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The effect of the Corporate Sustainability Reporting Directive on impact measurement in large manufacturing corporations

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Abstract

The CSRD mandates ESG transparency for approximately 60,000 companies. This study examines its potential to advance impact-based corporate accountability through literature review and in-depth expert interviews. While existing research emphasizes the need for transparency, practical guidance on designing and implementing data methodologies is limited. Discussing frameworks like Doughnut Economics and Impact Valuation, it finds the CSRD effective for reporting but less suited as a strategic tool. Impact measurement extends beyond compliance, informing strategic decisions. Still emerging, clear guidelines, performance-based mechanisms, and collaborative ESG understanding enable credible impact measurement. The research offers policymakers and practitioners actionable insights for an optimal methodology.

Keywords

CSRD | Impact Measurement | ESG Controlling | Sustainable Finance | Value Balancing Alliance | Strategic Transformation | Sustainable Development

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Introduction

"Climate change is happening today, so we have to build a more resilient tomorrow" (European Commission 2021). The escalating environmental crises, including global warming and the overexploitation of natural resources, underline the need for sustainable industry practices. Corporate activities are accelerating the degradation of natural ecosystems while jeopardizing the health of living organisms, pushing the earth system towards and beyond planetary boundaries (Wassénius et al. 2024). With six planetary boundaries already breached, sustainable development has become a non-negotiable priority to ensure the well-being of future generations. Accordingly, key performance indicators (KPIs) and sustainability reporting emerged as tools for measuring and communicating corporate environmental, social, and governance (ESG) performance (Chopra et al. 2024). EarthCheck (2023) finds that by 2021, 95% of large organizations surveyed reported on ESG, with 64% achieving data assurance or certification. DRSC (2023) finds that in 2023, 70% of the DAX40 companies applied the voluntary Global Reporting Initiative (GRI) framework. With a structured approach to assessing business impacts and risks and opportunities, ESG transparency supports long-term strategy and corporate accountability (European Commission 2024). However, challenges such as extensive, unclear reporting requirements, complex data measurement, and a lack of standardization persist, as highlighted by 80% of DAX40 companies (DRSC 2023).

The issue of comprehensive ESG and impact measurement has materialized from both an academic and policy implementation perspective. Academically, research on supporting frameworks for practitioners to implement impact measurement in the evolving institutional field of sustainable finance is scarce (Clarkin and Cangioni 2016; Rawhouser et al. 2017). Thousands of studies exist, demonstrating why corporations must improve transparency with their actual ESG data but these lack discussions on how corporations can improve accordingly (Maas, Schaltegger, and Crutzen 2016; Cort and Esty 2020). This study addresses this gap by focusing on necessary guidelines for implementing robust impact measurement methodologies

particularly under the EU´s Corporate Sustainability Reporting Directive (CSRD). It provides insights into suggestive policy implementation and impact measurement. Insights inform policymakers about the effectiveness of the legislation and related refinements. Academics and data experts benefit from the visions of an optimal impact measurement methodology, revealing how different enablers will thrive high-impact industries to take informed data-based decisions to combat planetary boundaries. This study draws on industry insights to explore improved ESG impact measurement through regulatory guidance with the research question:

How will evolving regulatory EU-frameworks (CSRD) shape the design, implementation, and credibility of impact measurement methodologies in large manufacturing corporations?

Based on a scoping literature review and expert interviews, the thesis categorizes findings under sustainable development, regulatory enforcement, and impact measurement methodologies, examining the shift from voluntary to mandatory reporting. First, the findings of the literature review are summarized. Second, the results of the interviews are summarized and analyzed. The findings are synthesized and common codes are identified and contrasted. Third, these are discussed in the context of existing literature and theory. Recommendations are drawn for practitioners, policy makers, ESG data experts and other stakeholders. Implications for CSRD implementation, ESG data collection, practice, and future research are discussed. Fourth, the thesis concludes with an outlook for CSRD and impact measurement implementation.

Literature review

Sustainable development

Planetary Boundaries

This literature review explores drivers of corporate impact measurement under the lens of sustainable paradigm shifts. Brundtland (1987) defines sustainable development as the need to meet current necessities without jeopardizing future generations. Complementary, the planetary boundaries framework, defined by Rockström et al. (2024), identifies nine critical earth system

processes that must remain within safe limits to prevent harmful planetary changes. The underlying scientific assessments indicate the extent of human-induced planetary change in these key biophysical processes, i.e., biosphere integrity, climate, land-system, and freshwater use. Accordingly, planetary boundaries science is critical to exposing the current decline in planetary resilience. Additionally, Rockström, Gupta, and Qin (2023) reflect the importance of maintaining 'safe' boundaries at both global and sub-global scales to ensure the earth's system's stability and resilience to provide a vibrant space for humanity and all other living organisms. Hence, global law and governance become decisive for safeguarding the core processes.

