

UPDATING THE INFORMATIONAL AND CONTROL PRACTICES IN THE SUSTAINABILITY AGENDA

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Abstract

Research purpose. The sustainability concept embraces a wide scope of linked practices: green thinking, sustainability informational and management assurance, ESG reporting and scoring, responsible and impact investment, stability measurements, and others. Significantly expanding beneficiary's and stakeholders' circle needs information to build and implement a policy providing ESG values creation and meeting their requirements in relevant sustainable agenda. This is why it is important to create a transparent information landscape and to shape new highlights in management and decision-making. The article is aimed at exploring specific ways to transform information and management practices, primarily accounting, ESG-reporting, analysis, and assurance to create a transparent information environment for sustainability.

Design / Methodology / Approach. The study is designed as a qualitative analysis of existing information and related practices to identify gaps in the information needed by stakeholders for decision-making with that practically generated in the current environmental momentum. It involves summarising, categorizing, and interpreting open access sources data, such as unidirectional studies, non-financial reporting and ESG-rankings databases, program documents, frameworks and standards for sustainability and "responsible" reporting, professional audit analytics, and others. Logical and comparative analysis was used for data processing. The study's theoretical framework is based on accounting theories, particularly the Interpretative paradigm.

Findings. The possibilities were assessed following proposed approaches to upgrade the up-to-date system of informational-verifying appraisal practices by the requirements of a proper ESG environment. A holistic system layout was suggested, including information and control practices employed to provide sustainability. The main part of the recommendations refers to accounting and reporting for sustainability. New accounting ESG objects to display in this system were identified. It developed an integrated balance model of total capitals and their sources engaged and ESG -value-creating, taking for the basis traditional balance theory. Given the diversity of corporate non-financial reporting, classification characteristics for ESG reporting were suggested, and two key models of ESG reporting were defined. Recommendations were made in the field of design and methodology for information support of sustainability.

Originality / Value / Practical implications. The article is the author's vision of the problems and ways of advancing traditional information practices in the context of global sustainability management requests. Recommendations for the holistic system of sustainability governance, informational support creation, transformation of accounting, ESG-reporting, other linked practices, streamlining, and methodological development of information activities that can be used in the practical field and employed in programmatic, advisory, and regulatory documents that structure the information field of socio-economic life.

Keywords: information, accounting, reporting, sustainability, ESG, practices, models.

JEL codes: O10, M40, M48, C81, O44.

Introduction

Transparency and the capacity of the information environment are important criteria for sustainable development. Global sustainable development and ESG governance have greatly expanded the circle of stakeholders involved in the last decades. Among them are businesses and public sector institutions, market actors, investors and lenders, government and regulative structures, international bodies, society in general, and every individual. All of them need the information to build and implement a policy

providing ESG values creation and meeting their needs of the sustainable agenda. This affects a full range of information and linked control, compliance, finance, and management practices including accounting for sustainability, corporate reporting, ESG-scoring and analysis, audit, and “green” data quality assurance.

Some markers can stress the popularity of sustainability information and control practices providing green transition, impacts regulation, responsible investments, and socially liable governance. Bloomberg estimates that “ESG assets may hit \$53 trillion by 2025, a third of global assets under management” (Bloomberg, 2023). In the largest international database of social responsibility reports as of November 2023, submitted 200,298 reports from 27,896 organizations (2023) (Corporate Register, 2023). The Ernst & Young survey of large-company executives found that “more than 78 % believe companies should invest in ESG issues, even if it reduces profits in the short term, and 99 % of investors surveyed utilize companies’ ESG disclosures as a part of their investment decision-making” (Ernst & Young, 2022). According to a study by the Governance & Accountability Institute, “96% of S&P 500 Companies and 81% of Russell 1000 Companies Published ESG Reports” (Governance & Accountability Institute, 2022). An analytical review by the International Federation of Accountants (IFAC, 2023) found that ESG disclosures appear in the reporting of “95% of the 1,350 companies studied in various countries and 64% of companies now obtain assurance/verification over some of the information they provided in 2021 (increasing from 91% and 51%, respectively, in 2019)”. According to KPMG, 45% of large companies’ executives admit that ESG programs increase the financial performance of businesses, 69% recognize a significant demand for “responsible” reporting, 72% predict increased attention and control to indicators of non-financial reports (KPMG, 2021). The Corporate Sustainability Reporting Directive, adopted by the European Parliament, makes it mandatory to apply ESRS by most of the EU companies (Official Journal of the EU, 2023).

Given the importance and high demand for ESG information, it has become crucial to appraise its quality, consistency, and transparency for decision-making and to improve the efficiency of practices ensuring such information.

Several issues can be highlighted in the field of sustainability governance information support. Firstly, there is a high diversity of information produced and low convergence of ESG assessments from different providers and sources. According to the summary report of Targeted consultation on the functioning of the ESG rating market in the EU and the consideration of ESG factors in credit ratings (2022), 83 % of respondents noted the lack of transparency on the methodologies used, 91 % emphasized significant biases in the methodology used by providers, 80 % consider that the market tends to potential conflicts of interests and 81 % find the level of correlation of ESG ratings inadequate.

Secondly, there is no holistic approach to the full cycle of information practices. They embrace different stages, methodologies of collecting and proceeding, producers, and outcome design. ESG reporting is the product of accounting and measurements out of the accounting field in matters of environmental, social, and corporate impacts, it employs a wide range of sources and follows frameworks and standards presented in an extensive variety. ESG rating is based on different sources of information, including public disclosures, media, third-party databases, government, NGOs, company data, and questionnaires. There are hundreds of ratings applied in the exploration of sustainable investment and corporate governance, evaluation of risks, and opportunities for different branches and business models. These ratings are provided by such giants of ESG analytics as MSCI (Morgan Stanley Capital International), Dow Jones Sustainability Indices, Bloomberg, ISS (International Shareholders Services), and many others published in platforms (such as Barra, RiskMetrics, FactSet, POINT, StyleResearch, Aladdin, ARISTA), and highly used by institutional investors, assets managers, companies and other stakeholders for decision-making. The main focus of the information traditionally provided has been placed on two key groups of stakeholders – investors and company managers.

