

Critical Review Journal Opportunities for Artificial Intelligence Development in the Accounting Domain: The Case for Auditing Melia A. Baldwin, Carol E. Brown, & Brad S. Trinkle (2006)

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Abstract

This critical review aims to analyze the article by Baldwin, Brown, and Trinkle (2006) titled Opportunities for Artificial Intelligence Development in the Accounting Domain: The Case for Auditing. The article discusses the opportunities for developing Artificial Intelligence (AI) in the accounting field, particularly in auditing and assurance processes. The method used in this review is a literature study with a descriptive-analytical approach to the article's content, covering research objectives, methods, main findings, contributions, as well as the strengths and limitations of the article. The review results show that auditing is a very potential field for AI application because it involves analyzing large amounts of data, complex decision-making, professional judgment, and anomaly and fraud detection. The authors of the article emphasize that AI is not intended to replace auditors, but rather serves as a tool to enhance efficiency, effectiveness, and the quality of audits. Although this article has limitations because it is conceptual and not yet supported by empirical evidence, the review provides an important contribution as an initial theoretical foundation for research on AI in auditing. Thus, this article remains relevant to be used as a reference in research on audit analytics, continuous auditing, fraud detection, and the use of AI technology in the accounting profession

Keywords

Artificial Intelligence, auditing, accounting, audit analytics, fraud detection.



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INTRODUCTION

The rapid advancement of information technology has fundamentally transformed the accounting profession over the past two decades. Digitalization has shifted accounting practices from traditional manual procedures to technology-driven systems capable of processing vast amounts of financial information in real time. This transformation has also significantly influenced the auditing profession, where

auditors are increasingly expected to analyze complex datasets, identify potential risks, detect fraudulent transactions, and provide high-quality assurance within increasingly shorter reporting periods. As organizations continue to adopt enterprise information systems, cloud computing, and big data analytics, conventional audit techniques are becoming insufficient to address the complexity and volume of available information. Consequently, the integration of Artificial Intelligence (AI) into auditing has emerged as one of the most significant technological innovations, offering new opportunities to improve audit efficiency, effectiveness, and decision quality. AI enables auditors to automate repetitive tasks, recognize hidden patterns within financial data, and generate insights that would be difficult to obtain through traditional audit procedures. As a result, AI is increasingly viewed not as a replacement for auditors but as an intelligent tool that strengthens professional judgment and enhances the reliability of audit outcomes. (Issa et al., 2016; Kokina & Davenport, 2017).

Among the pioneering studies discussing the application of AI in accounting is the article *Opportunities for Artificial Intelligence Development in the Accounting Domain: The Case for Auditing* by Baldwin, Brown, and Trinkle (2006). Although published before the widespread adoption of machine learning and generative AI technologies, the article provides a forward-looking conceptual discussion regarding the role of AI in auditing. The authors argue that auditing represents one of the most suitable areas for AI implementation because audit activities involve extensive knowledge processing, complex analytical reasoning, and decision-making under uncertain conditions. Auditors must evaluate financial evidence, assess internal controls, identify irregularities, and determine whether financial statements fairly represent an organization's financial condition. These tasks require both technical expertise and professional judgment, making AI an effective decision-support technology rather than a complete substitute for human auditors. Baldwin et al. (2006) propose that AI technologies can complement auditors by improving consistency, reducing routine workloads, and increasing the quality of analytical procedures throughout the audit process.

The article further explains several AI technologies that possess significant potential for auditing applications, including expert systems, artificial neural networks, machine learning, and data mining techniques. Expert systems are designed to replicate the reasoning processes of experienced auditors by applying predefined knowledge and decision rules to specific audit situations. Neural networks enable the identification of complex relationships within financial data, making them useful for

anomaly detection and fraud prediction. Machine learning algorithms continuously improve their predictive accuracy by learning from historical audit data, while data mining techniques facilitate the discovery of hidden patterns, unusual transactions, and risk indicators within massive financial databases. These technologies collectively enable auditors to perform continuous monitoring, automate risk assessments, and improve fraud detection capabilities beyond what can reasonably be achieved through manual audit procedures. Although some of these technologies were still in the early stages of development when the article was published, many of the concepts proposed by Baldwin et al. (2006) have become increasingly relevant in the era of big data, cloud computing, and intelligent automation (Issa et al., 2016; Sutton et al., 2016).

This critical review aims to evaluate the content, contributions, strengths, and limitations of Baldwin et al.'s (2006) article while considering its relevance to contemporary auditing practices. The article makes an important contribution by introducing a conceptual framework for integrating AI into auditing at a time when intelligent technologies were not yet widely adopted in professional accounting practice. The authors successfully demonstrate that AI should be viewed as a strategic support system capable of enhancing auditors' analytical capabilities rather than replacing their professional expertise. Nevertheless, because the article was written during the early development of AI, it does not discuss many contemporary technologies such as deep learning, robotic process automation, natural language processing, explainable AI, or generative AI, which now play increasingly important roles in modern audit environments. Furthermore, issues related to algorithm transparency, ethical considerations, cybersecurity risks, data governance, and regulatory compliance receive limited attention due to the technological context of the period. Despite these limitations, the article remains an influential reference because many of its conceptual arguments continue to underpin current research on AI-assisted auditing. Therefore, reviewing this study provides valuable insights into the evolution of AI in accounting and highlights how early theoretical perspectives have shaped the ongoing digital transformation of the auditing profession. (Baldwin et al., 2006; Issa et al., 2016; Kokina & Davenport, 2017; Sutton et al., 2016).

