

Original Research Article

Artificial Intelligence in ESG and Financial Reporting

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Abstract

Artificial Intelligence (AI) is increasingly becoming an enabling technology for the collection, validation, analysis and communication of environmental, social and governance (ESG) information and financial information. At the same time, expanding sustainability disclosure requirements are increasing the volume, variety and frequency of non-financial information that organisations must manage. This paper examines how AI can strengthen the relationship between ESG reporting and financial reporting by improving data processing, anomaly detection, disclosure preparation, forecasting, risk identification and digital reporting. The study uses a qualitative, descriptive and exploratory research design based on secondary sources, including international reporting standards, Indian regulatory publications and recent academic literature. Particular attention is given to IFRS S1, IFRS S2, the IFRS Sustainability Disclosure Taxonomy, India's Business Responsibility and Sustainability Reporting (BRSR) framework and BRSR Core. The findings indicate that AI can improve reporting timeliness, consistency, scalability and decision usefulness, but its effectiveness depends on data quality, governance, explainability, human oversight, cybersecurity and clear accountability. AI should therefore be treated as a controlled reporting technology rather than an autonomous substitute for professional judgement. The paper recommends an integrated AI-enabled reporting architecture with strong data lineage, model governance, human review, assurance controls and ethical safeguards.

Keywords: Artificial Intelligence; ESG; Sustainability Reporting; Financial Reporting; BRSR; IFRS S1; IFRS S2; Data Analytics; Assurance; AI Governance

1. Introduction

The reporting environment of modern organisations is moving from a predominantly financial reporting model towards a broader information model in which financial performance, sustainability-related risks and opportunities, climate exposure, human capital and governance practices are increasingly considered together. Investors, lenders, regulators and other stakeholders require information that is timely, comparable, reliable and relevant to economic decision-making. This development has increased the pressure on organisations to integrate financial and ESG data rather than treating sustainability reporting as a separate communication exercise.

The International Sustainability Standards Board (ISSB) issued IFRS S1 and IFRS S2 in June 2023. IFRS S1 establishes general requirements for sustainability-related financial disclosures, while IFRS S2 focuses specifically on climate-related risks and opportunities. The standards are designed to provide decision-useful information to users of general purpose financial reports and emphasise governance, strategy, risk management, and metrics and targets. IFRS S1 is effective for annual reporting periods beginning on or after 1 January 2024. [1,2]

India is also strengthening its ESG reporting environment. The Securities and Exchange Board of India (SEBI) introduced the BRSR Core framework in 2023, containing a defined set of ESG key performance indicators and a phased assurance requirement. The framework began with the top 150 listed entities for FY 2023–24 and is scheduled to extend progressively to the top 1,000 listed entities for FY 2026–27. It also introduced ESG disclosures for relevant value-chain partners. [8]

These developments create a significant data-management challenge. ESG information may originate from enterprise resource planning systems, utility meters, human resource systems, procurement records, supply-chain platforms, surveys, environmental monitoring systems and external databases. AI and data analytics can transform these heterogeneous inputs into structured information that can be checked, analysed and incorporated into reporting processes. ICAI has also recognised that AI can enhance financial and sustainability reporting through automated data collection, analysis, presentation, anomaly detection and continuous monitoring. [7]

2. Study Objectives

- To examine the role of Artificial Intelligence in ESG and financial reporting processes.
- To identify the benefits of AI-enabled reporting in relation to accuracy, efficiency, timeliness, consistency and decision usefulness.
- To analyse the relevance of AI to emerging sustainability reporting requirements, including IFRS Sustainability Disclosure Standards and India's BRSR/BRSR Core framework.
- To identify major risks and constraints associated with AI-enabled ESG and financial reporting.
- To recommend a practical governance framework for responsible and reliable use of AI in reporting.

3. Review of Literature and Conceptual Background

The literature on AI-enabled sustainability reporting is interdisciplinary, connecting accounting, auditing, information systems, machine learning, natural language processing and sustainability management. Recent systematic literature indicates growing research interest in AI and data analytics for sustainable financial reporting

and ESG disclosure, particularly as disclosure requirements expand. A recent systematic review found research distributed across natural language processing, machine learning, auditing and regulatory compliance, highlighting both the potential for scalable reporting and the need for stronger governance. [12]

From an accounting perspective, AI can be understood as an enabling layer over existing information systems. It does not replace accounting principles or disclosure requirements. Instead, it can support extraction of information from documents, classification of transactions, reconciliation of datasets, identification of unusual values, monitoring of reporting deadlines and linking disclosures to evidence. Final responsibility for materiality assessments, accounting estimates, judgements and representations should remain with authorised management and reporting professionals.