Doughnut Economics

The doughnut economics concept explains how the planetary boundaries are complemented by social boundaries. In 2023, nearly 1,500 studies about doughnut economics, or "safe and just", were published, a 4-fold increase since 2018 (DEAL, October 2024). Savini (2024) highlights the doughnut economics as a pivotal tool in modern policy-making by identifying sectors that either overshoot ecological limits or fail to meet basic human needs. It provides policymakers with a framework to identify and adjust these sectors to maintain a balance within planetary boundaries, thereby preventing the crossing of tipping points that could destabilize the earth system. Where data are available, the doughnut is a tool for target-setting as it allows policymakers to estimate how much each of these sectors should either decrease or increase. Such approach emphasizes sustainability and resilience by active involvement of institutions. Achieving sustainable development demands access by all to all resources to fulfill their human rights while ensuring that humanity´s use of natural resources does not stress the earth system.

Shift to a sustainable economic paradigm

In 2024, already six of nine planetary boundaries are breached and climate experts expect the imminent transgression of a seventh (PBScience 2024). Reaching the tipping points of these boundaries means leaving the "safe operating space" (Dixson-Declève 2022). Lenton et al. (2008) define tipping points as those elements regulating the functioning of the planet and

providing evidence of thresholds that, once crossed by small additional perturbations, can trigger self-reinforcing changes that undermine earth system resilience. Explaining such overshoot, G. Hardin's tragedy of the commons illustrates how individuals' pursuit of personal gain can lead to the depletion of shared resources. It suggests individuals' tendency to prioritize their personal needs while neglecting the negative impact it may have on others (Spiliakos 2019). This underlines the need for sustainable economic practices, followed by a paradigm shift in politics and the introduction of new strategic objectives such as the European Green Deal in 2020. First practices in transformational economics, including doughnut economics, prioritize integrating social and environmental considerations into economic decision-making, highlighting the importance of transparency, accountability, and legitimacy in achieving sustainable development goals. To be effective, however, they often require external validation. (Dixson-Declève 2022; Earth 4All 2022; Maas, Schaltegger, and Crutzen 2016)

Corporate Sustainability Reporting Directive (CSRD)

Evolution of non-financial reporting

Sustainability reporting emerged in the 1970s, when companies began to voluntarily disclose their environmental practices through standalone reports. Frameworks such as the Global Reporting Initiative (GRI) and the Task Force on Climate-related Financial Disclosures (TCFD) piloted voluntary ESG disclosures (Hamad et al. 2020; O'Dwyer and Unerman 2020; Rossi and Luque-Vílchez 2020). While the GRI emphasizes operational ESG topics, the TCFD focuses on the financial implications of climate risks (Silvola et al. 2024). These frameworks aim for comprehensive, balanced, and comparable disclosure of ESG outcomes, akin to the rigor of financial reporting standards (Eccles 2024).

The European Union has been a global leader in sustainable finance policy, exemplified by the 2021 Sustainable Finance Disclosure Regulation (SFDR), which introduced metrics to assess ESG impacts in investments. A major focus is enhancing transparency around financial products' sustainability claims (ter Laag 2021). In January 2023, the European Commission

enacted the CSRD, which mandates independent sustainability disclosures in line with the European Sustainability Reporting Standards (ESRS). Covering approximately 50,000 EU- and 10,000 non-EU companies with substantial EU activities, the CSRD enforces the double materiality approach to ensure that organizations disclose detailed, comparable information on their impacts, risks, and opportunities (IROs) (Täger 2022). This legislation aims to enhance corporate accountability and transparency (European Commission 2024). By prioritizing comprehensive and transparent reporting, the CSRD strengthens market discipline for sustainability and introduces a phased approach to assurance, moving from limited audit assurance to reasonable assurance within six years (Wassénius et al. 2024). This shift prioritizes data reliability and requires companies to disclose measurement methodologies, enhancing transparency (Maas, Schaltegger, and Crutzen 2016).

However, critics argue that sustainability reporting models, which often draw on traditional financial accounting structures, fail to capture the full scope of complex interactions between corporate activities and environmental impacts. As a result, these frameworks may struggle to accurately reflect both positive and negative contributions to environmental sustainability and planetary boundaries (Wassénius et al. 2024).

