Commission on Sustainability Data

Background Paper on Environmental Sustainability

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Abstract

Businesses face pressure from stakeholders and regulators to address their environmental impact. Despite strides in sustainability reporting, challenges persist, including regarding data quality and reliability. The Commission on Sustainable Data (CSD) proposes a new way of reporting reliable data on emissions, derived from the transactional data that records the actions undertaken by companies and other organisations. Policy implications extend across stakeholders: **Businesses** could gather and report reliable and verifiable data. **Investors and consumers** would be able to make better- informed decision-making, nudging markets toward sustainability. **Software companies** would be able to capture the necessary data with modest revisions to their current systems. This use of transactional data could be pushed down through **supply chains**. **Regulators** could require or at least encourage the reporting of this accurate and verifiable data, eliminating the danger of fraudulent reporting.

1. Background to the Commission on Sustainability Data[1]

Businesses must disclose various types of information depending on their industry and the regulations they face. These requirements can stem from international, European Union (EU), and national laws, which often necessitate the disclosure of both financial and non-financial data. Financial data involves money-related transactions and the financial performance of a business, while non-financial data encompasses a broader range of information essential for understanding a business beyond its financial metrics, including its environmental impact. Financial reporting has a long history dating back to the 19th century, whereas sustainability reporting only emerged about fifty years ago[2]. Both types of data are crucial for comprehensive business analysis and decision-making. Businesses disclose their performance through financial statements included in their annual reports and other public documents. Financial data typically includes revenues, expenses, assets, liabilities, cash flows, and profits, adhering to strict regulatory standards to ensure accuracy, transparency, and comparability. Non-compliance can result in legal repercussions[3]. This data is reported in financial statements such as the balance

[1] For information about the Commission, its members, purpose etc, see: https://www.kellogg.ox.ac.uk/kellogg-centres/centre-for-mutual-and-co-owned-business/commission-on-sustainability-data/

[2] Flower& Ebbers (2002); Herzig & Schaltegger (2006); Barkemeyer et. al. (2014); GRI (2020).

[3] Barkemeyer et al. (2014); GRI (2020).

sheet, income statement, and cash flow statement, following standards like GAAP (Generally Accepted Accounting Principles) or IFRS (International Financial Reporting Standards) .[4]

Since business activities impact more than just economic factors, diverse stakeholders increasingly demand comprehensive disclosures covering social and environmental issues that traditional financial reports do not address[5]. Sustainability and other non-financial data includes operational metrics, customer satisfaction scores, employee productivity data, and market share. The regulations governing this data are generally less stringent than those for financial reporting[6].

Clarity, accuracy, timeliness, comparability, and reliability[7] of disclosed data are critical for the quality and accuracy of sustainability-related ratings, data, and research. Despite an increase in sustainability disclosures, there is still significant variation in the quality and content of these disclosures[8].

The 2023 update of the Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises on Responsible Business Conduct[9] provides that enterprises should disclose regular, timely, reliable, clear, complete, accurate, and comparable information in sufficient detail on all material matters which may be material to an investor's decision-making and which also may be relevant for a broader set of stakeholders, including, workers, worker representatives, local communities and civil society, among others.

The Global Reporting Initiative (GRI) framework is a widely used standard in sustainability reporting, offering comprehensive and detailed guidelines. The GRI Standards outline several principles for high-quality non-financial reporting: clarity, accuracy, timeliness, comparability, and reliability:[10]
Clarity: Information must be clear, understandable, and accessible to stakeholders[11].
Accuracy: Information must be detailed enough for stakeholders to evaluate the company's performance[12].

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[4]https://www.sec.gov/reportspubs/investor-publications/investorpubsbegfinstmtguide; https://finance.ec.europa.eu/digital-finance/framework-financial-data-access_en
[5]Dumay, Frost & Beck, C. (2015); Lai, Melloni & Stacchezzini (2017).; Salesa, León, & Moneva (2022).
[6]Brand et al (2018).
[7]https://www.globalreporting.org/
[8]European Commission Directorate-General for Financial Stability, Financial Services and Capital Markets Union (2020),
[9]https://www.oecd.org/publications/oecd-guidelines-for-multinational-enterprises-on-responsible-business-conduct-81f92357-en.htm; Since their introduction in 1976, the Guidelines have been continuously updated to remain fit for purpose in light of societal challenges and the evolving context for international business.
[10]https://www.globalreporting.org/
[11]https://www.globalreporting.org/
[12]https://www.globalreporting.org/

Timeliness: Reports must be issued regularly and made available promptly for stakeholders.
Comparability: Information should enable stakeholders to compare performance over time and against other organisations.
Reliability: Information must be collected, recorded, compiled, analysed, and disclosed systematically to ensure it can be verified and deemed credible.

The primary challenge with data on environmental sustainability is its lack of completeness, consistency, accuracy, comparability, and reliability[13]. Auditing standards for sustainability reports are not as well-established as those for financial reports[14].

Material information can be defined as information whose omission or misstatement can reasonably be expected to influence an investor's assessment of an enterprise's value. This would typically include the value, timing, and certainty of a company's future cash flows. Material information can also be defined as information that a reasonable investor would consider important in making an investment or voting decision[15]. Implementing this principle in sustainability reporting is challenging, as it involves expanding accounting mechanisms to include a broader range of social, environmental, and economic impacts[16].

Kalesnik et al. (2020) highlight that sustainability data often relies on estimations, which are perceived as accurate in the absence of specific company data[17]. However, relying solely on sustainability scores, proxies, and estimates is insufficient to meet stakeholder and regulatory disclosure requirements. Concerns about the accuracy and reliability of sustainability data are growing alongside the urgency of global warming. Climate change significantly impacts the global investment landscape, creating both risks and opportunities. Investors and financial institutions need detailed information on a company's physical vulnerabilities, greenhouse gas (GHG) emissions, and emission reduction plans to assess and support the transition to a low-carbon economy. Additionally, geopolitical risks and economic uncertainties further complicate this transition, underscoring the need for better climate data for risk assessment by banks, pension funds, and other investment firms[18].

Energy policy decisions may also be influenced by the level of carbon lock-in, which occurs when fossil fuel-heavy systems prolong, delay, or hinder the shift towards low-carbon alternatives. This can be particularly impacted by actions such as delaying the phasing out of thermal coal. Presently, there is a challenge for financial market players due to a lack of dependable, high-quality data that can efficiently evaluate climate-related risks and prevent misleading claims of environmental responsibility, known as greenwashing. This shortage of

[13]Lee & Klassen (2015); Liesen et. al. (2015).; Kalesnik, Wilkens & Zink (2020); Michelon, Pilonato & Ricceri (2015); Stacchezzini, Melloni & Lai (2016; Sebrina et al (2023).
[14]Boiral, Heras-Saizarbitoria & Brotherton (2019).
[15]León & Salesa (2023); Unerman& Chapman (2014).
[16]Lai et al (2017).
[17]Kalesnik et al (2020).
[18]Gardes-Landolfini & Natalucci (2022).

data poses a significant barrier to transitioning toward cleaner energy sources and ecosystems, which necessitates redirecting investments toward low-carbon industries and substantial efforts in adaptation and mitigation. Moreover, it complicates the task of financial regulators in assessing risks to financial stability amidst uncertainties in quantifying climate-related impacts. Hence, policymakers urgently need to ensure improved availability of climate data[19].

The Network for Greening the Financial System introduces a directory that assesses existing climate data, identifies gaps, and suggests practical steps to bridge those gaps.[20] This report, developed by a working group co-chaired by the International Monetary Fund (IMF) and the European Central Bank, strengthens what we refer to as the climate information architecture. This framework comprises three key components: high-quality, comparable data; global disclosure standards; and methodologies for aligning with climate goals, including asset and activity taxonomies. The report's contributions are threefold. Firstly, it emphasises that despite significant progress in climate data since the United Nations (UN) Climate Change Conference in Glasgow (COP26)[21], challenges persist. These include inadequate disclosure coverage among privately held and small to medium-sized enterprises; scarcity of comparable and scientifically grounded future-oriented information like targets, commitments, and emission reduction pathways necessary for assessing risks; and the need for improved auditability to enhance data quality and trust[22].

The Commission on Sustainability Data (CSD) was created in response to the need for accurate, reliable, consistent, and comparable emission information. It stemmed from discussions at the University of Oxford's Conference on Sustainability Finance at Kellogg College on October 28th, 2022. The Commission's goal is to demonstrate how transactional data and be used to generate reliable and trusted data on emissions – including greenhouse gases such as carbon dioxide – to enable consumers and investors to assess a company's environmental impact, including related to its supply chain[23].

The Commission aims to empower consumers to consider the environmental effects of their purchases and assist investors in integrating sustainability into their decisions. It builds upon past initiatives, like the Global Data Commons project in 2018/19, involving Commissioner Dr Nigel Mehdi. However, the Commission's scope goes beyond current efforts, by focussing on the transactional data that can be garnered from the software that controls such operational activities at firm or organisational level.[24]

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[19]Gardes-Landolfini & Natalucci, (2022).

[20]https://www.ngfs.net/en

[21]https://www.un.org/en/climatechange/cop26

[22]Gardes-Landolfini & Natalucci, (2022).

[23]https://www.kellogg.ox.ac.uk/kellogg-centres/centre-for-mutual-and-co-owned-business/commission-on-sustainability-data/

[24]https://www.kellogg.ox.ac.uk/kellogg-centres/centre-for-mutual-and-co-owned-business/commission-on-sustainability-data/

The Commission addresses the pressing need for reliable data to guide sustainable practices. This requires action from governments worldwide through platforms like the UN Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP) established in 1992[25].

2. What is the problem?

Since the 1800s, human activities have emerged as the primary catalyst for climate change, predominantly through the combustion of fossil fuels (such as coal, oil, and natural gas), deforestation, and industrial processes. These actions release greenhouse gases like carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O) into the atmosphere, trapping heat and resulting in global warming. Scientific evidence indicates that human-induced GHG emissions are causing faster world warming than observed in the past two millennia[26].

