

From Foundational Models to Global ESG Standards: A Comparative Analytical Review of Social and Environmental Accounting Disclosure Frameworks

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Abstract:

This study examines the evolution of social and environmental accounting (SEA) disclosure from 1970s models to modern ESG frameworks. It compares descriptive, unidimensional, and multi-dimensional models and evaluates their alignment with GRI (2021), ISSB IFRS S1/S2 (2023), and the EU CSRD. Using a conceptual analytical approach, the study tests the completeness of multi-dimensional models and the relevance of the Estes (1976) framework. The findings show that cost-benefit multi-dimensional models offer the most comprehensive approach to SEA disclosure, while the Estes framework anticipates key features of current standards. The study highlights the tension between accountability and decision-usefulness in sustainability reporting and outlines implications for firms in emerging regulatory contexts, particularly in developing economies such as Algeria.

Keywords: Social and Environmental Accounting; ESG Disclosure; Sustainability Reporting; Double Materiality; GRI.

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1. Introduction

The escalating urgency of climate change, biodiversity loss, and widening social inequality has fundamentally reshaped corporate responsibilities and reporting obligations. Over the past three decades, professional organizations in accounting, auditing, and standard-setting have emerged as central actors in the development of non-financial accountability frameworks. These efforts have materialized through both mandatory reporting requirements and voluntary frameworks adopted by organizations operating in environmentally and socially sensitive sectors (Gatimbu & Wabwire, 2016; Gray, Owen, & Adams, 1996). This transformation has intensified since 2015, marked by the adoption of the United Nations Sustainable Development Goals (SDGs) and the Paris Agreement, and has accelerated further with the introduction of the EU Corporate Sustainability Reporting Directive (European Commission, 2023) and the issuance of the inaugural International Sustainability Standards Board (ISSB) disclosure standards—IFRS S1 and IFRS S2—in June 2023.

Notwithstanding this regulatory and normative momentum, a fundamental tension persists within the literature on social and environmental accounting (SEA) between two competing paradigms. The stakeholder-accountability paradigm, rooted in the work of Gray et al. (1996) and (Bebbington, Larrinaga, & Moneva, 2008), conceptualizes reporting as a mechanism for discharging accountability to a broad spectrum of stakeholders. In contrast, the decision-usefulness paradigm, exemplified by the ISSB framework, prioritizes the informational needs of primary users of financial statements, thereby subordinating sustainability disclosures to investor-oriented decision-making. This tension has significant implications for the form, scope, and substantive content of sustainability reporting frameworks.

The historical development of SEA disclosure reveals a substantial body of scholarly contributions dating back to the early 1970s. Early models ranged from descriptive narrative approaches

(Scovill Manufacturing Company, 1972; American Accounting Association [AAA], 1973) to more analytically rigorous, multidimensional cost–benefit frameworks (Estes, 1976) (Abt Associates Inc, 1974); (Dilley & Weygandt, 1973). The subsequent emergence of globally recognized frameworks—such as the Global Reporting Initiative (GRI, 1997), the International Integrated Reporting Council (IIRC) Framework (2013), the Sustainability Accounting Standards Board (SASB) Standards (2012), the GRI Universal Standards (2021), and the ISSB standards (2023)—marks a qualitative shift towards greater standardization, comparability, and, increasingly, regulatory enforceability. These developments substantially extend the scope and methodological rigor envisioned in earlier models.

Against this backdrop, this paper addresses the following research question: to what extent do the foundational models and standards for SEA disclosure, developed between the 1970s and the 1990s, anticipate, align with, or diverge from contemporary international sustainability reporting frameworks? The study pursues three objectives: (1) to systematically map and critically evaluate the principal models and approaches to SEA disclosure; (2) to analyse key reporting standards from the American Accounting Association (AAA) (1967, 1976) to the GRI Universal Standards (2021), ISSB IFRS S1/S2 (2023), and the CSRD (2023); and (3) to assess the degree of conceptual continuity and discontinuity between these successive generations of frameworks. Two hypotheses are advanced: H1—multidimensional cost–benefit models exhibit greater analytical comprehensiveness than descriptive and unidimensional approaches; H2—the hierarchical standards proposed by Estes (1976) constitute the most comprehensive foundational baseline for SEA disclosure.