This leads to one significant issue. The application of ESG information mostly supposes the financial logic of decisions aimed at such traditional targets as investment payback, profitability, value creation, and risk’ minimizing for equally investors and managers. Thus, even though sustainability is a priority, ESG information ensures more than responsible practice, but reputational benefits and attractiveness for the capital providers. Still, when we want to succeed in non-financial goals, we must employ

financial incentives to make this system work. One can note good examples of this – Emission Trading System for Carbon Markets, which defines carbon as a new class of assets and uses pure financial logic to reach ecological net zero objectives.

Being in the scope of research attention for decades the issues of information and control support sustainability governance have not been examined enough from a comprehensive angle. The spreadiest research pillars in the area considered are issues of corporate sustainability reporting evolution (Chopra, 2024; Fleaca et al., 2023; Miln & Gray, 2013), accounting for sustainability development (Bebbington & Larrinaga, 2014; Bebbington et al., 2017; Chetanraj & Kumar 2023; Chopra, 2024; Hopwood et al., 2010; Unerman & Chapman, 2014), sustainability performance, ESG-indicators and rating enforcement to manage policies, support responsible and impact investment, provide “green” capital allocation and evaluate sustainable development contribution of companies and countries (Fleaca et al., 2023; Halper et al., 2022; In et al., 2019; Luque-Vílchez et al., 2023, Sandberg et al., 2022). In this paper, we will focus mostly on the first two areas.

Even not-in-depth academic literature review shows the shortage of comprehensive exploration covering the entire cycle of external and internal information collection, processing, and control to make existing info-sourcing practices non-fragmentary and collinear. Research on most common information practices is mostly intra-disciplinary or covers the “bundles” of evidently linked academic disciplines. The trends of excessive theorizing in the area under consideration look alarming as well.

We define the research problem in two main planes – is the existing system of ESG information holistic, transparent, and efficient enough to provide the proper level of sustainability governance, what are the major elements of this system, and how could their design and methodology be transformed to give relevant support for the responsible decision-making to contribute not only financial but multidimensional progress and human well-being. This allows us to define study results as a comprehension of a holistic view of the practices providing proper quality ESG information cycle, and improvement of this system's main elements (primarily accounting and reporting) methodology to consider momentum cutting-edge stakeholders’ information requirements.

The article is aimed at providing a complex outlook on the information and control practices in the sustainability agenda and exploring specific ways to transform them, foremost accounting, and ESG reporting, to create a transparent and active information environment for sustainability. This paper continues previous studies, where the author has already examined problems of development accounting and reporting methodology regarding sustainability in ongoing medium turbulence (e.g., Odintsova, 2023, 2024).

Literature Review

Criteria of corporate sustainability performance “refers to a company’s ability to operate in a manner that upholds ecological integrity, social well-being, and sound governance principles, while simultaneously generating value for its shareholders” (Ahmad et al., 2023; De Souza Barbosa et al., 2023; Luque-Vílchez et al., 2023). “The assessment of corporate sustainability performance requires the evaluation of both qualitative and quantitative indicators, examining various dimensions such as environmental stewardship, social responsibility, and corporate governance” (Sandberg et al., 2022).

“The capacity of society to comprehend knowledge pertaining to sustainable development determines its ability to respond to current challenges and opportunities” (Fleaca et al., 2023; Chan et al., 2020). Recent bibliometric studies analyse the newest trends around sustainability information overall and in some specific subject areas. Pasko et al. (2021) reasoned that “sustainability matters (e.g., sustainability reporting, corporate social responsibility, and sustainable development disclosure) seem to become the major research directions soon”. The authors emphasized the fast expansion of the corporate sustainability data market, linking the rise in demand with the growth of investment products that “specifically aim to meet certain sustainability standards, the changing nature of business risks and investor awareness of the financial ramifications of those risks due to environmental issues, as well as rapidly evolving consumer preferences, market practices, and public awareness all contribute to this rise in demand” (Fleaca et al., 2023).

Maas et al. (2016) highlight four main related practices to bring ESG values in corporate operations which should have linked each other and included in an integrated system of organizational sustainability governance - assessment, accounting & control, reporting, and management. For Fleaca et al. (2023) there are two levels of sustainability monitoring and reporting – the level of countries and the level of companies. Countries' level is mostly represented by indexes developed by the UN Sustainable Development Solutions Network to measure countries' ability to achieve Sustainable Development Goals and monitor progress. The level of corporate sustainability performance information is introduced by the current reporting standards and frameworks.

Sustainability reporting mixes financial and non-financial information to show a company's economic, environmental, and social impacts (Jovanovic & Jovanovic, 2022), so companies provide data that is more timely, relevant, credible, and comparable and that demonstrates improved ESG performance. With this information, “financial analysts and investors can redirect and accelerate capital flows towards corporate investments that help tackle important problems related to climate crises and the reaching of sustainable development” (Arvidsson & Dumay, 2022). “Sustainability reporting frameworks provide a method of categorizing and regulating the semantics of non-financial information. The process of organization incorporates consensus-based typologies, definitions of concepts, controlled vocabularies, and methods of measurement. Frameworks are intended to advance precision, validity, consistency, and inter-operability” (Esty & Cort, 2020).

The multiplicity of sustainability reporting frameworks and metrics can be interpreted both as an obstacle and an opportunity (Esty & Cort, 2020). There are currently more than 600 different systems for regulating non-financial information, e.g. ESG standards and frameworks, data providers, and ratings reporting. On the one hand, the abundance of reporting regulatory systems in place creates a patchwork effect, heterogeneity, and questionable quality of the information provided, complicating the choice of the standard and reports provision. This drives complexity of the corporate reporting and adds costs for business since giving rise to companies' structural subdivisions designed to manage sustainability and control ESG indicators (Halper et al., 2022). At the same time, some studies emphasize as an advantage of reporting diversity that ESG-ratings based on reporting various frameworks improve the quality of analytics. “Many ESG-ratings providers tout the range of underlying information sources as a strength of their rating systems. For example, the rating provider CSRHub notes that it integrates information from 900 different sources in its ESG rating, including ESG analysts, government data, crowd-sourced information, and non-governmental organizations” (CSRHub, 2024).