The Earth's surface temperature has increased by approximately 1.1°C compared to the late 1800s (pre-Industrial Revolution), surpassing temperatures in the last 100,000 years. The last decade (2011-2020) marked the warmest on record, and each of the past four decades has been warmer than any preceding decade since 1850[27].

Climate change includes global warming, but temperature rise is only part of the issue. Because the Earth is a system, where everything is connected, changes in one area can influence changes in all others[28]. The key problems associated with climate change include the impact on nature, the impact on humans and society **(**such as health risks, food and water shortages, poverty, and forced displacement/migration, adverse impacts on conflict and political stability, employment, and businesses), the impact on economy and development, and the impact on human rights. Over the last several decades, governments have collectively pledged to slow global warming. The UN Framework Convention on Climate Change (UNFCCC) (1992), was the first global treaty to explicitly address climate change. It established an annual forum, known as the Conference of the Parties, or COP, for international discussions aimed at stabilising the concentration of greenhouse gases in the atmosphere. These meetings produced the Kyoto Protocol and the Paris Agreement. The Kyoto Protocol adopted in 1997 and entered into force in 2005, was the first legally binding climate treaty. It required developed countries to reduce emissions by an average of 5 percent below 1990 levels and established a system to monitor countries' progress. However, the treaty did not compel developing countries. Paris Agreement (2015) is the most significant global climate agreement to date, requiring all countries to set emissions-reduction pledges. Governments set targets, known as nationally determined contributions (NDCs), with the goals of

[25]https://www.kellogg.ox.ac.uk/kellogg-centres/centre-for-mutual-and-co-owned-business/commission-on-sustainability-data/

[26]UN Intergovernmental Panel on Climate Change (IPCC), (2023).

[27]UN IPCC, The Climate Change (2021).

[28]https://www.un.org/en/climatechange/what-is-climate-change; https://www.ohchr.org/en/special-procedures/sr-health/about-right-health-and-human-rights

preventing the global average temperature from rising 2°C (3.6°F) above preindustrial levels, and pursuing efforts to keep the rise to below 1.5°C (2.7°F). It also aims to reach global net-zero emissions, where the amount of greenhouse gases emitted equals the amount removed from the atmosphere, in the second half of the century. (This is also known as being climate-neutral or carbon-neutral).

Under the UNFCCC, developed countries must submit national reports every four years to the UN, detailing their emissions, policies, and measures to mitigate emissions. Since 2014, they are also required to submit biennial reports to enhance reporting on mitigation efforts and support provided. The Kyoto Protocol mandates that parties report emissions and removals of CO2 and other greenhouse gases annually, particularly from land use, land-use change, and forestry activities since 1990. The Paris Agreement operates on a five-year cycle, wherein countries commit to increasingly ambitious climate actions. Every five years, nations update their NDCs, outlining their plans to reduce emissions and enhance resilience to climate impacts. The first UN Global Stocktake (GST) Report, released in September 2023, cautioned that current efforts are insufficient to meet the long-term goals of the Paris Agreement[29]. The GST is a comprehensive assessment of the world's progress on climate action. Anchored in Article 14 of the Paris Agreement, it is intended to inform Parties to the Agreement on their progress against its goals, including but not limited to limiting global temperature rise to 1.5°C.

The Paris Agreement introduced the Enhanced Transparency Framework (ETF) that helps countries transition to a single universal transparency system. By December 2024, as part of the reporting requirements under the ETF, most countries are expected to submit their first Biennial Transparency Report (BTR). Least developed countries and small island developing states are granted flexibility with the deadline for this submission.

Businesses play a significant role in climate change dynamics[30], acting as contributors to GHG emissions, deforestation, land use changes, resource consumption, waste generation, pollution, and supply chain emissions. Simultaneously, they have the potential to serve as agents of mitigation and adaptation. Given the increased significance of the climate crisis in global affairs, businesses face pressure from investors, consumers, and regulators to report, acknowledge, and address their environmental impact.

Challenges Regarding SD and SDR

A high-quality corporate sustainability report must provide timely, reliable, clear, complete, accurate, and comparable sustainability information and data. This is a widely accepted standard in the field of sustainability reporting and is essential for maintaining legitimacy[31].

[29]https://unfccc.int/cop28
[2]9Griffin, P. (2017).
[31]Herzig & Schaltegger (2006).

Cöster et al. (2020) further assert that an effective sustainability report should outline an organisation's direction, current position, and sustainability goals, similar to financial reports[32].

Currently, collecting sustainability data is often challenging due to limited data availability, multiple data sources, and low data quality. The biggest hurdle in implementing sustainability in any business is the lack of accurate data[33], which leads to unreliable sustainability reporting and greenwashing. Despite the automation of many business processes, the data remains unclean, with significant duplication and fragmentation. Much of the data is outdated and irrelevant, resulting in sustainability reports that are more speculative than factual:[34]

Data fragmentation: According to the World Economic Forum, over 70% of companies consider data fragmentation a major challenge in sustainability reporting, making it difficult to gather comprehensive data on environmental and social impacts[35].

Data quality and reliability: The World Business Council for Sustainable Development reports that over 30% of sustainability data is unreliable or of poor quality, undermining the credibility of sustainability initiatives[36].

Data volume: The Global e-Sustainability Initiative notes that in 2021, the world produced around 59 zettabytes (1 zettabyte = 1 trillion gigabytes) of data, much of which pertains to sustainability[37].

Data collection costs: The UN Development Programme (UNDP) estimates that for many countries, the cost of collecting and managing environmental data can be as high as 1-2% of GDP[38].

Data accessibility: The UN Environment Programme (UNEP) found that only 6% of the necessary sustainability data is publicly accessible[39].

Lack of standardised reporting: A report by CDP (formerly the Carbon Disclosure Project) [40] revealed that in 2020, only 9% of the world's 500 largest companies reported on all environmental key performance indicators (KPIs) related to their activities[41].

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[32]Cöster, Dahlin & Isaksson (2020),

[33]Governance & Accountability Institute, Inc (2020).
[34]Choudhuri (2024).
[35]Choudhuri (2024).
[36]Choudhuri (2024)
[37]Choudhuri (2024)
[38]Choudhuri (2024)
[39]Choudhuri (2024)
[40]https://www.cdp.net/en
[41]Choudhuri (2024)

Incomplete and inaccurate data: A 2020 study published in Nature Communications reported that companies often underreport their carbon emissions, making it challenging to assess their true environmental impact[42].

Limited access to supply chain data: According to a 2019 CDP report, 61% of greenhouse gas emissions from major corporations are associated with the supply chain[43].

Consumer awareness: A 2020 Ipsos survey found that 42% of consumers had encountered products or companies they suspected of greenwashing[44].

Greenwashing occurs when a company or organisation exaggerates or misrepresents its environmental or social commitments and practices to appear more responsible than it actually is. This misleads investors, consumers, and the public, making them believe the company is more sustainable and ethical than it truly is[45]. The data problem associated with sustainability and greenwashing arises from several challenges:

Lack of standardisation: There is no universal framework or set of metrics for sustainability reporting. Companies often use different standards and metrics, making it difficult for investors to accurately compare and assess performance[46].

Data quality and reliability: Sustainability data can be incomplete, inconsistent, or unreliable. Companies may not disclose negative information or engage in selective reporting, highlighting positive efforts while downplaying negative impacts[47].

Scope and materiality: Determining which sustainability factors are most material to a particular industry or company can be subjective. Some companies may prioritise less significant factors to present a positive image while neglecting more critical issues[48].

Limited regulatory oversight: There is limited regulatory oversight and enforcement in sustainability reporting, leading to a lack of accountability for companies engaging in greenwashing[49].

The complexity of sustainability issues: Sustainability issues are multifaceted and interrelated, making it challenging to capture their full impact accurately. For example, a company may reduce its carbon emissions but still have problematic labour practices[50].

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[42]Choudhuri (2024)
[43]Choudhuri (2024)
[44]Choudhuri (2024)
[45]Choudhuri (2024)
[46]Choudhuri (2024)
[47]Choudhuri (2024)
[48]Choudhuri (2024)
[49]Choudhuri (2024)
[50]Choudhuri (2024)

Greenwashing may relate to data problems in the following ways:

Misleading metrics: Companies may cherry-pick sustainability metrics that present them in a favourable light while downplaying negative aspects[51].

Inadequate Disclosure: Companies may fail to fully disclose relevant sustainability information, making it difficult for investors and stakeholders to assess their true performance[52].

Lack of verification: Without standardised and independently verified sustainability data, investors may rely on self-reported information, which may be unreliable[53].

Complexity masking: Companies may focus on one sustainability dimension to divert attention from other, more significant issues[54].

Limited transparency: Lack of transparency can hide a company's actual sustainability practices and commitments. Scope 2 and Scope 3 emission data are particularly difficult to obtain. Scope 3 data needs to come from the supply chain, both upstream and downstream. There is no obligation for anyone to provide this data across departments, organisations, domains, and geographies, making it more challenging to gather[55].

Greenwashing is a significant problem because it can mislead consumers and hinder genuine efforts to address environmental issues. To combat greenwashing and address the data problem, efforts are underway to standardise sustainability reporting frameworks, increase transparency, and promote independent verification of sustainability data. Investors, regulators, and organisations are working together to establish more rigorous standards and practices to ensure that sustainability investments and commitments align with true sustainability goals[56].