Legislative requirements

The ESRS aim to create a unified framework for sustainability reporting, emphasizing location-specific data disclosure (Wassénius et al. 2024). This requires companies to adopt organized approaches to measure and manage ESG data, fostering transparency and informed decision-making (Maas, Schaltegger, and Crutzen 2016). Unlike in traditional financial reporting, double materiality considers both financial and ESG impacts. The ESRS provide a systematic method for Double Materiality Assessments (DMA), mandating that sustainability reports include material information on IROs (EFRAG 2021). These highlight the intrinsic relevance of a company's external impacts as indicators of its sustainability and financial performance. However, challenges persist. Wassénius et al. (2024) identify risks of overlooking critical

planetary materiality issues, i.e., for climate stability and ecosystem health. A specific revenue stream may induce localized environmental impacts, e.g., on biodiversity, but those may be underestimated relative to revenue significance. Additionally, company-determined materiality introduces bias, hindering cross-sector comparability and authenticity.

From voluntary to mandatory reporting

The historical landscape of voluntary disclosures in Europe highlights the critical challenge that companies tend to selectively report positive aspects while downplaying or omitting unfavorable details. Such subjectivity can skew ESG assessments toward favorable disclosures rather than providing an objective view of performance. In response, EU regulations, e.g., the CSRD, now mandate ESG reporting. These push companies toward robust systems for managing sustainability-related risks and impacts (Mezzanotte 2024). However, the chair of the International Accounting Standards Board (IASB), criticizes that in an ideal scenario, sustainability reporting becomes redundant if negative externalities, i.e., pollution, were fully internalized through mechanisms like appropriate taxation. For instance, a realistic carbon tax could align financial statements in heavy-polluting sectors with their true environmental costs, leading to natural asset devaluation in unviable activities. (IFRS 2019) Other critics note that corporate ESG reports often risk "greenwashing," raising doubts about their contributions to genuine sustainability (Maas, Schaltegger, and Crutzen 2016). Summarizing, today´s scattered ESG disclosures fall short on verification, consistency, and standardization. The sustainability data used for external reporting is frequently unreliable, incomplete, or imprecise, presenting challenges for effective ESG and impact assessment (Oliver Yebenes 2024).

Impact measurement

Impact measurement methodology

Impact measurement methodologies systematically assess a company’s ESG impacts, analyzing both positive and negative effects on society and the environment across their value chain. Moving beyond and assigning monetary values to non-financial data, impact valuation

integrates financial, human, social, and natural capital into a cohesive framework. This enables businesses to align with sustainable value creation under the concept of double materiality, considering both financial and non-financial impacts of and on business activities. (IFVI and VBA 2024) For better transparency, the indicators should be standardized, quantified, and comparable across companies and over time (GRI and SASB 2021). Further, clear indicators ensure accessibility for diverse stakeholders, providing a unified perspective on a company's overall impact and its core business activities (Maas, Schaltegger, and Crutzen 2016).

The Value Balancing Alliance

The Value Balancing Alliance (VBA) standardizes impact assessment and valuation across industries to measure social and economic costs, e.g., of biodiversity impacts. It emphasizes scalable ESG data collection and analysis through standardized, independent methodologies to combat inconsistent approaches. The VBA fosters open consensus on science-based data to meet regulatory demands and corporate concerns over data scarcity, urging companies to manage emerging risks proactively. Impact occurs where progress increases on an exponential curve. Progress, in this context, unfolds when actions are synchronized and effectively integrated into practice. An effective methodology requires data to meet key criteria from the user's perspective, namely usability, presentation and relevance. Only when these criteria are met can frameworks such as the VBA be meaningfully implemented to inform decision-making processes. Currently, impact values are often at extremes, either zero or infinite, which limits their usefulness in decision making and underlines the need for a pragmatic and specific approach to management. (VBA 2024; VBA and WifOR Conference, May 2024)

Status quo of ESG and impact transparency

Following the implementation of the CSRD, a consensus on social and environmental impacts remains unresolved, leading to inconsistencies in sustainability data and impeding standardized reporting (Bengo, Boni, and Sancino 2022). Despite national and international initiatives to advance practices across ESG dimensions, challenges persist. Rawhouser et al. (2017) highlight

the underdeveloped state of impact measurement, complicating assessments of effectiveness. Glaveli et al. (2023) note that the manufacturing sector demonstrates relatively detailed and transparent sustainability disclosures, driven by its significant environmental impact, accident rates, and many sector-specific standards. In comparison, industries like IT and cosmetics often provide lower-quality disclosures, lacking visual tools and actionable insights. These patterns highlight how sectoral context shapes sustainability reporting maturity, quality, and depth.