Analysis of major sustainable reporting frameworks highlighted that “a broad range of frameworks comprise different typologies and categorizations of aspects of sustainability. A review of the major frameworks available to investors reveals that there is much collaboration among them, and very little duplication or contradiction. With a few exceptions, they can be used in tandem. They all rely upon the Triple Bottom Line as a foundational conceptual framework for incorporating non-financial measures of performance into the evaluation of corporate activity” (Esty & Cort, 2020). The authors (Esty & Cort, 2020) included in the list of frameworks Standards of Global Reporting Initiative, the Integrated Reporting framework of IIRC, Sustainability Accounting Standards Board (SASB) Standards, Impact Reporting Frameworks for Small and Medium Enterprises (including Impact Reporting and Investment Standards (IRIS), the B Impact Assessment, and the Future-Fit Assessment), Climate Change-Related Frameworks (including Climate Disclosure Standards Board (CDSB), the Carbon Disclosure Protocol (CDP), and recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)) and Sustainable Development Goals (SDGs). Fleaca et al. (2023) in their research divided approaches for sustainability monitoring & reporting on International Standards of voluntary reporting (e.g. GRI, SASB, ISO26000, SA8000, AA1000), International Initiative for Sustainability Reporting (IFRS Sustainability Disclosure Standards developed by ISSB), European Initiative for Sustainability Reporting (ESRS – European Sustainability Reporting Standards developed by European Financial Reporting Advisory Group) and International Instruments (UN Compact Principles, UN Responsible Investment Principles, OECD Guidelines for Multinational Enterprises and OECD Due Diligence Guideline For Responsible Business conduct).

Since this study dated 2020, there have been some changes in standards and bodies, setting them. Following the results of the International Climate Change Conference the International Sustainability

Reporting Standards Board (ISSB) was created in 2021 as an international initiative to develop a global framework of standards for sustainable development disclosure. The International Integrated Reporting Committee (IIRC) and the Sustainability Accounting Standards Board (SASB) became parts of the Value Reporting Foundation (VRF), merged with the Climate Disclosure Standards Board (CDSB) and the International Sustainability Reporting Standards Board (ISSB) in 2022. Since IFRS Foundation's ISSB to work, it has released 2 standards, the IFRS S1 and S2 - general sustainability-related and climate-related disclosures which are to be integrated into the company's annual reports. So far under the umbrella of this organization there are three kinds of sustainability reporting standards – IFRS sustainability, SASB, and Integrated Reporting standards.

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The issues of accounting for sustainability started to go on the fore in the 80s and passed several stages of numerous academic discussions. They embrace various strands of its theoretical framing, methodology, principles, scientific interlinking, intra-disciplinary partitions. Considering components of accounting practice arose, accounting research tends to justify new practices by theories accepted in the professional domain, and articulates new types and concepts of accounting, uniting them with related ESG-governance activities. “There is a long-standing tradition of academic research examining a range of policies, processes and practices related to sustainability accounting and accountability” (Bebbington & Larrinaga, 2014; Buhr, 2007; Gray, 2010; Gray et al., 2010; Thomson, 2014; Unerman & Chapman, 2014) argue that “if accounting practices are to develop in a manner that can positively contribute towards sustainable development, there is a need for researchers to draw more broadly from the latest understandings provided by sustainability science” (Unerman & Chapman, 2014).

Academic writings in accounting for sustainable development are commonly based on the Interpretative research approach. In the theoretical background one can note the employment of stakeholder theory, legitimacy theory (Bebbington & Larrinaga, 2014); organizational change theoretical framing (Bouten & Hoozee, 2013; Contrafatto & Burns, 2013; Moore, 2013), control theory (Arjalies & Mundy, 2013; Rodrigue et al., 2013). Studies encompass “a multi-disciplinary problem-focused rather than a siloed-disciplinary approach to research” (Unerman & Chapman, 2014) to build new insight into long-term company efficiency and comply with cutting-edge sustainability sciences (ecosystem services, environmental disclosure, and corporate social responsibility). Accounting embraces sustainability accounting, social and environmental management accounting, social accountability, human rights, biodiversity, and corporate social performance (Guenther et al., 2016). According to the bibliometric analysis of Chetanraj and Kumar (2023) commonly mentioned are these accounting types: social and environmental accounting, environmental management accounting, economically focused accounting, environmental performance, carbon accounting, green accounting, integrated accounting, impact accounting, and others. Popular schools are social and environmental accounting (Gray & Laughlin, 2012; Chopra, 2023) and environmental management accounting (Dasanayaka et al., 2021; Schaltegger et al. 2013).

“Economically focused accounting is a highly complex field comprising both management and financial accounting. It can be characterized as communicating and helping to manage direct economic interactions and impacts between an organization and the world external to the organization. It draws a boundary around the organization and records, analyses and/or reports on economically material interactions and impacts that have an effect within or across this boundary” (Hopwood et al., 2010; Unerman & Chapman, 2014). Accounting for sustainable development necessitates to incorporate not just direct short-term economic interactions and impacts but also “to incorporate the direct interactions and impacts between the organization, the society in which it operates and the natural environment”. (Bebbington et al., 2001).

Impact accounting can be well-represented by the ideas of the Impact-Weighted Accounts Initiative at Harvard Business School and similar developments. The foundations of the Impact Accounting System methodology were developed in 2023 in partnership between the International Foundation for Valuing Impacts and the Value Balancing Alliance. The impact accounting methodology was developed to complement financial reporting with decision-useful information related to sustainability topics, to harmonize two existing methodologies from the perspective of both investors and entity managers. This methodology uses a cross-disciplinary complex approach based on financial accounting, impact management, and sustainability-related disclosures to measure impacts, and value changes in human well-being with a combination of qualitative, quantitative, and monetary approaches aimed to inform corporate managers' decisions or to provide a comprehensive view of the positive and negative impacts generated by an entity to inform investment decisions based on risk, return, and impact (IVFI, 2024). This document was preceded by the series of Harvard Business School developments designed in the frame of the Impact-Weighted Accounts project, each of which deserves special attention. These include A Framework for Product Impact-Weighted Accounts (Serafeim & Trinh, 2020), Accounting for Employment Impact at Scale (Fadhel et al., 2021), Accounting for Organizational Employment Impact (Freiberg et al., 2021), A Conceptualization of Sub-Living Wages: Liabilities, Leverage, and Risk (Keller et al., 2022) and others. For every case it was suggested original methodology; for example, product impact was evaluated in several dimensions including product reach (quantity and duration), customer usage (affordability, quality, and ability to choose), affecting environment (pollutants and efficiency), and the end of product's life (recyclability). Each evaluation dimension featured the kinds of data required, sources of this information, and proper method to make this information commensurable and estimate impact.