3. What is the solution?

Of the 17 UN Sustainable Development Goals (SDGs), number 13 calls for urgent action to combat climate change and its impacts. The governments of the 191 UN member states have committed to achieving the SDGs and businesses can help bridge the gap towards achieving the SDGs by enshrining sustainable development in their purpose and core activities. Despite increasing efforts towards sustainability, accurately assessing businesses' environmental impact remains challenging. Overcoming this challenge requires continual refinement of assessment methods and a commitment to transparency and accountability, as follows:

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[51]Choudhuri (2024)
[52]Choudhuri (2024)
[53]Choudhuri (2024)
[54]Choudhuri (2024)
[55]Choudhuri (2024)
[56]Choudhuri (2024)

1. Reimagining business models and financial strategies is essential to accelerate contributions to sustainable development. The private sector can drive global decarbonisation by setting science-based emission reduction targets and offsetting residual emissions through carbon credit purchases. A new model must balance profit objectives with societal sustainability goals, ensuring benefits for employees, suppliers, customers, and communities. Transparency about companies' impact on SDGs is crucial for this transformation[57]. To accurately measure a business's environmental impact, a multifaceted approach is necessary:

- Comprehensive data collection methods should cover all aspects of operations, including resource consumption and waste generation. We need to move beyond Scope 1[58] and Scope 2[59] GHG emissions disclosures. While measuring Scope 3[60] emissions is a complex endeavour, this is essential to understanding the carbon footprint of many companies[61].
- Ensuring data accuracy, reliability, and auditability is vital, utilising advanced technologies like IoT sensors[62] and collaborating with environmental experts[63]. Information Technology can play a pivotal role in addressing the data problems that lead to greenwashing by improving data collection, analysis, transparency, and verification. By leveraging IT solutions, companies can provide accurate and reliable information about their environmental performance, which is essential for promoting genuine sustainability efforts and holding those who are greenwashing accountable. However, this requires ethical and responsible use of Technology, good data governance, and above all a sense of trust among the ecosystem stakeholders[64].
- Transparency and accountability are crucial; businesses must openly communicate findings, progress, and goals to stakeholders[65].

2. Developing industry-specific reporting metrics and integrating these into existing frameworks can provide a complete view of a company's sustainable development impact. Current frameworks focus on operational impacts while assessing contributions to SDGs requires accounting for product and service impacts. Initiatives like the Global Investors for Sustainable Development (GISD) Alliance aim to address this gap[66].

3. International cooperation is crucial to establishing globally consistent standards and avoiding fragmented reporting requirements. Without collaboration, companies may face multiple,

[57]UN DESA (2021).
[58]UN DESA (2021).
[59]UN DESA (2021).
[60]UN DESA (2021).
[61]UN DESA (2021).
[62]For the role of information technology in solving data problems see Choudhuri (2024).
[63]UN DESA (2021).
[64]Choudhuri (2024)
[65]UN DESA (2021).
[66]UN DESA (2021).

conflicting sustainability reporting frameworks. Various initiatives seek to facilitate coordination across jurisdictions[67].

4. Sustainability reporting remains largely a voluntary practice, with each firm choosing its own standard. Many in the private sector now support mandatory sustainability reporting, highlighting the growing importance of sustainability issues[68]. Global Reporting Initiative (GRI) argues that one of the main issues with sustainability reporting is the voluntary aspect, and that for sustainability reports to reach higher comparability would require mandatory disclosure requirements[69]. However, disclosure requirements should be proportional to a company's size and capabilities. Small and medium-sized enterprises (SMEs) [70] and companies in developing countries may require simplified reporting standards. A transitional period that exempts companies from legal liabilities related to new data categories may help them adapt to new reporting requirements.

5. There is a widespread acknowledgment among market participants of the need for standardised reporting by companies to enable investors and sustainability-related product and service providers to better assess performance[71].

6. Defining what to measure, the right metrics, and key performance indicators (KPIs) is crucial for effective sustainability data collection. Organisations must identify the areas with the most significant environmental impact, social initiatives, and governance practices. This involves conducting internal sustainability assessments, and audits, and engaging with stakeholders to gain a comprehensive understanding of material issues[72].

7. Real-time data collection through sensors and Internet of Things (IoT) devices offers unprecedented insights into an organisation's sustainability performance. However, implementing real-time data collection requires significant investments in technology, Application Programming Interfaces (APIs), and data processing capabilities[73].

4. What is 'Sustainability Data'?

[67]UN DESA (2021).
[68]UN DESA (2021).
[69]GRI (2020).
[70]UN DESA (2021).
[71]UN DESA (2021).
[72]https://www.kewmann.com/resources/blogs/overcoming-4-challenges-in-sustainability-data-collection-the-first-step-of-sustainability-management
[73]https://www.kewmann.com/resources/blogs/overcoming-4-challenges-in-sustainability-data-collection-the-first-step-of-sustainability-management

The term ‘sustainability’ first appeared in 1972, referring to the future of humanity. A prominent magazine released a series of articles entitled ‘Blueprint for Survival’, authored by over 30 scientists. They proposed living in small, less industrialised communities among other ideas[74].

In 1987, sustainability was formally defined and gained traction through the UN World Commission on Environment and Development's report, known as the Brundtland[75] Commission. It defined sustainability as meeting the needs of the present without compromising the ability of future generations to meet their own needs while ensuring a balance between economic growth, environmental preservation, and social well-being[76].

Also in 1987, the UN General Assembly introduced the concept of sustainable development in its Environmental Perspective to the Year 2000 and Beyond report[77].

The concept of sustainable development was central to the 1992 UN Conference on Environment and Development in Rio de Janeiro[78]. This was the first global effort to outline action plans and strategies for achieving a more sustainable development path. In 2002, the World Summit on Sustainable Development convened in Johannesburg[79] to review progress since the Rio Summit. It adopted a Political Declaration and Implementation Plan[80], outlining activities and measures to promote development while respecting the environment.

The 2015 UN Summit on Sustainable Development[81] marked a significant milestone for global sustainability and climate change initiatives. It saw the expiration of the Millennium Development Goals and the introduction of seventeen new Sustainable Development Goals (SDGs)[82]. These goals expanded upon the original environmental sustainability goal and included targets such as ensuring clean water and sanitation, promoting affordable and clean energy, fostering sustainable cities and communities, encouraging responsible production and consumption, taking action on climate change, preserving life below water, and sustaining life on land.

Sustainability entails managing economic, social, and environmental impacts responsibly, often referred to as the "triple bottom line" (TBL). This principle urges businesses to not only focus

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[74]Dhanani (2022).

[75]Former Norwegian Prime Minister Gro Harlem Brundtland.

[76]World Commission on Environment and Development (1987); The remit of the Brundtland Report was to investigate the numerous concerns that had been raised in previous decades, namely, that human activity was having severe and negative impacts on the planet, and that patterns of growth and development would be unsustainable if they continued unchecked.

[77]https://wedocs.unep.org/handle/20.500.11822/29180

[78]https://www.un.org/en/conferences/environment/rio1992

[79]https://www.un.org/en/conferences/environment/johannesburg2002

[80]UN World Summit on Sustainable Development (2002)

[81]https://www.un.org/en/conferences/environment/newyork2015

[82]UN General Assembly (2015).

on financial performance but also consider their social and environmental effects. By adopting this approach, companies can assess their broader contributions to society and the environment, moving beyond mere profit maximisation[83].

Pillars of corporate sustainability

Corporate sustainability revolves around three main pillars[84]:

i. **Economic Sustainability**: This aspect focuses on ensuring that a company's actions lead to long-term financial health and economic progress. It involves sustaining profitability over time, creating economic value, and responsibly managing resources[85].

ii. **Social Sustainability**: Businesses must consider their impact on society, encompassing fair labour practices, community involvement, and social responsibility. Social sustainability emphasises promoting fairness, diversity, and inclusion through equitable labour practices, prioritising health and safety, upholding human rights, and engaging with communities[86].

iii. **Environmental Sustainability**: This dimension centers on minimising adverse effects on the environment by reducing GHG emissions, waste, and pollution while conserving natural resources. It occurs when human consumption aligns with nature's replenishment rates and pollution generation remains within nature's capacity for restoration[87].

Corporate sustainability strives to ensure ethical, responsible, and sustainable business practices that benefit the communities where companies operate. By addressing various issues such as emission reduction, improving working conditions, upholding human rights, and preserving natural resources, corporate sustainability promotes profitability and social responsibility. Ultimately, this approach creates long-term value for all stakeholders.

ESG and Sustainability Data

With the growing recognition of climate change, social inequality, and governance issues, sustainability is gaining significance among companies. To tackle these challenges and enhance their sustainability performance, companies are increasingly relying on ESG data, which refer to the environmental, social and governance aspects of an organisation's actions, products, and processes over time. This data assists organisations in understanding their sustainability performance, pinpointing areas for enhancement, setting goals, and making informed decisions

[83]Purvis, Mao & Robinson (2019).
[84]Purvis et. al. (2019).
[85]Purvis et. al. (2019).
[86]Purvis et. al. (2019).
[87]Purvis et. al. (2019).

to accomplish long-term environmental and social objectives. Moreover, ESG data serves as a vital tool for transparency and reporting to investors, customers, employees, and the wider public. By integrating ESG data into their operations, companies can exhibit responsible corporate governance and contribute positively to the global sustainability effort[88].

ESG data encompasses various metrics and indicators, including:

Environmental impact data comprises measurements of energy consumption, GHG emissions, water usage, waste generation, recycling, biodiversity conservation, and other environmental impacts[89]. Investors may favour companies with a strong commitment to reducing their environmental footprint.

Social impact data includes metrics related to labour practices, employee well-being, diversity and inclusion, human rights, community engagement, health and safety, and supply chain practices.

Governance data assesses how a business operates to ensure it acts in the best interest of stakeholders. It covers areas such as business strategies, ethics codes, internal policies, executive compensation, board accountability and diversity, transparency, disclosure, and anti-corruption measures. Governance data helps investors evaluate a company's long-term value and compliance with regulatory requirements.

The Commission on Sustainability Data is focussed particularly on the environmental sustainability aspects of ESG, and the importance in this regard of having trusted data on emissions.