Methodology

Research design

The methodology for this dissertation is designed to investigate the question, "How will evolving regulatory EU-frameworks (CSRD) shape the design, implementation, and credibility of impact measurement methodologies in large manufacturing corporations?" Combining secondary and primary sources, the qualitative approach prioritizes depth over breadth, aiming to uncover diverse perspectives. The research topic is adequate due to its relevance to industry, policymakers, and society by exploring current challenges under the CSRD, the readiness of practitioners, and arising opportunities for sustainable development. A case study of the Value Balancing Alliance as an impact measurement methodology assesses its applicability for large manufacturing companies, focusing on three core dimensions:

Design refers to the planning phase to establish specific goals, scope, and the framework. This includes selecting appropriate indicators, metrics, and methods to be used in the assessment.

Implementation involves the execution of the design, including data collection, analysis, and reporting. It puts the theoretical framework in practice to gather actionable insights.

Credibility refers to the trustworthiness of the results obtained from the impact measurement. It ensures that the findings are accurate, unbiased, and can be relied upon by stakeholders.

Data collection

Secondary research comprised studies from 2017 to 2024, using NOVA SBE library and insights from ResearchGate, Academia.eu, and LinkedIn for experience-driven insights. Prime

search terms for the literature were ‘CSRD’, ‘Double Materiality Assessment’, ‘ESG controlling’, ‘Sustainable Finance’, ‘Impact Measurement’. Journal articles, reports, and books were used for all knowledge domains. The literature review further included business reviews, webinars, podcasts, blog articles, policy documents, and academic theses. Special attention was given to sources that discuss the evolution of CSRD in Europe, defining the geographical focus. The scoping review was oriented on the PRISMA item checklist (Figure 1) to select adequate studies with a reliable approach (Page et al. 2021).

The primary research followed 10 open-ended interview questions (Figure 2), asked to 11 experts categorized in 1) CSRD or ESG compliance expert from finance, 2) ESG data expert from industry or consultancy, 3) CSRD or compliance expert working in industry, 4) academic or topic expert, i.e. from project work (Table 1). To reduce bias, interviewees were selected from a diverse pool of participants with non-probability sampling. Positions ranged from entry-level to managers and directors for detailed information on the challenges and opportunities associated with implementing the CSRD in manufacturing companies. In-depth discussions spread among three clusters: 1) ESG data, 2) governance structures, and 3) impact measurement methodologies under the shift from voluntary to mandatory sustainability reporting. Each interview was semi-structured and lasted 30 to 45 minutes, sufficient to cover the prepared interview questions and allow time for comprehensive responses. The interviews were structured around eight to ten questions, with five being fixed and repeated in each interview to ensure comparability. The other three to five questions were tailored to the interviewee's area of expertise to broaden the scope and depth of the findings.

Due to the limited extent of this research, the regulatory scope focused on the CSRD, established to improve and standardize sustainability reporting by companies within the EU. The CSRD will be phased in for reporting years 2024, 2025 and 2026+. It first targets companies that meet at least two of the following criteria (EUR-Lex 2024):

1) Number of Employees: More than 250 employees.
2) Net Turnover: Exceeding €50 million.
3) Total Assets: Exceeding €25 million.

The range includes large manufacturing corporations as those significantly impact society and the environment, marking their actions as crucial to reach sustainable development.

Limitations are that scoping reviews rather focus on breadth than on depth of each reference, overgoing a critical meta-analysis. The actuality of the topic comprises the number of suitable literature and the maturity of the experts' knowledge base in this evolving field. Specifically, the first CSRD reports, that allow benchmarking, will only be published in March 2025.

Data analysis

Results from secondary sources were identified by an inductive thematic analysis as an iterative and reflective process, ensuring trustworthiness (Nowell et al. 2017). Notes were taken continuously during full-text screening, followed by the initialization of deductive codes to identify relevant factors (Horlings et al. 2020). Primary research followed similar, entailing systemic coding of the interview transcripts, and categorizing those into codes (Table 2). Thereafter, interpretation focused on the research objective, reflecting specific insights to the greater universal to backbone the data collection process.

Results

Corporate Sustainability Reporting Directive

Alignments in governance structure

Back to 2018, interviewee P2.I memorizes a first link of ESG data with financial information in the company, marking an initial effort in integrated reporting to enhance transparency in both financial and non-financial impacts. Although this initial integration improved ESG disclosure, the reports were somewhat fragmented, resembling two separate documents combined post hoc. By 2022, the company's IPO and related investor-driven ESG demands, influenced by regulatory pressures, resulted in more integrated and collaborative reporting processes between

financial and non-financial teams. Despite progress, P2.I observed gradual development, marked by continuous adjustments. Experts anticipate that under the CSRD, sustainability reporting will shift towards finance departments or specialized ESG units. Marketing teams, which historically managed sustainability communications often lack the technical skills needed for complex ESG metrics and audits. This transition is expected to formalize governance structures with clearer roles and responsibilities to ensure reliable, high-quality non-financial disclosures.