A similar comprehensive approach is an Impact-Weighted Accounts Framework of the Impact Economy Foundation, developed in 2022 with two accompanying documents (Impact Economy Foundation, 2022). This framework includes methodology detailing and explaining such basic topics of impact accounting as identification, measurement, providing comparability, aggregation, and presentation in statements of Impact -Weighted Accounts. An important feature of this document is that it is largely linked with the concept of Integrated Reporting, embracing value creation for society and stakeholders through the entity's impacts on the different kinds of capital involved (the same idea proposed in the six-capital classification of Value Reporting Foundation): "financial, manufactured, intellectual, human, social and natural capital" (IFRS Foundation, 2021). A highly interesting concept of impact statements: Integrated Profit and Loss Statement and Integrated Balance Sheet and three derived statements: the Stakeholder Value Creation Statement (ability to create value for society and stakeholders), the Sustainability Statement for External Costs (act sustainably by operating within planetary and social boundaries) and the Sustainability Statement for SDG Contribution (contribute the sustainable development according to SDGs) (Impact Economy Foundation, 2022). The mix of economic and societal impact measurement issues and the design of proper methodology are discussed in studies by Peng and Yang (2014), Rawhouser et al. (2019) and Salazar et al. (2012).

Research Methodology

Given high-level academic concerns, diversity of studies and matters argued in the scope of sustainability, the study was designed as an analysis of existing information, control, and other related practices to identify gaps in the information needed by stakeholders for decision-making that practically generated in the current environmental momentum. It involves exploration, summarizing, interpreting open access sources data, such as unidirectional studies, non-financial reporting and ESG-ranking databases, program documents, frameworks and standards for sustainability reporting, professional audit analytics, and others. Much of the paper was initiated into an academic writing overview, there were 60 sources examined, including 52 scientific studies in unidirectional and linked topics.

This research is grounded on general philosophical approaches (system method and dialectics, synthesis, analysis, induction, and deduction). It was decided a qualitative approach in this research is the most suitable because it makes it possible to analyse the evolution of accounting and corporate reporting for sustainability over time; to assess the potential of existing information practices to provide the information needed; and to suggest upgrade of accounting and bound activities' constructions in

ESG landscape. Since research has been descriptive to gather an in-depth understanding of sustainability information systems it applied mostly theoretical methods e.g., qualitative analysis, analogy, comparing, evaluation of cause-and-effect relationships, inference, and interpretation. There were methods of classification to build an ESG frameworks classification system, summarizing and modelling to define the two key ESG reporting models. Logical and comparative analysis was used for data processing. Legal methods (formal-logic analysis) are used as the basis for conclusions drawn.

The study's theoretical framework was mostly based on relevant social science theories, particularly the Interpretative paradigm. When assessing the possible impact of the new agenda on the methodology of accounting, the balance sheet theories were used in conjunction with such key accounting methods as accounts, and reporting.

Results

Sustainability management is a proactive process that is employed by various actors at different levels for both financial and non-financial decision-making and significantly changes the stakeholders' priorities and behaviour logic. For now, the effectiveness criteria for any economic activity are much broader than just financial efficiency associated with investment decisions. Company competitive stability, dominance, and credibility are determined by their impacts on the capital aggregated, influence along the entire value chain, activity-linked risks, and long-term consequences. The implementation of such an approach requires a transparent and conveniently organized information environment that ensures a consistent integral chain of information flows for immediate and further use.

Sustainability management-engaged information and control practices analysis defines the concept of the sustainability information support system including several sequential and parallel information practices. These practices provide not only ESG-data collection, proceeding, presentation, verification, and interpretation, but also communication with the stakeholders, focusing on the areas of executive attention and providing a pro-active sustainability governance model. Since information support of sustainability governance is introduced by a set of practices carried out by different actors with distinct objectives, methodologies, and "input-output" designs, it leads to a high level of diversity, discrepancy, and insufficient quality of information produced.

The quality of the information support system can be assessed as lacking due to the absence of a holistic system, practices apartness, a variety of frameworks, "game rules" and regulators, a shortage of methodology unity and continuity, and scatter of metrics and criteria for evaluation ESG goals.

Being complex, the system of sustainability information and control maintenance should be built as a whole chain of consistent and mutually ensuring targeted processes. By incorporating the decision-making process in this system, it can be considered as a cycle with feedback for new ESG information needed at the next decision-making stage in the sustainability governance contour.

Hence, a holistic systemic approach should be realized to streamline the full cycle of information production and control practices by engaging regulatory methods, infrastructural changes, and a cross-disciplinary approach. We believe several key practices should be included in this system – accounting, ecological, social, and impact measurements, ESG reporting, verification of reported data (ESG assurance), ESG rating, analysis, and decision support.

Figure 1 presents our insight into basic information and control practices employed to provide Sustainability.