5. Sustainability Reporting and Transparency

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[88]ESG and sustainability frameworks are two related but distinct concepts. While both ESG and sustainability are concerned with environmental, social, and governance factors, ESG focuses on evaluating the performance of companies based on these factors, while sustainability is a broader principle that encompasses responsible and ethical business practices holistically. The key difference between ESG and sustainability is that ESG is a measured assessment of sustainability using benchmarks and metrics, while sustainability is a broad principle that encompasses a range of responsible business practices and covers a range of topics such as supply chain management, stakeholder engagement, and community development. While both terms overlap, they have different scopes and focuses. On the other hand, within this broad use of the term sustainability is the issue of environmental sustainability, and the role of emissions causing the climate crisis – it is in relation to this that the Commission on Sustainability Data is proposing a way of making those emission data accurate and trusted, by basing them on the actual activities and behaviours of the company, which are recorded within the software that is used to control those activities.

[89]Purvis et. al. (2019).

Sustainability reporting includes different terms like non-financial reporting, extra-financial reporting, ESG reporting, social reporting, corporate sustainability reporting, and socio-environmental reporting. Sustainability reporting is the systematic disclosure of sustainability data to external parties, whether voluntary, solicited, or mandated, enabling comparisons with past performance and measurement of progress towards established objectives[90]. This allows organisations to measure their performance across all aspects of sustainable development, set goals, and help move towards a more environmentally friendly, resource-efficient, and inclusive economy. According to the GRI, sustainability reporting means measuring, disclosing, and being responsible for organisational performance to achieve sustainable development goals (SDGs), internally and externally[91].

The sustainability reporting and accounting field concerns both the collection, analysis and communication of corporate sustainability information and data[92]

Companies undertake sustainability reporting for various reasons, including legislative and regulatory requirements, external pressures from stakeholders like investors or consumers, and the need to track, measure, and improve their impact and progress. However, regardless of the amount of information a company provides in its sustainability report, it is meaningless unless stakeholders can trust that the information is reliable and accurate. This is where transparency and traceability become crucial. By ensuring transparency and traceability in sustainability reporting, a company can gain credibility and build trust with its stakeholders and the public, which is essential for creating sustainable value. In the context of climate change, transparency means being open about and considering relevant climate information and data during reporting.

Measuring and disclosing sustainability practices is crucial for transparent and responsible corporate conduct. Through regular and accurate reporting, various stakeholders such as investors, employees, and the wider community gain insight into an organisation's ESG impact, risk management strategies, and commitment to sustainable practices. This not only aids in informed decision-making but also encourages accountability, building trust among stakeholders[93].

"Climate-related corporate disclosure" refers to businesses disclosing climate-related information with their stakeholders (e.g., investors, civil society groups, regulators, and employees). This includes detailing their impact on climate change (such as GHG emissions), and how climate change affects their operations, and how they are managing these risks. Climate-related disclosures emerged as part of ESG reporting, which became more prominent

[90]Erkens, Paugam &Stolowy (2015).
[91]GRI (2011).
[92]Schaltegger, Bennett & Burritt (2006)
[93]https://www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf

in the early 21st century, particularly in the realm of "responsible investment," which traditionally didn't focus on financial assessments[94].

In the context of climate change, companies have mainly focused on reporting Scope 1 and Scope 2 GHG emissions. Scope 1 emissions are direct emissions controlled by a company, like vehicle combustion or chemical production emissions. Scope 2 emissions are linked to purchased electricity. Indirect emissions are Scope 3, including those from suppliers (Scope 3 Upstream) or from the products a company sells (Scope 3 Downstream). However, there has been poor disclosure of Scope 3 emissions, with most data coming from estimation models. Although measuring Scope 3 emissions is complex, it is essential for measing the carbon footprint of companies[95].

The evolution of sustainability reporting can be traced back to developments since the 1980s[96]. Initially, in the late 1980s, companies began publishing voluntary environmental reports, particularly those with environmentally impactful operations, notably large polluters. This trend emerged partly in response to pressure from non-governmental organisations scrutinising the influence of multinational corporations. This underscores the significance of sustainability reporting as a means of engaging stakeholders and safeguarding corporate reputation[97].

From the mid-1990s onward, sustainability reporting diversified in scope and approach. Companies with socially responsible operations began adopting corporate social responsibility reporting, with historical ties to earlier philanthropic movements. Within these disclosures, climate action was generally viewed through the lens of corporate social responsibility, which frames corporate climate action as a means of reducing or compensating the company's negative impact on society and the environment.[98]

In recent years there has been a fast-increasing demand for greater formal reporting by companies on their environmental performance and the impact their business has on the planet and people. International organisations, governments and investors, business customers and clients, and consumers are increasingly asking companies for their climate risk-related information. There is a growing demand for stricter reporting requirements and an increasing acceptance of mandatory ESG disclosures[99]. Therefore, in certain jurisdictions, climate reporting is moving from a voluntary to a mandatory reporting regime. For instance, although sustainability data reporting is mostly voluntary for businesses in international law, it is mandatory in EU Law and certain jurisdictions.

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[94]Boffo & Patalano (2020).
[95]UN DESA (2021).
[96]Ball, A. (2004); Kolk (2011)..
[97]http://ec.europa.eu/environment/emas/index_en.htm
[98]EC (2011).
[99]EY&Oxford Analytica (2021); Pucker (2021).

The 2023 update of the OECD Guidelines for Multinational Enterprises provides that enterprises should prepare and disclose information by internationally recognised accounting and disclosure standards, and refrain from the publication of insufficient or unclear information. An annual external audit should be conducted by an independent, competent, and qualified auditor with internationally recognised auditing, ethical, and independence standards to provide reasonable assurance to the board and shareholders that the financial statements are prepared, in all material respects, by an applicable financial reporting framework. To enhance the credibility of responsible business conduct information, enterprises may seek external assurance attestation of such information. Review of responsible business conduct information by an independent, competent, and qualified entity by internationally recognised assurance standards can substantiate and enhance confidence in the information disclosed and contribute to higher quality and more comparable reporting. The purpose is to help build transparency and accountability around the operations of multinational enterprises. Clear and complete information on enterprises is important to a variety of users ranging from shareholders, potential investors, and the financial community to other constituencies such as workers, local communities, special interest groups, governments, and society at large. To improve public understanding of the structure and activities of enterprises, their corporate policies, and performance concerning environmental, social, and governance matters, enterprises should be transparent in their operations and responsive to the public's increasingly sophisticated demands for information[100].

The UN Global Compact (1999)[101] serves as a strategic platform backing multinational corporations dedicated to upholding ethical standards in human rights, labour practices, environmental preservation, and anti-corruption measures. This initiative champions endeavors aligned with sustainable development objectives aimed at fostering a more equitable world[102]. The annual reporting requirements for signatories of the UN Global Compact present a complementary approach, where multinationals are subject to a broader array of questions while SMEs have the option to respond to a condensed version of the questionnaire. For all companies, a transitional period during which they are excluded from legal liabilities arising from the collection and disclosure of new data categories should be considered, until they become familiar with new methods.

The UN Guidelines on Business and Human Rights[103] (2011) provide that as the basis for embedding their responsibility to respect human rights, business enterprises should express their commitment to meet this responsibility through a statement of policy that is publicly

[100]https://www.oecd.org/publications/oecd-guidelines-for-multinational-enterprises-on-responsible-business-conduct-81f92357-en.htm

[101] www.unglobalcompact.org/AboutTheGC/

[102]https://unglobalcompact.org/what-is-gc/mission/principles#:~:text=The%20Ten%20Principles%20of%20the,%2C%20environment%20and%20anti%2Dcorruption.

[103]https://www.ohchr.org/sites/default/files/documents/publications/guidingprinciplesbusinesshr_en.pdf

available and communicated internally and externally to all personnel, business partners and other relevant parties. On 24 February 2015 as a catalyst for change, the first comprehensive guidance for companies to report on human rights issues in line with the UN Guiding Principles on Business and Human Rights was launched[104]. The UN Guiding Principles Reporting Framework is the first comprehensive guidance for companies to report on human rights issues in line with their responsibility to respect human rights. This responsibility is set out in the UN Guiding Principles on Business and Human Rights, which constitute the authoritative global standard in this field. The UN Reporting Framework enables companies to respond to this growing array of requirements and expectations for improved reporting on human rights. It can also help companies meet their commitment to continuous improvement in this area of their performance.

Mandatory climate risk disclosure rules in the EU, the UK, and the United States (US) ask companies for information related to their climate targets and goals. This includes the target time horizon, interim targets, how they are planning to meet the targets, and relevant data to demonstrate progress on an annual basis.

The EU Corporate Sustainability Reporting Directive (CSRD) (2022)[105] brings in more extensive mandatory sustainability reporting for EU companies, non-EU companies meeting certain thresholds for net turnover in the EU, and companies with securities listed on a regulated EU market and requires assurance of this information. In-scope companies are required to disclose information both about how sustainability-related factors, such as climate change, affect their operations and information about how their business model impacts sustainability factors. The scope of required reporting covers environmental, social, and human rights and governance factors. Environmental factors include not only climate (including Scopes 1, 2, and 3 GHG emissions) but also water/marine resources, circular economy, pollution, and biodiversity. The objective of the CSRD is to improve sustainability reporting to better exploit the potential of the European single market and to contribute to the transition to a fully sustainable and inclusive economic and financial system in line with the European Green Deal[106] and the UN SDGs[107]. The CSRD applies to different companies over different timelines and also applies to certain UK companies starting in 2024.

The international and EU initiatives exert their impact on a worldwide scale. US and UK regulations and proposals differ significantly from the CSRD.