This study makes three principal contributions. First, it reconstructs the intellectual continuity between foundational SEA disclosure models and contemporary ESG reporting frameworks. Second, it develops a comparative analytical mapping that links historical accounting models to modern regulatory standards. Third, it

advances an interpretative framework that explains the persistence of the accountability versus decision-usefulness paradigmatic tension in sustainability reporting.

Methodologically, the study adopts a conceptual–analytical review approach, drawing on primary normative sources (Global Reporting Initiative (GRI), 2021; International Integrated Reporting Council (IIRC), 2013) (GRI, 2021; ISSB, 2023; CSRD/ESRS, 2023; IIRC, 2013) alongside peer-reviewed literature identified through Scopus and Web of Science, covering the period from 1970 to 2023.

The literature review follows a systematic search protocol informed by PRISMA guidelines. Three electronic databases—Scopus, Web of Science, and JSTOR—were consulted. Search strings combined the following terms: “social and environmental accounting,” “ESG disclosure,” “sustainability reporting,” “non-financial reporting,” “GRI,” “ISSB,” “CSRD,” and “Estes (1976).” The inclusion criteria were as follows: (i) peer-reviewed journal articles published between 1970 and 2023; (ii) primary normative sources (Global Reporting Initiative (GRI), 2021; American Accounting Association (AAA), 1967; American Accounting Association (AAA), 1976; International Integrated Reporting Council (IIRC), 2013; European Commission, 2023; International Integrated Reporting Council (IIRC), 2013) (GRI, 2021; ISSB, 2023; CSRD/ESRS, 2023; IIRC, 2013; AAA, 1967, 1976); and (iii) publications in English or French. The initial search yielded 412 sources; following title and abstract screening, 187 met the inclusion criteria, and 89 were retained for full-text analysis.

2. Theoretical Underpinnings of Social and Environmental Accounting Disclosure

The literature on social and environmental accounting (SEA) is grounded in a set of complementary theoretical frameworks that explain both the motivations underlying corporate disclosure—or non-disclosure—of social and environmental information and the normative standards such disclosures are expected to satisfy.

2.1 Legitimacy Theory

Legitimacy theory, originally articulated by (Suchman, 1995) and subsequently developed within the SEA literature (Deegan, 2002; O'Dwyer, 2003), posits that organizations operate within an implicit social contract with the societies in which they are embedded. From this perspective, the disclosure of social and environmental performance constitutes a strategic mechanism through which organizations seek to establish, maintain, or repair legitimacy.

The progressive expansion of reporting frameworks—from voluntary, descriptive approaches to mandatory, standardized regimes—reflects the intensification of societal expectations regarding corporate accountability. Early descriptive models of the 1970s (e.g., SMFC, EGFA, AAA) may thus be interpreted as initial responses to emerging legitimacy pressures, particularly in environmentally sensitive industries. By contrast, the Corporate Sustainability Reporting Directive (CSRD, 2023) represents the formal institutionalization of these expectations within a binding regulatory framework.

2.2 Stakeholder Theory

Stakeholder theory, as developed by (Freeman, 1984) and subsequently applied to social and environmental accounting (SEA) by Gray et al. (1996) and Bebbington et al. (2008), posits that organizations are accountable not only to shareholders but also to a broader set of stakeholders—including employees, local communities, regulators, and environmental groups—whose interests are affected by corporate activities. This stakeholder-oriented perspective is explicitly embedded in the Global Reporting Initiative (GRI) framework, whose foundational principles of stakeholder inclusiveness and materiality operationalize Freeman's conceptual model within a reporting context.

Similarly, multidimensional SEA models, such as those proposed by (Estes, 1976) and (Abt Associates Inc, 1974), reflect a stakeholder-centric conception of disclosure by systematically accounting for both the social costs imposed by corporate activities and the benefits generated for society.

2.3 Institutional Theory

Institutional theory (DiMaggio & Powell, 1983; Scott, 1995) provides a framework for understanding the diffusion and standardization of reporting practices through mechanisms of coercive, mimetic, and normative isomorphism. The widespread global adoption of GRI standards—currently implemented by more than 10,000 organizations across over 100 countries (Global Reporting Initiative (GRI), 2023)—illustrates the combined effects of normative and mimetic isomorphic pressures. In contrast, the Corporate Sustainability Reporting Directive (European Commission, 2023) introduces a coercive dimension by mandating sustainability reporting compliance for more than 50,000 entities within the European Union.

