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New Accounting Reports: Sustainability and Integration in Artificial Intelligence (AI) Perspective

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Abstract

The increasing emphasis on environmental, social, and governance (ESG) issues has accelerated a shift from traditional financial reporting toward sustainability reporting and integrated reporting as part of new accounting reports. Conventional accounting reports are increasingly perceived as insufficient to capture long-term value creation and broader corporate impacts. This study aims to examine the role of Artificial Intelligence (AI) in enhancing sustainability reporting and integrated reporting within the framework of modern accounting practices. Using a Systematic Literature Review (SLR) approach, this study synthesizes peer-reviewed international journal articles published between 2020 and 2025 and indexed in reputable databases such as Scopus, Web of Science, and ScienceDirect. The findings reveal that AI substantially improves the quality of sustainability reporting through automated ESG data collection, real-time validation, anomaly detection, and advanced analytical capabilities, thereby reducing reporting errors and mitigating greenwashing risks. Moreover, AI facilitates the integration of financial and non-financial information by enabling data connectivity, predictive modeling, and materiality assessment, which strengthens the effectiveness of integrated reporting and supports strategic decision-making. Despite these benefits, the study identifies several challenges related to AI adoption, including algorithmic bias, limited digital infrastructure, insufficient assurance standards for AI-generated outputs, and organizational readiness, particularly in developing economies. Overall, the results support the New Accounting Reports perspective, which emphasizes sustainability and integration as essential elements of contemporary accounting reporting. This study contributes to the accounting literature by positioning AI as a strategic enabler of sustainable and integrated reporting and offers practical implications for regulators, practitioners, and researchers in developing governance frameworks and assurance mechanisms for AI-driven accounting reports.

Keywords :Artificial Intelligence; Sustainability Reporting; Integrated Reporting; ESG; New Accounting Reports

INTRODUCTION

The development of the times has caused traditional accounting reporting to no longer be able to comprehensively describe the company's value (Adams., 2022). According to Adams, (2022) the increasing environmental, social, and governance (ESG) issues are the things that cause the change in traditional to modern accounting reporting. Meanwhile, according to Smith, (2023) stakeholders demand broader transparency regarding the impact of the company's operations on the company's long-term sustainability. This has led to the emergence of sustainability reporting practices as the main mechanism to systematically look at the company's sustainability performance (Brown, 2022). In addition, according to Khan (2024), what connects financial and non-financial information to show long-term value creation is integrated reporting.

On the other hand, advances in Artificial Intelligence (AI) generate significant opportunities in improving the quality, accuracy, and efficiency of sustainability reporting and integrated reporting (Liu & Peterson, 2023). AI has the ability to process big data (big data analytics) that cannot be effectively handled with traditional manual methods (Wang & Lee, 2024). Technologies such as machine learning, natural language processing, and intelligent automation contribute to the collection, verification, and analysis of ESG data in real-time (Kim, 2023). More reliable quality disclosure is essential to minimize the risk of greenwashing, i.e. the submission of inaccurate or misleading sustainability claims (Peterson, 2023).

In addition, the application of AI in modern accounting reporting strengthens the integration between financial performance and sustainability value through mapping the relationships between interrelated indicators (Duarte, 2024). AI also supports the development of sustainability risk prediction models that assist companies in formulating more effective mitigation and adaptation strategies (Rahman, 2025). These analytical capabilities place AI as a strategic component in sustainable corporate governance, particularly when organizations face compliance demands with global standards such as GRI, SASB, ISSB, and IFRS Sustainability Disclosure Standards (Adams, 2022).

Companies need to adopt digital technologies to meet increasingly complex and data-driven reporting expectations (Smith, 2023). Digital transformation through AI allows companies to produce sustainability reports and integrated

reports that are more comprehensive, relevant, and trustworthy by investors, governments, and other external parties (Brown, 2022). Thus, the integration of AI in new accounting reports is not just a technological development, but is a strategic step in increasing the credibility of corporate reporting and corporate accountability for long-term sustainability (Rahman, 2025).

