliability of AI decisions.
- **Impact Analysis:**
 - **Stakeholder Trust:** Analyze how these technological integrations and proposed framework changes might affect stakeholder trust and reliance on internal audit's assurance.
 - **Future Readiness:** Evaluate the readiness of internal auditors to adopt these changes and the impact on their roles and skill sets.

Literature Review:

1. Digital Transformation Using AI in Auditing (Alkhafaji et al., 2024)

Methodology: This study uses a qualitative analytical approach to review the opportunities and threats of AI adoption in the audit process.

Objective: To explore how AI enhances the efficiency and accuracy of audit processes while identifying risks and challenges associated with its implementation.

Hypotheses: AI can significantly improve the quality and speed of auditing by reducing manual interventions.

Findings: The study highlighted that while AI reduces human error and supports real-time auditing, it also introduces challenges related to data integrity and cybersecurity.

Current Study's Perspective: This research aligns with the current investigation into the transition from reasonable to absolute assurance in internal auditing due to AI's ability to analyze entire populations instead of samples

2. The Role of AI in E-Accounting Audit (Zakaria, 2021)

Methodology: A theoretical analytical approach focusing on the relationship between AI and accounting audit practices.

Objective: To evaluate how AI contributes to e-accounting audit development, especially in a digitally transforming environment.

Findings: AI was found to revolutionize traditional accounting audits, enabling automation, enhanced fraud detection, and improved financial reporting.

Current Study's Perspective: This study supports the notion that AI can redefine internal auditing by increasing automation and minimizing human biases

3. AI and Fraud Detection in the Private Sector (Mohammed & Al-Abdul Rahman, 2024)

Methodology: Mixed methods involving surveys, interviews, and case studies within Saudi Arabia's private sector.

Objective: To assess how AI technologies enhance fraud detection processes.

Findings: AI technologies offer real-time fraud detection and advanced pattern recognition, though challenges related to implementation and ethical considerations persist.

Current Study's Perspective: The findings reinforce the potential of AI to elevate auditing processes from mere assurance to actionable insights, aligning with this study's goal to explore absolute assurance

4. The Impact of AI on Audit Quality (Zakaria et al., 2024)

Methodology: Field study on Egyptian audit firms using quantitative data.

Objective: To investigate the influence of AI on audit quality and accuracy.

Findings: AI improves audit efficiency, reduces costs, and enhances stakeholder trust but requires significant investment in technology and training.

Current Study's Perspective: This study supports exploring how AI's benefits can redefine audit assurance levels, particularly transitioning to absolute assurance

5. AI Competencies for Public Sector Auditors (Aldemir & Uysal, 2024)

Methodology: A conceptual framework development for AI competencies in auditing.

Objective: To identify essential AI competencies for auditors and propose a framework for public sector implementation.

Findings: The study proposed the CACS framework (Commitment, Access, Capability, Skills) to integrate AI effectively into auditing.

Current Study's Perspective: This research provides a competency-based lens for understanding how auditors can leverage AI to enhance assurance delivery

6. The Role of Artificial Intelligence in Shaping the Big Four's Internal Audit Strategies (Akachat & Boucheriba, 2024):

Methodology: Descriptive analytical approach combined with a case study of the "Big Four" auditing firms.

Objective: To examine how AI technologies influence internal audit functions.

Findings: Positive impacts of AI on audit processes include improved efficiency and tailored applications per firm. However, training employees is critical to leverage these technologies effectively.

Current Researcher's Perspective: This aligns with exploring AI's role in transitioning from reasonable to absolute assurance in auditing by facilitating full data analysis rather than relying on samples

7. Challenges and Risks of Internal Audit in Light of Using Artificial Intelligence (Abdelouahed & Abdelmadjid, 2022):

Methodology: Qualitative analysis of AI challenges and risks in internal auditing.

Objective: To assess the obstacles faced by auditors in adopting AI, particularly ethical concerns and operational risks.

Findings: AI offers immense potential for anomaly detection and fraud identification but is hindered by resistance to change and lack of technical expertise among auditors.

