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Integrating Sustainable Development Goals in Environmental, Social and Governance Criteria and the Sustainability Transformation of the EU Business Sector

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Abstract

The paper reviews environmental, social, and governance (ESG) Criteria and Sustainable Development Goals (SDG) within the EU policy framework. It evaluates the integration of the SDGs into existing sustainability reporting frameworks, advocating for more comprehensive and interdisciplinary approaches to embed long-term SDGs in corporate sustainability reporting. This is considered essential to accelerate the EU business sector's sustainability transformation. Moreover, this paper evaluates the effectiveness of current frameworks in influencing firm behavior, particularly in reducing pollution levels, promoting green innovation, and complying with enhanced disclosure requirements. Finally, it concludes by suggesting that, while progress has been made, there is a need for further alignment and refinement of these frameworks to ensure that they drive meaningful corporate action and policy development towards achieving the transformation to sustainability.

KEYWORDS: ESG, Sustainable Development Goals, SDG, CSRD, Sustainability Reporting, European Green Deal

JEL Classification: Q56, M14, G38, Q01, Q58

Introduction

The concept of environmental, social, and governance (ESG) factors has evolved significantly over the years, reflecting a growing recognition of the interconnectedness between business operations and broader societal and environmental issues. ESG grew from investment philosophies clustered around sustainability and, thereafter, socially responsible investing. The 'E' captures environmental issues including energy efficiency, carbon footprints, greenhouse gas emissions, deforestation, impact on biodiversity, waste management, and water use. The 'S' covers pressing social aspects such as labour standards, wages and benefits, diversity in the workplace and board, racial justice, pay equity, human rights, talent management, community relations, privacy and data protection, health and safety, supply chain management, and other human capital and social justice. The "G" refers to governance, which encompasses a broad range of factors related to how a company is directed and controlled. This includes corporate structure, board composition, business ethics, anti-corruption measures, executive compensation, shareholder rights, risk management, and transparency, among others.

Initially, ESG was primarily associated with the screening of companies to promote ethical investment, that is, investors abstained from certain industries or companies deemed socially or environmentally harmful. Over time, the concept has matured to include broader sustainability considerations and includes proactive measures such as positive screening, active engagement with companies, and the development of global standards and reporting frameworks.[1]

In the absence of international consensus on ESG disclosures, many frameworks and indices have emerged to guide company disclosures and inform investors. Given the fact that there are numerous attributes to be considered in the ESG context, a common framework is necessary to avoid bad practices, endure harmonization across industries and countries, and protect investors from adverse investment selection. A common framework would specify what information companies need to disclose, including details on environmental impact, social responsibilities, governance practices, and how these align with long-term sustainability goals. Furthermore, it would provide standardized metrics and methodologies for measuring and reporting ESG performance and would ensure that disclosures are aligned with international objectives, such as the SDGs.

The integration of Sustainable Development Goals (SDGs) into ESG criteria is essential in shaping the future of sustainable business practices and financial markets. As sustainability considerations increasingly influence corporate strategy, investment decisions, and regulatory frameworks, understanding the role of ESG-SDG alignment becomes critical for boosting economic resilience, reducing environmental risks, and ensuring corporate accountability in the long term. Given the growing emphasis on sustainable finance and reporting standards, this

[1] Positive screening is the process of finding companies that score highly on environmental, social and governance (ESG) factors relative to their peers

study provides valuable insights into how policy refinements and reporting frameworks can drive meaningful corporate action and economic transformations.

Key Definitions and Concepts

Environmental, Social, and Governance (ESG) Criteria: A set of standards used by investors to evaluate a company's performance in environmental protection, social responsibility, and corporate governance.

Sustainable Development Goals (SDGs): A collection of 17 global objectives set by the United Nations in 2015 to address issues such as poverty, climate change, education, and social justice by 2030.

Corporate Sustainability Reporting Directive (CSRD): A European Union directive that mandates large and listed companies to disclose detailed sustainability information, enhancing transparency and comparability.

European Green Deal: A set of policy initiatives introduced by the European Commission to make the EU climate-neutral by 2050 through sustainable economic growth and regulatory measures.

EU Taxonomy for Sustainable Activities: A classification system establishing a common language for sustainable economic activities within the EU, helping companies and investors navigate sustainability standards.

Double Materiality: The principle that companies should report both how sustainability issues impact their financial performance and how their operations affect people and the environment.

Greenwashing: The practice of misleading consumers or investors by exaggerating or falsely claiming sustainability efforts to appear more environmentally responsible.

Corporate Sustainability Reporting: The process by which companies disclose their environmental, social, and governance (ESG) performance and impact, often in compliance with regulatory frameworks.

Principles for Responsible Investment (PRI): A United Nations-supported initiative that encourages investors to incorporate ESG considerations into their decision-making processes.

The International ESG Reporting Framework

After the turn of the century, several initiatives and projects have attempted to establish universal and nuanced frameworks for ESG reporting (Figure 1). The first coordinated effort to establish a framework for ESG reporting was undertaken by the Global Reporting Initiative (GRI) in 2000 (the initiative was founded in 1997). GRI standards are widely recognised and used by businesses, governments, and non-profit organizations to scientifically assess their performance in key issues in the realm of sustainability (GRI, 2023). The aim is to strengthen transparency and accountability, which, in turn, promotes sustainable investment and provides vigor to the ESG framework. The current structure of the GRI framework includes three types of frameworks (DIANEOSIS, 2023):

i. Universal Standards, which refer to generic guidelines for reporting irrespective of the sector or scope of the reporting firm.
ii. Sector Standards, which are tailored to the specific industry and sector in which the firm operates.
iii. Topic Standards, which refer to the specific thematic areas in sustainability in which different company operations apply (these can include inter alia waste management, energy efficiency, biodiversity considerations, labor health and safety).