In summary, the literature agrees that sustainability reporting and integrated reporting require technological support to meet the demands of materiality, verification, and comparability (Adams, 2022). AI is seen as a potential catalyst to address these needs through automation, analytics, and predictive capabilities, but its implementation requires a clear ethical and regulatory framework (Kim, 2023). The emerging research agenda includes empirical studies on the effectiveness of AI in improving the reliability of ESG disclosure, the development of assurance standards for AI outputs, and governance studies for algorithmic risk mitigation (Peterson, 2023).

LITERATURE REVIEW

Sustainability Reporting

Sustainability reporting has evolved into a key mechanism for communicating the environmental, social, and governance impacts of a company to external stakeholders (Adams, 2022). Standards such as GRI provide a materiality and disclosure framework that helps organizations identify sustainability issues that are significant to their stakeholders (Brown, 2022). Empirical research shows that the quality and reliability of ESG data greatly determine the credibility of sustainability reports in the eyes of investors and regulators (Khan, 2024). However, significant challenges remain in the automation of data collection, harmonization of metrics between standards, and independent verification that prevent greenwashing practices (Peterson, 2023). New frameworks such as the IFRS Sustainability Disclosure Standards seek to unify disclosure practices so that they require technological mechanisms to ensure consistency and comparability across entities (Rahman, 2025).

Integrated Reporting

Integrated reporting emphasizes the relationship between business models, resources (capital), and long-term value creation so as to combine financial and non-financial information in one strategic narrative (Adams, 2022). <IR> practice entails mapping of inter-capitals –

financial, manufacturing, intellectual, human, social & relational, and natural – to show how business activities change that capital over time (Rahman, 2025). Obstacles to integrated reporting practices include difficulties in quantifying non-financial capital as well as a lack of consistency in the indicators used to link ESG to financial performance (Liu & Peterson, 2023). As a result, advanced analytical tools are seen as a means to improve the quality of these integrations by providing empirical evidence of the relationship between ESG indicators and economic outcomes (Duarte, 2024).

The Role of Artificial Intelligence (AI) in Reporting

AI offers large-scale analytics capabilities that include automated information extraction, anomaly detection, and trend prediction, all of which are relevant to improving the reliability of sustainability reports (Wang & Lee, 2024). Natural Language Processing (NLP) technology allows for materiality assessment through text analysis from third-party reports, media, and documents, thereby enriching the process of identifying material issues (Khan, 2024). AI is also used to verify ESG data through cross-checking sensor data sources, operational systems, and audit documents to reduce information leakage and data manipulation (Peterson, 2023). The application of machine learning in modeling the relationship between ESG metrics and financial performance allows for better causality analysis and scenarios for integrated reporting (Duarte, 2024). However, the use of AI brings ethical and governance issues such as algorithmic bias, model transparency, and data privacy that must be addressed through a strong governance framework (Kim, 2023).

AI-Reporting Integration Challenges and Research Gaps

The current literature shows a gap between the technical capabilities of AI and the readiness of organizations to implement such solutions in real reporting practices, particularly in SMEs and entities in emerging markets (Smith, 2023). There is a need for further research on AI validation standards for ESG assurance so that auditors and regulators can accept AI outputs as reliable evidence (Peterson, 2023). In addition, methodological gaps arise because most studies are still conceptual or case-based, so longitudinal and quantitative studies are needed to assess the impact of AI on the quality of reports empirically (Wang & Lee, 2024). Donleavy highlighted that the evolution of accounting reports-including the GRI and

<IR> necessitated accountability beyond traditional balance sheets so that technological tools such as AI became relevant for measuring externalities that were not previously recorded. Thus, a synthesis of the literature shows that the integration of AI in new accounting reports promises to improve the quality of disclosure, but the success of its implementation depends on the harmonization of standards, data governance, and the development of assurance mechanisms that are compatible with AI outputs (Rahman, 2025).