P6.C emphasized that sustainability topics, i.e., shaped by regulatory demands, are contextual and hence, influenced by timing, technological feasibility, and methodological maturity. All interviewees observed that companies feel pressured by the CSRD, demanding significant resources for reporting purposes. Compared to sustainability reporting as an immediate need, impact measurement holds a strategic position, going beyond compliance or communication alone. While the CSRD's DMA includes some aspects of impact measurement, it falls short of leveraging its full potential. P4.C says that from a scientific view, referencing frameworks like Life Cycle Assessment (LCA), "a broader range of data points than demanded by the CSRD framework is essential to fully capture ESG impacts". Experts agree that current ESG data methodologies may not be optimal compared to more expansive scientific standards.

Improved ESG data transparency

The experts indicate six prime CSRD-affected ESG data criteria (Figure 3).

As for scope, mandatory reporting has broadened the requirements for ESG impact data and provided clearer range definitions. P7.C exemplifies the ESRS S2 Workers in The Value Chain, influenced by directives like the Lieferkettensorgfaltspflichtengesetz (LkSG) or CSRD. Consequently, data collection along the supply chain became more extensive, both in scope and detail, disclosing all impacts. Accordingly, this requires a comprehensive data portfolio with newly collected information. P7.C emphasizes that "we need to put a face to people that are faceless in sustainability knowledge".

Moreover, industry experts reveal that under voluntary reporting, the ESG data collection was initially done using Excel. Today, a specialized ESG software improves the collection process from all subsidiaries, minimizing technology-related data gaps. P2.I says: “The shift to mandatory ESG reporting improved the quality of integrated reporting.”

Aligned with an Accenture study (2024), data quality depends on the refinement of frameworks and controls to establish automated ESG data collection. P6.C highlights that evolving reporting regulations aim for data quality that is consistent for both ESG and financial data. The experts add that the CSRD audit requirement plays a key role in stimulating higher data quality. Mandating ESG reporting, they recognize a stronger focus of corporations on compliance, accordingly providing credible ESG data for audits. Further, seeking trust from the investors, companies invest to enhance the accuracy and reliability of their data measurement, naturally improving data quality and credibility.

The interviewees recognize the CSRD’s ambitious goal to create a unified ESG reporting standard but highlight challenges related to its complexity. Existing frameworks like TCFD and GRI, coupled with certifications like EcoVadis, add to a fragmented reporting landscape. The CSRD, yet, aims to enhance interoperability among these to harmonize data disclosure. P5.D spotlights the relevance for non-EU countries, i.e. the UK. “Some of these countries might orient themselves on CSRD to develop greater standardization” in their reporting standards. Non-EU companies subject to CSRD requirements must adhere to ESRS for their subsidiaries, but might potentially adopt organization-wide reporting practices. These dependencies stress the urgency for a single standard, though the interviewees concern such unlikely to emerge. Critics argue for a broader perspective, as the Corporate Sustainability Due Diligence Directive (CSDDD), EU Taxonomy, and other financial regulations introduce distinct requirements for interoperability, transparency, and related data measurement. However, agreement occurs on the minimum of unified reporting standards, improving data comparability for benchmarking.

Summarizing, mandatory reporting provides a defined scope but requires a defined approach. Such enable standardized ESG impact data collection and visualization, making comparability effective. Experts believe that industry-specific lighthouse projects could emerge through greater comparability, driving both corporate profit and sustainable development. Though, "while data is crucial, it is neither standardized nor universally accessible", says P3.C, criticizing the current ESG landscape. P1.F expects challenges for the first CSRD companies from the absence of clear, comparable references, which might refine the standards over time.

Re-orientation of stakeholder communication

The interviewees note that societal pressure is critical in enforcing corporate accountability, with reputational risks acting as penalties for poor ESG performance. Exemplarily, the ESRS S3 Affected Communities will be increasingly important in comparing reported ESG performance with actual business performance. Thus, stakeholder dialogue becomes even more critical for large corporations as transparency expectations rise. Other experts claim mandatory reporting as mainly investor-oriented, but also relevant for clients and internal stakeholders, i.e., employees, who evaluate employer attractiveness based on ESG performance. Departments within organizations, and decision-makers such as the CFO and COO, also utilize ESG data for capital planning and strategy development. Furthermore, policymakers play a crucial role as external stakeholders, urging companies to align with national and international climate goals.