The Carbon Disclosure Project (CDP) and the Climate Disclosure Standards Board (CDSB) have been closely related in their efforts to improve corporate environmental reporting. CDP is a global non-profit organization founded in 2000, which specializes in corporate reporting on environmental impacts by collecting and analyzing data related to climate change, such as greenhouse gas emissions, deforestation, water security, and impact on ecosystem services from thousands of companies in many sectors and countries.(CDP, 2023). The results are published in the form of annual reports, which facilitate the flow of information from the corporations to investors and stakeholders. The organization's standardized reporting system has become a widely accepted benchmark for corporate environmental disclosure (the 'E' of the ESG framework), incentivising private companies to incorporate climate-related considerations into their business strategies. CDSB, on the other hand, was an initiative that aimed to integrate climate-related financial disclosures into mainstream corporate reporting (DIANEOSIS, 2023). While they operated as separate entities, CDSB worked in collaboration with CDP, leveraging its environmental data to help companies align their disclosures with global reporting frameworks. In 2022, CDSB was officially consolidated into the International Financial Reporting Standards (IFRS) Foundation to form the International Sustainability Standards Board (ISSB) (IFRS Foundation, 2022).

The Principles for Responsible Investment (PRI), launched in 2006 by a group of institutional investors and the United Nations, operate according to six core principles (PRI, 2023[2]):

i. Incorporating ESG issues into investment decision-making processes.
ii. Inclusion of ESG issues into our ownership policies and practices.
iii. Obtaining the appropriate disclosure of ESG issues by the entities in which they invest.
iv. Promoting acceptance and implementation of the principles within the investment industry.
v. Collaboration to improve effectiveness in implementing the principles.
vi. Reporting on the activities and progress towards implementing the principles.

The International Integrated Reporting Committee (IIRC) promotes the development of the *Integrated Reporting* (IR) framework as a holistic approach to sustainability reporting. It was

[2] Retrieved from https://www.unpri.org/about-us/about-the-pri.

introduced by the International Integrated Reporting Council (IIRC) in 2010 to encourage companies to move beyond traditional financial reporting. It acknowledges six types of capital: financial, manufactured, intellectual, human, social and relationship, and natural capital. Since corporations combine these capital sources to create value, this should be reflected in their reporting according to the framework, thus acknowledging the core tenets of the notion of ESG. The IIRC was merged with SASB in 2021 to create the Value Reporting Foundation (VRF)[3]. The Sustainability Standards Accounting Board (SASB) is a nonprofit organization founded in 2011, which focuses on developing industry-specific sustainability accounting standards to assist companies in disclosing financial material information related to ESG factors (SASB, 2023). This approach differs from the others discussed as it is based on the notion of 'financial materiality', which focuses on the sustainability tenets that affect the firm's financial performance most of the time. As such, the SASB framework monitors indicators such as resource efficiency, employee engagement, product safety, and business ethics, tailored to the specifics of each industry. In this framework, the proposed standards are treated as complementary to the financial reporting requirements of each company to shape an integrated risk profile for stakeholders and investors.

The Climate-Related Financial Disclosure Task Force (TCFD) was established in 2015 by the Financial Stability Board (FSB) and is also working to incorporate climate impacts in corporate reporting. The TCFD framework is built on four core elements that guide organizations in disclosing climate-related financial information (TCFD, 2023; Dianeosis, 2023).

i. Governance
This pillar monitors how the board and senior management oversee and manage climate-related risks and opportunities. It includes disclosure on the governance structure, the role of the board in climate-related decision-making, and how responsibilities are assigned within the organization to address climate-related issues.

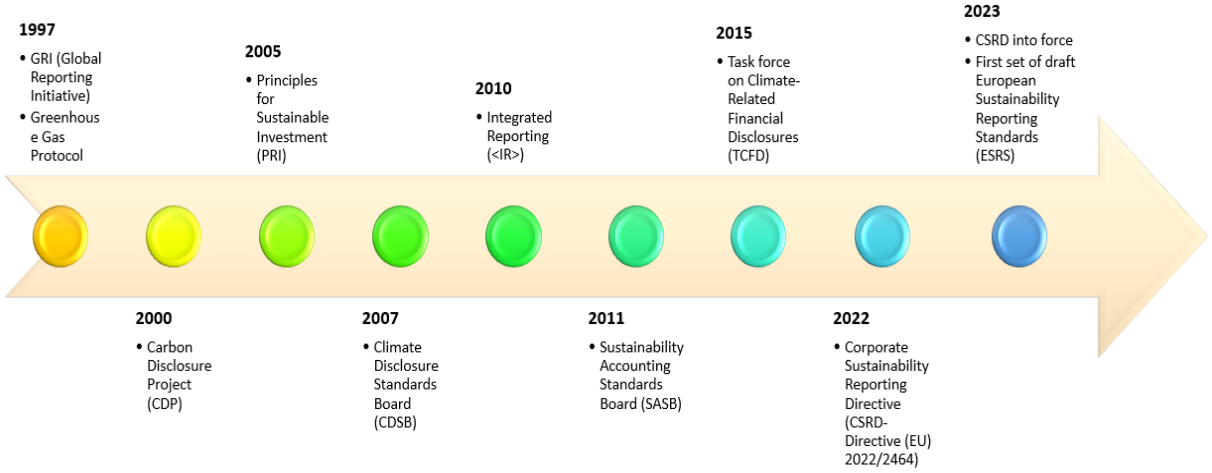
ii. Strategy:
This element refers to the degree of integration of climate impact assessment and threats arising from climate change into the company's strategy.

iii. Risk Management:
This tenet focuses on incentivising companies to measure and disclose climate-related risks in a coherent and holistic fashion. It refers to the recognition and measurement of risks related to both the possible firm's operations and the adverse impact of climate change and extreme catastrophic events.

iv. Metrics and Targets:
Following the process described in the Risk Management element, risks and impacts must be quantified to convey information for the company's sustainability reporting process. In the event that this is practically impossible, qualitative metrics and targets are imposed and reported to assess environmental performance.