2.4 The Decision-Usefulness versus Accountability Paradigm

A central conceptual tension within SEA lies between the decision-usefulness paradigm and the accountability paradigm. The former, exemplified by the ISSB framework, conceptualizes sustainability disclosures as decision-relevant information for investors and other primary users of financial statements. The latter, grounded in the work of (Gray, Owen, & Adams, 1996) and (Milne & Gray, 2013), views reporting as a mechanism for discharging accountability to all affected stakeholders, irrespective of financial materiality.

This distinction has significant implications for standard-setting. In particular, the ISSB's adoption of a single materiality perspective contrast with the European Union's Corporate Sustainability Reporting Directive (CSRD), which incorporates a double materiality approach encompassing both financial and societal impacts. The foundational models examined in this study are predominantly aligned with the accountability paradigm.

3. Approaches and Models of Social and Environmental Accounting Disclosure

Social and environmental performance associated with organizational activities can be conceptualized according to two principal reporting orientations: integration within, or separation from,

traditional financial statements. These orientations reflect distinct assumptions regarding the relationship between financial and non-financial reporting.

3.1 First Orientation: Integration (Unified Financial Reporting)

The integration approach involves the incorporation of economic, social, and environmental information into a unified reporting framework aligned with traditional financial statements. This orientation anticipates the principles later formalized in the International Integrated Reporting Framework (International Integrated Reporting Council (IIRC), 2013).

Within this approach, three reformulated financial statements are typically proposed: (i) an Economic and Environmental Income Statement; (ii) an Economic and Environmental Balance Sheet; and (iii) an Economic and Environmental Cash Flow Statement. These constructs prefigure contemporary developments in natural capital accounting, including balance sheet recognition and profit-and-loss impact methodologies advanced by initiatives such as (Capitals Coalition, 2020) and (Natural Capital Coalition, 2016).

3.2 Second Orientation: Separation (Independent Social and Environmental Reporting)

Under the separation approach, social and environmental information is disclosed through standalone reports, while conventional financial statements remain unchanged (Mashri, 2014; Khateeb, 2010). This orientation has generated the greatest diversity of reporting models and continues to underpin the dominant practice in contemporary sustainability reporting.

3.2.1 Descriptive Models (Narrative Approach)

Descriptive models constitute the earliest and most widely adopted form of social and environmental disclosure, particularly prevalent until the mid-1970s. Three foundational models exemplify this approach.

First, the SMFC model (Scovill Manufacturing Company, 1972) employed a balance-sheet format that anticipates the dual-sided

accountability logic characteristic of later impact accounting frameworks. Second, the EGFA model (Eastern Gas and Fuel Associates, 1973) introduced comparative quantitative disclosures based on non-monetary performance indicators, thereby prefiguring the key performance indicator (KPI) methodology central to contemporary GRI reporting. Third, the American Accounting Association (AAA, 1973) model proposed the inclusion of descriptive social and environmental information within the notes to annual financial statements, anticipating the “management approach” disclosures formalized in GRI 3 (2021).

Notwithstanding their pioneering role, descriptive models exhibit several limitations, including susceptibility to narrative bias, the absence of systematic measurement of net social and environmental contribution, limited comparability, and a heightened risk of symbolic disclosure or greenwashing (Cho & Patten, 2007; Laufer, 2003).

Critical assessment: Although historically significant, the SMFC model lacks operational comparability criteria, thereby constraining its applicability within contemporary assurance-oriented reporting environments. More broadly, descriptive models are unable to satisfy key attributes of credible SEA disclosure—such as verifiability, timeliness, and independence—identified by Estes (1976).

3.2.2 Unidimensional Models (Cost-Focused Approach)

The unidimensional approach focuses exclusively on the disclosure of social and environmental costs, without incorporating corresponding benefits. Linowes’ Socio-Economic Operating Statement (1972) exemplifies this approach by monetizing costs across three domains: human resources, environmental impacts, and product quality, while distinguishing between improvements and adverse effects. This framework exhibits conceptual affinity with life-cycle costing methodologies in environmental management accounting (International Federation of Accountants (IFAC), 2005).

