Journal of Theoretical Accounting Research
ISSN: 1556-5106
Volume 21 Issue 2 Year 2025 Page 186-198

Determinants of Ethical and Scalable AI for the Sustainable Development Goals: A Qualitative Framework from the Global South

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Abstract
Artificial Intelligence (AI) is poised to aid in implementing the United Nations Sustainable Development Goals (SDGs), especially in Low- and Middle-Income Countries (LMICs) where developmental challenges are most evident. Yet the ethical, logistical, and governance challenges of applying AI in these settings remain underexplored. This research examines the factors that enable the scalable and ethically responsible deployment of AI in education, healthcare, and clean energy, contributing to SDG achievement. It also examines the changing nature of accountability, assurance and transparency in the sustainability reporting systems with the adoption of AI. Data collection was based on inductive exploratory design whereby semi-structured interviews were conducted on 37 actors (AI developers, policymakers, and community representatives) in five countries (India, Kenya, Bangladesh, Ghana and the Philippines). Thematic analysis identified four major themes influencing AI adoption: ethical concerns (e.g., bias, transparency), adoption barriers (e.g., infrastructure gaps, digital illiteracy), success enablers (e.g., institutional capacity, community involvement), and governance bottlenecks (e.g., lack of oversight, policy fragmentation). The findings, interpreted through accountability and assurance theory, show how ethical design, institutional readiness, and governance quality jointly determine the reliability and legitimacy of AI-driven sustainability data. Based on these insights, the paper develops a conceptual model for context-sensitive and ethically sound AI systems. The framework serves as a diagnostic and prescriptive tool for inclusive policy design, stakeholder engagement, and capacity-building. By extending accounting theory into the digital domain, it conceptualizes AI as both a technological and ethical actor within sustainability accounting systems, reinforcing transparency, comparability, and stakeholder trust.

Keywords: Artificial Intelligence; Sustainable Development Goals; Accountability; Assurance; Ethics; Sustainability Accounting, Policy Framework

INTRODUCTION

Background and Rationale

Artificial intelligence (AI) is increasingly recognised as a transformative enabling force across various domains, possessing substantial potential to tackle complex, interconnected global challenges. As a global enabling technology, AI is a general-purpose technology that is set to significantly contribute to the realisation of the United Nations' 2030 Agenda for Sustainable Development, encompassing its 17 Sustainable Development Goals (SDGs), which include eradicating poverty, diminishing inequalities, enhancing health and education, and fostering sustainable economic growth (UN DESA, 2023)..Through the use of big data analysis, machine learning algorithms and decision support systems, AI can contribute to better policy planning, service provision, and resource allocation, especially in resource-limited settings (Vinuesa et al., 2020). Empirically, AI is being used in a number of SDG-related sectors. In the health sector AI enabled tools for diagnostics aid in early detection of diseases and predicting risks to health in remote and unreached regions (WHO, 2023). SDG 2 (Zero Hunger) In agricultural domain, precision farming using AI enhances crop productivity and reduce water usage. NLP-enabled educational technologies are becoming more prevalent, in the interests of creating multilingual content and driving equity in learning, associated with SDG 4 (Quality Education). Moreover, the use of artificial intelligence in energy management and urban planning contributes to the realisation of sustainable cities (SDG 11) and climate action (SDG 13) via the use of predictive analytics (Rolnick et al., 2023). In an accounting sense, such AI-driven interventions generate novel forms of metrics of performance, sustainability information, and non-financial disclosures that are increasingly part of the frameworks of public and corporate accountabilities. Unerman, Bebbington, and O'Dwyer (2018) and O'Dwyer and Unerman (2020) state that AI thus implies not only the improvement of operational efficiency but also a new way of how companies assess, test, and report achievements on the way to sustainable growth, the key problems of sustainability accounting and assurance. This change requires theoretical research in the accommodation of accounting systems to digital accountability systems and the data being produced through algorithms.

Problem Statement

Regardless of its potential, there is no even spread and systemic issues with how AI is applied and affects the implementation of the SDGs. First, scalability is identified as a critical issue. Most AI models are produced in intellectually advanced environments and take for granted that an advanced digital infrastructure, skilled human capital, and data wealth are relatively available, conditions not often present in low- and middle-income nations (LMICs) (ITU, 2024). This technological imbalance hinders the adaptation and scaling up of AI inspired innovations, making them irrelevant or unsustainable in diverse social and economic settings (World Bank, 2023).

Second, ethical issues are becoming of greater prominence in discussions around the use of AI. Algorithmic bias, data privacy, biased system design, and divination, among others, have challenged issues of fairness and responsibility in AI applications (Jobin et al., 2019; Binns et al., 2023). The challenge in solving these issues is especially acute in the regions where regulation or the legal framework is weak, and where local actors have lower capacity in terms of engaging in the governance of AI systems. A 2023 UNESCO, "A Recommendation Regarding the Morality of Artificial Intelligence Inventions," only intensifies the requirement to have transparent, inclusive, and human-rights-centered AI design (UNESCO, 2023).

Third, there is an unreasonable digital divide that is compromising the fair play of AI dividends. The rural and marginalized communities have limited access to broadband connectivity, electricity, and digital devices, which are local constraints that impede the implementation and use of AI interventions (UNESCO, 2023). Such omissions are also associated with inadequate training, including and more so digital literacy, that prevents more communities not to being part of the digital technology adoption decision matrices. Unless such efforts are made to actively build digital capabilities, as well as inclusive participation, AI might only increase, instead of decrease.

These discrepancies have a great influence on the accounting and accountability processes. The AI-produced sustainability data would have been unethical, verifiable, or in other situations. Weak data governance also means the impact of poor sustainability disclosure because it compromises the assurance and auditability. The issue is directly connected to the role of accounting in ensuring transparency and confidence (Maroun, 2018; Boulianne, Fortin, and Lecompte, 2023). In that way, it is crucial for theory and practice to develop an understanding of how AI can be integrated into sustainability accounting systems in an ethical and culturally appropriate way to address the existing discrepancies.