[3] https://www.valuereportingfoundation.org/

Figure 1: Evolution of the Sustainability Framework



Source: Authors' Elaborations

To validate the strengthening of its efforts in the direction of sustainable finance and corporate responsibility, the European Commission launched the renewed Corporate Sustainability Reporting Directive (CSRD) in 2023. According to this directive, a growing set of large companies will be required to report on sustainability, as will all listed SMEs in the EU[4]. In conjecture to the policies underpinning the European Green Deal and in line with the documentation of the EU taxonomy, this initiative will provide investors and authorities with access to the necessary information to assess the environmental and social impact of companies and gauge financial risks and opportunities concomitant to sustainability issues. The first set of companies is expected to provide all relevant information and data regarding the 2024 financial year in their 2025 reports.

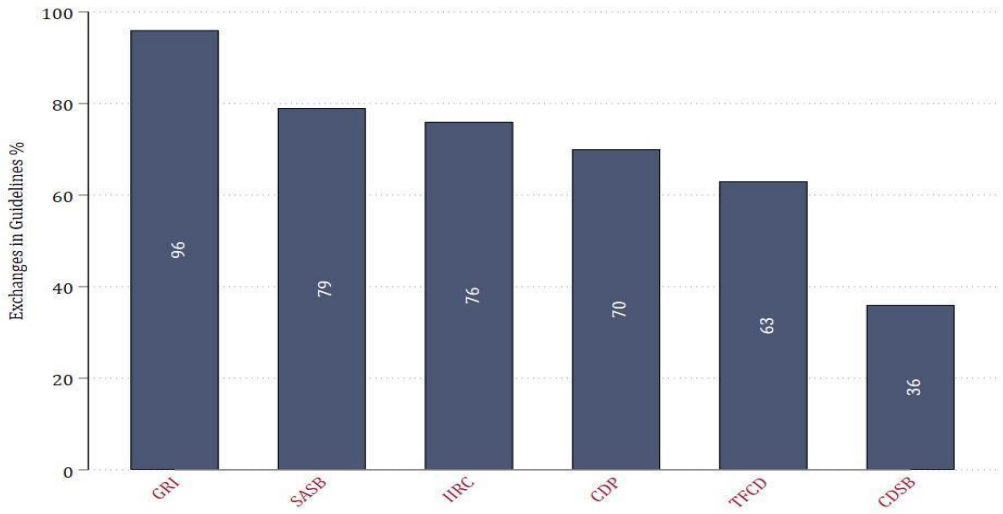
The European Sustainability Reporting Standards (ESRS), adopted in July 2023, is a significant milestone, as these standards aim to improve the quality and comparability of sustainability reporting for all companies subject to the CSRD, across the EU. Applicable to large companies, listed entities, and significant financial institutions, the ESRS encompasses 12 topic standards addressing comprehensive ESG issues. This facilitates improved transparency and accountability, allowing investors and stakeholders to make more informed decisions based on standardized sustainability performance indicators.

[4] Details on the most recent developments can be found in https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en.

These developments aim to improve the forward-looking aspect of sustainability reporting by connecting the concepts of ESG with the "Agenda 2030", the SDGs, and the Fit-for-55 package (DIANEOSIS, 2023). Research suggests that the SDGs have significantly influenced the evolution of corporate reporting standards, driving a shift towards more comprehensive and sustainability-focused disclosure frameworks. The CSRD implementation is expected to promote the use of sustainability reporting assurance, with companies' efforts towards SDG achievement (captured by the SDG INDEX) influencing their assurance decisions. This indicates that the SDGs are becoming integral to new reporting requirements (Krasodomska et al., 2023).

According to the UN Sustainable Stock Exchanges (SSE) Initiative, 96% of covered stock exchanges refer to the Global Reporting Initiative (GRI) in their guidance documents, followed by 79% for SASB and 70% for CDP[5] (Figure 2). As described in Figures 1 and 2, material progress has been recorded in the field of ESG frameworks in a global effort to establish a common ground for sustainability reporting. However, according to Boffo and Patalano (2020), 'In this sense, while the ESG methodologies are improving and becoming more transparent, the scoring remains in a transition state, with some rating providers still in the process of refining their methodology by including factors such as materiality'.

Figure 2: ESG Standards in Exchange Guidance Documents



Source: UN SSE Initiative (Sustainable Stock Exchanges, 2024)

Not all frameworks assess both financial and impact materiality or assign the same analytical weights. However, the overall sustainability assessment process is hindered by a profound

[5] https://sseinitiative.org/esg-guidance-database/

divergence and controversy over the ratings provided by different organizations after the ESG reports have been finalized (Boffo and Patalano, 2020; Berg et al., 2022). The latter shows that harmonization transcends the field of reporting frameworks, however, the fruitful dialogue emerging can only improve the integration and relevance of ESG metrics and sustainability reporting.

Advantages and Disadvantages of Sustainability Reporting Frameworks

Among the different sustainability reporting frameworks, the GRI has emerged as one of the most widely adopted globally (Finch, 2005; Gutterman, 2021). Its popularity may be due to its comprehensive approach, covering a wide range of sustainability issues, and its international recognition, being referenced in both government policies and market instruments across multiple countries (Gutterman, 2021). The broad scope of GRI allows companies to effectively communicate their sustainability performance, particularly in achieving long-term benefits such as enhanced financial outcomes, improved competitive positioning, and overall business success (Finch, 2005). Also, it promotes resource efficiency, the development of sustainable solutions, and the attraction of responsible investments (Canan, 2024).