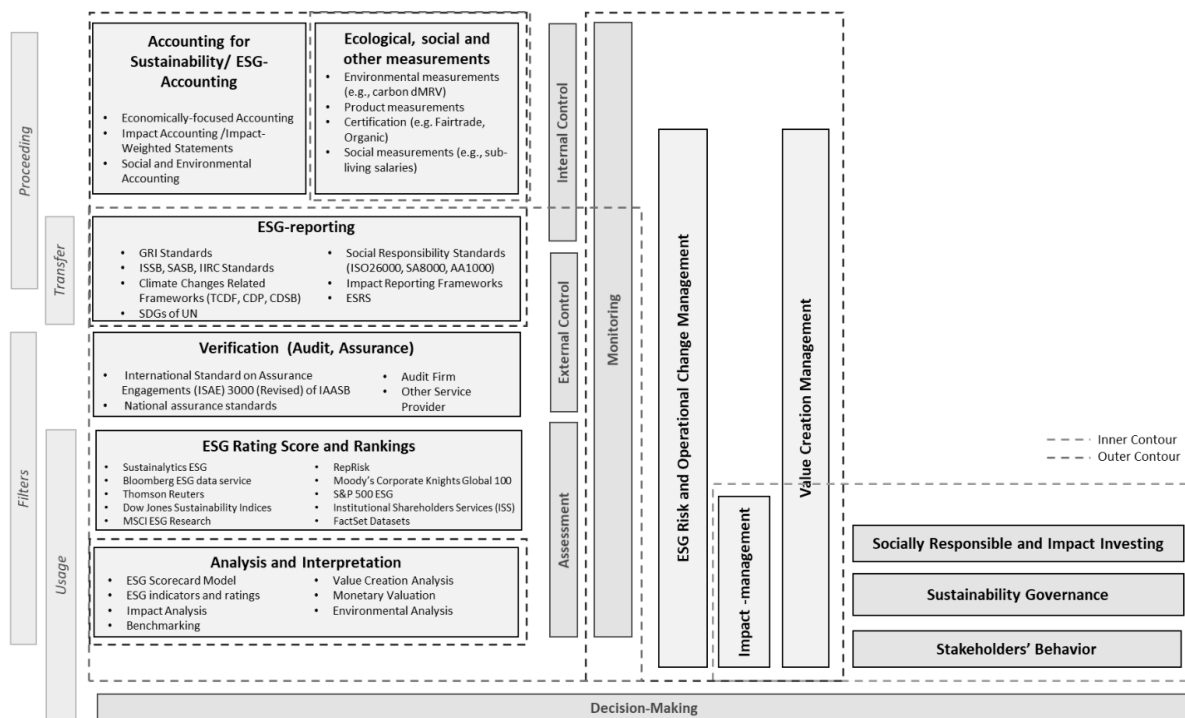


Fig. 1. Information and Control Practices in Sustainability Governance (Source: Developed by author)

Accounting for sustainability and organizational non-financial ESG reporting are two major elements of information providing inherent to the system being considered.

Accounting, treated in a broad sense, largely according to the Interpretive paradigm allows us to construct socio-economic reality, and not just reflect it. Sustainability accounting is a rapidly developing dynamical informational area that has an interdisciplinary and multi-paradigm nature, associated with bound practices, such as internal control, management analytics, and prediction, social and ecological measurements, human behaviour governance, etc. It could be differently intradisciplinary structured or focused to supply information for the reporting and analytical systems and embrace impact- accounting, environmental, social accounting, material flow-cost accounting, life cycle or value chain costing, ESG-management accounting, economically focused accounting, and other existing or emerging types. ESG accounting expands its methodology through cutting-edge sustainability sciences knowledge engagement, starting to operate with a big scope of non-financial information obtained from a wide range of sources. The key features and components of accounting in the sustainability agenda are drawn in Figure 2.

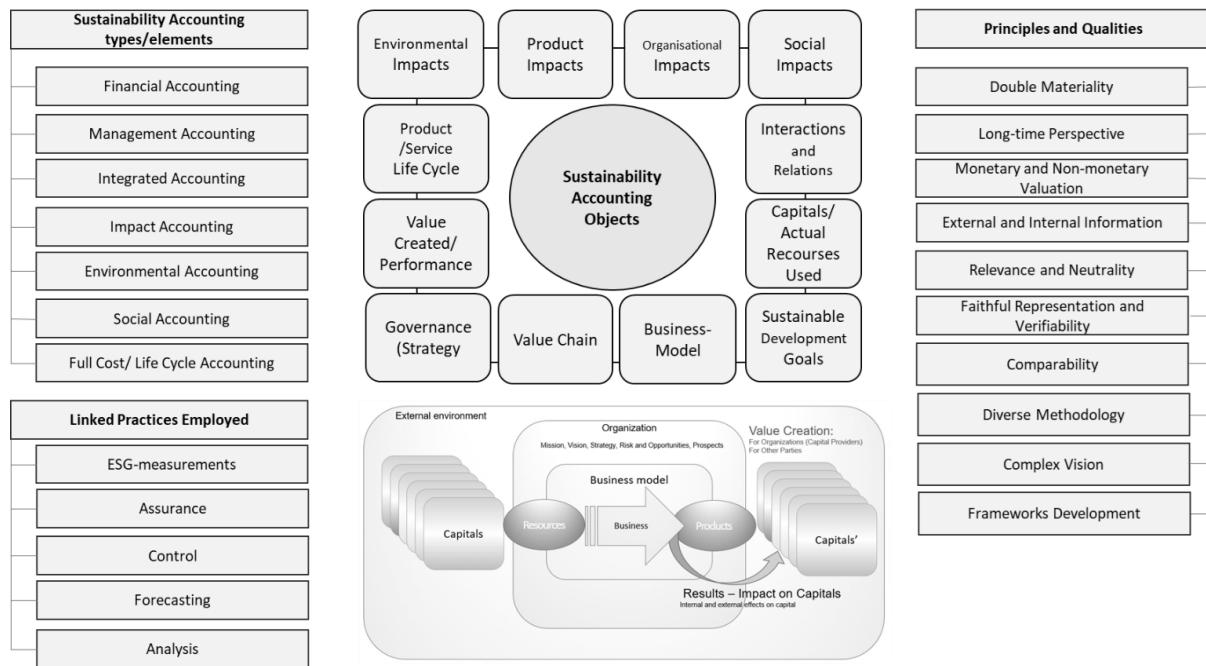


Fig. 2. The Main Fitting Components of Accounting for Sustainability (Source: Developed by author)

Through sustainability semantics, new accounting objects have emerged, like all the capital employed, impacts and interactions, their consequences in a long-term perspective, full value chain and product's life cycle, business model, governance matters (strategy, interaction with stakeholders, management team ethics and integrity, management approaches). Content of even regular accounting objects such as assets, capital, liabilities, and performance are expanded. So, we can define an asset as a resource existing as a means or opportunity to accomplish something, and its value is not always monetary, there are other types of utility (environmental, humanitarian, etc.). The rights of ownership are replaced by the rights of access/use/receipt of some benefit embodied in it (in the form of obligations or voluntary encumbrances). The evolution of the concept of assets passed several stages, from balanced and controlled resources to available and used resources (Fig. 3).