Theoretical and Empirical Gaps

The current literature of AI and sustainable development is largely biased in terms of techno-optimistic speculation and prescriptive constitution, supported by a limited amount of empirical research, which mirrors the real demands of practical application, particularly of the emerging world (Vinuesa et al., 2020; O'Neil and Mehrotra, 2024). Despite the fact that the ethical and governance of AI might be discussed theoretically in plenty, there is a lack of literature on the integration of AI into local institutional, infrastructural, and cultural contexts. Specifically, the literature does not record a significant evidence-based scalable strategy of integrating scalability, ethical design, and local adaptation of AI applications to achieve SDG. Secondly, the contributions of multi-stakeholder partnerships like public-private partnerships, NGOs, and community-based actors, which facilitate the adoption of ethical and sustainable AI are not given much scholarly attention. In fact, a sensitivity to the operation of such relations is critical in the generation of contextually appropriate as well as operationally practical AI solutions. More importantly, the accounting research still lacks a theoretical foundation of how artificial intelligence technologies change the valuation, assurance, and reporting processes of sustainable accounting. Although AI brings with it independent decisions and algorithm-based data generation, the conventional accountability paradigm (Gray et al., 1996; Power, 1997) assumes the presence of a human agency and surveillance by the institutions. A significant gap that this study seeks to address relates to the absence of theory in the association of AI governance with accounting accountability, particularly within the LMIC settings.

Research Objectives and Questions

The overall objective of the research consists of creating a context-sensitive, ethically-driven, and scalable framework of AI to aid the deployment of SDGs and especially in developing and resource-limited environments. This purpose is furthered using an accounting perspective by theorizing how these AI systems transform the relationships between sustainability accounting and accountability in organizations and in government agencies.

To achieve this goal in particular, the following research problems are considered in this study:

- RQ1: How can AI frameworks be designed to strengthen accountability, assurance, and transparency in sustainability accounting systems while addressing context-specific challenges in SDG implementation?
- RQ2: What constitutes ethical and inclusive AI reporting from the perspective of diverse stakeholders in the Global South, and how can these insights inform accounting theory?
- RQ3: What infrastructural, institutional, and socio-political barriers hinder the scalability of AI in sectors such as education, healthcare, and clean energy?
- RQ4: How do multi-stakeholder partnerships influence the reliability, credibility, and assurance of AI-driven sustainability information and reporting?

The qualitative investigation in this paper is informed by these questions and is based on interviews, field

observations, and documentary analysis of pilot interventions in SDG-related areas.

The research is an addition to the theory and practice. It is important in three major aspects:

1. Empirical Contribution: The paper presents evidence-based results of the research on experimentation and stakeholder interaction on the field level, filling an essential empirical knowledge gap in AI-for-SDGs literature.
2. Theoretical Advancement: The paper contributes to the theoretical progress by applying the accountability and assurance theory to the areas of AI-enabled sustainability reporting and creating a new conceptual framework that combines AI principles of ethical behavior and sustainability accounting.
3. Policy Relevance: The research findings will be used in evidence-based policymaking and institutional capacity-building, and the creation of participatory governance systems to apply AI.

Finally, the study aims at showing how incorporation of AI in sustainability reporting frameworks can improve credibility, auditability, and ethical quality of non-financial reporting, which would not only contribute to the theory and practice of sustainability accounting in developing setting.

THEORETICAL FOUNDATION

Accountability Theory and the Digital Transformation of Responsibility

Under the accountability theory, individuals and organizations should defend their decisions to the impacted personnel of the decision, often through open reporting and assurance processes. This concept has played an important role in formulating corporate reporting and assurance systems in accounting, which aim at enhancing credibility and confidence. Maroun (2018) identifies that the transition to integrated reporting already poses a challenge to the traditional assurance procedures by requiring interpretive assurance that considers stakeholder interpretation, meaning, and context.

Artificial intelligence is gradually expanding this accountability limit. AI systems generate, analyze, and share data on sustainability, which brings in algorithmic agents, whose decisions alter assurance processes and accounting disclosures. This gives the concept of algorithmic accountability, whereby human and non-human participants need to divide their responsibility (Boulianne et al., 2023). Ethical concepts such as the five core values of AI in society: beneficence, non-maleficence, autonomy, justice, and explanation, have been proposed by Floridi and Cowls (2022) as a moral justification of applying responsibility to AI-based accounting systems. Through such concepts, the accountability theory has changed its human-focused concept to a socio-technical concept that adopts a model of transparency, data ethics, and algorithm governance.

Legitimacy Theory and AI-Enabled Sustainability Reporting

The legitimacy theory states that organizations maintain their social license when they align what they disclose with the expectations and social norms of society in general. Sustainable accounting legitimacy is achieved through providing social and environmental impacts in an open and credible way. O'Dwyer and Unerman (2020) state that with the integration of AI technologies that automatically compile, evaluate, and disclose sustainability information, the progress in disclosures on sustainability is increasing in the context of not only evaluating effects but also managing risks and dependencies.

Unerman, Bebbington, and O'Dwyer (2018) develop this view and state that corporate accounting must consider externalities and the overall effects of organizational activities. The question of data collecting and predictive modeling generated by AI systems is only valid on the basis of ethical reliability and traceability. As with the transparency requirements that are irrelevant to the legitimacy of accounting, Floridi and Cowls (2022) emphasize the importance of explicability as an important element of AI ethics. Hence, the legitimacy of AI-driven sustainability reporting requires such features as algorithmic transparency, explainability, and auditability that would preserve the trust of stakeholders.

Stakeholder Theory and the Expansion of Accountability Networks

Under the stakeholder theory, corporations owe a duty to multiple stakeholders, and all these stakeholders have a right to knowledge and ethical conduct. These stakeholders are the shareholders, regulators, workers, communities, and society in general. The additional stakeholders who have joined this network by the introduction of AI are data scientists, tech developers, and algorithmic systems themselves, whose design decisions affect the accounting outcomes.

De Silva, Gunarathne, and Kumar (2025) prove that digital integration can increase the sustainability reporting and assurance in case the stakeholder engagement is incorporated throughout the process. On the same note, Madar-Coman and Tudor-Tiron (2023) conclude that integrated thinking and reporting enhance stakeholder relationships and facilitate sustainable value creation. In this respect, AI is an equal participant in responsibility networks - its management defines how the needs of stakeholders are addressed and to which values they are of primary importance.

As Boulianne et al. (2023) note, the lack of ethical consideration in the design of algorithms or data analysis may threaten professional integrity, which is why accountants should assume the ethical responsibilities of AI-based systems. To this, Rahwan et al. (2019) coined the term of machine behavior because autonomous systems are perceived as actors that interact with social institutions. All these insights reconstruct the stakeholder theory in the digital era, broadening the concept of accountability to such a level that both human and algorithmic agents are involved.