Nevertheless, the use of sustainability reporting frameworks comes with challenges. One significant drawback is the disproportionate focus placed by many frameworks on greenhouse gas emissions, often overlooking other critical aspects of sustainability, such as social and governance factors (Tsairi & Martens, 2024). This narrow focus can hold back a holistic assessment of a company's sustainability performance. Furthermore, the existence of multiple frameworks has resulted in a divided landscape which may create confusion for companies trying to decide which framework to adopt, complicating their reporting processes and reducing the comparability of sustainability data across firms (Djalolitdinovna & Xakimovna, 2024).

The EU Sustainable Finance Framework

Sustainable finance plays a pivotal role in the European Union's (EU) quest for a resilient, low-carbon, and socially inclusive economy. As the EU strives to achieve its ambitious environmental and climate targets outlined in the European Green Deal and the 2030 Climate Target Plan (European Commission, 2020; 2021), sustainable finance serves as a linchpin in funneling capital towards environmentally sound and socially responsible investments. The importance of sustainable finance in the EU extends beyond mitigating environmental risks; it aligns financial institutions and corporations with the principles of responsible business, fostering long-term resilience, and contributing to the overall stability of the financial system. Harmonizing individual regulations and practices toward a holistic EU sustainability framework is aligned with the validation of ESG standards and the connection of ESG indicators with concrete outcomes that promote corporate responsibility.

The EU sustainable finance framework is based on the following building blocks[6].

Corporate disclosure of climate-related information

The guidelines on reporting climate-related information were published in March 2018 and were based on the recommendations of the Technical Expert Group on Sustainable Finance (TEG). The EU has issued specific guidance for companies on how to report holistically on the environmental impact of their business across the value chain and the effects of climate change on their business. The EC (2019) underlines that all climate-related information should be reported in accordance with the Non-Financial Reporting Directive and should address the issue of double materiality. The latter refers to the acknowledgement of the feedback loop between the environmental impact of the financial operation and the environmental degradation that affects them.

EU labels for benchmarks (climate, ESG) and benchmarks' ESG disclosures

The EU has initiated the development of sustainability-related labels and benchmarks for products traded in the single market, aiming to enhance transparency regarding ESG criteria. These labels primarily apply to financial products, such as investment funds and bonds, but also extend to corporate sustainability disclosures. For instance, the EU Climate Transition Benchmark (CTB) and the EU Paris-Aligned Benchmark (PAB) are financial benchmarks designed to help investors assess the climate impact of their portfolios (European Commission, 2020). Additionally, the EU Green Bond Standard (EUGBS) serves as a classification system for bonds that finance environmentally sustainable projects (European Commission, 2023). Beyond financial instruments, discussions are ongoing about broader labeling schemes, such as an EU Ecolabel for retail financial products, which would help consumers identify sustainable investment options. The overarching aim of these initiatives of the European Commission is to introduce a standardized methodology that improves comparability across different ESG financial products and potentially increases awareness among consumers, policymakers and investors in the EU about corporate sustainability practices overall. Nevertheless, divergence across ESG metrics and ratings are acknowledged by the literature (Berg et al., 2022). The rationale for a unified ESG label arises from the necessity to enhance comparability across financial products, facilitating informed investment decisions. A standardized label would allow investors to evaluate the environmental, social, and governance aspects of different financial instruments more effectively, reducing ambiguity and boosting confidence in the sustainability claims made by companies. The need for greater comparability is supported by Kapellas & Siougle, 2017, who emphasize the impact of regulatory interventions on the international comparability and usage of financial statements, which in turn influences investment decisions.

However, there are both pros and cons to a unified ESG label. On the positive side, a single label could simplify reporting, increase transparency, and help combat greenwashing by setting clear,

[6] The categorization is based on official EU documentation (see https://single-market-economy.ec.europa.eu/industry/sustainability/corporate-sustainability-and-responsibility/sustainable-finance_en)

standardized criteria for sustainability. It would also reduce the trouble on companies and investors to come up with multiple, and in some cases conflicting standards. On the other hand, some critics argue that no single label can capture the full complexity of ESG factors across different sectors and regions, and the risk of oversimplification exists. Steuer, S., & Tröger, T. H. (2022) study disclosure regulations to determine if they can trigger the green transition of the global economy and achieve socially optimal climate targets and suggest that transparency obligations in green finance regulation can involve standardized disclosure of raw data or quality labels that signal desirable green characteristics of investment products.

Sustainability-related disclosure in the financial services sector (SFDR)

The Sustainable Finance Disclosure Regulation (SFDR),[7] adopted in 2019, is a European Union regulation that sets mandatory sustainability disclosure requirements for financial market participants, including investment funds, insurance providers, and financial advisors. It aims to redirect capital flows considering sustainability issues and integrate ESG factors into risk management processes (E&Y, 2023). Unlike a labeling system, which certifies sustainability compliance, SFDR aims to increase transparency on how financial products incorporate ESG factors by categorizing them into three levels: Article 6 (no ESG consideration), Article 8 ("light green" products promoting environmental/social characteristics), and Article 9 ("dark green" products with sustainable investment as an objective). In this way, It addresses the pressing issue of *greenwashing* regarding financial products by setting a level playing field for environmental reporting in the financial sector. Scherer et al., 2023, argue that SFDR labels matter in attracting flows, with a substantial and statistically significant effect of reduced flows in the immediate month following reclassification.

The SFDR involves a nuanced approach as it "distinguishes between disclosures regarding sustainability risks and those concerning sustainability factors and distinguishes between regular financial products, financial products that promote, among other characteristics, environmental or social characteristics, and financial products that have sustainable investment as their objective" (Busch et al., 2021, p. 33). More specifically, all financial market participants must provide clear information on the potential adverse impacts of investment decisions or financial advice on the sustainability of ESG and the assessment of potential risks concomitant with sustainability issues in their operations.