Current Researcher's Perspective: This study highlights the challenges of integrating AI into auditing frameworks, supporting the investigation into ethical and operational barriers to achieving absolute assurance

8. The Future of Auditing in the Digital Age: Analyzing the Impact of AI, Blockchain, and Data Analytics on Audit Processes and Assurance Services (Chukwuani, 2023)

Methodology: Comprehensive literature review and case analysis of AI, blockchain, and data analytics in auditing.

Objective: To explore how these technologies enhance audit quality and operational efficiencies.

Findings: AI reduces costs, increases audit accuracy, and improves compliance monitoring, but significant investments in infrastructure and training are necessary.

Current Researcher's Perspective: These findings reinforce the hypothesis that AI can transform audit methodologies and improve stakeholder trust through precise insights

9. Is Artificial Intelligence Improving the Audit Process? (Fedyk et al., 2022)

Methodology: Empirical analysis using resumes from 36 large audit firms and interviews with audit partners.

Objective: To measure AI's impact on audit quality, fees, and labor force restructuring.

Findings: AI improves audit quality, reduces restatements, and streamlines audit costs. However, it displaces entry-level auditors, necessitating new skill development.

Current Researcher's Perspective: This study aligns with examining AI's transformative potential and the labor dynamics it introduces in auditing.

10. The Evolution and Impact of Digital Transformation on Internal Audit and Managerial Control in Public Institutions (Udrescu, 2024)

Methodology: Literature review and quantitative surveys among public institution staff.

Objective: To evaluate how digital transformation impacts internal auditing and managerial controls.

Findings: While AI significantly improves audit capabilities and efficiency, challenges such as auditor retraining and systemic integration remain.

Current Researcher's Perspective: This supports the current research by illustrating the systemic benefits of AI and the barriers to adoption in a controlled environment

Data Analysis:

This section presents the analysis conducted to evaluate the impact of artificial intelligence (AI) on the internal audit process, particularly its potential to transition from providing reasonable assurance to absolute assurance. The analysis examines data consistency, validity, and the potential challenges associated with the adoption of AI in auditing practices.

1. Reliability Analysis: Cronbach's Alpha:

To measure the reliability of the questionnaire used in this study, Cronbach's Alpha was calculated. The value obtained was 0.85, indicating high internal consistency among the survey items. This suggests that the questions in the instrument are reliable and effectively measure the constructs related to AI's role in internal auditing.

2. Validity Analysis:

● Internal Consistency Validity:

Pearson's correlation coefficient was calculated between each item and the total score. The results showed significant positive correlations (ranging from **0.68 to 0.81, $p < 0.05$**), confirming the alignment of the questions with the overall construct.

● Construct Validity:

Factor analysis revealed that the items grouped into two main components:

- The advantages of AI in internal auditing (e.g., enhanced efficiency, ability to analyze full populations).
- The limitations and risks (e.g., data errors, ethical challenges).
- These components together explained **74%** of the total variance, indicating strong construct validity.

3. Descriptive Statistics:

The descriptive analysis summarized the participants' responses to various aspects of AI integration into internal auditing:

● Advantages:

- **85%** of participants agreed that AI improves efficiency and reduces human error in audits.
- **78%** believed that AI's ability to analyze entire datasets enhances audit accuracy.

● Challenges:

- **72%** expressed concerns about the quality and reliability of data fed into AI models.
- **65%** highlighted ethical challenges, such as data privacy and algorithmic biases.

4. Hypotheses Testing:

To evaluate the research hypotheses, regression and ANOVA analyses were conducted:

Hypothesis 1: Transition from reasonable assurance to absolute assurance.

The regression model indicated that while AI contributes significantly to enhanced audit quality ($\beta = 0.76, p < 0.01$), the presence of data limitations negatively impacts the ability to achieve absolute assurance ($\beta = -0.32, p < 0.05$).

Hypothesis 2: Challenges associated with AI adoption.

ANOVA results revealed significant differences between traditional audits and AI-enabled audits in terms of data reliability ($F(2, 147) = 6.84, p < 0.01$). This underscores the difficulty of transitioning fully to AI without addressing underlying data issues.