Integrating the Theories: Toward an AI–Accountability Framework

Combining all these theoretical strands, this paper is designed to present an AI-Accountability Framework, which incorporates the accountability, legitimacy, and stakeholder theories into the new sustainability accounting paradigm.

- The question of who is accountable for the decisions made by algorithms and the integrity of data in these scenarios is answered by the accountability theory, which is extended with the help of interpretive assurance (Maroun 2018) and ethical principles of AI (Floridi and Cowls 2022)..
- Legitimacy theory distributes the concept that AI-enabled disclosures may support or undermine trust in people based on the clarification and fairness of the models that go into the disclosures (O'Dwyer and Unerman 2020; Unerman et al. 2018).
- Stakeholder theory shows how distributed networks of accountability, which encompass human professionals and intelligent systems, are established through digital integration (De Silva et al. 2025) and integrated thinking (Madar-Coman and Tudor-Tiron 2023).

Altogether, these views form a theoretical basis of the mean of how AI reshapes the notion of responsibility, assurance, and legitimacy in sustainability accounting. It is in this structure that the idea of AI is understood not as a technical device but as an ethical and epistemic agent that changes the relations of accounting responsibility in developing situations.

LITERATURE REVIEW

The concept of Artificial Intelligence (AI) has become a disruptive element in the fields of study, and it is more closely associated with the achievement of the Sustainable Development Goals (SDGs) and the overall objectives of corporate responsibility and sustainability reporting. Researchers, governments, and non-governmental agencies have recognized that AI can be used to enhance decision-making, the quality of data, and policy development towards sustainable outcomes (Vinuesa et al., 2020; UN DESA, 2023). However, the technological change is also forcing the consideration of the principles of accountability, transparency, and openness to reporting systems in the accounting and governance sectors (Boulianne, Fortin, and Lecompte, 2023; O'Dwyer and Unerman, 2020).

In this section, the pertinent literature will be synthesized in four areas with a direct link to each other, including (1) AI to Sustainable Development, (2) Ethics and Accountability in AI Deployment, (3) Scalability and Infrastructure in the Global South, and (4) Multi-Stakeholder Governance and Inclusive AI. These themes combined point to the transformative opportunities of AI as well as conceptual gaps that require the use of an integrated accounting-theoretic approach.

AI for Sustainable Development: A Transformative Potential

AI is already becoming a strategic tool that can be used to realize the SDGs, create innovations in healthcare, education, agriculture, and government services (Sengupta, Pathak & Ghosh, 2023). AI-based disease surveillance systems can help in early detection and predicting risks (WHO, 2023), and adaptive learning platforms can generate inclusive education resources based on natural language processing to marginalized learners (Holstein et al., 2021). Precision systems that run on machine learning are used in agriculture to achieve maximum crop yields and resource utilization, which advances SDG 2 (Zero Hunger).

Vinuesa et al. (2020) project that AI can positively affect about 79 out of 169 SDG targets, but they warn that the use of AI may lead to inequalities when used irresponsibly. Similar potential is highlighted by the ITU (2024) and World Bank (2023), and the latter points out that pilot programs funded by the donors in the low- and middle-income countries (LMICs) frequently do not become a part of the local institutions.

In technical accounting, the new technical developments result in new classes of sustainability information that can be included in other reporting and assurance processes. De Silva, Gunarathne, and Kumar (2025) also point to the fact that digital knowledge integration contributes to improved sustainable accounting performance, though Curtó-Pagès et al. (2021) also note the fact that the development of SDG reporting within corporations is associated with the increased need for reliable and data-backed data supported by AI. The issue of an accounting system where data flows and assurance can be done through algorithms is emphasized by the correlation between data generated by AI and the reliability of sustainability reporting. However, the integration of AI-developed measurements in accounting systems is not theorized in the literature so far, which is why this study fills this gap by connecting the AI innovation to accountability and assurance models.

Ethics and Accountability in AI Deployment

Although AI can be promoted as efficient in terms of analysis, certain ethical issues related to fairness, bias, privacy, and transparency arise. Binns, Veale, and Van Kleek (2023) and Jobin, Ienca, and Vayena (2019) specify algorithmic accountability as an urgency issue, especially in the Global South, which has weak governance and, thus, allows unethical data habits. Equally, to prevent ethics washing where organizations implement superficial AI ethics codes with no enforcement mechanisms, O'Neil and Mehrotra (2024) caution that superficial codes of ethics must not be mistaken for codes that are truly enforced.

Floridi and Cowls (2022) discuss five universal ethical principles, such as beneficence, non-maleficence, autonomy, justice, and explicability, which are closely related to the issue of fairness, integrity, and transparency in accounting. The UNESCO (2023) Recommendation about the Ethics of Artificial Intelligence also provides the need to govern AI inclusively and rights-based, with specific focus on those institutions implementing AI.

These controversies in accounting research overlap with the development of assurance and accountability systems.

Boulianne et al. (2023) are involved in the same debate but from the perspective of accounting research, and they investigate the ways in which AI and data analytics create new ethical dilemmas in accountants. The accountability of sustainability accounting and assurance is directly related to the ethical data governance and algorithmic transparency. Hence, it becomes crucial to consider AI ethics in accounting theory through interpretive assurance (Maroun, 2018) and accountability models (Unerman, Bebbington and O'Dwyer, 2018) to ensure that the stakeholders in digital-era reporting remain confident. By adding all these ethical and interpretive factors to AI governance, accounting theory can become less human-based, and more algorithmic, ensuring trust in reporting in the digital era.

Scalability and Infrastructure Constraints in the Global South

Scalability of the AI systems is a recurrent issue in the developing areas, usually relating to the infrastructural aspects like insecure power supply, poor broadband networks, and low internet accessibility (World Bank, 2023; ITU, 2024). Taylor and Broeders (2022a) present a concept of data justice, which underlines the fact that the circulation of data in the Global South is determined by the power inequalities and sovereignty issues. Equally, Kumar, Bhatnagar, and Singh (2023) encourage resource-constrained AI models to use local resources, whereas Mhlanga (2022a) emphasizes that such local resources amplify the importance of ethical and social impacts.

These structural issues can be interpreted in the framework of accounting and sustainability reporting as unequal abilities to produce, verify, and report sustainability information. According to De Silva et al. (2025), digital integration is positively related to the performance of sustainable reporting, yet the relation is conditional upon the support of the appropriate infrastructure and institutional background. These limitations are important to overcome to create scalable and ethical AI models that can be consistent with the principles of accountability and dependable practices of sustainability accounting. The international reporting differences in the absence of equal infrastructure may carry on through the scalability of the AI systems and introduce new accounting issues of comparability, dependability, and inclusivity in the sustainability disclosures.