European Green Bond Standard

A green bond is differentiated from a regular bond by its label, which signifies a commitment to exclusively use the funds raised to finance or refinance 'green' projects, assets, or business activities (ICMA, 2015). Despite the growing interest in sustainable finance, the lack of harmonized environmental data hinders investors in making informed decisions that include environmental sustainability concerns (Anyfantaki et al., 2022). The EU leads the world in terms

[7] EU 2019/2088: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32019R2088

of green bond issuance, accounting for more than half of the global volume in 2021, while it only accounts for 3% to 3.5% of the overall bond market[8].

The European Green Bond Standard (EUGBS) is an EU-wide standard to encourage market participants to issue and invest in green bonds and improve the effectiveness, transparency, comparability, and credibility of the market. Political agreement was reached in March 2023 following the TEG report in 2019 and the consultation process beginning in 2020. This voluntary standard is intertwined with the EU Taxonomy insofar as the latter defines green economic activities which are eligible for financing through the green bond scheme to safeguard transparency in financial transactions and contribute to environmentally sustainable investment. All companies and public entities aiming to finance green projects by tapping capital markets are eligible to use the EUGBS on the premise that at least 85% of the funds raised by the bond are allocated to economic activities that align with the EU Taxonomy Regulation.

EU Taxonomy

The EU taxonomy is a classification system that establishes a list of environmentally sustainable economic activities. It could play an important role in helping the EU scale up sustainable investment and implement the European Green Deal. In its all-encompassing capacity, the EU taxonomy is the cornerstone of the EU sustainable finance framework as it underpins all financial transactions and aims to establish common ground across all stakeholders in the EU financial system. Taxonomy improves market transparency by establishing criteria according to which financial activities will be labeled as sustainable. While it is closely linked to the EU Green Bond Standard (EUGBS)—ensuring that at least 85% of funds raised by green bonds align with the Taxonomy—it also plays a critical role in the Sustainable Finance Disclosure Regulation (SFDR) framework. Under SFDR, financial products categorized as Article 8 ("light green") and Article 9 ("dark green") must disclose how and to what extent their investments align with the EU Taxonomy criteria. The broad set of activities that are included in the green finance framework according to the EU Taxonomy are[9]:

- Climate Change Mitigation
- Climate Change Adaptation
- Sustainable use and protection of water and marine resources
- Transition to a Circular Economy
- Pollution Prevention and Control
- Protection and Restoration of Biodiversity and Ecosystems

The ongoing procedure also aims to tackle the pressing issue of greenwashing in accordance with the other EU initiatives described in this section. According to the European Commission (2022), the EU taxonomy is 'a transparency tool based on a classification system that transforms the EU's

[8] https://www.reuters.com/sustainability/eu-gives-nod-worlds-first-green-bond-standards-2023-10-05/

[9] Details can be found in https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en

climate and environmental objectives into criteria for specific economic activities for private investment purposes. However, it does not provide investors with a list of activities they are obliged to invest in, nor does it impose restrictions on government bodies and regional authorities regarding their investment decisions.

Both the Sustainable Finance Framework and the disclosure frameworks outlined in Figure 1 aim to enhance transparency and accountability in corporate sustainability. More specifically, the frameworks like GRI, TCFD, and CSRD offer reporting guidelines and metrics that allow companies to disclose their ESG impact in a standardized way. This standardization is necessary for the transparency of sustainable finance to ensure that investors have access to reliable, comparable data to make informed decisions about sustainable investments.

The Impact of Corporate Sustainability Framework on Firm Behavior

Corporate sustainability reporting and climate-related reporting are deeply interconnected, although their purpose is different. Climate-related reporting mainly outlines a company's exposure to climate risks, its greenhouse gas emissions, and its strategies to mitigate and adapt to climate change, while corporate sustainability reporting covers not only climate impacts but a broader range of social, economic and governance dimensions. Therefore, rather than being separate or supplemental to climate reporting, corporate sustainability reporting integrates climate-related disclosures within a wider sustainability framework. For example, the GRI and the CSRD contain climate metrics as a crucial component of the environmental pillar of ESG, ensuring that companies report on their climate-related performance alongside other sustainability metrics.

Corporate sustainability reporting frameworks play a crucial role in shaping the behavior of firms and enhancing their environmental performance, though the extent of their impact can differ between sectors and individual firms. Following Porter's hypothesis (Porter, 1991; Porter & Van der Linde, 1995), it can be expected that environmental policies can have a benign effect of firm competitiveness as a multifaceted term. Research by Czerny & Letmathe (2017) underscores the EU Emissions Trading System (ETS)'s ability to encourage companies to make cost-effective environmental investments and improve eco-efficiency. On the other hand, Joltreau & Sommerfeld (2018) found that the EU ETS has a limited effect on a firm's competitiveness and profitability, indicating that the system's influence can be nuanced. According to Andreou and Kellard (2021) environmentally proactive firms perform worse compared to their industry peers, indicating that there are trade-offs in pro-environmental behavior at the company level.

In the realm of corporate social responsibility (CSR), Christensen et al. (2021) argue that CSR practices might limit a firm's flexibility in responding to decreases in productivity. Conversely, Mittelbach-Hörmanseder et al. (2020) highlight the value of CSR disclosures, noting their significant role in enhancing a firm's value and reducing the cost of equity capital. The EU Non-Financial Reporting Directive (NFRD) has notably impacted on firms that were previously less transparent, leading to more uniform disclosure practices across various industries, as shown by research from Cuomo et al. (2022) and Arif et al. (2021).

The role of green bonds in supporting sustainable development has also been thoroughly examined. Studies, including those by Sisodia et al. (2022), reveal that green bonds can bolster a firm's reputation, align with ESG factors, and finance environmentally sustainable projects. This suggests that green bonds serve as an effective tool for companies to secure funding for green initiatives, potentially steering their strategic decisions and behaviors toward more sustainable practices.