The digitalisation of sustainability reporting further strengthens the case for AI. The IFRS Sustainability Disclosure Taxonomy provides elements for tagging sustainability-related financial information so that it becomes computer-readable and can be extracted, compared and analysed more efficiently. [5] EFRAG's work on digital reporting and XBRL similarly demonstrates the movement towards structured and machine-readable sustainability information. [4]

4. Methodology

The study adopts a qualitative, descriptive and exploratory research design. It is based entirely on secondary data and does not involve human participants. Sources include official publications of the IFRS Foundation and ISSB, SEBI regulatory materials, ICAI sustainability-related publications and recent peer-reviewed academic literature. The analysis focuses on five dimensions: (i) reporting data management, (ii) analytical and predictive capabilities, (iii) disclosure preparation and digital reporting, (iv) assurance and internal controls, and (v) governance and ethical risks.

The study uses thematic analysis to identify recurring opportunities and constraints associated with AI in ESG and financial reporting. Regulatory requirements are used as the benchmark against which AI applications are considered. The objective is not to statistically test a causal relationship, but to develop an evidence-based conceptual understanding and practical recommendations for organisations adopting AI-enabled reporting systems.

5. AI Applications in ESG and Financial Reporting

5.1. Data Collection and Integration

AI can assist organisations in collecting information from structured and unstructured sources. Optical character recognition, natural language processing and automated data extraction can convert invoices, contracts, policies, reports and supplier documents into usable data. Machine learning can support classification and mapping of information to reporting categories. This is valuable for ESG information because data is often distributed across departments and business units.

5.2. Data Quality and Validation

Reporting reliability depends on source-data quality. AI systems can identify missing observations, duplicate records, unusual movements and inconsistent relationships. For example, a system can flag a sudden reduction in reported electricity consumption that is inconsistent with production volume. Similar analytical procedures can be applied to financial data. An anomaly should be treated as a trigger for investigation rather than proof of an error.

5.3. ESG Risk Identification and Forecasting

Machine-learning models can analyse historical and external data to identify patterns associated with environmental and social risks. Forecasting tools can support scenario analysis relating to energy use, emissions, resource consumption, supply-chain disruption and other sustainability-related exposures. When such risks may affect cash flows, access to finance or cost of capital, they become relevant to sustainability-related financial disclosures under IFRS S1. [1]

5.4. Automated Disclosure Preparation

Generative AI and natural language processing can assist in drafting narrative disclosures from approved datasets. AI can compare current-year disclosures with previous periods, identify missing sections and map evidence to reporting requirements. However, automatically generated narrative should remain subject to professional review because a fluent sentence can still be materially incorrect or unsupported.

5.5. Audit, Assurance and Continuous Monitoring

AI can strengthen assurance by enabling continuous or frequent testing of large datasets rather than relying exclusively on small samples. Rules and machine-learning models can identify unusual transactions, inconsistent ESG metrics and missing supporting evidence. India's growing assurance requirements surrounding BRSR Core increase the value of reliable data trails and automated controls. SEBI's framework specifies reporting data and approaches to facilitate verification and requires disclosure of relevant assumptions, estimates and industry-specific adjustments. [8]

5.6. Digital Reporting and Comparability

Structured digital reporting makes information more accessible to users and technology systems. The IFRS Sustainability Disclosure Taxonomy is intended to support digital consumption and comparison of sustainability-related financial information. AI can operate on structured information to perform benchmarking, trend analysis, peer comparison and risk screening. [5,6]

6. Integrated AI-ESG-Financial Reporting Framework

An effective AI-enabled reporting system should connect operational data with financial and sustainability information through controlled data flows. The proposed framework consists of six layers: source data, data governance, AI analytics, reporting and taxonomy mapping, human review and assurance, and stakeholder communication. The first layer captures information from financial, operational and ESG systems. The second establishes ownership, definitions, access controls and data lineage. The third applies AI for validation, classification, forecasting and anomaly detection. The fourth maps validated information to applicable reporting requirements. The fifth introduces management review, accounting judgement, internal controls and assurance. The final layer presents approved information to investors, regulators and other stakeholders.

Layer	Primary Function	AI Contribution	Key Control
1. Source data	Collect financial and ESG data	Extraction and classification	Source validation
2. Data governance	Definitions, ownership and lineage	Data-quality monitoring	Access and change controls
3. AI analytics	Analysis, forecasting and anomaly detection	Machine learning/NLP	Model validation
4. Reporting	Map data to disclosures	Drafting and taxonomy mapping	Disclosure checklist
5. Review & assurance	Professional judgement and verification	Continuous testing	Human sign-off and evidence
6. Communication	Publish decision-useful information	Trend and peer analysis	Final approval

Table 1. Proposed AI-enabled ESG and financial reporting architecture. Note: The framework is conceptual and developed from the reporting and technology themes identified in this study.

7. Findings

Efficiency and timeliness

AI can reduce repetitive manual work and shorten reporting cycles by automating extraction, reconciliation and monitoring.

Improved consistency

Centralised definitions and automated mapping can reduce inconsistent treatment of similar ESG and financial information across departments.

Scalability

AI can process large volumes of structured and unstructured data, making it useful for value-chain and multi-location reporting.

Better risk visibility

Predictive analytics can identify emerging patterns and support scenario analysis before risks become financially significant.

Stronger auditability

Automated logs, data lineage and exception reports can create stronger evidence trails for internal review and assurance.