METHODS

This study employed a qualitative critical review method to systematically evaluate the journal article **Opportunities for Artificial Intelligence Development in the Accounting Domain: The Case for Auditing** by Baldwin, Brown, and Trinkle (2006). The review focused on examining the article's objectives, theoretical foundations, methodological approach, principal findings, and overall contribution to

the development of Artificial Intelligence (AI) applications in auditing. The analysis was conducted through an in-depth reading of the article, followed by a critical assessment of its conceptual arguments, strengths, limitations, and relevance to current developments in accounting and auditing research. Particular attention was given to the authors' discussion of AI technologies—including expert systems, neural networks, machine learning, and data mining—and their potential to enhance audit effectiveness, fraud detection, risk assessment, and professional decision-making. The findings of the reviewed article were then compared with more recent literature on AI in auditing to evaluate the continued relevance of its theoretical propositions and identify areas where technological advancements have extended the original concepts. This critical review ultimately provides a comprehensive evaluation of the article's academic contribution and its significance in shaping subsequent research on AI-assisted auditing.

FINDINGS AND DISCUSSION

Critical Analysis, Contribution to Knowledge, Current Relevance, and Future Research Implications

The article by Baldwin, Brown, and Trinkle (2006) represents one of the pioneering conceptual studies that specifically explored the opportunities for Artificial Intelligence (AI) development within the accounting domain, particularly in auditing. At a time when AI applications in professional accounting practice were still in their infancy, the authors presented a forward-looking perspective on how intelligent systems could fundamentally transform audit processes. Their work remains academically significant because it established a conceptual foundation for subsequent studies investigating the integration of AI into auditing. Rather than viewing AI as merely a technological innovation, the authors positioned it as a strategic decision-support system capable of enhancing auditors' analytical capabilities while preserving the essential role of professional judgment. This perspective has continued to influence both academic research and professional practice, making the article an important milestone in the evolution of technology-assisted auditing (Baldwin et al., 2006; Sutton et al., 2016).

One of the greatest strengths of the article lies in its ability to establish a logical relationship between the characteristics of auditing and the capabilities of Artificial Intelligence. The authors argue that auditing involves complex knowledge processing, evidence evaluation, risk assessment, and decision-making under conditions of uncertainty. These characteristics make auditing particularly suitable for AI implementation because intelligent systems excel at processing large volumes of structured and unstructured data, identifying hidden patterns, and supporting consistent decision-making. The discussion

demonstrates a clear understanding that AI technologies should be designed to complement rather than replace human expertise. By connecting audit objectives with technological capabilities, the article provides a convincing theoretical explanation of why AI has exceptional potential in audit environments. This conceptual linkage remains highly relevant as audit firms increasingly rely on intelligent technologies to improve audit quality and operational efficiency (Baldwin et al., 2006; Issa et al., 2016).

Another important contribution of the article is its comprehensive discussion of several AI technologies, including expert systems, neural networks, machine learning, and data mining. Rather than introducing these technologies as isolated innovations, the authors explain how each technology addresses specific audit challenges. Expert systems can support auditors by replicating rule-based reasoning during audit planning and evidence evaluation. Neural networks are capable of recognizing complex financial patterns associated with fraud or financial distress. Machine learning enables continuous improvement in predictive accuracy through exposure to historical audit data, while data mining facilitates the discovery of hidden relationships within massive financial databases. Although these technologies have evolved considerably since 2006, the conceptual framework proposed by Baldwin et al. remains applicable because it emphasizes the functional relationship between AI capabilities and auditing requirements. Many of the technologies discussed have become standard components of contemporary audit analytics platforms used by leading accounting firms worldwide (Baldwin et al., 2006; Kokina & Davenport, 2017; Vasarhelyi et al., 2015).

The visionary nature of the article constitutes another major strength. When the study was published, practical AI implementation in auditing was extremely limited, and many organizations were only beginning to digitalize their accounting systems. Nevertheless, Baldwin et al. accurately predicted that AI would eventually transform audit practices by improving analytical procedures, increasing efficiency, and supporting more effective risk assessment. Nearly two decades later, these predictions have largely materialized. Modern audit firms employ continuous auditing systems, predictive analytics, robotic process automation (RPA), machine learning algorithms, and AI-assisted anomaly detection to examine complete datasets rather than relying solely on sampling techniques. Continuous monitoring technologies now enable auditors to evaluate transactions throughout the reporting period instead of performing only periodic reviews, significantly enhancing audit effectiveness and fraud detection capabilities. Consequently, many of the article's conceptual predictions have proven remarkably accurate in light of current technological developments (Alles, 2015; Kokina & Davenport, 2017; Appelbaum et al., 2017).