The sustainability frameworks and regulations introduced by the EU and other regulatory bodies have yielded meaningful changes in firm behavior and ambient pollution levels, although the results are characterized by regional variations. For example, Dong et al. (2024) reports a significant decrease in environmental pollution over a 17-year period and particularly, the regulation surrounding the energy transition, such as the coal resource tax reform, has effectively reduced environmental pollution, especially in western regions of China. Pulino et al. (2022) use a sample of large Italian firms to find that strengthening ESG compliance criteria has been associated with enhanced profitability (EBIT). The effect is more pronounced in the case of environmentally sound investment projects.

However, the effects of such frameworks on firm behavior are not uniformly positive. While environmental regulations like the new ambient air quality standards (AAQS) have contributed to improvements in pollution levels, they have also imposed financial pressures on some firms. According to Huang and Li (2023), these standards have brought a negative impact on firm innovation, potentially due to the increased environmental expenditures required to meet regulatory requirements. Although profitability has mitigated some of this negative impact, the degree of industrial pollution was not found to significantly alter this relationship (Huang & Li, 2023). Gregory et al (2014) conclude that markets positively value most aspects of CSR, albeit the positive effects mostly manifest in the medium- to long- run. Boulhaga et al (2023) highlight the positive association between CSR and firm performance (as measured by Tobi's Q) for 98 public French firms, however, note that this is contingent on firm internal control and sound communication of corporate strategies to all stakeholders.

Firm innovation itself has also played a critical role in pollution reduction. Environmental policy, including tightening corporate standards, is key in inducing firm innovation, especially in the field of green technologies, by aiming to align social and private incentives in the presence of elevated externalities (Popp et al., 2010). The example of the EU cap-and-trade system (EU ETS) has yielded mixed results in terms of stimulating green innovation for European firms (Anderson et al., 2010; Borghesi et al., 2015) Chen et al. (2022) identifies that innovative practices within firms contribute to a significant reduction in emissions. These innovations help reduce energy consumption and improve resource allocation, further promoting environmental sustainability, but the effects of these innovations are heterogeneous, varying across industrial sectors, regions, and ownership types (Chen et al., 2022).

In summary, while the sustainability frameworks have generally led to positive changes in pollution levels and firm behavior, the impact is multifaceted. Certain regulations may inadvertently impede firm innovation, whereas others have proven highly effective in reducing

pollution. The success of these frameworks appears to depend on various factors, including regional disparities, firm characteristics, and the specific implementation mechanisms employed.

The Sustainable Development Goals Framework

Since the late 2000s, the integration of Environmental, Social, and Governance (ESG) factors into investment strategies has increasingly focused on evaluating companies' ESG initiatives, processes, and performance. This evaluation aims to identify companies that effectively manage ESG-related risks and opportunities, particularly those that could have a material impact on their financial performance and long-term sustainability. Investors monitor how well companies address issues such as climate change, labor practices, corporate governance, and resource efficiency, as these factors can influence profitability, reputation, and regulatory compliance. Based on the results of these assessments, investors adjust their portfolios by either increasing (overweighting) or decreasing (underweighting) their holdings in companies, aligning investment decisions with both financial goals and sustainability considerations. This approach helps mitigate risk and capitalize on companies that are better positioned for long-term success in a rapidly evolving ESG landscape.

With the introduction of the SDGs in 2015, the approach to ESG integration in investment strategies has started to change. Previously, ESG assessments primarily focused on evaluating companies' internal sustainability initiatives, risks, and performance. However, the SDGs introduced a broader framework, encouraging investors to align their portfolios not just with ESG risk mitigation but also with global sustainability objectives, such as poverty reduction, climate action, and social equity.

It is estimated that for the achievement of the SDGs an investment of US$5 to US$7 billion per year is required by 2030. The annual investment required to achieve these goals increases, highlighting the need for capital mobilization . Since 2015, the SDGs have been an instrument for investors to align investments with the SDG objectives. This not only establishes additional investment evaluation layers to ESG and more common exclusion criteria, whereby specific business sectors are excluded from investment portfolios based on ethical or moral criteria but also highlights the need to create additional attractive investment opportunities that are 'adjusted to the SDGs'.

Agenda 2030 is a universal agenda that applies to and must be implemented by all countries and all stakeholders at the local level and in any instance of economic activities. Sound metrics and data are critical to turning the SDGs into practical tools for problem solving. The UN SDSN partners with a variety of organizations to evaluate progress toward the achievement of the SDGs at the national and local level. Both official and unofficial metrics are used to measure distance to targets for each of the SDGs to identify action priorities, understand key implementation challenges, track progress, ensure accountability, and identify gaps that must be closed to achieve the SDGs by 2030. The SDSN methodology (Sachs et al., 2020) was audited by the EU JRC in July 2019.

Sachs et al. (2019) suggested an approach to making the SDGs operational for governments and policymakers, based on Six Transformational themes, while Koundouri et al. (2021, 2022) proposed a methodology to map European Green Deal policy documents to the SDGs. Furthermore, Koundouri et al. (2022) present a methodology to assess the degree to which the National Recovery and Resilience Plans (NRRPs) of the NextGenerationEU programme support the SDGs and apply it to the NRRPs of 7 European countries.

ESGs, SDGs, and Corporate Sustainability Reporting

In the contemporary business environment, corporate sustainability reporting is an emerging concern, especially given the global shift towards sustainable practices. This shift is not driven just by social pressures but also by global requirements related to the promotion of sustainable business operations. Tam et al. (2022) highlight the increasing prominence of corporate sustainability reporting, although noting a research gap when it comes to SMEs and financial institutions in Europe. This gap shows the critical need for a comprehensive sustainability report that integrates the criteria of the ESG with the SDGs.