[104]https://www.ungpreporting.org/first-comprehensive-guidance-for-companies-on-human-rights-reporting-launches-in-london/

[105]https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022L2464

[106]https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

[107]https://www.iasplus.com/en-gb/news/2022/12/csrd-published-in-the-officialjournalof-the-european-union

The UK Companies (Strategic Report) (Climate-related Financial Disclosure) Regulations[108], which came into effect in 2022, amend the Companies Act 2006**[109]** and require listed UK organisations to publish detailed information about the impact of climate change on their business[110]. The Regulations provide UK companies with a uniform way to assess the financial impacts of their exposure to climate-related risks and opportunities. The disclosures will reveal how companies are dealing with the challenges posed by a changing climate, and this, in turn, will help investors and stakeholders put climate change at the forefront of their decision-making. In doing so, the UK is the first G20[111] country to enshrine in law mandatory Task Force on Climate-related Financial Disclosure (TCFD)[112] aligned reporting requirements[113]. Parallel changes have been made to the reporting requirements by certain limited liability partnerships with the introduction of The Limited Liability Partnerships (Climate-related Financial Disclosure) Regulations 2022[114]. In the event of non-compliance with the Regulations (and the other statutory requirements relating to strategic reports), the Conduct Committee of the Financial Reporting Council has the authority to go to court to compel a company to revise its strategic report. The court may order the company directors to personally pay for the costs associated with preparing a revised report. Additionally, the UK government has confirmed its intention to make compliance with the TCFD mandatory by 2025**[115]**.

The climate disclosure requirements in the UK are applicable to specific large private companies incorporated in the UK, as well as companies with UK-listed equity. However, they do not encompass non-UK companies lacking a UK listing, unlike the CSRD. Presently, the UK climate regulations don't mandate the disclosure of Scope 3 GHG emissions. The UK Government is in the process of formulating comprehensive corporate sustainability reporting standards and a green taxonomy. Additionally, the UK Treasury has initiated working groups to devise policy recommendations and legislative proposals in this domain. It has been affirmed by the UK Government that the reporting standards being devised by the International Sustainability Standards Board (ISSB)[116] will serve as a fundamental component of this forthcoming framework and will underpin corporate reporting[117].

On March 6th 2024, the US Securities and Exchange Commission (SEC) adopted rules that will require public companies to disclose extensive climate change-related information in their SEC

[108]https://www.legislation.gov.uk/uksi/2022/31/contents/made
[109]https://www.legislation.gov.uk/ukpga/2006/46/contents
[110]Beddow (2023).
[111]https://www.oecd.org/g20/about/
[112]https://www.fsb-tcfd.org/
[113]https://www.gov.uk/government/news/uk-to-enshrine-mandatory-climate-disclosures-for-largest-companies-in-law
[114]https://www.legislation.gov.uk/uksi/2022/46/contents/made
[115]https://www.iasplus.com/en-gb/news/2020-en-gb/11/uk-tcfd-2025; EY&Oxford Analytica (2021).
[116]https://www.ifrs.org/groups/international-sustainability-standards-board/
[117]Meynier et. al. (2023).

filings[118]. The required disclosures are similar to those that many companies already provide based on broadly accepted disclosure frameworks, such as the TCFD and the GHG Protocol[119]. France, Germany, and Norway have also introduced mandatory legislation[120].

6. Standardisation of Sustainability Reporting

Currently, sustainability reporting lacks the clarity, comparability, consistency, and completeness, of traditional financial reporting, despite the increasing adoption of various sustainability reporting standards. This issue arises partly because sustainability reporting has not been standardised. Companies follow different rules and each company has its own approach, timeline, and terminology. The current requirements for sustainability reporting are vague and open to interpretation, allowing companies to selectively disclose aspects, which can result in incomplete or misleading information[121].

Globally, there are over 600 different standards for sustainability reporting, making the process complex and time-consuming, often resulting in redundant work[122]. Different frameworks recommend varying types of information, making it challenging for companies to understand and comply with the numerous guidelines relevant to their sector and nature. Specific reporting guidelines must be followed depending on the organisation type, such as Sustainability Reporting Guidelines for Public Listed Companies (PLCs), the GRI for government agencies or NGOs, and the TCFD for financial institutions. These guidelines can be intricate and demand careful adherence to ensure comprehensive and standardised reporting. Companies frequently express frustration over the numerous questionnaires they must complete, as these questionnaires often request slightly different information on similar topics, increasing their workload. The requested data is often of little relevance to their business, creating a significant resource burden with minimal benefit. For instance, companies that produce thorough, publicly available TCFD-aligned disclosures may find this information does not align with the data collection and rating models of various ratings providers, leading to concerns about potential downgrades or exclusion from indices[123].

Having so many guidelines for ESG reporting makes it difficult for companies to prioritise good-quality reporting. They have to meet mandatory rules and also respond to requests for extra information from rating agencies. This means there is a big difference in the quality of information companies share about their ESG performance[124].

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[118]https://www.sec.gov/news/press-release/2024-31
[119]https://ghgprotocol.org/
[120]https://www.germanwatch.org/sites/default/files/full_disclosure_6._article_31-08-2021.pdf
[121]UN DESA (2021).
[122]Sullivan (2023).
[123]EC (2020).
[5]4Sullivan (2023).

Due to the lack of agreement on standards and the difficulty in comparing information, there is a growing push for global standards for sustainability reporting[125]. Such standards would ensure that everyone follows the same rules, making the information clear and comparable, thereby facilitating a better understanding and evaluation of ESG performance. There is support from international groups, the EU[126], many governments, and organisations like the CDP, the GRI[127], and the International Financial Reporting Standards Foundation's (IFRS) ISSB and European Financial Reporting Advisory Group (EFRAG)[128] for developing universal sustainability reporting standards. The goal of the EU CSRD is to make sustainability reporting more common and align it better with financial reporting[129]. Companies have to share sustainability information in a specific part of their reports, following European Sustainability Reporting Standards (ESRS)[130].

The EFRAG [131] has proposed new sustainability reporting standards for SMEs, which is a big step in creating a new reporting framework under the EU's CSRD. EFRAG, mostly funded by the EU, was given the job of creating new EU sustainability reporting standards and optional standards for SMEs that are not listed on the stock market[132].

When it comes to voluntary disclosure of ESG factors, companies can choose from various reporting methods. For the "Environmental" aspect of ESG, multiple frameworks and standards are available for organisations to disclose information about climate impacts, risks, and other environmental issues like water and plastic waste. Some frameworks are tailored to specific industries, while others are more general and applicable across different types of organisations[133].

Each company decides which reporting standard to follow, and numerous standards are available[134]. Moreover, interpretations of any given reporting standard often differ. As a result, sustainability reporting requirements vary among organisations and countries based on national laws, regulations, and individual company choices. This lack of standardisation leads to reports and data that are inconsistent, unreliable, and difficult to compare. The GRI standard and other

[125]Impact Management Project (2020); World Economic Forum (2020); SASB (2020).
[126]EC (2020).
[127]https://www.globalreporting.org/
[128]https://www.efrag.org/
[129]See more https://ec.europa.eu/info/business-economy-euro/company-reporting-and-auditing/company-reporting/ corporate-sustainability-reporting_en
[130]https://www.efrag.org/Assets/Download?assetUrl=%2Fsites%2Fwebpublishing%2FMeeting%20Documents%2F2302241014027635%2FESRS%20-%20presentation%20to%20SRB%2014%20June.pdf
[131]See more https://ec.europa.eu/info/business-economy-euro/company-reporting-and-auditing/company-reporting/ corporate-sustainability-reporting_en
[132]https://www.esgtoday.com/efrag-releases-proposed-eu-sustainability-reporting-standards-for-small-companies/
[133]Sullivan (2023).
[134]Cöster, et al., (2020).

standards include disclosure requirements, but these are often vague and open to interpretation, further contributing to inconsistency, lack of comparability, and reliability. Additionally, the flexibility for companies to choose their reporting standards can introduce bias, as they might omit negative aspects intentionally. Greater accounting accuracy could have negative consequences, as detailed sustainability reporting can make a company appear worse compared to competitors who do not provide equally detailed reports. This can create a perception of unprofitability, as the effort required for accurate sustainability accounting may reflect poorly on a company relative to less thorough competitors.

The Current Reporting Ecosystem

To grasp the reporting ecosystem, it is crucial to distinguish its components:

i. Frameworks:

Sustainability reporting frameworks, also known as ESG frameworks, provide organisations with structured guidelines to identify, evaluate, and report sustainability issues pertinent to their activities. These frameworks enable companies to gauge their performance against industry peers and global standards, communicating their advancements to stakeholders like investors, regulators, customers, and employees[135].

There are several prominent sustainability reporting or climate- or ESG-related disclosure frameworks, including the CDP, the GRI, the Sustainability Accounting Standards Board (SASB)[136], and the TCFD.

Carbon Disclosure Project (CDP): Not only has the growing concern over climate change increased the popularity of carbon reporting, but it has also led to a broader focus on social and environmental reporting. An illustrative example is the CDP (2000), which has spurred companies and cities worldwide to measure and disclose not only their GHG emissions but also their climate change risks and water strategies. CDP oversees a worldwide environmental disclosure system utilised by over 23,000 companies. These companies disclose their environmental impact by completing any or all of CDP's three questionnaires focusing on climate change, forests, and water security. Additionally, CDP offers an optional fourth module for reporting on supply chain sustainability. The organisation publishes the scores of participating companies on its website[137].

Global Reporting Initiative (GRI): Established in 1997, the GRI introduced the first global, third-party standards for measuring sustainability and social impact. Its latest standards, the GRI Standards, encompass three sets of 34 topic-specific standards covering economic, environmental, and social aspects. These standards aid companies in reporting on material ESG

[135]https://www.fsb-tcfd.org/recommendations/
[136]https://sasb.org/
[137]https://www.cdp.net/en

issues to their investors and other stakeholders. While GRI lacks central oversight, companies can opt to share their reports through a database on the GRI website[138].

Even though GRI is the most commonly used standard globally for sustainability reporting, studies have shown that organisations often use GRI standards, and reporting standards in general, inconsistently. This inconsistency can lead to a lack of comparability between different sets of data[139].