However, the principal limitation of this approach lies in its exclusive emphasis on costs, which precludes a comprehensive assessment of overall social and environmental performance. This limitation motivated the development of subsequent multidimensional models that integrate both costs and benefits.

Critical assessment: While the monetization of costs reflects a degree of methodological rigor, the one-dimensional approach yields an inherently incomplete representation of corporate social and environmental performance. By excluding benefits, it cannot support the calculation of net social value or deficit—an analytical requirement central to contemporary impact accounting frameworks and aligned with the double materiality principle embedded in the CSRD.

3.2.3 Multidimensional Models (Cost–Benefit Approach)

The multidimensional cost–benefit approach represents the most analytically comprehensive framework for social and environmental accounting (SEA), as it incorporates both social and environmental costs and benefits, thereby enabling the calculation of a net social–environmental surplus or deficit. This approach exhibits strong conceptual alignment with contemporary impact accounting and integrated reporting paradigms (International Integrated Reporting Council (IIRC), 2013; Impact Management Project, 2019).

Four principal models exemplify this approach. First, the Estes model—*Social Impact Statement* (1976)—closely parallels contemporary “true cost accounting” and “impact-weighted accounts” methodologies, as developed by the Harvard Business School Impact-Weighted Accounts Initiative (Serafeim, Zochowski, & Downing, 2021). Second, the Clark Abt model (1972) constructs both a social balance sheet and a social income statement, employing a stakeholder-differentiated structure that anticipates the multi-capital framework underpinning the International Integrated Reporting Framework (International Integrated Reporting Council (IIRC), 2013). Third, the Seidler model (1973) introduces a distinction between profit-oriented and non-profit entities, thereby prefiguring the sector-specific

standard-setting approaches later adopted by the Sustainability Accounting Standards Board (SASB, 2012) and reflected in the development of ESRS sectoral standards.

Critical assessment: Multidimensional models constitute the most conceptually advanced category of early SEA disclosure frameworks. Their principal limitation lies in the absence of standardised methodologies for the monetisation of social and environmental impacts, which constrains comparability across organisations and reporting periods. This limitation is progressively being addressed by contemporary frameworks, notably through the structured indicator systems of the GRI and the comparability-oriented disclosure requirements of the ISSB.

3.3 Comparative Summary of Disclosure Models

Table 1 provides a comparative synthesis of the three principal approaches to SEA disclosure across four analytical dimensions: scope of coverage, measurement basis, capacity to determine net contribution, and alignment with contemporary reporting frameworks.

Table 1. Comparative Analysis of Social and Environmental Accounting Disclosure Models

Disclosure Approach	Scope & Measurement	Net Social–Environmental Contribution	Contemporary Framework Alignment
Descriptive (SMFC, EGFA, AAA)	Qualitative only; non-monetary	None	GRI 3 management approach narrative disclosures (2021)
Unidimensional – cost-focused (Linowes, 1972)	Costs only; monetary	Partial – net cost	Environmental cost accounting (IFAC, 2005)
Multi-dimensional – cost-benefit (Estes, 1976; Abt, 1972; Seidler, 1973)	Costs & benefits; monetary + quantitative indicators	Full – surplus/deficit	IIRC IR Framework (2013); GRI Universal Standards (2021); CSRD double materiality (2023); Impact-Weighted Accounts (Harvard, 2021)

Source: Author analytical synthesis, based on (Estes, 1976; International Integrated Reporting Council (IIRC), 2013; Serafeim, Zochowski, & Downing, 2021).

4. Standards for Social and Environmental Reporting: Foundations and Contemporary Convergence

Standards constitute the normative benchmark against which the adequacy and credibility of accounting practices are evaluated. This section traces the evolution of social and environmental reporting standards from foundational academic contributions to contemporary regulatory frameworks.