ESG criteria have gained prominence in the discourse of corporate strategy and, more recently, firm valuation. Entities that have enlisted in the United Nations Principles for Responsible Investment (PRI) have increased from 734 in 2010 to 3038 in 2020, while the amount of assets corresponding to these signatories has surged from 21 trillion $ to 103 trillion over the same period (Avramov et al., 2022). ESG considerations have gained traction as investors increasingly recognise their potential to mitigate risks and enhance long-term financial performance. The growing incorporation of ESG criteria has influenced capital allocation and investment decisions, leading to a shift towards sustainable and responsible investing practices. Institutional investors, such as pension funds and asset managers, are increasingly integrating ESG considerations into their investment strategies to align with stakeholders' values and fulfill fiduciary duties (Cohen, 2023). Using data from the MSCI ESG database, Nagy et al. (2015) document the presence of an ESG momentum. In the same direction, Koundouri and Landis (2023), using Thomson Reuters Refinitiv, document a strong ESG momentum in international stock returns and markets. Khan et al. (2016) distinguish between material and immaterial sustainability initiatives and investment at a sector level and find that firms investing in material sustainability significantly outperform their peers.

Sustainability reporting goes beyond environmental responsibility to impact financial reporting quality, with Krista and Pogurecka (2023) advocating for board-directed strategic integration into corporate governance to meet global standards. By 2024, the European Commission will mandate corporate sustainability reporting, though Patrick and Metzger (2022) note many companies remain underprepared. Research offers valuable context: Halkos & Nomikos (2021) tracked Global Reporting Initiative diffusion from 1999-2017, revealing Europe's shift from growth to

downturn, while Pasko et al. (2022) analyzed 935 articles to identify key historical trends in the relationship between sustainability reporting and corporate governance.

The holistic nature of sustainability reporting integrates several dimensions of corporate performance, including financial, environmental, and social aspects. Such a comprehensive approach is crucial to address the needs of various stakeholders (GRI, 2021). The convergence between sustainability reporting and corporate governance is evident and is expected to be an area of increasing research interest, particularly with a focus on ESG, disclosures, and governance performance (Pasko, A., & Stolowy, H., 2022). However, despite the growing number of sustainability reports, Darshi et al., 2023, question their quality. To enhance their credibility and transparency, there is a pressing need for external assurance.

The impact of ESG performance on company financial outcomes has attracted increasing attention from academics, investors, and asset owners over the past decade, evident in studies on capital costs (Bauer and Hann, 2010; Schneider, 2011), stock valuation (Jiao, 2010), and returns (Gerhart et al., 2015; Kahn et al., 2016; Henriksson et al., 2018). Specifically, the relationship between ESG disclosure and firm-level financial performance has emerged as a focal point, though numerous empirical studies yield mixed evidence due to nonlinearities stemming from varied sample sizes, sectoral coverage, and emphasis on particular ESG aspects (Khan, 2020; Veeravel et al., 2024).

Although there are numerous studies linking strong corporate ESG performance with increased financial performance, Whelan et al. (2021, p.9) found that, in part, a meta-analysis of the literature states that only:

'26% of studies that focused only on disclosure found a positive correlation with financial performance compared to 53% for performance based ESG measures (e.g., assessing a firm's performance on issues such as greenhouse gas emission reductions). This result holds in a regression analysis that controls for several factors simultaneously. '

Having said that, in a recent study Cohen (2023) uses S&P 500 stocks data from 2019 to 2021 finds strong evidence supporting that failing to address environmental, social, and governance issues significantly hampers financial stability, whereas enhanced ESG compliance enhances corporate survival rates. Veeravel et al. (2024) use a method of moments panel quantile regression and find that high ESG scores have a positive and statistically significant impact on accounting (ROA) and market performance (Tobin's Q) for a rich dataset of Indian listed firms from 2010 to 2019. Coehn et al. (2020) undertake a comprehensive analysis using data on green patents and show that "traditional" firms (e.g., in the energy sector) with low ESG scores contribute significantly to green innovation and emissions abatement. This finding, combined with all evidence outlined above, underscores the need to scrutinize the research on the relationship between ESG performance and firm attributes, as it is far from straightforward.

The SDGs have also been studied in the context of corporate sustainability reporting. Using company-specific SDG related scores[10]. Beckaert et al. (2023) find a strong link between ESGs, SDGs, and portfolio Alphas. Additionally, Van Zanten and Huij (2022) show that, unlike ESG ratings, an SDG score captures the revealed sustainability preferences; aligns with EU taxonomy regulation; and supports the mitigation of climate change. Focusing on ASEAN countries, Ngan et al. (2022) find a positive relation between ESG performance of companies and SDG performance and economic growth. Pastun et al. (2020) find that ESG disclosure regulation influences the position of the country in SDGI and 50 largest economies rankings. The more countries comply with the ESG disclosure criteria, the better the position in the rankings. Including ESG criteria is an important evolutionary step in the country's economic development.

Integrating SDGs into the ESG frameworks

Apart from studies indirectly linking the need to integrate the SDGs in the ESG analyses, there is little research on frameworks that directly integrate the SDGs into the ESG metrics and frameworks. In cooperation with its partners and stakeholders, the Global Agreement on the General Agreement on the Development of GRI and the United Nations have established guidelines to help companies successfully integrate SDGs into reporting processes. Companies can use the relevant business reporting database[11] to find relevant disclosures so that they can report on their work towards the SDGs.