Multi-Stakeholder Governance and Inclusive AI Design

Good AI governance entails the collaboration of multi-actors, composed of governments, the private sector, civil society, and end-users. OECD (2023b) and Taylor and Broeders (2022b) emphasize the role of public-private partnerships (PPPs) in facilitating capacity-building and the possibility of reproducing the existing power imbalance in the case of corporate-led governance.

The literature on accounting also emphasizes the need to involve multi-stakeholders in the construction of credible reporting and assurance systems. The study by Madar-Coman and Tudor-Tiron (2023) identifies that integrated thinking and reporting build collaborative accountability arrangements, which is relevant to AI governance, whereby ethical supervision needs to be distributed among institutional participants. The involvement of participants in design (Holstein et al., 2021) and involvement in the local community (Mhlanga, 2022a) also enhances trust and legitimacy of the AI systems.

In this regard, stakeholder inclusiveness is not only an ethically sound thing but also an accounting obligation. The AI governance that involves a variety of voices and open assurances is similar to the principles of accountability and legitimacy that O'Dwyer and Unerman (2020) and Unerman et al. (2018) describe. In such a way, inclusive governance is one of the preconditions of credible AI-based sustainability accounting.

Synthesis and Research Gap

The literature available offers critical understanding of the transformational potential of AI and ethical and infrastructural issues regarding AI. However, it is still fragmented - the technological investigations are concentrated on the functionality and the ethical investigations do not often deal with the institutional responsibility and accounting theory. Not many studies have tried to combine the concept of scalability, ethics and stakeholder inclusion in one conceptual framework. There is an evident gap in research in the point of AI governance and accounting theory. Existing frameworks do not adequately cover the manner in which the role of algorithmic systems can be incorporated in assurance, audit and reporting processes especially in LMICs. As Pizzi et al. (2020) note, management and accounting research on the SDGs is still evolving, and a theoretical consolidation is needed to understand how AI reshapes corporate responsibility and reporting.

By constructing a context-sensitive AI–Accountability Framework that connects ethical AI principles (Floridi & Cowls, 2022) with ideas of accountability, assurance, and involvement among stakeholders (Maroun, 2018; Unerman et al., 2018; De Silva et al., 2025), our study fills this gap. By defining how AI systems can be institutionally implemented in emerging economies, transparently ensured, and ethically governed, the framework advances the accounting for sustainability.

RESEARCH METHODOLOGY

Research Design

This research used a qualitative exploratory approach in order to examine the ethical and scalable application of artificial intelligence. The goal of this research was to contribute to the Sustainable Development Goals (SDGs) that have been established by the United Nations. Qualitative studies are particularly suitable in the case the phenomena are emerging, complex, and situated within socio-political structures (Creswell & Poth, 2018). The design sought to generate grounded theoretical insights on how accountability, assurance, and governance operate within AI-enabled sustainability

contexts across low- and middle-income countries (LMICs).

The purpose of the qualitative design was not only descriptive but also theory-building, linking field-level experiences to conceptual developments in accountability and sustainability accounting.

Data Sources

Primary Data

The author conducted semi-structured interviews from January to March 2019 with three types of key informants: AI developers, policy makers, and non-governmental organizations (NGOs) and community representatives. The participants were the ones involved in AI design, policy or implementation initiatives that would help in supporting the SDGs. The distribution of the participants is shown below.

Table 1. Interview Participants by Stakeholder Group

Country	Number of Pilot Studies
India	5
Kenya	3
Bangladesh	4
Ghana	2
Philippines	3

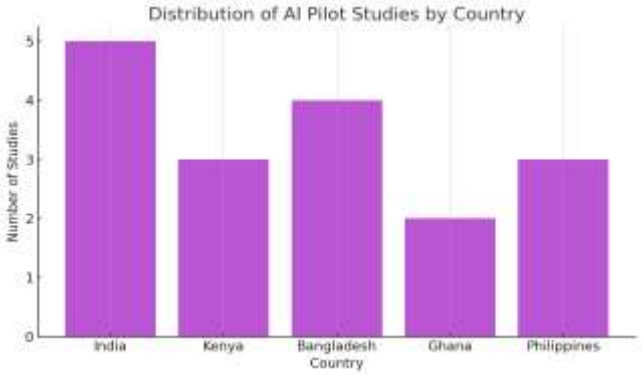

Figure 1. Distribution of Interview Participants by Stakeholder Type

The interviews were able to record various views on ethical AI, scalability, as well as institutional preparedness. The narratives of the participants were used to give an empirical basis to theorizing the construction of accountability, transparency, and ethical assurance in AI-based systems of sustainability reporting.

Secondary Data

The policy documents and researched reports provided unpublished data. These sources provided me with general information about the way the adoption of AI in an ethical and inclusive way is being implemented at both the global and local level. Key references included:

• UNDP (AI for Good reports and SDG policy implementation actions),

• OECD (Responsible AI principles), • C- TOC 18-000579 Considerations for responsible development of AI (based on the INTERPOL Framework for assessing police use of AI) [6] and • United Nations (AI, this century's intelligence - towards a human rights perspective) [5]).

• UNESCO (Guidelines on Ethics of AI, 2023),

• World Bank (Digital devt and data governance frameworks.

Table 2. Secondary Data Source Citations

Source	Citations Used
UNDP	10
OECD	7
UNESCO	12
World Bank	15

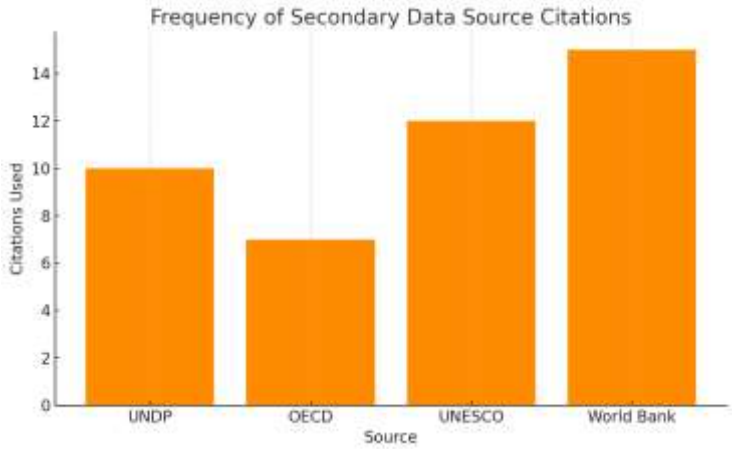

Figure 2. Frequency of Secondary Data Source Citations

The combination of primary and secondary data enabled methodological triangulation and theoretical integration by connecting practitioner perspectives with institutional frameworks on ethical AI and accountability.