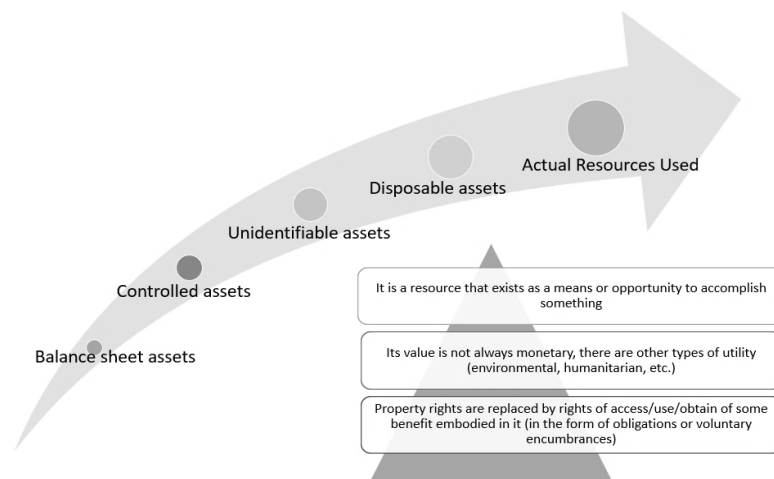


Fig. 3. Evolution of the "Asset" Concept for Sustainability Accounting (Source: Developed by author)

The results of value creation, distributed over time and embodied in various types of organization's capital, are provided by aggregate sources related both to its financial relations and non-financial obligations to society due to the humanitarian values, and ethical norms. For example, the balance sheet model may look like presented in Figure 4.

Resources Derived from Capital to Be Used in Value Creation	Obligations to the owners/holders of these capitals
Financial Capital (Monetary and Non-Monetary) Assets	Legal obligations to suppliers of financial capital (owners, creditors)
Manufacturing Capital (Producing Assets)	
Intellectual Capital (Knowledge and Intelligence Assets)	Legal obligations to society, its individual groups, institutions, and subjects
Human Capital (Human Resources - Skills, Experience, Qualifications, Interaction, Development)	
Social Capital (Social and Reputational Assets)	Obligations to suppliers of any type of capital, assumed voluntarily (encumbrances or humanitarian burden)
Natural Capital (Environmental and Nature Resources Employed)	
Δ Capitals	Δ Obligations

Impact on capitals

Fig. 4. Recommended Balance Sheet Model for Sustainability Accounting (Source: Developed by author)

The main issue for ESG reporting remains the high diversity of existing frameworks and standard systems complicating reporting design and further data application. To bring a variety of sustainability reporting systems in order we suggest using features for classification presented in Figure 5.

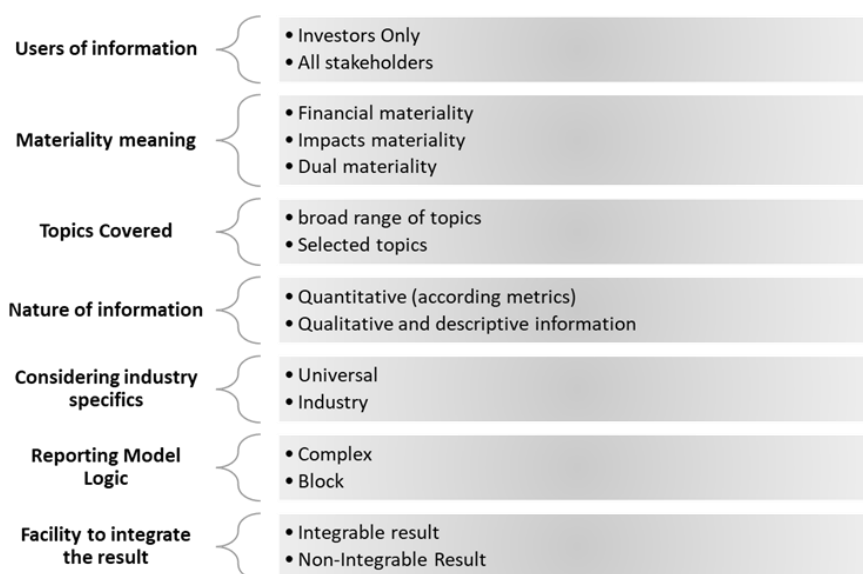


Fig. 5. Characteristics of ESG Reporting Systems Classification (Source: Developed by author)

Thus, the key distinctive features permit the divide ESG-reporting multitude for basic models - the “Bottom Lines” model including the set of ESG indicators (for example GRI Reporting), and the Model of capital impact and value creation (e.g., Integrated Reporting).

The reporting model can be described as a method of creating a system that discloses financial and non-financial indicators, with explanations, that help users evaluate a company's sustainability contribution and its impact on all the types of capital involved in the overall value-creation process.

To provide extensiveness, reliability, and effectiveness of ESG information for users the cycle of practices should include such important practices as stability and impact measurements, data filters – audit and assurance, and analysis concentrated in rating and decision-making support. Almost all the operations noted are focused on external information provision. When talking about internal use information within the organization, then the cycle of generation, processing, control of this information changes to a certain extent and includes accounting, with parallel monitoring and control of ESG

information to carry out proactive management, internal and external reporting involving actions to avoid risks, manage value creation factors, and maximize the positive impact on the total capital.

To provide efficiency of this system it should be built with incorporation following primary principles and information requirements:

- double materiality to provide both financial and non-financial decisions for all stakeholders,
- consistency and mutual interconnection of practices included,
- transparency, neutrality, and impartiality of the information provided,
- multi-disciplinarity, academic openness, and constant development,
- rejection of formal boundaries in the subject area and methodology employed (relevance as a main criterion for information usefulness),
- organization's impacts measurement, evaluation of affecting overall capitals employed and value creation,
- long-term time coverage of impacts and interactions consequences, application life cycle and value chain approaches,
- commensurability and comparability of information, possibility of metrics' usage, monetary and non-monetary valuation,
- verifiability of information and control objectivity.