Hypothesis 3: Stakeholder Trust and Expectations

To evaluate the impact of AI on stakeholder trust, a correlation analysis was conducted:

- A moderate positive correlation ($r = 0.58, p < 0.01$) was found between the perceived accuracy of AI-driven audits and stakeholder trust.
- However, **67%** of participants expressed concerns about the transparency of AI processes, suggesting that trust is contingent on greater explainability and accountability in AI algorithms.

Hypothesis 4: Skills and Competency Requirements for Auditors

Regression analysis highlighted a significant relationship between the adoption of AI and the need for advanced auditor competencies ($\beta = 0.72, p < 0.01$).

- 72% of participants identified technical expertise in AI tools and data analysis as critical for auditors.
- Training gaps were evident, with 58% indicating insufficient resources to develop these skills.

Hypothesis 5: AI's Limitations in Achieving Absolute Assurance

Qualitative feedback and quantitative analysis revealed that while AI enhances audit processes, its reliance on flawed or incomplete data often leads to inaccuracies.

- Nearly 70% of participants noted that errors in input data could propagate through AI systems, undermining audit reliability.
 - To evaluate the impact of AI on stakeholder trust, a correlation analysis was conducted:
5. Key Insights on AI Model Limitations
 - Data Quality Issues:
 - 67% of participants highlighted errors in datasets as a primary limitation, which impacts the accuracy of AI-driven audits.
 - Ethical Concerns:
 - Lack of transparency in AI algorithms was identified by 68% as a barrier to achieving stakeholder trust.
 - Operational Barriers:
 - A significant training gap among auditors prevents effective utilization of AI, with 58% citing a lack of resources for skill development.

Qualitative Insights on the Role of AI in Redefining Internal Audit:

In response to the research inquiry—"To what extent do you believe that artificial intelligence (AI) can contribute to changing the definition of internal auditing from providing 'Reasonable Assurance' to 'Absolute Assurance,' given its ability to analyze entire populations instead of relying on traditional sampling methods?"—a qualitative analysis was conducted to capture diverse expert perspectives. Below is a sequential narrative summarizing the collected insights.

1. Support for AI as a Transformative Tool:

A minority of experts expressed optimism about AI's potential to transform internal auditing by significantly enhancing accuracy and reliability:

- Proponents' Viewpoint:

Supporters argue that AI's capability to analyze entire datasets reduces the margin of error associated with sampling.

 - AI has revolutionized data analysis in auditing, offering a level of accuracy that was previously unattainable with traditional methods.
 - They also noted that AI could provide real-time insights and anomaly detection, which align with the aspirations of absolute assurance.
 - However, even these optimistic views were tempered by recognition of existing challenges.

2. Ethical and Operational Concerns

The majority of participants highlighted significant barriers to redefining internal auditing, even with AI adoption.

- Ethical Challenges:

Many expressed concerns about the transparency and accountability of AI algorithms:

 - The black-box nature of AI makes it difficult for stakeholders to fully trust the system's outputs, particularly in high-stakes auditing.
 - Ethical dilemmas, such as data privacy and bias in AI algorithms, further complicate the transition.
- Operational Limitations:

Experts emphasized that the quality of the data fed into AI systems determines the accuracy of outputs, stating:

 - AI is only as reliable as the data it processes. Incomplete or biased data can lead to flawed results, undermining the concept of absolute assurance.

3. The Role of Professional Judgment:

Several respondents stressed that internal auditing involves a significant degree of professional judgment that cannot be fully automated:

While AI can analyze data comprehensively, it cannot replicate the nuanced understanding and ethical reasoning that auditors bring to the process. They argued that AI should be viewed as a complementary tool rather than a replacement for human oversight.

4. Practical Feasibility of Absolute Assurance

A dominant theme across responses was skepticism about the feasibility of absolute assurance, even with AI:

- Absolute assurance is not realistic, as it implies a level of certainty that does not exist in any auditing process.
- Participants pointed out that inherent uncertainties in data collection, processing, and contextual factors make absolute assurance unattainable:
- Auditing will always involve some level of uncertainty, whether due to limitations in data accuracy or the evolving nature of organizational risks

5. Consensus Against Redefining Internal Audit

The majority of participants concluded that while AI enhances the efficiency and scope of auditing, it does not warrant redefining internal auditing to imply absolute assurance. Key reasons included:

- The persistent need for professional judgment in interpreting audit findings.
- Limitations in data quality and algorithmic reliability.
- Ethical concerns regarding the implications of full automation.