4.1 Standards Proposed by the American Accounting Association (American Accounting Association (AAA), 1967; American Accounting Association (AAA), 1976)

The American Accounting Association (AAA) identified four foundational standards for social and environmental reporting: relevance (information should serve the intended purpose of the report), verifiability (information should be capable of independent corroboration), neutrality/objectivity (information should be free from bias), and quantifiability (information should, where feasible, be expressed in quantitative—preferably monetary—terms).

While these criteria represent an important early attempt to formalize SEA disclosure, the AAA framework does not explicitly address key attributes such as timeliness, independence, or comparability. These limitations were subsequently addressed in more comprehensive frameworks, particularly that proposed by Estes (1976).

4.2 The Estes Hierarchical Standards Framework (1976)

The framework developed by Ralph W. Estes (1976) is widely regarded as one of the most comprehensive early attempts to establish normative standards for social and environmental disclosure (Benston, 1982). Extending the AAA's earlier work, Estes proposed a three-tier hierarchical structure:

- **Primary standards (mandatory):** relevance, absence of bias, and understandability;
- **Secondary standards (desirable):** timeliness, verifiability, independence, and comparability;

- **Additional considerations:** locational significance, storability, and evaluative status.

This hierarchical configuration anticipates the structure of qualitative characteristics later formalized in the IASB (International Accounting Standards Board (IASB), 2018), adapted here to the context of non-financial reporting. The comprehensiveness and internal coherence of Estes' framework provide empirical support for Hypothesis 2 (H2).

4.3 GRI Standards: From the G4 Guidelines to the Universal Standards (2021)

The Global Reporting Initiative (GRI), established in 1997, has become the most widely adopted framework for sustainability reporting worldwide. The GRI Universal Standards (2021), effective from January 2023, comprise three core components: GRI 1 (Foundation), GRI 2 (General Disclosures), and GRI 3 (Material Topics). Notably, GRI 3 introduces a structured and systematic approach to materiality assessment.

The framework is underpinned by a set of reporting quality principles, including accuracy, balance, clarity, comparability, completeness, sustainability context, timeliness, and verifiability. As of 2023, the GRI Standards are used by more than 10,000 organizations across over 100 countries (Global Reporting Initiative (GRI), 2023), underscoring their global significance and institutional legitimacy.

4.4 The IIRC Integrated Reporting Framework (2013) and the Value Reporting Foundation (2021)

The International Integrated Reporting Council (IIRC) issued its Integrated Reporting (IR) Framework in 2013, introducing a principles-based approach to corporate reporting centred on value creation across six forms of capital: financial, manufactured, intellectual, human, social and relationship, and natural. This multi-capital perspective represents a significant conceptual advancement in integrating financial and non-financial information within a unified reporting structure.

In 2021, the IIRC merged with the Sustainability Accounting Standards Board (SASB) to establish the Value Reporting Foundation (VRF). Subsequently, in 2022, the VRF was consolidated into the IFRS Foundation, thereby positioning integrated reporting as a conceptual precursor to, and foundational component of, the International Sustainability Standards Board's (ISSB) emerging sustainability disclosure architecture (IFRS Foundation, 2022).

4.5 ISSB Standards: IFRS S1 and IFRS S2 (2023)

In June 2023, the International Sustainability Standards Board (ISSB) issued its inaugural standards: IFRS S1 (*General Requirements for Disclosure of Sustainability-related Financial Information*) and IFRS S2 (*Climate-related Disclosures*). These standards are structured around four core disclosure pillars: governance, strategy, risk management, and metrics and targets.

Key features of the ISSB framework include a single materiality perspective focused on financial relevance, explicit connectivity with IFRS-based financial statements, and a forward-looking orientation that incorporates scenario analysis and the quantification of climate-related risks. As of December 2023, more than 20 jurisdictions have announced plans to adopt or align with IFRS S1 and S2 (IFRS Foundation, 2023c), indicating rapid global diffusion.

4.6 The EU Corporate Sustainability Reporting Directive (CSRD) and ESRS (2023)

The European Union's Corporate Sustainability Reporting Directive (CSRD) (Directive 2022/2464/EU), which entered into force in January 2023, constitutes the most comprehensive mandatory sustainability reporting framework currently in operation. Its scope extends to over 50,000 companies operating within the European Union.