Sampling Strategy

The sampling technique of purposive sampling was used to guarantee the inclusion of information-rich cases suitable for the research aims. On the basis of the following criteria, participants were chosen to participate:

- Contributions to AI projects in SDG areas in their professional field,
- Presence of different institutions and geographies,
- Presence of different institutions and geographies.

The sampling was to facilitate conceptual richness and theoretical saturation as opposed to statistical representation, which is in line with the interpretive logic of theory-building research.

Data Collection Procedures

Data collection took place over six months and was done in the three following modalities:

1. Field Visits and Observations:

AI pilot projects were monitored in five countries, namely, India, Kenya, Bangladesh, Ghana, and the Philippines, in the areas of education (SDG 4), healthcare (SDG 3), and clean energy (SDG 7). On-site observations gave some important contextual information. The observations formed vital parts of determining the way accountability structures and ethical assurance worked in AI interventions in community and public contexts.

Table 3. AI Pilot Studies by Country

Country	Number of Pilot Studies
India	5
Kenya	3
Bangladesh	4
Ghana	2
Philippines	3

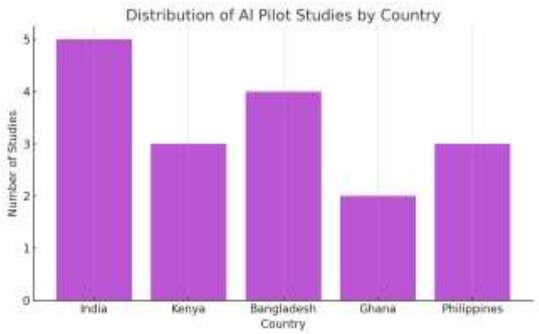

Figure 3. Distribution of AI Pilot Studies by Country

2. Semi-Structured Interviews: Interviews were carried out face-to-face or via the internet and were conducted for a duration of about 45-60 minutes. A themed interview guide was created that included the themes of scalability, inclusivity, ethical issues, and institutional preparedness. All the sessions were recorded (with permission) and transcribed to analyze them. The questions were tailored in such a way that they were intended to find out how the participants conceptualized and applied accountability, transparency, and ethical oversight in their AI projects.

3. Institutional Collaboration: Collaboration with NGOs and government agencies allowed obtaining documentation and internal reviews of AI projects, which improved data triangulation. These institutional documents provided further testimony of the practices to implement the ethical principles, assurance procedures, and governance structures in practice.

Data Analysis

The qualitative data that were obtained by interviews, field notes, and institutional records were analyzed through an overall thematic analysis in accordance with that of Braun and Clarke (2006). It was an inductive and theory-generative analysis that sought to determine recurring constructs that could be conceptually related to accountability, assurance, and legitimacy.

Stage 1: Familiarization

The researcher read and re-read the transcripts and recordings of the observations with the aim of developing a comprehensive understanding of the story of the stakeholders.

Stage 2: Open Coding

In NVivo 12, more than 600 first codes were generated. These codes were of 1 finer items such as the algorithmic obscurity, the infrastructural vagueness, the regulatory fragmentation and allowing practices.

Stage 3: Theme Development and Refinement

Codes were clustered into thematic areas and distilled into four overarching themes, with each theme having three subthemes. These were reflections of the concerns, limitations and facilitators faced in the front-line.

Table 4. Detailed Thematic Analysis Table

Theme	Subtheme	Frequency
Ethical Concerns	Bias in Decision Making	10
Ethical Concerns	Lack of Transparency	8
Ethical Concerns	Algorithmic Fairness	7
Adoption Barriers	Infrastructure Constraints	9
Adoption Barriers	Data Poverty	6
Adoption Barriers	Low Digital Literacy	5
Success Enablers	Community Participation	7
Success Enablers	Institutional Readiness	6
Success Enablers	Capacity Building	5
Governance Gaps	Regulatory Vacuum	6
Governance Gaps	Ethical Oversight Gaps	5
Governance Gaps	Policy Standardization Issues	4

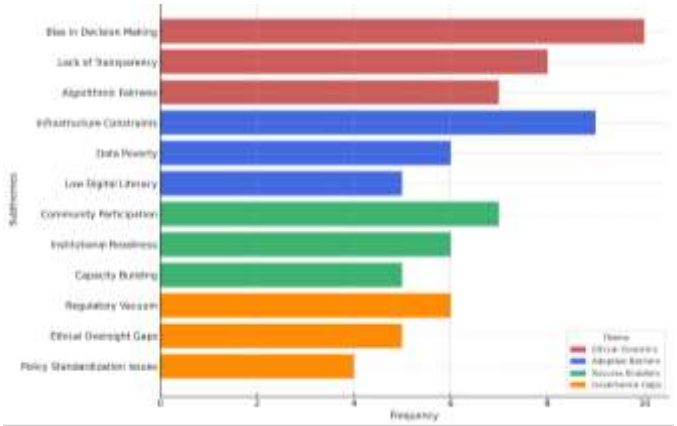

Figure 4. Sub-theme Frequencies by Thematic Domain

The bar chart (Figure 4) presents the overall frequency of coded data under each major theme. Ethical Concerns was the most frequently quoted theme other than Uncertainty Factors which was followed by Adoption Barriers, Success Enablers, and Governance Gaps.

Interpretive Insights

• Ethical: There was repeat mention of ethical concerns such as biased algorithms, opaque decision making and lack of XAI framework as significant obstacles to trust and adoption by stakeholders.

• Barriers to Adoption: Insufficient internet access, digital illiteracy, and data unavailability were the main barriers to scaling AI in low-resource settings.

• Success Enablers: Readiness within organizations to implement interventions, and community engagement which was meaningful in the development of

interventions, were often cited as key enablers; such as in pilot interventions co-designed with the local actors.
• Governance Gaps: Another theme described how weak regulatory regime and the lack of ethical guidance and ad hoc policy measures had undermined institutional accountability in the deployment of AI.