International Sustainability Standards Board (ISSB) (IFRS): Introduced in 2022 by the ISSB, the IFRS Sustainability Disclosure Standards offer a global framework for sustainability and climate reporting tailored to the needs of chief financial officers and investors. Given the IFRS's prominent role in financial reporting, these standards are expected to facilitate the integration of sustainability reporting with a company's financial statements and accounting practices. Companies are encouraged to adopt ISSB standards and commence relevant disclosures by 2025[140].

Sustainability Accounting Standards Board (SASB): The SASB develops sector-specific sustainability reporting standards aimed at tracking and communicating ESG performance metrics crucial to investors. SASB's standards vary across industries and are available for numerous sectors. More recently, SASB has been integrated into the new ISSB (IFRS) sustainability reporting standards[141].

Task Force on Climate-Related Financial Disclosure (TCFD): The TCFD offers guidance to companies on disclosing climate-related financial risks to investors, lenders, insurers, and other stakeholders. TCFD operates primarily through theme or pillar-based recommendations, increasingly adopted within the finance and banking sectors. It is endorsed by regulatory bodies such as the US SEC[142], the UK Financial Conduct Authority (FCA)[143], the National Association of Insurance Commissioners (NAIC)[144], and the Singapore Exchange (SGX)[145]. Integration of TCFD into ISSB standards is planned for 2024.

Additionally, there are initiatives tailored to specific countries, such as Connected Reporting[146] in the UK. This initiative seeks to revolutionise corporate reporting, enhancing the quality of annual reports and accounts through a novel approach.

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[138]https://www.globalreporting.org/
[139]Safari & Areeb. (2020).
[140]https://www.ifrs.org/groups/international-sustainability-standards-board/
[141]https://sasb.org/
[142]https://www.sec.gov/
[143]https://www.fca.org.uk/
[144]https://content.naic.org/
[145]https://www.sgx.com/
[146]www.accountingforsustainability.org

ii. Standards:

Standards serve as detailed and specific guidelines that expand upon the principles established by frameworks. They delineate precise requirements, metrics, and indicators for organisations to utilise when reporting on various sustainability topics. By providing a common language and metrics, standards facilitate comparability across organisations and sectors[147].

The nature of standards varies depending on the framework and industry sector. For instance, the GRI offers both universal standards applicable to all organisations and topic-specific standards addressing industry-specific concerns. Conversely, the SASB concentrates on industry-specific standards tailored to capture financially material ESG issues within specific sectors[148].

iii. Protocols:

Protocols, on the other hand, are specific tools, methodologies, or instructions aiding organisations in measuring, monitoring, and reporting their sustainability performance by chosen frameworks and standards. These protocols can either stand alone or be integrated into frameworks[149].

They furnish detailed guidance on collecting, calculating, and disclosing data consistently and accurately, covering various aspects of sustainability reporting like GHG emissions accounting, water usage, waste management, energy usage, and plastic waste generated. Some protocols, such as the GHG Protocol, enjoy universal applicability across different frameworks due to their universally accepted measurement and reporting methodologies for GHG emissions. Others may be tailored to a specific framework or industry, like the GRI's set of embedded protocols within its standards. Protocols assume a pivotal role in furnishing detailed guidance on data collection, calculation methodologies, and reporting requirements within these frameworks and standards, ensuring comparability and consistency across sustainability reports.

TCFD Recommendations: Organisations can use these recommendations to harmonise with the TCFD framework, ensuring a unified method for disclosing both risks and opportunities associated with climate change on financial aspects[150].

GHG Protocol: Offering guidelines for measuring and managing GHG emissions, this protocol supports various reporting frameworks and standards, allowing organisations to monitor their climate impact effectively[151].

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[147]Sullivan (2023).
[148]Sullivan (2023).
[149]Sullivan (2023).
[150]https://www.fsb-tcfd.org/recommendations/
[151]https://ghgprotocol.org/

CDP Questionnaires: Designed to aid organisations in addressing CDP's annual disclosure requests, these questionnaires provide a structured framework for reporting information concerning carbon, water, and forests[152].

CDP-Water Protocol: Guiding reporting water-related aspects, this protocol assists organisations in meeting CDP's water disclosure requirements by addressing risks, opportunities, and impacts associated with water[153].

CDP-Forest Protocol: This protocol offers guidance on disclosing forest-related information, aiding organisations in fulfilling CDP's forest disclosure requirements by addressing relevant risks, opportunities, and impacts[154].

International <IR> Framework: Organisations can utilise the Integrated Reporting Framework to craft integrated reports showcasing their value creation across financial, environmental, social, and governance realms[155].

GRI Standards: These standards enable organisations to consistently and comparably report on a broad spectrum of ESG issues, aligning with the comprehensive approach of the Global Reporting Initiative[156].

SASB Standards: Specifically tailored for industries, these standards facilitate the consistent disclosure of material ESG information, aligning with the SASB's principles[157].

iv. Additional Elements in the Sustainability Reporting Ecosystem:

Apart from frameworks, standards, and protocols, the sustainability reporting ecosystem encompasses several supplementary components. Ratings assess and rank organisations' sustainability performance against specific criteria, while rankings compare and list their performance relative to peers or industry benchmarks. Regulations, enforced by governmental or regulatory bodies, establish mandatory sustainability reporting requirements. Global goals, exemplified by the UN SDGs, offer universal targets and objectives to steer sustainability endeavors. Additionally, principles such as those outlined in the UN Global Compact articulate foundational commitments and values that shape organisations' sustainability strategies. These components synergise, complementing and reinforcing each other throughout the reporting process to construct a unified sustainability reporting framework. Together, they form a

[152]https://www.cdp.net/en/guidance
[153]https://www.cdp.net/en/water
[154]https://www.cdp.net/en/forests
[155]https://integratedreporting.ifrs.org/resource/international-ir-framework/
[156]https://www.globalreporting.org/standards/
[157]https://sasb.org/standards/

comprehensive landscape that facilitates organisations in disclosing their environmental performance effectively and voluntarily[158].

Moreover, for companies applying a Reporting Framework that addresses different aspects of non-financial performance, such as the GRI's G4 Framework[159] or the Integrated Reporting Framework, the UN Reporting Framework provides an important addition and complement. It enables companies to ensure that their human rights reporting is complete, meaningful, and aligned with the global standard on corporate respect for human rights. Moreover, specific information required under the G4 Framework, as well as industry- or issue-specific business and human rights initiatives, can be used to support companies' answers to questions in this Framework. Cross relationships to other key initiatives are set out within the guidance to the UN Reporting Framework to help companies produce human rights reporting that addresses its various reporting requirements and choices coherently[160]. The UN Reporting Framework is supported by an investor coalition of 87 investors representing $5.3 trillion assets under management, by six early adopter companies, and by leading institutions including the UN Working Group on Business and Human Rights, the UN Global Compact, and the International Integrated Reporting Council (IIRC)[161]. The UN Reporting Framework is cited and recommended by multiple governments in policy and guidance documents. Hundreds of companies have participated in training and outreach on the UN Reporting Framework, and dozens more are using the Framework for both external human rights as well as for reporting[162].

v. Integration Sequence:

The integration of frameworks, standards, and protocols into sustainability reporting follows an iterative and interconnected process rather than a strictly linear one. However, to comprehend their interaction better, one can conceptualise the process in the following sequence:

Framework Selection: Organisations initially opt for a suitable sustainability reporting framework that aligns with their strategic objectives, stakeholder expectations, and industry context.

Standard Identification: Within the chosen framework, organisations pinpoint the pertinent standards, encompassing both universal and industry-specific ones, to capture and report material sustainability concerns.

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[157] Sullivan (2023).
[159]https://www.globalreporting.org/standards/
[160]https://shiftproject.org/resource/human-rights-reporting-and-assurance-frameworks-initiative/
[161]https://integratedreporting.ifrs.org/
[162]https://shiftproject.org/resource/human-rights-reporting-and-assurance-frameworks-initiative/

Protocol Application: Subsequently, organisations employ appropriate protocols to gauge, monitor, and report their sustainability performance by the selected frameworks and standards[163].

However, confusion prevails over the framework companies should follow to provide sustainability-related information. Companies currently face fragmented reporting frameworks. Companies also provide sustainability information by responding to surveys and questionnaires, including from investors, data aggregators, indices, and rating agencies. Large companies may receive more than 100 such queries each year. The same sustainability issue can thus be measured in many ways and reported through multiple channels depending on the framework selected and the specific questionnaire. This creates unnecessary complexity and reporting burdens for companies. Corporate executives and investors alike have thus called for reducing the number of sustainability reporting standards. Standard setters must consolidate their work into a single, coherent global set of reporting standards[164].

7. Due Diligence, Confidentiality and Sustainability Reporting

Due diligence describes the actions taken by a company to identify and act on actual and potential risks to people and the environment. Not only within its own operations but throughout its entire supply chain. It is connected to business risk management – but starts with understanding what the risks to people and the environment might be. It is built on proportionality – the right conduct depends on the severity of the impact, the company's involvement with the impact, and its own ability to address it. Furthermore, it is guided by the principles established in international standards such as the UN's Guiding Principles on Business and Human Rights and the OECD Guidelines for Multinational Enterprises[165].

The UN Guiding Principles clarify that all business enterprises have an independent responsibility to respect human rights and that to do so they are required to exercise human rights due diligence to identify, prevent, mitigate, and account for how they address impacts on human rights. Human rights due diligence is a way for enterprises to proactively manage potential and actual adverse human rights impacts with which they are involved. It involves four core components:

i. Identifying and assessing actual or potential adverse human rights impacts that the enterprise may cause or contribute to through its activities, or which may be directly linked to its operations, products, or services by its business relationships;

ii. Integrating findings from impact assessments across relevant company processes and taking appropriate action according to its involvement in the impact;

[163]Sullivan (2023).
[164]UN DESA (2021).
[165]https://www.germanwatch.org/sites/default/files/full_disclosure_6._article_31-08-2021.pdf

iii. Tracking the effectiveness of measures and processes to address adverse human rights impacts to know if they are working; and

iv. Communicating on how impacts are being addressed and showing stakeholders – in particular affected stakeholders – that there are adequate policies and processes in place.