The CSRD introduces several key features: (i) a double materiality requirement encompassing both impact materiality and financial materiality; (ii) a comprehensive set of 12 European Sustainability Reporting Standards (ESRS), including cross-cutting

and thematic standards; (iii) mandatory third-party assurance; and (iv) digital reporting through XBRL tagging to enhance machine-readable comparability.

The double materiality principle embedded in the CSRD represents the closest contemporary analogue to the full cost–benefit logic underpinning Estes’ (1976) multidimensional model, as it requires organizations to account for both the impacts they generate and the financial risks they incur.

4.7 Comparative Framework: Standards Convergence and Divergence

The evolution of sustainability reporting standards reflects a progressive institutionalization of principles initially developed within the academic literature on social and environmental accounting. Contemporary frameworks increasingly formalize, standardize, and operationalize concepts that were previously articulated in exploratory or normative terms.

Table 2 provides a comparative mapping of foundational SEA standards against the quality criteria embedded in contemporary reporting frameworks. This comparison illustrates the extent of conceptual continuity, as well as areas of divergence, across the five decades separating early academic models from current regulatory instruments.

Table 2. Mapping of Foundational Standards against Contemporary Reporting Frameworks

Standard / Criterion	AAA (1967/76)	Estes (1976)	GRI (2021)	ISSB S1/S2 (2023)	CSRD/ESRS (2023)
Relevance / Materiality	Yes	Yes (primary)	Yes – impact materiality	Yes – financial materiality	Yes – double materiality
Neutrality / Faithfulness	Yes	Yes (primary)	Yes – accuracy, balance	Yes – faithful representation	Yes – assurance required
Verifiability	Yes	Yes (second)	Yes	Yes	Yes – mandatory

		ary)			assurance
Comparability	Partial	Yes (second ary)	Yes	Yes	Yes – XBRL tagging
Timeliness	No	Yes (second ary)	Yes	Yes	Yes
Understandability	No	Yes (primary)	Yes – clarity principle	Yes	Yes
Independence / Assurance	No	Yes (second ary)	Recommended	Required	Mandatory
Net contribution (cost-benefit)	No	Yes (implicit)	Yes – impact materiality	Partial – financial only	Yes – double materiality

Source: Author, based on (American Accounting Association (AAA), 1967; American Accounting Association (AAA), 1976; Global Reporting Initiative (GRI), 2021; European Commission, 2023; IFRS Foundation, 2023a; IFRS Foundation, 2023b; IFRS Foundation, 2023c).

5. Discussion

The findings of this study can be synthesized along a clear evolutionary trajectory: foundational models (1970s) → voluntary frameworks (GRI, 1997; (International Integrated Reporting Council (IIRC), 2013); SASB, 2012) → regulatory standards (European Commission, 2023); (IFRS Foundation, 2023c). This progression reflects not a rupture with early social and environmental accounting (SEA) thought, but rather its progressive institutionalization. However, at the regulatory stage, a divergence becomes evident between accountability-oriented and decision-usefulness-oriented paradigms.

5.1 Confirmation of H1: Analytical Superiority of Multidimensional Models

The comparative analysis presented in Section 3 provides strong support for Hypothesis 1 (H1), indicating the analytical superiority of multidimensional cost–benefit models over descriptive and

unidimensional approaches. This superiority can be demonstrated along three principal dimensions.

First, scope of analysis: multidimensional models incorporate both the social and environmental costs incurred by organizations and the benefits generated for stakeholders, thereby enabling the calculation of a net social–environmental surplus or deficit.

Second, measurement rigor: these models require the quantitative often monetary valuation of both costs and benefits, thereby mitigating the risks of impression management and symbolic disclosure associated with purely narrative approaches (Cho & Patten, 2007; Laufer, 2003).

Third, alignment with contemporary frameworks: the cost–benefit logic underpinning multidimensional models is directly reflected in several modern reporting frameworks, including the double materiality principle embedded in the CSRD, the multi-capital model of the IIRC framework, and the methodologies developed by the Harvard Impact-Weighted Accounts Initiative (Serafeim, Zochowski, & Downing, 2021).

A critical qualification is, however, necessary. Contemporary frameworks such as the GRI and the European Sustainability Reporting Standards (ESRS) increasingly adopt a pluralistic approach that combines quantitative indicators, monetary valuation where feasible, and qualitative contextual disclosures. This hybridization reflects both methodological pragmatism and the inherent complexity of measuring social and environmental impacts.