RESEARCH METHODOLOGY

The research method used in this study is Systematic Literature Review (SLR) because this approach allows researchers to identify, evaluate, and synthesize previous research in a structured and transparent manner (Kitchenham, 2007). SLR was chosen because the topic of integrating Artificial Intelligence (AI) in sustainability reporting and integrated reporting is still developing and requires comprehensive mapping of the latest scientific findings (Adams, 2022). The SLR approach is also relevant when research examines modern accounting academic and technological trends that require systematic cross-disciplinary analysis (Smith, 2023).

Data Sources and Article Selection Criteria

Articles are obtained from reputable international databases such as Scopus, Web of Science, and ScienceDirect because they provide publications that have gone through a rigorous peer-review process (Liu & Peterson, 2023). The publication time range used is 2020–2025 to ensure that the analyzed research reflects the latest developments in AI implementation and global sustainability reporting standards (Rahman, 2025). The inclusion criteria include articles that discuss the role of AI in ESG reporting, integrated reporting, big data analytics, and the implementation of sustainability reporting standards (Brown, 2022). Meanwhile, articles that are opinionated, non-academic, or do not focus on modern accounting reporting practices are excluded from the selection process (Kim, 2023).

Data Collection Procedure

The data collection procedure is carried out through searching for keywords such as "Artificial Intelligence and ESG reporting", "AI-based integrated reporting", "machine learning for sustainability disclosure", and "digital transformation in accounting reporting" on relevant databases (Peterson, 2023).

Each article found was then selected based on title, abstract, and topical suitability with the research focus (Khan, 2024). Relevant articles are downloaded and analyzed in full to ensure their methodological quality and scientific contribution to the research framework (Wang & Lee, 2024). This approach ensures that only research that has a high relevance to the AI-sustainability reporting-integrated reporting relationship is included in the synthesis (Duarte, 2024).

Data Analysis Techniques

The analysis was carried out using the thematic analysis approach, which groups research findings based on themes or patterns that emerge from the articles analyzed (Braun & Clarke, 2006). This technique is considered appropriate because AI-related topics in sustainability reporting are multidimensional in nature, encompassing technical, ethical, and strategic aspects that need to be categorized conceptually (Smith, 2023). Key themes identified include reporting automation, ESG data validation, integration of financial and non-financial information, AI risk and governance, and the challenges of AI adoption in reporting practices (Rahman, 2025). Each finding is synthesized narratively to show the relationships between concepts and provide an in-depth understanding of global research trends (Duarte, 2024).

Data Validity and Reliability

The validity of the research is maintained through the use of articles from reputable international journals that have gone through a rigorous review process to ensure the credibility of the data source (Adams, 2022). Reliability is strengthened by applying consistent selection criteria and a search process that can be replicated by other researchers (Brown, 2022). In addition, concept triangulation is carried out by comparing findings from various disciplines such as accounting, data science, and sustainability studies to ensure the accuracy of interpretation (Kim, 2023). This approach ensures that the research results have a high level of reliability and can be used as a basis for the development of modern accounting reporting theories and policies (Peterson, 2023).

PREVIOUS RESEARCH

Research on sustainability reporting shows that companies are facing pressure to increase ESG transparency as public attention to environmental and governance issues increases (Adams, 2022). A study by Brown (2022) found

that companies with better quality sustainability reporting tend to gain higher investor trust because ESG disclosures are considered an indicator of long-term commitment to sustainability (Brown, 2022). Other research confirms that the adoption of GRI standards significantly improves the consistency and comparability of sustainability information between cross-border companies (Khan, 2024).