Decision usefulness

Connecting ESG indicators with financial drivers can help management and investors understand how sustainability-related risks and opportunities may influence enterprise prospects.

8. Risks and Constraints

AI-enabled reporting also introduces significant risks. Poor-quality source data can produce unreliable outputs at greater speed and scale. Opaque models may make it difficult for reviewers to understand why a particular result was generated. Generative AI can produce unsupported statements if used without controlled source material.

Cybersecurity and privacy risks may arise when sensitive financial, employee or supplier information is processed through AI systems. Model drift can reduce reliability when business conditions, reporting definitions or regulations change.

There is also a risk of automation bias. Users may accept AI-generated results because they appear precise or professionally written. This is particularly dangerous in financial and sustainability reporting because materiality, estimates and judgements often require context. AI should therefore support, not replace, professional scepticism and accountability. Organisations should retain clear responsibility for every reported figure and narrative statement.

9. Discussion

The evidence suggests that the greatest value of AI does not arise from simply automating report writing. The more important opportunity is to create an integrated information environment in which financial and ESG data share common definitions, controls and evidence trails. This aligns with modern sustainability reporting. IFRS S1 requires information about sustainability-related risks and opportunities that could reasonably be expected to affect an entity's prospects, including effects on cash flows, access to finance or cost of capital. [1] ESG information therefore has an increasingly direct connection with financial decision-making.

For Indian organisations, BRSR and BRSR Core provide an important regulatory context. The phased expansion of BRSR Core assurance increases the need for controlled processes and reliable evidence. SEBI's framework also recognises the importance of value-chain information, which can be difficult to collect manually. AI can help standardise supplier data, identify gaps and support aggregation, but organisations must disclose assumptions and estimates and maintain appropriate verification mechanisms. [8,9]

The role of accounting and assurance professionals is consequently changing rather than disappearing. Professionals will increasingly need competence in data governance, AI controls, sustainability standards, digital reporting and model risk. ICAI's Sustainability Reporting Standards Board focuses on strengthening sustainability reporting and assurance capabilities and recognises technology-driven solutions such as AI and data analytics as relevant to accurate and timely impact reporting. [7,10]

10. Recommendations

- Establish an AI governance policy specifically covering financial and ESG reporting use cases.
- Create a common ESG-financial data dictionary with clear definitions, ownership and reporting frequency.
- Maintain complete data lineage so every reported metric can be traced to an approved source.
- Use AI primarily for extraction, validation, anomaly detection, forecasting and controlled drafting rather than unrestricted autonomous reporting.
- Require human approval for material judgements, estimates, accounting treatments and final disclosures.
- Validate AI models periodically for accuracy, bias, drift and explainability.
- Integrate cybersecurity, privacy and access controls into the AI reporting architecture.
- Build staff capability in AI literacy, ESG standards, data analytics and professional scepticism.
- Use digital taxonomies and structured reporting where applicable to improve machine readability and comparability.
- Maintain an evidence repository for assurance, including source records, model outputs, exceptions, reviewer actions and final approvals.

11. Conclusion and Implications

AI has the potential to reshape ESG and financial reporting by connecting large volumes of operational, financial and sustainability information with faster analytical and reporting processes. Its principal benefits include efficiency, scalability, anomaly detection, forecasting, consistency and improved decision support. The development of IFRS S1, IFRS S2, digital sustainability taxonomies and India's BRSR Core framework strengthens the relevance of reliable, structured and connected reporting information. [1,2,5,8]

However, AI does not automatically make reporting reliable. Output quality remains dependent on source data, model design, controls and professional judgement. The central implication of this study is that AI should be implemented as part of a governed reporting ecosystem. Organisations that combine AI capability with strong accounting controls, sustainability expertise, human oversight and assurance processes are more likely to obtain sustainable benefits than organisations that pursue automation alone.

For management, the implication is to invest in integrated data infrastructure and governance rather than isolated AI tools. For accounting and assurance professionals, the implication is to develop technology and sustainability competencies alongside traditional reporting expertise. For regulators and standard-setters, the continuing priority should be clear disclosure requirements, digital interoperability and assurance expectations. Future research may empirically examine whether AI adoption improves ESG reporting quality, reporting timeliness, assurance outcomes and investor decision usefulness across Indian listed companies.

12. Constraints of the Study

The study is conceptual and based on secondary sources; therefore, it does not statistically measure the effect of AI adoption on reporting quality. The pace of regulatory and technological change also means that specific AI tools, reporting requirements and implementation practices may evolve. Future empirical research using company-level data, interviews, surveys or longitudinal analysis could provide stronger evidence on the magnitude of AI's impact.

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Appendix A: Practical AI Control Checklist

- Confirm that each AI-generated metric has an identifiable source.
- Check that material assumptions and estimates are documented.
- Review exceptions and anomalies before final reporting.
- Retain model version, date, input data and reviewer evidence.
- Ensure final disclosures are approved by responsible management.
- Reassess models when standards, business processes or data structures change.

Originality Note

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