5.2 Confirmation of H2: The Enduring Relevance of the Estes Standards Framework

The comparative mapping presented in Table 2 supports Hypothesis 2 (H2), indicating that the hierarchical framework proposed by (Estes, 1976) remains the most comprehensive foundational benchmark for SEA reporting standards. Notably, this framework anticipates several criteria that have only recently been operationalized within contemporary regulatory regimes.

For instance, Estes identified independence and assurance as desirable (secondary) standards as early as 1976; these elements have since become mandatory under the CSRD through its requirement for third-party assurance. Similarly, the criterion of comparability—emphasized by Estes—has been operationalized through digital reporting mechanisms such as XBRL tagging under the CSRD and through the ISSB’s efforts to enhance cross-jurisdictional consistency in sustainability disclosures.

These developments underscore the prescience of Estes’ framework and its continued relevance as a conceptual foundation for modern sustainability reporting.

5.3 The Paradigmatic Tension: Accountability versus Decision-Usefulness

A central finding of this study is the persistence of a paradigmatic divide between accountability-oriented and decision-usefulness-oriented approaches to sustainability reporting. Foundational SEA models—as well as the GRI and CSRD frameworks that most directly extend them—are primarily aligned with the accountability paradigm, emphasizing the disclosure of impacts on a broad range of stakeholders.

By contrast, the ISSB framework is predominantly grounded in the decision-usefulness paradigm, prioritizing sustainability information that is financially material to investors and other primary users of financial statements. Consequently, entities reporting exclusively under IFRS S1 and S2 may disclose only financially material sustainability information, potentially omitting significant social and environmental impacts affecting communities, ecosystems, and vulnerable populations.

The double materiality principle embedded in the CSRD directly addresses this limitation by requiring disclosure of both financial risks and broader societal impacts. However, its applicability remains geographically constrained, primarily to entities operating within or significantly exposed to the European Union.

5.4 Implications for Algerian Enterprises

Algeria's regulatory framework governing corporate social and environmental disclosure remains comparatively underdeveloped relative to international sustainability reporting standards. Existing legislative instruments—notably the Law on Environmental Protection and Sustainable Development (Law 03-10, 2003) and provisions within commercial law addressing corporate transparency—do not mandate systematic sustainability reporting aligned with frameworks such as the GRI, ISSB, or CSRD.

Based on the analysis presented in this study, a phased adoption pathway for Algerian enterprises may be proposed. First, organizations should establish a baseline of disclosure aligned with GRI standards, focusing on quantitative indicators for material topics. Second, enterprises should progressively incorporate the cost–benefit logic articulated by Estes (1976), including the valuation of social and environmental impacts. Third, alignment with ISSB standards (IFRS S1 and S2) should be pursued to meet the information needs of international financial stakeholders. Finally, organizations with exposure to European markets should monitor developments related to the CSRD and ESRS, with a view to future compliance.

5.4.1 Legislative and Regulatory Framework

Algeria's legislative and regulatory framework governing environmental and social disclosure remains fragmented and underdeveloped relative to international sustainability reporting standards. The principal legal instruments include: (i) Law 03-10 of 19 July 2003 on Environmental Protection and Sustainable Development; (ii) Executive Decree 06-198 of May 2006, which mandates environmental impact assessments for large-scale industrial projects; (iii) Law 16-09 of 3 August 2016 on the promotion of renewable energy; (iv) Article 715 bis of the Commercial Code, requiring joint-stock companies to produce a management report, albeit without specific provisions relating to social or environmental performance; and (v) the Ministerial Circular issued by the Ministry of Higher Education and Scientific Research (MESRS, 2022), which encourages

public institutions and state-owned enterprises to adopt internal corporate social responsibility (CSR) charters.

Notably, Algeria has not yet engaged with the jurisdictional adoption process of the International Sustainability Standards Board (ISSB), in contrast to regional peers such as Morocco—which initiated a public consultation on ISSB alignment in 2024—and Tunisia, which incorporated selected GRI indicators into stock exchange listing requirements for large firms in 2021. This absence of alignment reflects a broader lag in the institutionalization of ESG disclosure practices.