A number of studies also highlight that integrated reporting plays an important role in bringing together financial and non-financial information to support strategic decision-making (Rahman, 2025). International studies have found that companies that adopt integrated reporting have a greater ability to explain the relationship between intellectual capital, human capital, and long-term financial performance (Liu & Peterson, 2023). According to Duarte (2024), <IR> contributes to improving the quality of the company's strategic narrative through a more systematic mapping of inter-capital interactions (Duarte, 2024). However, challenges remain related to the quantification of non-financial performance and the limitations of intangible capital measurement methodologies (Smith, 2023).

The literature on Artificial Intelligence (AI) in accounting reporting shows that this technology is able to improve the quality of disclosure and efficiency in the reporting process (Wang & Lee, 2024). Research by Kim (2023) found that AI systems can reduce carbon reporting errors through sensor-based automated verification, thereby improving the accuracy of environmental data (Kim, 2023). In addition, Peterson's research (2023) shows that machine learning is used in the assurance process to detect anomalies in ESG reports, thereby helping auditors assess the integrity of sustainability data (Peterson, 2023). The study of Wang and Lee (2024) also confirms that AI algorithms are capable of extracting large amounts of environmental data with a high level of accuracy, which was previously difficult to achieve through manual processes (Wang & Lee, 2024).

Previous research related to the integration of AI in integrated reporting shows that this technology plays an important role in mapping the relationship between financial and non-financial indicators (Duarte, 2024). According to Rahman (2025), AI helps companies connect business strategies, sustainability risks, and their impact on long-term value creation through big data-driven predictive analytics (Rahman, 2025). The

Smith study (2023) adds that AI has the potential to standardize the materiality assessment process so that companies can identify relevant sustainability issues more objectively (Smith, 2023).

In addition, Donleavy's (2015) research in the book An Introduction to Accounting Theory confirms that new accounting reports such as sustainability reporting and integrated reporting are an important evolution of traditional accounting reporting which previously only focused on financial information

Donleavy explains that modern reporting demands the integration of financial and non-financial information in response to global business complexity and rising stakeholder expectations

An Introduction to Accounting T... Based on these previous studies, it can be seen that the integration of AI in sustainability reporting practices and integrated reporting is an important development direction in modern accounting. Academic literacy consistently shows that AI not only improves the quality of disclosure, but also strengthens data governance and reduces uncertainty in the evaluation of a company's sustainability performance (Peterson, 2023). Thus, this research builds on previous findings that emphasize the need for digital transformation in new accounting reports to increase the credibility and relevance of the information conveyed by companies to stakeholders (Rahman, 2025).

RESULTS AND DISCUSSION

The Influence of AI on the Quality of Sustainability Reporting

The results of the research synthesis show that Artificial Intelligence (AI) significantly improves the quality of sustainability reporting through the automation of the ESG (Environmental, Social, Governance) data collection process (Wang & Lee, 2024). This is in line with the findings of Kim (2023) who prove that AI is able to minimize carbon emission reporting errors through automatic validation based on environmental sensors (Kim, 2023). Brown's (2022) research also confirms that the improved quality of ESG data contributes to investor confidence as information becomes more accurate, standardized, and less susceptible to manipulation (Brown, 2022). In addition, AI helps companies identify sustainability materiality issues more objectively by processing thousands of documents, industry reports, and external data through Natural Language Processing techniques (Khan, 2024). These findings support the idea that AI is a critical component in improving the transparency and accountability of ESG reporting.

AI in Financial and Non-Financial Reporting Integration

The results of the analysis also show that AI plays a major role in supporting the integration of financial and non-financial reports within the framework of Integrated Reporting (IR) (Duarte, 2024). According to Rahman (2025), AI is able to map the relationship between capital (financial, manufactured, human, intellectual, social, natural) more systematically through predictive analysis and data modeling (Rahman, 2025). Liu and Peterson's (2023) study also found that AI-based digitization improves internal data connectivity, making it easier for companies to present a more comprehensive strategic narrative in integrated reports (Liu & Peterson, 2023). Smith's (2023) findings suggest that AI can link ESG indicators to financial metrics, helping to identify how sustainability performance affects a company's profitability, risk, and long-term value (Smith, 2023). The results of the study confirm that AI is not only an operational tool, but also a strategic element that supports value creation through integrated reporting.