Discussion

The results of the study can help to improve the sustainability governance information support system and give some reply to the research question. As was shown in the literature review, unidirectional studies mostly concentrated on isolated parts of information and control practices tending to improve accounting for sustainability, non-financial reporting, verification, and analytics. In this paper, some ideas of Chopra (2024); Fleaca et al., (2023), and Maas et al. (2016), were developed and the holistic view is not presented sufficiently and could be applied with the developed model of the information practices cycle to improve information provision for sustainability.

With a diversity of academic and practical insights regarding accounting development in the sustainability agenda (Chopra, 2023; Dasanayaka et al., 2021; Fadhel et al. 2021; Freiberg et al., 2021; Impact Economy Foundation, 2022; Serafeim & Trinh, 2020; Unerman & Chapman, 2014; and many others), we believe it is feasible to design an updated system of accounting for sustainability with these main fitting components:

- impact accounting to give information regarding product, organizational, environmental, social, and human well-being impacts, describing impact pathways and measure impacts,
- accounting of the entity's Sustainable Development Goals contribution,
- integrated accounting of a company's ability to create value embodied in the capital (financial, manufactured, intellectual, human, social and relationship and natural) while influencing the external environment and capital during its activities,
- accounting of the full entity's value chain, which encompasses its activities and relationships (including upstream, own operations, and downstream) to create its products from initial project to production, delivery, consumption, and end-of-life,
- accounting focuses on an entity's economic, social, and environmental interactions and influences.

The diagram of accounting for sustainability suggested integrates recent ideas in this field of studies and employs the newest approaches to reach the goals of efficient ESG governance.

The proposed balance model for integrated reporting expanded the model of assets classification for new ESG accounting have been developed existing theories of all-encompassed balance (Suyc et al., 2024), key ideas of Integrated Reporting (IFRS Foundation, 2021) and Integrated Balance Sheet in Impact-Weighted Accounts (Impact Economy Foundation, 2022). Accounting evolution in the sustainability context remains one of the highly interesting and not enough explored topics and needs to be considered in further studies.

One more part of ESG info-sourcing is the shaping of data sets that are not covered by conventional accounting tools due to their specificity of the coverage of objects and the techniques used. This area of data collection includes environmental measurements, usually carried out by special technical units of enterprises, and the collection of information of a social nature, most represented in statistical reports. This part of measurements and assessments are usually provided by special departments or outsourcing structures, for example, ecological measurements dMRV Digital Measurement, Reporting, Verification (for the Voluntary Carbon Market), product characteristics measurements, and certification appraisals (e.g. Fairtrade, Organic), Social measurements (e.g., B Impact Assessment to overall score B-Corp organizational certification, developed by the B-Lab). This activity combines different levels of data collection and aggregation, from topic detail observations to the technologies of tracking influences and integral assessments. Thus, it could be logically divided into techniques of primary data collection and analytical investigations and considered as a part of accounting or analysis accordingly.

Organizational reporting performs information transfer, communicating and affecting markets and stakeholders' response. "Responsible" corporate reporting embraces a wide scope of the information transmitted while proceeding it structures the areas of managerial attention, risk assessment, and mitigation. The idea of non-financial reporting harmonization is still debatable, but it can be unequivocally stated that despite the reporting fatigue and the difficulty for reporting entities in choosing and applying appropriate frameworks, a wide information coverage makes it possible to better assess the current situation in the field of the ESG-agenda.

ESG reporting can be featured differently: according to the scope of "users (investors or all stakeholders), materiality meaning (financial, impact or dual materiality), nature of information (including quantitative, or qualitative data), considering industry specifics (universal or industry), coverage of topics (broad range of topics, or selected topics). We believe this list should be supplemented to define ESG-reporting models that have been formed for a moment. Firstly, it is a complex or block outcome, e.g., an integrated report is a complex model that indicates a company's ability to create value, while a larger part of sustainability/corporate responsibility reports provides information on different topic blocks. Afterwards, reports could differ by common logic and the possibility of results generalization in one integrable output. This possibility is inherent to integrated reporting unlike other frameworks' ESG-reports with findings cannot be summarized into an overall result or common inference" (Odintsova, 2024).

In this paper, the main features for ESG reporting classification were adjusted by the new ones and two main models of sustainability reporting were suggested. The difference in characteristics listed precisely allows us to distinguish two basic reporting models: sustainability reports, and integrated reporting, with either a few "bottom lines" set of ESG indicators or complex models of further value creation.

Sustainability reports assume comprehensive coverage of all aspects of the company's activities and assessment of their mutual influence. "This reporting is addressed to the wide scope of stakeholders and based mostly on the impact materiality principle – disclosing the organization's impact on nature and society. This approach with the same or less coverage of topics and indicators applies in many other frameworks' sustainability / corporate responsibility reports because they mostly use block logic with no integrated output. The drift to double materiality is obvious, and the combination of a few ESG-frameworks' requirements and ideas in one report. Integrated reporting is more focused on providers of financial capital. However, it gives a comprehensive vision of the parameters and prospects for the business, matches in coverage and integrity to the requests of a wide range" (Odintsova, 2023). However, relying on the financial materiality principle, this reporting system indicates relevant value-creation drivers. Integrated reporting is based on three key concepts: capital (financial, industrial, intellectual, human, social, natural) both involved and influenced by organizations, a business model that transforms resources into products and results, and the ability to create value under their influence. In terms of the International Framework for Integrated Reporting, an integrated report is a "concise communication about how an organization's strategy, governance, performance, and prospects, in the context of its external environment, lead to the creation, preservation or erosion of value over the short, medium, and long term" (IFRS Foundation, 2022).

Both ESG-reporting models have certain advantages that do not overlap, and both should be used in sustainability pro-active governance. There are a few focuses that can be considered while estimating ESG-reporting significance. First, being information and communicative practice, reporting carries double functionality, both in internal processes of data collection construction and in the implementation “client-oriented” external approach to govern stakeholders’ and mainly market reaction to information supplied. It could be referred to as the Constructionist Methodology in accounting in the Interpretative paradigm, considering particularly the possibility of reality construction via information, linguistic concepts, and different roles of accounting and reporting. of ESG-data capture and proceeding shape parallel targeting sustainable-value creation and control linked risks. This practice highlights non-financial areas of managerial attention and platforms for value creation. It refreshes management semantics to transform business performance criteria to the impact on capital metrics and appropriate drivers. This approach enables us to predict the reaction of the market, society, institutions, and authorities and to highlight ESG governance and risk management areas.