Impact measurement

Concept analysis: directive as driver for improved ESG data collection

The interviews reveal that data improvements with mandatory ESG reporting are driven by a confluence of scientific, regulatory, and stakeholder-oriented factors. "Science has realized the effects of e.g. climate change", providing compelling evidence and its sector-specific impacts, such as in transportation, and private households. This scientific basis has catalyzed the prioritization of climate issues by international organizations like the United Nations, gradually permeating through EU directives, e.g. CSRD, and lastly, national legislation, e.g. the LkSG.

Regulatory adherence further accelerates the shift, while voluntary frameworks such as the GRI and the VBA often lack sustained managerial support. The mandatory regulations, especially when tied to remuneration-related KPIs, incentivize management to integrate ESG into business practices. Lastly, stakeholder interests, particularly from investors, play a pivotal role. Companies are increasingly motivated to ensure high-quality, consistent ESG and financial data transparency to meet market expectations, as exemplified by the use of ESG rating scorecards to benchmark performance. Collectively, these drivers underscore the multifaceted forces behind the transition toward improved data measurement under mandatory ESG reporting.

Problem analysis: similar constraints perceived of current impact measurement

Systemic barriers occur due to inconsistencies across ESG dimensions under the CSRD (Table 3). While climate-related reporting, guided by ESRS E1 Climate Change, benefits from clearer frameworks, other areas, e.g., biodiversity, face significant gaps due to undefined terminologies and inconsistent impact measurement methodologies. Holistically, the CSRD defines "impact" as encompassing all corporate effects on nature and society, but challenges remain in fully understanding and operationalizing these definitions across sectors. Hence, difficulties arise in translating complex terminologies into actionable insights, and the underrepresentation of nature as a “silent” stakeholder, alongside the absence of a universally equitable social framework, exacerbates the challenge.

Additionally, the interviews revealed systemic barriers in the context of the DMA, resulting in inconsistent ESG data. Standardized regulatory methodologies are scarce, as corporations often use individualized approaches, i.e., stakeholder evaluations or diverging scoring systems. Further, the subjectivity in determining materiality amplifies these challenges. Practitioners retain significant discretion in deciding which issues are deemed material, with decisions often influenced by resource constraints and data availability. This subjectivity allows manipulation, as companies may downplay or omit significant negative impacts of business activities. For instance, one expert noted concerns after participating in a study of a manufacturing company

which revealed child labor incidents in the supply chain. However, “this data was never publicly communicated” and classified as non-material. Consequently, under the current CSRD, companies might justify such omissions through subjective scoring or by providing reasons for non-disclosure. This underlines the need for more robust and standardized measurement guidelines to ensure accountability and comparability in ESG reporting.

Operational challenges lie in inadequate IT infrastructures to meet the granular data demands. P4.C rates current ESG data quality low (score 2-3 on a scale of 1-15) due to insufficient depth and inconsistent formats. P7.C says that the “reliance on assumptions during data modeling exacerbates inconsistencies”, as internal and external data sources are used but vary in format, accuracy and completeness. However, mandatory reporting induced a shift from secondary to primary data, driving authenticity and credibility. This evolution enhances the assessment precision, moving from broad polygon assessments to specific point assessments of company-specific risks, reducing uncertainty and the margin of error. The experts emphasized to define clear KPIs to reduce ambiguity, align non-financial reporting with financial data practices, and enhance comparability. Unlike financial data, non-financial data lacks a universal unit and may require contextualization or monetization to be meaningful. However, monetizing ESG data remains complex, though it offers potential for standardization and clearer risk valuation. Two domains of monetization are impact valuation, voluntary but beneficial for broader scopes, or risks and opportunities, increasingly monetized through analyses of capital and operational expenditures. Latter are scrutinized for exposures to environmental, market, and regulatory shifts. Financial components are anticipated to shape reporting practices.

Further, concerns regarding the regulatory framework for sustainability reporting upraised. While the mandate for external assurance of ESG reports may heighten corporate accountability, it risks creating burdens from inconsistent auditor capabilities. According to P1.F, “politicians ask for smoother handling but auditors add stricter requirements rather than

pragmatic support". P9.C adds that "in the first wave of CSRD reports, data credibility will depend on audit quality". Correspondingly, current penalties, as by the Federal Financial Supervisory Authority (BAFIN) and the handling of the LkSG, are insufficiently strict, as being focused on procedural errors rather than sustainability outcomes. Comparatively, France's CSRD penalty model was cited as a potential benchmark for driving stricter compliance in Germany, though yet infant with a focus on instances of willful omission and procedural errors. "Such introduction in Germany would mean a radical change for companies" as knowledge gaps in ESG areas and strategy development present additional challenges for corporations attempting to align with evolving directives. Despite, interviewees emphasized that adequately enforced regulatory pressure, coupled with stringent, well-formalized targets and penalties, could enhance the authenticity and credibility of ESG data.