Enterprises should identify and assess risks by geographic context, sector, and business relationships throughout their activities (both HQ and subsidiaries) and the value chain. However, collecting and reporting sustainability or ESG data can present several challenges:

i. Many companies lack comprehensive data on their sustainability performance or ESG factors. Even when data exists, it might be scattered across different departments or systems, leading to inconsistencies and inaccuracies.

ii. There is a lack of standardised metrics and reporting frameworks for sustainability and ESG data. This makes it difficult to compare performance across companies or industries and hampers efforts to establish benchmarks and best practices.

iii. Determining which sustainability issues are material to a company and should be reported on can be subjective and complex. Companies must navigate a wide range of ESG factors to identify those most relevant to their operations and stakeholders.

iv. Interpreting sustainability or ESG data requires expertise in both sustainability issues and data analysis. Without proper analysis, data may be misinterpreted or fail to provide meaningful insights.

v. Ensuring the integrity of sustainability or ESG data is crucial for building trust with stakeholders. Companies need robust systems for data collection, validation, and assurance to prevent inaccuracies or fraud.

vi. Engaging with stakeholders to understand their sustainability priorities and reporting needs can be challenging. Companies must balance the interests of diverse stakeholders, including investors, customers, employees, communities, and regulators.

vii. Compliance with evolving sustainability regulations and reporting requirements adds complexity to the data collection and reporting process. Companies must stay abreast of changing regulatory landscapes and adapt their reporting practices accordingly.

viii. Integrating sustainability or ESG considerations into core business strategies and decision-making processes is essential for driving meaningful change. However, achieving alignment between sustainability goals and business objectives can be challenging, particularly in industries with competing priorities.

The 2023 update of the OECD Guidelines for Multinational Enterprises includes a set of disclosure recommendations on responsible business conduct information, including the enterprise's actual or potential adverse impacts on people, the environment, and society, and related due diligence processes. In the context of disclosure, due diligence processes can be a useful means by which enterprises can ensure they are effectively identifying and communicating relevant responsible business conduct information consistently and credibly, including information that may be material. In this way, due diligence can support enterprises in identifying material risks and impacts, and enhance the relevance, quality, and comparability of disclosures. Furthermore, due diligence processes can be a means of ensuring credible reporting against enterprise goals and commitments for which identifiable or measurable targets may not exist. Disclosure recommendations throughout the Guidelines should not place unreasonable administrative or cost burdens on enterprises. Nor should enterprises be expected to disclose information that may endanger their competitive position unless disclosure is necessary to fully inform an investor's decisions and to avoid misleading investors. Collaboration among companies, investors, regulators, and other stakeholders to develop standardised reporting frameworks, improve data quality and transparency, and integrate sustainability considerations into corporate governance and strategy is needed to address these challenges. In February 2022, the European Commission published a legislative proposal for a new Corporate Sustainability Due Diligence Directive (CSDDD)[166]. However, at the time of writing it had not yet secured the European Council's approval.[167]

Confidentiality Principle and Sustainability Reporting

Data confidentiality refers to the protection of sensitive information from unauthorised access or disclosure. It is a subset of data privacy, focusing on keeping data secure and ensuring that only authorised individuals or entities have access to it. Although at first glance data confidentiality regulations and corporate sustainability reporting regulations may appear as separate entities, focusing on data confidentiality and sustainability reporting, respectively, there is an intrinsic connection between the two, making data protection an integral component of Sustainability Reporting. Corporate Sustainability Reporting regulations aim to provide a transparent and comprehensive account of a company's ESG practices. This data often includes sensitive information about operations, supply chains, and other aspects of the business. Effective sustainability reporting under corporate sustainability reporting regulations cannot ignore the principles of data protection and confidentiality as stipulated by data protection regulations. Data confidentiality is crucial in sustainability reporting for several reasons:

Protecting Competitive Advantage: Companies may have proprietary information related to their sustainability efforts, such as innovative practices or product development strategies. Disclosing this information could potentially give competitors an advantage.

[166]https://eur-lex.europa.eu/resource.html?uri=cellar:bc4dcea4-9584-11ec-b4e4-01aa75ed71a1.0001.02/DOC_1&format=PDF

[167]https://viewpoints.stevens-bolton.com/post/102j2xk/revised-corporate-sustainability-due-diligence-directive-is-approved

Ensuring Trust: Stakeholders – including investors, customers, and employees – trust that the information disclosed in sustainability reports is accurate and reliable. Data breaches or unauthorised access to confidential information could undermine this trust.

Compliance and Legal Requirements: Many jurisdictions have regulations regarding the protection of sensitive data, such as the General Data Protection Regulation (GDPR)[168] in the EU and the Data Protection Act 2018[169] in the UK. Failure to maintain data confidentiality could result in legal penalties and regulatory scrutiny.

Mitigating Risks: Confidentiality breaches can lead to various risks, including financial losses, damage to reputation, and legal liabilities. Protecting sensitive sustainability data helps mitigate these risks.

To integrate data confidentiality effectively into sustainability reporting, organisations typically implement robust data governance frameworks. This includes measures such as encryption, access controls, secure transmission protocols, data masking/anonymisation, secure storage, data retention policies, audit trails and monitoring, non-disclosure agreements, employee training on data handling, and regular audits to ensure compliance with regulations. In summary, data confidentiality is an essential component of sustainability reporting to protect sensitive information, maintain trust with stakeholders, comply with regulations, and mitigate risks.

8. The Commission on Sustainability Data

Sustainability or ESG scores, proxies, and estimates are no longer sufficient for satisfying stakeholder and regulatory disclosure requirements. No investor would accept a company's annual financial disclosure if it simply estimated actual revenue based on an average of its five closest competitors. Likewise, investors no longer accept estimates that a company has reduced its carbon emissions by 20% just because the average carbon emission reduction of their 5 closest competitors was 20%. All stakeholders will want to know the actual data from the actual company and obtain confidence in that data through verification of its validity by a qualified third party.

The Commission on Sustainability Data was thus established to examine how data might be captured and disseminated which was reliable, so that consumers and investors could judge the environmental sustainability of a company's operations. Key to this is to use actual data, rather

[168]Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02016R0679-20160504&qid=1532348683434

[169]https://www.legislation.gov.uk/ukpga/2018/12/contents/enacted

than estimates or averages, and which can be reported in a form that prevents it from being falsified. This would be done by accessing the data from the software that controls the actual operations within the organisation. It is thus 'real', actual data, related to the processes that the company (or other organisation) conducts. This operational data can be translated into emissions data. Companies may wish their operational data to remain confidential, and it is a relatively simple matter to do so, whilst also having an encripted copy that prevents the data from being altered or falsified. This last step is what makes the data not only accurate, but also reliable and trusted.

Investors and Consumers would benefit from enhanced information for making informed decisions regarding investments and purchases, thereby influencing market behavior towards more sustainable practices.

Software Companies would be able to integrate systems for logging transactional data into private databases, ensuring data ownership and auditability. They would also play a crucial role in promoting the standardisation and trustworthiness of the resulting sustainability data.

Companies that wished to benefit from having their environmental impact known and trusted could encourage or even insist that their supplyers also complied with this new standard, of allowing their operational data to be audited (albeit under conditions of strict confidentiality). In this way, the provision of reliable and trusted data could be driven through supply chains.

Thus, there are reasons to think that the market mechanism would lead to this new 'gold standard' of reporting being adopted. First, any company that wished to 'prove' their environmental credentials would adopt this gold standard. They would thus benefit from attracting customers who wished to avoid exacerbating the climate crisis. And to obtain 'super gold' or 'platinum' standing, such companies would not only enable their transactional data to be audited, they would favour suppliers who did too, thus encouraging these supplier companies to also enable their operational data to be auditable. And so forth.

However, in addition to these market mechanisms, it would be quite possible for governments and regulators to encourage or even enforce the this practice – of allowing operational data to be audited, so that there was widespread or even universal availability of accurate, reliable, unfalsifiable and trusted data.

The Commission's recommendations are thus fully consistent with the rest of the international policy agenda on tackling climate change by addressing the critical issue of the reliability and verifiability of sustainability data. By establishing trusted data that is derived from audited operational data, the implementation of the Commission's recommendations would create more transparent and reliable data on emissions, which in turn would create increased incentives on companies to improve their performance, as this would be immediately picked up and reported through the use of the actual performance data. Indeed, this process would enable companies to identify areas of its operations where efficiencies could be made, processes made more

effective, costs cut, and quality enhanced, which in turn could help enhance productivity, organisational preformance, market share and profitability.

All this also aligns with the broader international efforts to promote sustainability and combat climate change by ensuring that companies accurately report their carbon emissions and other sustainability metrics. Additionally, the Commission's emphasis on collaboration across supply chains echoes the importance of international cooperation in achieving SDGs and addressing climate change on a global scale. Thus, the Commission's recommendations complement and reinforces the broader international policy agenda on tackling climate change by providing a framework for verifying and promoting sustainability practices across industries and borders.

9. The E-liability Institute

The Commission on Sustainability Data heard a presentation from the E-liability (Environment Liability) Institute, whose aim is to establish a common standard for carbon reporting, including supply chain transparency. Its founders, Professors Robert Kaplan, and Karthik Ramanna[170], developed the E-liability approach, which is an accounting algorithm enabling organisations to produce real-time, accurate, and auditable data on their total emissions as well as those of their suppliers and products[171].

The E-liability approach highlights the need for accurate measurement of emissions from all tiers of the supply chain[172].