Reliability and Validity Measures

- Inter-coder Reliability: 20% of the dataset was coded independently by a second researcher, achieving an inter-coder agreement of 87%.
- Member Validation: Thematic summaries were returned to 8 participants for review, and all confirmed the thematic interpretations as accurate and representative of their perspectives.
- Triangulation: Data from interviews, observations, and institutional sources were cross-verified to enhance credibility.

Such a set of measures provided the accountability and sustainability research with transparency in methods and supported the interpretive reliability needed in theory-building.

Ethical Considerations

The research ethics committee of the host institution held ethical clearance. Each participant had information sheets and consent forms on how the participation was voluntary. Any personal identifiers were deleted, and all the records were coded and kept in a safe place. Interpretation of the interview material and localization of questions were also adopted to ensure cultural sensitivity. The participants had the opportunity to review their transcripts and pull out at any point. These steps have guaranteed adherence to the international AI ethics guidelines (UNESCO, 2023; Floridi and Cowls, 2022) and alignment with the focus of accounting on integrity, transparency, and professional responsibility.

FINDINGS AND DISCUSSION

This section shows the thematic analysis findings as per the research questions and literature. Four key themes (Ethical Accountability, Institutional and Technical Barriers, Assurance Enablers, and Governance and Oversight Gaps) were identified in this analysis. Combined, these themes justify how accountability and assurance are built, limited, and possibly changed by the use of AI in situations of sustainability. These findings have been interpreted in the light of accountability and sustainability accounting and indicate that the ethical and institutional factors affect the credibility, assurance, and legitimacy of AI-based sustainability reporting.

Ethical Concerns in AI Deployment

Stakeholders were aware of ethical aspects. Evidently, panelists raised several significant issues, as algorithmic obscurity, data bias, and, more broadly, the absence of transparency become the most significant challenges when it comes to the appropriate application of artificial intelligence to sensitive areas of human activity, such as education and healthcare. One AI developer said, for example, "We can't rely on a decision we don't understand, especially in health diagnostics." That is in line with the discourse that going global on responsible artificial intelligence and has an accent on such values as accountability, openness, and justice (Jobin et al., 2019; Floridi and Cowls, 2021). However, there is a dearth of operationalization of these principles in the LMIC context. The most mentioned subthemes under ethical concerns as theme sub-code were Bias in Decision-Making (n = 10), lack of Transparency (n = 8), and Algorithmic Fairness (n = 7). Such findings suggest that the practical application of ethical AI principles remains an international issue, particularly in low capacities (UNESCO, 2023). In terms of accounting, these results are in tandem with the issue of black-box reporting, where parties involved are unable to trace or confirm the process of generating sustainability information. The concept of algorithmic opacity is a challenge to the roots of assurance and verifiability on which accounting credibility relies (Maroun, 2018). In such a way, algorithmic fairness and transparency may be perceived as the new versions of the so-called ethical assurance that is needed to make stakeholders trust AI-based reporting systems.

Adoption Barriers in Resource-Constrained Environments

The second key theme touches upon the structural and infrastructural issues of AI implementation. All five countries mentioned the problem associated with low internet availability, no access to good electricity, and no access to cheap digital devices. These issues reverberate the arguments presented by the World Bank (2023) and the International Telecommunication Union (ITU, 2024) regarding the digital divide as being one of the most critical factors that hinder the development of artificial intelligence in the countries, which are located in the Latin American region. The environmental barriers to the use of AI were thematically grouped into Infrastructure Constraints (n = 9), Data Poverty (n = 6), and Low Digital Literacy (n = 5) sub-categories. Unless these foundational challenges are addressed, we cannot hope that AI will do anything but, in theory at least, aid development. Theoretically speaking, such infrastructural constraints are the impediments to the generation of consistent, comparable, and audited sustainability data, which are the central demands of accountability and legitimacy. Lack of reliability and completeness of data systems intensifies uncertainty in assurance providers in terms of the verification of sustainability performance (De Silva et al., 2025). This supports the necessity of a combined digital accounting infrastructure that will guarantee that AI-based disclosures are technically viable and ethical.

Enabling Factors for Ethical and Scalable AI

Nevertheless, the presence of the AI integration was feasible and successful in cases where the corresponding enablers were present, which was demonstrated by several projects. The success factors identified included

effective community involvement, effective institutions, and continuous capacity-building. These enablers can be compared to those proposed by Holstein et al. (2021), the participants in participatory AI design, and Mhlanga (2022b), who deals with the issue of institutional alignment as a prerequisite of successful technology transfer in developing countries. Sub-themes under this area included Community Participation (n = 7), Institutional Readiness (n = 6), and Capacity Building (n = 5). These are not just technically possible, but also socially legitimate, which is a mandatory requirement of the sustainable integration of AI (Vinuesa et al., 2020). Such participatory and capacity-building practices in the accounting discourse are equivalent to the notions of stakeholder inclusiveness and interpretive assurance, where the legitimacy is co-created in the form of a dialogue and institutional readiness (Madar-Coman and Tudor-Tiron, 2023; Unerman et al., 2018). The identified success enablers can therefore be applied as viable tools for incorporating accountability and ethical guarantees into the AI governance systems.

Governance Gaps and Policy Fragmentation

Governance limitations were also certain to be a significant challenge to the functioning of AI. Having no thorough regulatory framework, ethical oversight mechanisms, and policy coherence were frequently cited as the still-to-be-addressed issues by all participants. One of the senior policymakers of Ghana remarked, we are using technologies that generate ever-increasing power, and when you have no regulations, you end up before a judge and jury. That's dangerous." This observation corresponds to the available literature that highlights the fragmented nature of AI governance in LMICs (Taylor and Broeders, 2022a; OECD, 2023b). Subthemes Most frequently cited subthemes were Regulatory Vacuum (n = 6), Ethical Oversight Gaps (n = 5), and Policy Standardization Issues (n = 4). These are shortcomings that destroy the institutionalized value of the ethical values and responsibility of the beneficiaries. These loopholes in governance in the lens of accounting theory undermine formal accountability and assurance mechanisms. Absent ethical control and standardized regulation, such an assurance process will be disjointed, much like audit environments where non-standardized standards destroy comparability and trust among stakeholders (O'Dwyer and Unerman, 2020). Enhancing AI governance systems is thus comparable to enhancing regulatory assurance systems in the accounting practice where transparency and legitimacy of technology-mediated reporting are assured.

Conceptual Framework: Determinants of Scalable and Ethical AI

A conceptual framework was created by using the four thematic areas to illustrate interdependence among the domains and overall impact on the SDG-related AI application in terms of scalability and ethicality.