Moreover, the interviewees noted that the ESRS, which form the CSRD, were released only shortly before reporting requirements came into effect, creating a short-term constraint of building capabilities and resources. Critics concern a gap in clear guidance for implementing these standards, which adds to the complexity for corporations and the quality of ESG data.

Case analysis: Value Balancing Alliance as a purposeful, but yet non-feasible approach

The Value Balancing Alliance (VBA) is viewed as an ambitious effort to standardize impact measurement and monetization frameworks. Companies recognized its innovative potential, particularly in demonstrating the economic value of ESG impacts, but face significant challenges in interpreting and applying the methodology. The abstract nature of ESG data, such as the "lack of consensus on how to measure e.g. the social cost of carbon," compounds the challenges of accurate monetization. Further, while the VBA emphasized standardization, ESG data comparability remains elusive due to inconsistent quality, modeling assumptions, and varying data sources. These operational challenges highlight the need for expert involvement, as management often lacks the expertise to effectively interpret insights. While the VBA's

efforts represent a purposeful step toward standardized impact assessments, its practical application remains constrained by methodological and operational barriers.

The “optimal” impact measurement methodology

Solution analysis: development of an “optimal” methodology

An "optimal" impact measurement methodology entails clarity, credibility, and broad applicability, with the desired outcomes to guide its design. Experts emphasized "end-to-front", working backward from the ultimate objectives to structure the methodology. Consistent application across industries requires a universally understandable framework. To enhance comparability, a complementary catalogue of ESG topics might enable better IRO organization and focus on critical challenges, e.g., pollution. While progress continues in specific areas, such as the improved categorization of microplastic-risks, misunderstandings remain to categorize ESG risks for i.e., raw material items. In an ideal scenario, inconsistencies through data operationalization would not exist. The proposed framework includes three core components:

1) Comprehensive accounting for negative ESG impacts, ensuring a holistic perspective.
2) Clear identification of boundaries and tipping points to recognize the most critical areas of concern where negative impacts are closest to critical thresholds.
3) Concise development of mitigation measures. Similar to advancements in GHG assessments, potential exists for other environmental impacts, such as micro-particles.

The interviewees accentuated the potential of an “optimal” impact measurement methodology that aligns with evolving ESG standards. The CSRD was recognized as a valuable driver for improving ESG measurement, however, its complexity, particularly concerning resource and mineral data, poses significant challenges for implementation. P1.F says: “I am to 98% sure, that impact measurement will evolve positively, slowly, but it will certainly improve once requirement complexity reduces”. Correspondingly, the VBA framework is a promising methodology that could be adapted for CSRD requirements. It provides benchmark scoring models that could enable objective materiality assessments. Further, ESG impact valuation is a

critical innovation to clarify the economic implications of sustainability initiatives. P8.I illustrated the transformative potential of ESG transparency by piloting the VBA methodology in a manufacturing context. By revealing a substantial water footprint within the operations, the transparency motivated substantial investments in sustainable R&D, ultimately targeting water-free operations. This highlights how transparency can drive strategic sustainability decisions. The interviewees recognized the progress made with CSRD's phase-in requirements and stressed the need for full enforcement and institutional support, e.g. EU Commission sponsorship, to fill data gaps and reduce the financial burden of developing methodologies.

Discussion

Interpretations from different perspectives

Overall, the integration of concepts such as the Doughnut Economics and Planetary Boundaries guides businesses toward sustainability performance (Demastus and Landrum 2023). ESG disclosure emerged as a market trend influenced by regulation or investor demands. Thus, recent efforts to harmonize accounting through international standards and their integration into national law reflect the need for consistent sustainability reporting (Oliver Yebenes 2024). However, challenges related to international interoperability underline the complexity of global adoption. Literature discusses that existing directives, e.g., the Non-Financial Reporting Directive (NFRD) prioritize shareholder value creation while often overlooking the criticality of natural resource conservation (Arvidsson 2023; Flower 2015). ESG has gained a notable traction among investors (Rawhouser et al. 2017), signaling a shift towards corporate accountability. Specifically, catalysts for ESG transparency are attributed by 70%, with a growing trend, to regulatory mandates, which experts note being the strongest catalyst. Another 30% are attributed to investor-driven factors.