Equally important is the authors' emphasis that Artificial Intelligence should function as a decision-support tool rather than a replacement for professional auditors. This perspective remains consistent with current auditing standards, which emphasize professional skepticism, ethical reasoning, and human accountability. While AI can automate repetitive analytical procedures and identify unusual patterns more efficiently than humans, it cannot fully replicate auditors' ethical judgment, contextual understanding, communication skills, or

responsibility for audit opinions. Human auditors remain indispensable in interpreting evidence, resolving ambiguities, evaluating management explanations, and ensuring compliance with professional standards. Therefore, Baldwin et al.'s conceptual position continues to align with modern perspectives advocating human-AI collaboration instead of complete automation (Baldwin et al., 2006; Issa et al., 2016; Sutton et al., 2016).

Despite its substantial contributions, the article exhibits several limitations that deserve critical consideration. First, the study is entirely conceptual and lacks empirical validation. The authors provide persuasive theoretical arguments regarding AI's potential benefits but do not conduct experiments, surveys, or case studies to demonstrate its practical effectiveness in real audit engagements. Consequently, readers cannot determine the extent to which AI improves audit quality, reduces audit risk, or enhances decision accuracy under practical conditions. Subsequent empirical studies have attempted to address this limitation by investigating AI implementation within actual audit environments, thereby extending the theoretical foundation established by Baldwin et al. (Issa et al., 2016; Kokina & Davenport, 2017).

Second, because the article was published in 2006, it naturally does not address technological developments that have dramatically reshaped AI during the past decade. Emerging technologies such as deep learning, generative AI, large language models (LLMs), natural language processing, explainable AI, and robotic process automation have expanded AI applications far beyond those originally envisioned. These innovations enable auditors to analyze contracts, interpret narrative disclosures, automate documentation, summarize complex financial information, and interact with intelligent systems using natural language. Consequently, although the article remains conceptually valuable, its technological discussion requires updating to reflect the current AI ecosystem (Dwivedi et al., 2023; Sutton et al., 2016).

Another limitation concerns the relatively limited discussion of ethical, legal, and governance issues associated with AI implementation. The article primarily highlights opportunities while devoting comparatively little attention to risks such as algorithmic bias, data privacy, cybersecurity threats, model transparency, explainability, and auditor accountability when AI-generated recommendations are incorporated into audit decisions. These issues have become increasingly important as AI systems assume greater responsibility in organizational decision-making. Modern auditing literature recognizes that successful AI adoption requires not only technological capability but also effective governance frameworks, ethical guidelines, regulatory compliance, and transparent algorithmic decision-making. Therefore, future conceptual frameworks should integrate technological innovation with ethical and governance considerations to ensure responsible AI implementation in auditing (Appelbaum et al., 2017; Dwivedi et al., 2023).

From the perspective of knowledge development, the article has made a lasting contribution to accounting and auditing literature by establishing one of the earliest theoretical foundations for AI-assisted auditing. It inspired subsequent research in fraud detection, audit analytics, continuous auditing, predictive risk assessment, and intelligent decision-support systems. Contemporary researchers have expanded these concepts through empirical

investigations, technological innovation, and interdisciplinary collaboration, yet many continue to build upon the conceptual arguments introduced by Baldwin et al. The article also remains highly relevant within accounting education because future auditors increasingly require competencies in digital technologies, AI applications, big data analytics, and information systems alongside traditional auditing knowledge. Accounting curricula must therefore evolve to prepare graduates for technology-enabled audit environments while maintaining strong foundations in professional ethics and judgment (Baldwin et al., 2006; Vasarhelyi et al., 2015; Issa et al., 2016).

Future research should extend the conceptual foundation provided by Baldwin et al. by conducting empirical investigations into the effectiveness of AI in improving audit quality, audit efficiency, fraud detection accuracy, and auditor decision-making. Researchers should also examine behavioral variables such as auditors' trust in AI, acceptance of intelligent systems, professional skepticism, and perceived independence when AI-generated recommendations are incorporated into audit procedures. Furthermore, accounting education research should investigate students' readiness to utilize AI technologies and evaluate how university curricula can effectively integrate AI literacy into auditing education. Such studies will provide a more comprehensive understanding of the technological, behavioral, ethical, and organizational dimensions of AI adoption, ensuring that future developments in intelligent auditing continue to strengthen both professional practice and academic knowledge (Issa et al., 2016; Kokina & Davenport, 2017; Dwivedi et al., 2023).

CONCLUSION

Overall, Baldwin, Brown, and Trinkle's (2006) article is an influential work in the development of AI and auditing studies. This article makes a strong argument that auditing is a highly potential area for AI applications.

While it has limitations in that it does not present empirical evidence and was written before the development of modern AI, this article remains relevant as a theoretical foundation. Further research is needed to test the effectiveness of various AI technologies in improving audit quality and supporting auditor decision-making.

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