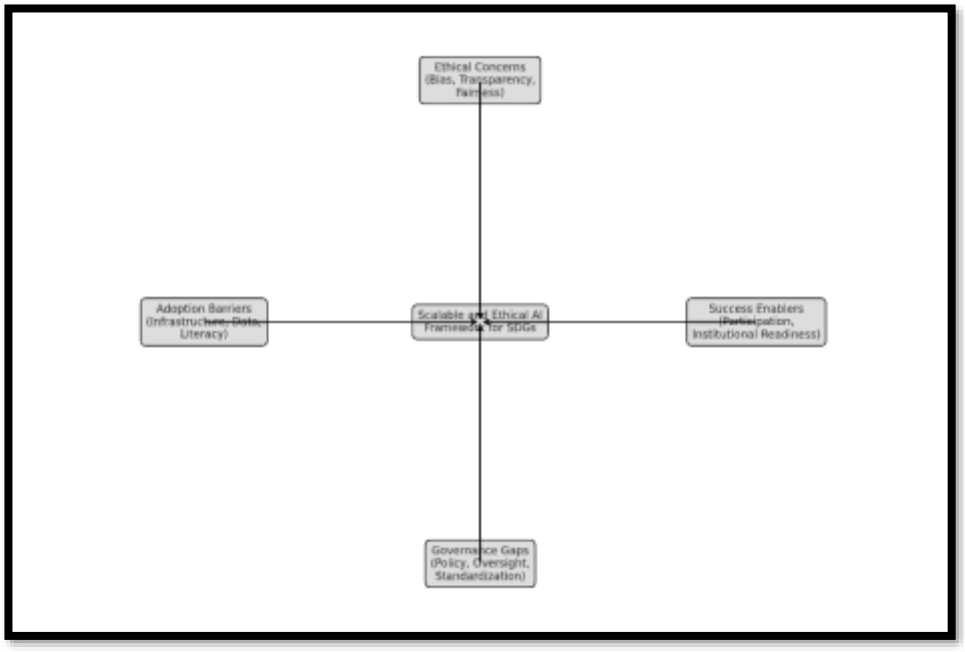

Figure 5. Conceptual Framework: Determinants of Scalable and Ethical AI for SDGs

The framework (Figure 5) conceptualizes Scalable and Ethical AI as an integrative outcome influenced by:

- Ethical Concerns: e.g., bias, transparency, fairness;
- Adoption Barriers: e.g., infrastructure, literacy, data availability;
- Success Enablers: e.g., participation, institutional readiness;
- Governance Gaps: e.g., lack of policy, oversight mechanisms.

It also serves as a diagnostic tool and blueprint for stakeholders seeking to build inclusive and robust AI systems tailored to developmental contexts. Reinterpreted through accountability theory, the framework functions as an "AI–Accountability Model." Ethical Concerns correspond to moral dimensions of

reporting transparency; Adoption Barriers mirror systemic risks to data assurance; Success Enablers relate to stakeholder participation and legitimacy-building; and Governance Gaps denote deficiencies in oversight that threaten institutional accountability. Together, these components offer a conceptual foundation for AI-integrated sustainability accounting frameworks.

Cross-Thematic Integration

It is worth noting that the four domains are systemic in nature. As an example, weak governance may increase the risk of ethical risks, and strong community engagement decreases adoption barriers. The framework thus provides both descriptive and normative understanding: it outlines the way scalable and ethical AI is built and stipulates what should be the case to actualize it. In the accounting field, the existence of such systemic interactions manifests the mechanism of accountability as a networked process comprising ethical, institutional, and regulatory aspects. These themes combined make the framework valuable to the development of theory on how the AI technologies can transform the assurance, legitimacy, and transparency underpinnings of sustainability accounting.

CONCLUSION AND POLICY IMPLICATIONS

Problem to be solved / motivation.

This study project is intended to fill a severe gap in the existing literature regarding the ethical and scalability of artificial intelligence (AI) to develop sustainable development goals (SDGs) of the United Nations in low- and middle-income nations (LMICs). The initiative looks at systemic, structural, and ethical challenges that hinder the adoption of AI in various areas, health, education, and renewable energy, driven by the absence of contextual frameworks. In addition to its relevance in the context of development, the study also addresses a conceptual gap in the accounting theory, namely, the need to transform accountability, assurance, and governance to consider algorithmic systems as participants in sustainability reporting. This drive is not to be confused with the interpretation of AI as a technical instrument, but rather to consider AI as a transformational agent that is remaking the institutional responsibility and moral confidence.

Method Used

Techniques that were applied are of a qualitative exploratory approach, which included semi-structured interviews of 37 stakeholders (AI developers, policymakers, and representatives of non-governmental organizations) in five low- and middle-income countries: India, Kenya, Bangladesh, Ghana, and the Philippines. It uses the theme analysis method suggested by Braun and Clarke in 2006, which is supplemented by the fieldwork and institutional records. The interpretive qualitative design has facilitated the generation of theory on the basis of practice, where it was possible to develop an AI-Accountability Framework. The application of thematic analysis also made sure that the ethical, institutional, and governance aspects were not only identified empirically but also incorporated in the conceptual framework of accountability and sustainability reporting theory.

Key Findings

The study results reported four broad themes:

- Ethical Issues (e.g., bias, interpretability, and algorithmic fairness);
- Adoption Barriers (i.e., infrastructure deficiencies, digital illiteracy, data poverty);
- Success Enablers (institutional readiness, community engagement, capacity building);
- Governance Gaps (e.g., Disjointed policy, absence of oversight).

We created a conceptual framework that structures these areas, as well as the basis of a diagnostic and prescriptive instrument for the design of context-sensitive AI systems that are ethical, scalable, and inclusive. Theoretically, the findings generalize accountability and assurance frameworks by establishing the interaction of algorithmic decision systems, infrastructural preparedness, and quality of governance in the establishment of reliability and legitimacy of sustainability reporting. The framework offers a conceptual interposition of ethical AI principles and accounting concepts like transparency, comparability, and stakeholder trust.

Limitations of the Work and Future Work to Be Performed

The qualitative data sample includes the five countries, and, therefore, the study may not offer the complete scope of issues in South.

- It does not include longitudinal analysis for the sustainability of AI interventions over time.
- Directions for future research would be to:
- Quantitative verification of the proposed conceptual model;
- Comparative studies between various socio-political areas;
- Application domain AI ethics frameworks, such as in public health and education.