5.4.2 Corporate Practices: Sectoral Illustrations

The voluntary adoption of non-financial reporting practices among Algerian enterprises remains limited and is largely confined to state-owned entities or firms with international exposure. Sonatrach, the national hydrocarbon company, has published an annual sustainability report since 2019, disclosing environmental performance indicators broadly consistent with descriptive reporting models. However, these disclosures do not incorporate monetized cost–benefit analysis or independent third-party assurance.

Similarly, Djezzy (Veon Group) has issued sustainability reports aligned with selected GRI indicators since 2021. In contrast, Cevital, the largest private agro-industrial conglomerate in Algeria, has adopted internal environmental policies and communicates qualitative CSR commitments, but does not provide systematic quantitative disclosures.

Collectively, these practices reflect a pattern consistent with unidimensional disclosure approaches: while certain cost-related indicators are reported, benefits remain largely unquantified, and no comprehensive assessment of net social and environmental contribution is undertaken.

5.4.3 Critical Assessment and Future Perspectives

The analysis of Algeria’s ESG disclosure landscape reveals three interrelated structural deficits.

First, a regulatory deficit: the absence of mandatory reporting standards results in disclosures that are voluntary, heterogeneous, and frequently lacking in comparability and verifiability.

Second, a capacity deficit: accounting professionals and auditors in Algeria have limited exposure to the technical requirements associated with major international frameworks such as the GRI, ISSB, and CSRD. This constrains the availability of the human capital necessary for effective implementation and assurance.

Third, a market incentive deficit: domestic capital markets exert minimal pressure on firms to disclose ESG information, thereby reducing the incentive for voluntary adoption. Instead, convergence pressures are predominantly external, driven by emerging European regulatory requirements—particularly the Corporate Sustainability Due Diligence Directive (CSDDD, 2024) and the value chain disclosure provisions of the CSRD, which extend reporting expectations to non-EU suppliers of large European companies.

6. Conclusion

This study has examined the principal approaches, models, and standards of social and environmental accounting (SEA) disclosure, tracing the conceptual continuity between foundational contributions of the 1970s and the contemporary generation of international sustainability reporting frameworks. Four principal conclusions emerge.

First, multidimensional models demonstrate clear analytical superiority. The cost–benefit frameworks developed by Estes (1976), Abt (1972), and (Dilley & Weygandt, 1973) provide a more rigorous and comprehensive basis for assessing social and environmental performance than descriptive or unidimensional approaches. Their underlying logic is reflected in contemporary practices, including integrated reporting, impact-weighted accounting methodologies, and the double materiality principle embedded in the CSRD. These findings support Hypothesis 1 (H1).

Second, the (Estes, 1976) framework exhibits strong anticipatory capacity with respect to modern reporting standards. Its

hierarchical structure remains the most comprehensive foundational benchmark, encompassing criteria—such as independence, assurance, comparability, and timeliness—that have only recently been institutionalized within regulatory frameworks, particularly the CSRD. These findings support Hypothesis 2 (H2).

Third, a persistent paradigmatic tension characterizes contemporary sustainability reporting. The divergence between the accountability-oriented paradigm, exemplified by the GRI and CSRD, and the decision-usefulness paradigm, embodied in the ISSB framework, constitutes a central conceptual and practical challenge for standard-setters and reporting entities alike.

Fourth, in the Algerian context, the findings suggest that a phased and pragmatic adoption pathway is most appropriate. Such a pathway would involve initial alignment with the GRI Universal Standards, followed by the gradual integration of impact valuation methodologies inspired by multidimensional models, and subsequent alignment with ISSB standards to meet the expectations of international financial stakeholders.

Notwithstanding these contributions, the study is subject to limitations. Its focus on normative and conceptual analysis precludes empirical validation of the proposed frameworks and interpretations. Future research should therefore: (i) undertake empirical assessments of the quality and extent of SEA disclosure among Algerian listed and state-owned enterprises; (ii) investigate the institutional and organizational determinants of voluntary adoption of GRI and ISSB standards in developing economies; and (iii) evaluate the practical feasibility of implementing multidimensional cost–benefit disclosure models within the Algerian corporate environment.

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