Consolandi et al. (2018) develop a framework, which maps the material ESG issues for each of the 79 industries to the SDGs and their targets. For each sector, there are distinct SDGs where it has a high impact, and for each SDG there are particular sectors that have a high impact on it, and some sectors are more important to the SDGs in aggregate than others. Sheyvens et al. (2016) underscore the significant barriers which impede the private sector from contributing to the completion of the SDGs, however, note that targeted policies at the national and international level of governance can steer towards the alignment of incentives between the private sector and society as a whole.

In this direction, Koundouri et al. (2023) introduce a novel framework which consists of a three-step approach that downscales the UN SDSN SDG framework at the company level. The framework includes:

- mapping of the company's value chain;
- a double materiality assessment with the definition of quantitative ESG key performance indicators (KPIs) at various scales (e.g. generic – applies to all companies - sector specific – applies to companies incorporated in a specific sector – and unit specific – applies to different units across the value chain);

[10] Global AI Corp.'s (GAI) SDG scores.

[11] https://www.globalreporting.org/goals-and-targets-database/

- setting of KPI-specific goals for 2030 and 2050. The Long List of KPIs is compatible and in line with the Corporate Sustainability Reporting Directive (CRSD) and all currently commonly applied frameworks discussed in the first sections of this study (GRI, SASB, IIRC, CDP, etc.).

This novel model is more holistic than the ESGs and reveals the complex interdependencies between the ESG KPIs in the implementation of the SDGs.

ESG Frameworks and Greenwashing

EU frameworks pertaining to sustainable finance and ESG disclosure are targeted, inter alia, to address the growing issue of greenwashing. Greenwashing, the deceptive practice of overstating environmental credentials to present a false impression of sustainability, has eroded corporate and public efforts towards green transition and acts as an impediment to funneling much needed financial resources to environmentally sound projects (D' Amato et al., 2017). According to Pacces (2021), the EU initiatives outlined are designed to address the principal-agent problem associated with sustainable finance via 3 channels: (i) the EU taxonomy sets clear standards on the activities characterized as green or sustainable, (ii) the recipients of funds are expected with align their interests to the investors as the EU taxonomy shapes the design and marketing of financial schemes, and (iii) mandatory sustainability reporting is expected to incentivise institutional investors to voice their concerns regarding beneficiaries' actions and potential greenwashing practices. The European Commission places emphasis on the role of EU taxonomy in the effort to quell greenwashing and unsustainable practices, since "[it] allows financial and nonfinancial companies to share a common definition of economic activities that can be considered environmentally sustainable. In this way, it plays an important role in helping the EU scale up sustainable investment, by creating security for investors, protecting private investors from greenwashing, helping companies become more climate-friendly and mitigating market fragmentation."[12]

Having said that, the confluence of sustainability frameworks and the complexity surrounding most of them hinder their efficiency and amplifies the risk of greenwashing and opacity in financial activities (Migliorelli, 2021). In the case of the EU and the recent advances in the sustainable finance framework, the uncertainty lies in the degree of harmonized implementation across member states and the divergence in institutional quality which affects corporate self-reporting of nonfinancial metrics. The EC has taken decisive steps in the realm of sustainable finance; however, the implementation and monitoring of the proposed standards and classification are material if we do not want to jeopardize the ambitious targets set by the EU Green Deal and the Paris Agenda.

[12] https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en

In conclusion, the effectiveness of these measures in preventing greenwashing will depend on their implementation and enforcement. Regulators must ensure rigorous oversight and enforcement of reporting requirements to deter misleading practices and hold companies accountable for accurate and transparent disclosure of their ESG performance. Moreover, investor awareness and scrutiny of sustainability disclosures will play a crucial role in detecting and challenging instances of greenwashing, ultimately driving companies toward more genuine and meaningful sustainability efforts.

Conclusion

This paper discusses the evolution of Corporate Sustainability Reporting Frameworks and the relevant EU policy context. The environmental, social, and governance (ESG) framework, which is used to assess a company's sustainability and performance, has developed over time from a niche concept to a mainstream consideration for businesses.

Considering these developments, the European Union introduced the Corporate Sustainability Reporting Directive (CSRD) on 5 January 2023. This directive requires that larger listed companies, including SMEs, provide comprehensive reports detailing their impact on social and environmental aspects. The first batch of these reports under the new directive will emerge in 2025, capturing activities of the financial year 2024. In addition to CSRD, the development of the European Sustainability Reporting Standards (ESRS) by the European Financial Reporting Advisory Group (EFRAG) is also a crucial initiative. These standards, aligned with EU policies, also contribute to the global movement toward standardized sustainability reporting. The CSRD is part of the wider EU action plan for sustainable finance along with the EU Taxonomy, launched in 2020, the recently launched EU Green Bond Standard, and the Non-Financial Reporting Directive (NFRD). Until the CSRD becomes fully operational, the NFRD remains the primary guiding regulation. This directive requires large public-interest companies to disclose a wide range of non-financial information, emphasizing transparency and accountability (Corporate Sustainability Reporting, 2023).

Moreover, recently, SDGs have become an international requirement that needs to be achieved and require the focus of recent literature and regulation authorities. This article underlines the need that there is a relative gap in literature in relation to frameworks that further mainstream the SDGs in the ESG reporting of companies, which are expected to further accelerate the transition of companies and the EU business sector. The integration of the SDGs and Agenda 2030 into the ESG framework through relevant metrics and monitoring is a material issue for promoting sustainable development.

In conclusion, recent developments in ESG frameworks and their integration in EU policy have marked a paradigm shift in corporate and investor priorities, emphasizing the integration of sustainability considerations into decision-making processes. As stakeholders in the private sector acknowledge the importance of ESG factors, a more holistic approach is taken in the

process of corporate financial reporting. Additionally, ESG material issues are more important than ever in investment decisions and gain traction in the functioning of the financial sector. Considering the ongoing process, a moderate degree of harmonization of framework has been achieved over the past twenty years, paving the way for the harmonization of practices in the realm of corporate sustainability.

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