The operationalization of the AI-Accountability Framework in the context of sustainability reporting and assurance processes is another topic which needs to be researched in the future, and how accountants, regulators, and technologists may co-develop ethical and auditable AI-based reporting systems. There are longitudinal studies that might examine the effect of institutional learning and technological maturity on ethical assurance and accountability in the long-run.

REFERENCES

1. Binns, R., Veale, M., & Van Kleek, M. (2023). Algorithmic accountability and the Global South: Ethical challenges in data-driven development. AI & Society, 38(2), 411–425.
2. Boulianne, E., Fortin, M., & Lecompte, A. (2023). Artificial intelligence and data analytics: ethical implications for accounting. In *Research Handbook on*

accounting and ethics (pp. 168-179). Edward Elgar Publishing.
3. Curtó-Pagès, F., Ortega-Rivera, E., Castellón-Durán, M., & Jané-Llopis, E. (2021). Coming in from the cold: A longitudinal analysis of SDG reporting practices by Spanish listed companies since the approval of the 2030 agenda. *Sustainability*, *13*(3), 1178.
4. De Silva, P., Gunarathne, N., & Kumar, S. (2025). Exploring the impact of digital knowledge, integration and performance on sustainable accounting, reporting and assurance. *Meditari Accountancy Research*, *33*(2), 497-552.
5. Floridi, L., & Cowls, J. (2021). A Unified Framework of Five Principles for AI in Society. Harvard Data Science Review, 3(1).
6. Floridi, L., & Cowls, J. (2022). A unified framework of five principles for AI in society. *Machine learning and the city: Applications in architecture and urban design*, 535-545.
7. Holstein, K., Wortman Vaughan, J., Daumé III, H., Dudik, M., & Wallach, H. (2021). Improving fairness in machine learning systems: What do industry practitioners need?. Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems, 1–16.
8. ITU. (2024). AI for Good: Leveraging Artificial Intelligence to Advance Sustainable Development Goals. International Telecommunication Union.
9. Jobin, A., Ienca, M., & Vayena, E. (2019). The global landscape of AI ethics guidelines. Nature Machine Intelligence, 1(9), 389–399.
10. Kumar, A., Bhatnagar, S., & Singh, R. (2023). Designing Resource-Constrained AI Models for the Global South: A Review. Journal of AI Research and Development, 45(3), 97–114.
11. Kureljusic, M., & Karger, E. (2024). Forecasting in financial accounting with artificial intelligence–A systematic literature review and future research agenda. *Journal of Applied Accounting Research*, *25*(1), 81-104.
12. Madar-Coman, M. M., & Tudor-Tiron, A. (2023). EXPLORATORY RESEARCH ON THE ROLE OF INTEGRATED THINKING AND REPORTING IN PROMOTING SUSTAINABLE DEVELOPMENT: A QUALITATIVE CASE STUDY. *Annales Universitatis Apulensis-Series Oeconomica*, *25*(2).
13. Maroun, W. (2018). Modifying assurance practices to meet the needs of integrated reporting: The case for "interpretive assurance". *Accounting, Auditing & Accountability Journal*, *31*(2), 400-427.
14. Mhlanga, D. (2022a). Artificial Intelligence in the Global South: Ethical and Social Implications. Technology in Society, 71, 102091.
15. Mhlanga, D. (2022b). Artificial intelligence in the Global South: Ethical and social implications. Technology in Society, 70, 102018.
16. Moll, J., & Yigitbasioglu, O. (2019). The role of internet-related technologies in shaping the work of accountants: New directions for accounting research. *The British accounting review*, *51*(6), 100833.
17. O'Neil, C., & Mehrotra, A. (2024). Designing trustworthy AI: Bridging ethics and practice in global contexts. Journal of Ethical AI, 3(1), 22–41.
18. O'Dwyer, B., & Unerman, J. (2020). Shifting the focus of sustainability accounting from impacts to risks and dependencies: Researching the transformative potential of TCFD reporting. *Accounting, Auditing & Accountability Journal*, *33*(5), 1113-1141.
19. OECD. (2023a). OECD Framework for the Classification of AI Systems. Organisation for Economic Co-operation and Development.
20. OECD. (2023b). Public-Private Partnerships for Sustainable Development: Policy Principles and Good Practices. OECD Publishing.
21. Palmer, L. (2007). Assessment of SOX implementation: from an Internal Audit perspective.
22. Pizzi, S., Caputo, A., Corvino, A., & Venturelli, A. (2020). Management research and the UN sustainable development goals (SDGs): A bibliometric investigation and systematic review. *Journal of cleaner production*, *276*, 124033.
23. Rahwan, I., Cebrian, M., Obradovich, N., Bongard, J., Bonnefon, J. F., Breazeal, C., ... & Wellman, M. (2019). Machine behaviour. *Nature*, *568*(7753), 477-486.
24. Rolnick, D. et al. (2023). Tackling climate change with machine learning: Challenges and opportunities. ACM Computing Surveys, 55(4), Article 88.
25. Sengupta, A., Pathak, Y., & Ghosh, S. (2023). AI-Enabled Public Services for SDGs: A Case-Based Review of Policy Innovations in the Global South. Government Information Quarterly, 40(4), 101817.
26. Taylor, L., & Broeders, D. (2022a). Data Justice and the Politics of Global Development. Big Data & Society, 9(1), 1–12.
27. Taylor, L., & Broeders, D. (2022b). In the name of development: Power, profit and the datafication of the global South. Geoforum, 130, 77–85.
28. UN DESA. (2023). Science, Technology and Innovation for the SDGs. United Nations Department of Economic and Social Affairs. Retrieved from https://sdgs.un.org
29. Unerman, J., Bebbington, J., & O'dwyer, B. (2018). Corporate reporting and accounting for externalities. *Accounting and business research*, *48*(5), 497-522.
30. UNESCO. (2023). Recommendation on the Ethics of Artificial Intelligence: Implementation Guidelines. Paris: United Nations Educational, Scientific and Cultural Organization.
31. Vinuesa, R., Azizpour, H., Leite, I., Balaam, M., Dignum, V., Domisch, S., ... & Nerini, F. F. (2020). The role of artificial intelligence in achieving the Sustainable Development Goals. Nature Communications, 11(1), 233.

32. WHO. (2023). Digital Health Interventions and Artificial Intelligence in Primary Care: A Global Overview. World Health Organization.
33. World Bank. (2023). Digital Development Global Practice: Inclusive Access to the Digital Economy. World Bank Group.