The qualitative feedback suggests that while AI holds immense potential for improving internal auditing, redefining it to imply absolute assurance is neither feasible nor desirable under current conditions. The consensus among experts underscores the importance of maintaining the role of professional judgment and addressing challenges such as data quality, ethical considerations, and algorithmic transparency. This aligns with the hypothesis that the transition from reasonable assurance to absolute assurance remains a significant challenge, even in the age of advanced AI.

4- Study Findings:

Based on the quantitative and qualitative analyses conducted, the study produced the following key findings:

1. AI Enhances Efficiency but Cannot Guarantee Absolute Assurance

While AI significantly improves the efficiency, accuracy, and comprehensiveness of audit processes by enabling full population analysis, the concept of absolute assurance remains unattainable, mirroring the findings of (Alkhafaji et al., 2024) who also noted the technological limitations. However, this contrasts with (Zakaria, 2021) who emphasized the transformative potential of AI in redefining audit scopes without highlighting these limitations as prominently.

2. Data Quality and Ethical Concerns Limit AI's Potential

The reliability of AI-driven audit processes is directly tied to the quality of input data. Poor data quality can propagate errors, undermining the trustworthiness of results, a concern also raised by (Mohammed & Al-Abdul Rahman, 2024) regarding the implementation challenges. Ethical issues such as algorithmic transparency and data privacy echo the difficulties noted by (Abdelouahed & Abdelmadjid, 2022) in their analysis of AI's ethical implications in auditing.

3. Stakeholders' Trust Requires Human Oversight

Even though stakeholders acknowledge the value of AI in enhancing audit capabilities, their trust remains contingent on the involvement of human auditors. This aligns with the findings from (Akachat & Boucheriba, 2024), who argue that human oversight is critical to leveraging AI technologies effectively, thereby maintaining a balance between technological advancements and traditional auditing integrity.

4. Auditors Need Advanced Skills to Leverage AI

The adoption of AI in internal auditing necessitates a shift in auditors' skillsets, particularly in data science and AI ethics, as also noted by (Aldemir & Uysal, 2024). They proposed a framework for AI competencies, suggesting a need similar to our findings that auditors must enhance their capabilities to integrate AI effectively.

5. The Definition of Internal Auditing Should Not Be Redefined

In line with the majority of the academic discourse, such as the insights provided by (Udrescu, 2024), redefining internal auditing to imply absolute assurance is viewed as impractical and potentially misleading. This study supports maintaining the traditional focus on providing reasonable assurance, with AI acting as an enhancement rather than a replacement, reinforcing the stance taken by (Chukwuani, 2023) on the supportive role of technology in auditing.

Conclusion:

1. **AI's Role in Enhancing Auditing Efficiency:** The statistical evidence confirms that AI significantly enhances the efficiency, accuracy, and comprehensiveness of audit processes. However, as noted in the hypothesis testing ($\beta = 0.76$, $p < 0.01$ for audit quality enhancement), these benefits are not sufficient to guarantee absolute assurance due to persistent data quality issues, algorithmic limitations, and contextual uncertainties. This aligns with previous findings that highlight the dependence of AI's effectiveness on the quality of input data. Furthermore, ethical concerns such as algorithmic transparency and data privacy continue to pose challenges, echoing concerns in the broader literature and underscoring the need for rigorous ethical standards in AI deployment in auditing.
2. **Ethical and Operational Challenges:** Our findings on the ethical challenges and operational limitations resonate with broader academic discussions. The qualitative feedback from this study emphasizes the black-box nature of AI, which complicates transparency and increases the risk of biases (**68% highlighted lack of transparency as a barrier**). This reinforces the argument by other researchers that while AI can automate data processing, it cannot replicate the professional judgment required for ethical decision-making. Therefore, while AI can streamline certain audit functions, it necessitates enhanced auditor competencies in ethics and data science to mitigate risks associated with AI usage.
3. **Stakeholder Trust and Human Oversight:** The correlation analysis indicating a moderate positive relationship between AI-driven audit accuracy and stakeholder trust ($r = 0.58$, $p < 0.01$) suggests that stakeholders value the precision AI brings to audits. However, **67%** of participants' concerns about AI transparency reveal that trust also heavily depends on human auditors' involvement. This underscores the essential role of human oversight in ensuring that AI applications in auditing are both effective and ethically sound. Thus, AI should be considered a tool that complements, not replaces, the nuanced insights provided by human auditors.
4. **Addressing Training and Competency Gaps:** The significant relationship identified between AI adoption and the need for advanced auditor competencies ($\beta = 0.72$, $p < 0.01$) points to a critical gap in current training programs. Nearly 58% of participants indicated a lack of resources for developing necessary skills, suggesting that the effective adoption of AI in auditing requires substantial investments in education and continuous professional development. This finding aligns with calls in the literature for comprehensive training programs that include AI ethics, data science, and algorithm evaluation.
5. **The Practicality of Absolute Assurance:** Reflecting on the consensus from the qualitative insights and quantitative evidence, it is clear that while AI improves various facets of auditing, the notion of achieving absolute assurance is unrealistic under current technological and ethical constraints. Therefore, internal auditing should maintain its focus on providing reasonable assurance, with AI serving to enhance rather than redefine the auditing process.

Recommendations:

Based on the findings of this study, it is evident that while artificial intelligence (AI) holds great promise in transforming internal auditing practices, several challenges and limitations prevent its full potential from being realized. To address these issues and maximize the benefits of AI in auditing, the following recommendations are proposed:

1. **Maintain the Focus on Reasonable Assurance**
 - Internal auditing should retain its core objective of providing reasonable assurance to stakeholders, with AI serving as a tool to enhance—not redefine—audit practices.
 - Efforts should be directed toward integrating AI without compromising the professional judgment and ethical principles essential to the auditing process.
2. **Invest in Data Quality and Governance**

- Organizations must prioritize robust data governance frameworks to ensure the accuracy, consistency, and integrity of data used in AI-driven audits.
- Regular audits of the AI systems themselves should be conducted to identify and mitigate biases or errors in algorithms.
- 3. Enhance Auditor Training and Skills Development
 - Comprehensive training programs should be established to equip auditors with the technical skills required to operate and evaluate AI systems effectively.
 - Training should also include ethical considerations related to AI, ensuring auditors are prepared to address transparency and accountability issues.
- 4. Strengthen Stakeholder Communication and Transparency
 - Organizations should communicate clearly with stakeholders about the role of AI in the auditing process, highlighting both its advantages and limitations.
 - Transparency in how AI-generated insights are derived will enhance trust and credibility.
- 5. Adopt a Hybrid Model for Internal Auditing
 - A hybrid approach that combines AI's computational power with human expertise should be adopted to balance efficiency with ethical oversight.
- 6. Enhancing the Ethical Framework for AI Applications in Internal Auditing
 - A new standard or updated guidance in the International Standards for the Professional Practice of Internal Auditing (ISPPA) should be developed to address the use of artificial intelligence, focusing on:
 - **Transparency and Accountability:** Ensuring that AI models used for risk assessment or data analysis are interpretable and understandable by internal auditors.
 - **Responsibility:** Clearly defining accountability for decisions made based on AI recommendations, with proper documentation of how systems operate and their outcomes.
 - **Integrity Assurance:** Reviewing the data used to train AI systems, with an emphasis on avoiding bias and relying on accurate and reliable data sources.
 - **Continuous Learning:** Requiring internal auditors to stay updated on AI developments and improve their skills to use AI effectively and responsibly.

These recommendations aim to provide a balanced approach to integrating AI into internal auditing, ensuring that its potential benefits are realized while addressing its limitations and risks. By adopting these strategies, organizations can enhance the effectiveness and reliability of their auditing processes while maintaining stakeholder trust.

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