The common feature of models we see initially inherent to reporting emphasis is to create value (in this case ESG-value), and clear financial intention to attract investors through reputation capitalization. This means that being non-financial, ESG reporting uses financial goals’ designs. Moving this practice forward, one must avoid financial patterns originating with traditional reporting but use the idea of accounting as a social practice and interpretative paradigm. But to make reporting an instrument of sustainability management we must avoid financial stereotypes in its main idea. This can make ESG-reporting impact not reactive but proactive and use it to leverage sustainability governance incentives and main actors’ responsible behaviour.

The quality of ESG and sustainability information is not guaranteed for many reasons. First by the heterogeneity of reporting standards and systems, the voluntary nature of reporting, and the absence of those procedures and rules that make financial reporting reliable. Clarity in accounting principles and procedures is a weighty guarantor of the quality of financial reporting, and this practice has been worked out for many decades. Moreover, the financial statements are under audit control, an additional important filter for the quality of the data provided to the user. As for ESG reporting, its verification is not mandatory. The ESG audit and assurance are voluntary, and the entities implementing it are audit firms and other organizations. As for ESG reporting, its verification is not mandatory, the audit and assurance are still voluntary, and the entities implementing it are audit firms and other organizations. Companies’ mandatory ESG audit and assurance will complement existing information practices and increase the transparency, reliability, and reliability of information promoted. An analysis of the International Federation of Accountants indicates that although there continues to be a meaningful difference between ESG reporting and ESG assurance rates, the incidence of this audit and assurance is on an upward trend: 95 % of audit firms and 38 % of other assurance service providers applied Standard on Assurance Engagements ISAE 3000 (Revised) when including national assurance standards (such as the AICPA’s attestation standards) this indicator grows to 99 % in 2021. The ISAE 3000 (Revised) remained the most widely used standard for ESG assurance engagements of audit firms (or their affiliates), while non-IAASB standards were most used by the other service providers. The International Sustainability Standards Board (ISSB), The International Auditing and Assurance Standards Board (IAASB), and The International Ethics Standards Board for Accountants (IESBA) collectively work to ensure their standards support high-quality sustainability disclosure and assurance (IFAC, 2023).

Corporate reporting information is aimed at a wide range of users, especially since the principle of dual materiality, which underlies a significant number of ESG reporting standards, assumes the usefulness of the information provided both for assessing the financial performance of a business and its impact on nature and society. To make further decisions based on this information, analytical practices are needed to assess the company’s performance in the field of sustainability and form a set of indicators that are easy for decision-makers to use. Such practices include ESG rating, which is carried out, to an overwhelming extent, by special rating providers for green investment markets, and direct analysis, which does not result in scoring and ranking based on certain aggregates. Among them, one can note such well-known rating providers as Sustainalytics ESG, Bloomberg ESG data service, Thomson Reuters, Dow Jones Sustainability Indices, MSCI ESG Research, RepRisk, Moody’s Corporate Knights

Global 100, S&P 500 ESG (the Standards and Poor's), Institutional Shareholders Services (ISS), FactSet Datasets and others. It has noted several problems in ESG rating industry in the study of Halper et al. (2022): the lack of standardized ESG disclosures or weighting of ESG factors coupled with the grouping (and subjective weighting), it reasoning that ESG ratings are 60% correlated, compared to a 99% correlation for credit ratings from the top three credit rating agencies; insufficient accordance between the E, the S, and the G, that calls for distinct scores for each, the divergence in ratings and variability in definitions makes them not reliable enough as a sole information source.

ESG control practice primarily supposes monitoring sustainability indicators of economic entities. Conventionally, the subjects of such monitoring are state structures or voluntary non-state entities, the functions of which include monitoring the achievement of sustainable development goals. Various mechanisms for tracking indicators of interest and diverse sources of information are used. However, the effectiveness is often quite low, the response time lag is quite long, and the response type is reactive.

The data used for the study was limited by incomplete access to the ESG reporting and ratings databases providing full information only on a paid basis.

Conclusions

Information and control practices called to provide sustainable governance comprise a wide scope of financial, governance, and information matters, not only information supplied for the decision-makers and a broad range of stakeholders. This led to new approaches providing sustainability governance, green value creation, and responsible investment, setting up integrated thinking and movement towards societal progress and a sustainable future.

The system of sustainability information and control provision can be considered as a chain of consistent and mutually ensuring targeted processes, including accounting for sustainability, ESG measurements, verification (assurance), rating, and analysis and while incorporating in this system the decision-making process, it can be considered as a sustainability governance loop. Given the importance of all the elements in this system of information and control sustainability management support, nevertheless we believe the key generating elements are accounting and reporting and it is to them that we paid the most attention in this writing.

Accounting in ESG-agenda is a chief swiftly developing interdisciplinary informational practice, linked with internal control, management analytics, and social and ecological measurements, which includes impact accounting, Sustainable Development Goals contribution accounting, integrated accounting, value chain and life-cycle accounting. Sustainability governance significantly impacts accounting, expanding its subject field, basic concepts, the scope of objects, criteria for their recognition, and making multidimensional the businesses' activity metrics.

Analysis of reporting systems revealed that the wide-spread ones could differ on many points (users, materiality meaning, detailing, topic coverage, etc.), but the most important distinction is in the basic informational reporting model including either a few "bottom lines" set of ESG-indicators or complex model of value creation. The common feature of both models we see is initially inherent to reporting emphasis to create value (this case ESG-value), and clear financial intention to attract investors through reputation capitalization. This means that even being non-financial, ESG reporting uses financial objectives designs. Moving this practice forward one must avoid financial patterns that originated with traditional reporting but use the idea of accounting as a social practice and interpretative paradigm. The analysis of two main ESG-reporting models reveals their certain advantages do not overlap and both should be used in sustainability pro-active governance. The approach recommended will enable not only to predict the reaction and behaviour of, the market, society, institutions, and authorities but to highlight areas of importance for ESG-governance and risk management.

The approaches suggested in this study should be developed in further research but can be useful for improving information practices to reach transparency and higher efficiency of sustainability governance.

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