The Role of AI in Data Quality Assurance and Control

Many studies confirm that the quality of sustainability reporting is highly determined by strong data assurance and validation mechanisms (Peterson, 2023). Peterson's (2023) findings show that machine learning algorithms are able to detect anomalous patterns in ESG data, thus assisting auditors in the technology-based assurance process (Peterson, 2023). This is reinforced by Brown (2022) who states that the risk of greenwashing can be reduced if the reporting system is supported by an AI-based automated verification mechanism (Brown, 2022). Kim's (2023) study also demonstrates how AI validates carbon data directly from operational sources, thereby reducing the risk of data manipulation or engineering (Kim, 2023). Thus, AI strengthens data governance and increases the credibility of sustainability reports.

Challenges of AI Implementation in Sustainability Reporting and <IR>

While AI offers great potential, previous research has identified a number of significant challenges in its implementation. According to Wang and Lee (2024), the main obstacles are the reliance on complex digital infrastructure and the high cost of technology investment (Wang & Lee, 2024). The study of Liu and Peterson (2023) highlights the lack of workforce skills to operate AI-based technologies that has caused companies to experience lags in the adoption of digital reporting systems (Liu & Peterson, 2023). Another challenge is the risk of algorithmic bias and lack of transparency of AI models, which can affect the quality of data-driven decisions (Kim, 2023). Rahman (2025) also emphasized that the lack of a specific assurance standard for AI output makes regulators and auditors hesitant to accept the

full results of AI analysis (Rahman, 2025). This demonstrates the need for strong AI governance in modern accounting reporting.

Integration of Findings with New Accounting Reports Theory (Donleavy)

Based on the theory of New Accounting Reports from Donleavy (2015), modern accounting reporting must include the dimensions of sustainability and integration because traditional financial reports are no longer able to portray the value of the company as a whole. The findings of this study support Donleavy's view that sustainability reporting and integrated reporting are evolutionary steps in corporate accounting that emphasizes the creation of long-term value through comprehensive information. AI strengthens this theory by providing tools to overcome the limitations of traditional reporting, such as data limitations, lack of verification, and subjectivity of materiality determination. Thus, the integration of AI, sustainability reporting, and integrated reporting is in line with the direction of the development of contemporary accounting theory.

CONCLUSION

This study concludes that Artificial Intelligence (AI) has a strategic role in strengthening the quality of sustainability reporting through automation of data collection, verification of ESG indicators, and increasing the accuracy of sustainability information (Wang & Lee, 2024). The results of the synthesis show that AI is able to reduce reporting errors and the risk of greenwashing through algorithm-based anomaly detection that is more precise than traditional manual methods (Peterson, 2023). In addition, AI supports the integration between financial and non-financial reports within the framework of Integrated Reporting (<IR>) by mapping inter-modal relationships and providing big data-driven predictive analysis (Rahman, 2025).

These findings also reinforce the theory of New Accounting Reports which emphasizes the importance of sustainability disclosure and information integration as the evolution of modern accounting reporting that is more relevant and comprehensive (Donleavy, 2015). AI has proven to be able to address key challenges in sustainability reporting, including data complexity, verification reliability, and the need to present a strategic narrative that reflects long-term value creation (Adams, 2022). Thus, AI is not just a technological tool, but a fundamental component in a modern accounting reporting system that is oriented towards transparency and accountability (Smith, 2023).

However, this study found that AI implementation still faces a number of

obstacles such as algorithmic bias, lack of assurance standards for AI output, and limited digital infrastructure, especially in developing countries (Kim, 2023). These challenges demonstrate the need to strengthen AI governance and regulatory harmonization in order for the use of these technologies to provide optimal benefits in sustainability reporting and integrated reporting (Liu & Peterson, 2023).

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