The recommendations from the Commission on Sustainability Data – to provide accurate and trusted emmissions data by deriving these from the actual operations of the organisation – and the approach of the E-liability Institute are entirely synergistic. They focus on different parts of the process of creating and accounting for emmissions data. The recommendations from the Commission on Sustainability Data concern how we can get accurate and trusted data. The E-liability Insitute is concerned with how that data is then accounted for. We need both. Trusted data, properly accounted for.

10. Oxford Net Zero

The Oxford Net Zero (ONZ) [173] Initiative[174] was established to address the urgent challenge of achieving global 'net zero' emissions to combat climate change. It aims to provide practical research and resources to inform policymakers and businesses on a global scale, leveraging Oxford University's expertise in climate science and policy.

[170]https://e-liability.institute/about-the-institute/
[171]https://e-liability.institute/about-the-institute/
[172]https://e-liability.institute/about-the-institute/
[173]https://netzeroclimate.org/
[174]https://zero.ox.ac.uk/about

The Initiative has concluded that achieving global 'net zero' emissions is critical to halting global warming. It emphasises the importance of aligning standards, tracking progress, and informing effective solutions to limit the cumulative net total CO2 in the atmosphere. Its recommendations include defining tailored net zero statements for corporations, particularly those in hard-to-abate sectors like the fossil fuel industry. It also emphasises the importance of engaging with fossil fuel extractors to understand their perspectives and roles in the transition to net zero. Additionally, it highlights the need for societal engagement and obtaining social licenses for fossil fuel companies to transition towards net zero. The policy implications are significant, especially for policymakers, businesses, and financial institutions. Policymakers need to enact regulations that facilitate the transition to net zero, while businesses, particularly those in the fossil fuel industry, must adapt their strategies to align with net zero goals. Financial institutions also play a crucial role in funding and supporting the transition to net zero.

This initiative aligns with the broader international policy agenda on tackling climate change by focusing on achieving global 'net zero' emissions, which is a key goal of the Paris Agreement and other international climate initiatives. By providing practical research and resources, the Net Zero Initiative contributes to global efforts to combat climate change and transition to a low-carbon economy.

The Commission on Sustainability Data heard a presentation from Oxford Net Zero, and indeed the two Oxford Net Zero Fellows both served as Commissioners on the Commission on Sustainability Data. The Commissions Recommendations are entirely consistent with the approach of Oxford Net Zero, enabling as the Recommendations would the reporting of accurate and trusted emmissions data, which is vital to achieve the reductions in these emmissions whish is central to achieving ‘net zero’.

11. Conclusion

The exercise of sustainability reporting helps companies to better understand and manage their exposure to climate-related risks and opportunities - important insights that can help companies remain competitive. It provides investors and stakeholders with the information they need to make climate-informed decisions about where to allocate their capital. In addition, reporting helps organisations demonstrate their commitment to being transparent and accountable on climate-related issues - something that is becoming increasingly important as investors, consumers, and other stakeholders demand greater action on climate change. By transparently disclosing their emissions, GHG mitigation potential, and financing needs, businesses can help national governments determine where to channel and prioritise climate investments to enhance their impact. National governments can also use this data to quantify the collective impact of non-state action and understand how it can contribute to national goals, helping to inform future policy decisions.

It can be concluded from this study that there is much uncertainty regarding the future of sustainability reporting. However, if companies aim to contribute to the preservation of the planet, society, and its resources, they need to integrate sustainability efforts with accurate,

reliable, verifiable data management. For companies to attract customers who wish to consume responsibly, and investors who wish to invest responsibly, the surest way would be to declare that they have implemented the Commission on Sustainability Data's recommendation, to report emmissions data derived from their actual operational data. To gain an even greater competitive advantage, they could declare that they have not only made this commitment, but are also seeking to ensure it applies across their supply chains.

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About the Authors

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Glossary of Terms

Access Control: Limiting access to sensitive data only to those individuals who absolutely need it to perform their jobs.

Adaptation: Adjustments made in response to climate change to reduce vulnerability and increase resilience to its effects.

Audit Trails and Monitoring: Keeping detailed logs of who accesses sensitive data and when.

Brundtland Commission: The Brundtland Commission, officially known as the World Commission on Environment and Development, was convened by the United Nations in 1983. Its mission was to address the growing concern over the relationship between economic development and environmental sustainability.

BTR *stands for* Biennial Transparency Report

Carbon Footprint: The total amount of greenhouse gases emitted directly or indirectly by an individual, organisation, product, or activity, usually measured in units of carbon dioxide equivalent **CDP** stands for Carbon Disclosure Project

CH4 *stands for* Methane

Climate Action: Efforts taken at various levels (individual, community, national, global) to address climate change through policies, initiatives, and behavioral changes.

Climate Change: Refers to significant and lasting changes in the statistical distribution of weather patterns over periods ranging from decades to millions of years.

Climate Data: Information collected from various sources (e.g., satellites, weather stations, ocean buoys) about past, present, and projected climate conditions, including temperature, precipitation, sea level, and atmospheric composition.

Conference of the Parties (COP): The supreme decision-making body of the UNFCCC, where parties meet annually to negotiate and discuss international climate policy.

Climate Reporting: The process of documenting and communicating climate-related information, including data analysis, trends, impacts, and response strategies, often for regulatory compliance, public awareness, and decision-making purposes.

CO2 *stands for* Carbon Dioxide

COP *stands for* Conference of the Parties

CSD *stands for* Commission on Sustainability Data

CSRD *stands for* Corporate Sustainability Reporting Directive.

Data Masking/Anonymisation: Anonymising or masking sensitive data before reporting or disclosing it. This involves replacing identifiable information with pseudonyms or removing it entirely while still maintaining the integrity of the data for analysis.

Data Retention Policies: Implementing policies for how long sensitive data should be retained and when it should be securely destroyed. This reduces the risk of unauthorised access over time.

EFRAG *stands for* European Financial Reporting Advisory Group

Encryption: Encrypting sensitive data both in transit and at rest. This ensures that even if unauthorised parties gain access to the data, they will not be able to understand it without the encryption key.

ESG *stands for* Environmental, Social, and Governance.

ESRS *stands for* European Sustainability Reporting Standards

ETF *stands for* Enhanced Transparency Framework

EU *stands for* European Union

European Green Deal: The European Green Deal encompasses a series of policy initiatives designed to propel the EU toward a sustainable transition, ultimately targeting climate neutrality by 2050.

FCA *stands for* Financial Conduct Authority

G20 *stands for* Group of Twenty

G20: Group of Twenty, is an international forum for the governments and central bank governors from 19 countries and the European Union. It was established in 1999 to bring together major advanced and emerging economies to discuss and coordinate global economic policy.

GAAP *stands for* Generally Accepted Accounting Principles

GHG *stands for* Greenhouse Gas

Greenhouse Gas: Gases that trap heat in the atmosphere, contributing to the greenhouse effect. Common GHGs include carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O).

GISD *stands for* Global Investors for Sustainable Development

GRI *stands for* Global Reporting Initiative

GST *stands for* Global Stocktake

Global Stocktake: A process established by the Paris Agreement to assess collective progress toward achieving its goals. The stocktake occurs every five years, providing a comprehensive review of mitigation, adaptation, and support provided by countries.

Global Warming: The long-term increase in Earth's average surface temperature, primarily due to human activities such as burning fossil fuels and deforestation.

IFRS *stands for* International Financial Reporting Standards

IIRC *stands for* International Integrated Reporting Council

IPCC *stands for* Intergovernmental Panel on Climate Change

Intergovernmental Panel on Climate Change: A scientific body under the auspices of the UNFCCC, established to provide policymakers with regular assessments of the scientific basis of climate change, its impacts, and future risks.

ISSB *stands for* International Sustainability Standards Board

Materiality: The principle that companies should focus on reporting information that is relevant or material to their stakeholders, particularly information that could influence the economic, environmental, or social decisions of stakeholders.

Mitigation: Actions taken to reduce or prevent the emission of GHGs and lessen the severity of climate change impacts.

N2O *stands for* Nitrous Oxide

NAIC *stands for* National Association of Insurance Commissioners

Net Zero: The balance between the amount of greenhouse gases emitted and the amount removed from the atmosphere, achieved through reduction measures and carbon offsetting.

NDCs *stands for* Nationally Determined Contributions

Nationally Determined Contributions: Each country that is a party to the Paris Agreement is required to submit NDCs, which outline their goals and targets for reducing greenhouse gas emissions and adapting to climate change.

Non-Disclosure Agreements (NDAs): When sharing sensitive data with third parties, requiring them to sign NDAs outlining their responsibilities regarding data confidentiality and security.

OECD *stands for Organisation for Economic Co-operation and Development*

ONZ *stands for* Oxford Net Zero

SASB *stands for* Sustainability Accounting Standards Board

SDGs *stands for* Sustainable Development Goals

SEC *stands for* Securities and Exchange Commission

Secure Transmission: When transmitting sensitive data, using secure protocols like HTTPS or SFTP.

Secure Storage: Storing sensitive data in secure locations with access controls, firewalls, and intrusion detection systems in place.

SGX *stands for* Singapore Exchange

Supply Chain: The network of all the individuals, organisations, resources, activities, and technology involved in the creation and sale of a product, from the delivery of source materials from the supplier to the manufacturer, through to its eventual delivery to the end user.

SMEs *stands for* Small and medium-sized enterprises

Stakeholder: An individual, group, or organisation that has an interest or concern in an organisation or issue, and may be affected by or affect the actions of that organisation

TBL stands for Triple Bottom Line

Triple Bottom Line: An accounting framework that considers three dimensions of performance: economic, social, and environmental. It aims to measure a company's success not only in financial terms but also in social and environmental terms.

TCFD *stands for* Task Force on Climate-related Financial Disclosures

UN *stands for* United Nations

UNFCCC *stands for* United Nations Framework Convention on Climate Change