Accordingly, both, literature and experts mark the shift towards ESG reporting as a paradigm change and emphasize the interdependence between long-term profitability and planetary health (Täger 2022). However, experts doubt the change's stability, as overshooting planetary

boundaries could create a two-tier system between few adaptable businesses and those left behind. Hence, to become better adaptable, corporations must assess, understand, and mitigate their ESG impacts to maintain their "license to operate".

It became evident that regulation drives such evolution, with policy makers opting either for prescriptive measures, e.g., the 2023 microplastics regulation, or for greater industry transparency to foster a deeper impact understanding. Compared to the EU Taxonomy, the latter mechanism gradually enhances broad corporate understanding of ESG issues.

Nevertheless, experts recognize varying responses from companies, e.g., with BASF adopting a compliance-driven strategy to maintain its reputation facing stakeholder pressure. Literature adds that management's clarity of purpose, whether compliance-driven or opportunity-driven, determines the organizational capabilities required to effectively navigate this transition. Thus, the move towards mandatory reporting represents not only a regulatory shift but also broader understanding that sustainability and profitability are not mutually exclusive, with planetary boundaries serving as a critical guideline for long-term business strategy.

Consequently, experts and literature agree that companies must re-evaluate how they interpret and act on planetary boundaries which requires harmonized, clear terminology. Driving sustainable practices requires advocacy by internal ESG champions and effective bottom-up communication. Experts say "sustainability is not a cult, we can disagree but we need mutual understanding". Thus, the experts advocated for precise definitions and consistent ESG frameworks, including better definitions of tipping points and impacts. While climate tipping points are widely recognized and defined in literature, their implications, i.e., the climate events in Valencia in November 2024, remain poorly understood.

Correspondingly, the experts complain that this gap results in fragmented, isolated practices. Literature further reveals missing standardization across ESG schemes, noting that the GRI's non-prescriptive approach to targets or thresholds creates confusion and hinders consistent

implementation (Siew 2015; GRI 2022; Demastus and Landrum 2023). To address this issue, experts suggest regulation-driven advocacy by facilitating target-setting with clear definitions of thresholds and tipping points, particularly as global climate impacts interact with local conditions. Literature proposes to use the Doughnut as a target-setting tool.

Overarching agreement exists that the mandatory ESG reporting requires a restructuring of responsibilities, with finance seen as critical to ensuring governance efficiency. By 2023, about half of the DAX40 companies shifted primary responsibility to the CFO and finance function (DRSC 2023), leveraging existing skills and resources for better ESG data.

Complementary, research accentuates credible ESG data. To ensure the usability of data, experts suggest to adopt KPIs for specific production processes, sites, or products. These metrics should balance leading and lagging indicators, providing a comprehensive view of ESG performance and facilitating management improvements while addressing planetary boundaries through robust and enforceable reporting (Maas, Schaltegger, and Crutzen 2016).

Specifically, the CSRD is a recognized enabler for standardized ESG disclosure, but its comprehensiveness is questioned when compared to scientific frameworks such as Life Cycle Assessment (LCA). Under this view, experts argue that the CSRD's reliance on generic ESG metrics may not adequately capture the full range of ESG impacts. Hence, despite its value as a reporting tool, it appears less effective for strategic decision-making. One manager adds that "the extensive scope of the CSRD data landscape makes it too intricate to be effectively used for strategic decision-making", limiting its utility beyond compliance and highlighting the need for impact-based frameworks that balance detail with strategic applicability.

Recommendations addressing the research question

Following the discussed limitations of the CSRD and extensive requirements, two fundamental tools can make ESG data an efficient instrument. First is regulation that targets harmonization and homogenization of disclosures. Second is clear guidance for standardized measurement. The analysis suggests eight recommendations for policymakers and practitioners (Table 4).

Expert hubs: Establish five cross-EU hubs with experts from industry, law, finance, IT, and politics to exchange ESG knowledge. These hubs should develop homogenized and accessible methodologies for impact measurement, under public sponsorship i.e. by the EU Commission.

Structured timeline: Adopt precise timelines for ESG goals to improve data quality. Policy makers should provide clear, incremental support, allowing ample room for business innovation and preparation, while avoiding overly rigid regulation that could stifle creative solutions.

Refined governance structures: Restructure corporate responsibilities to implement early change management to anticipate resource requirements and align stakeholders with ESG goals. Enable cross-functional collaboration between finance, marketing, and dedicated ESG teams. Create an adaptive, connected governance model that supports sustainable development. Invest in training to increase employee motivation and understanding of sustainability principles.

Strategic tools: Link executive remuneration to measurable ESG KPIs, i.e., decarbonization indices, to drive management engagement and data-based decision-making. This induces the shift from compliance-oriented ESG data collection to comprehensive impact measurement, enabling the formulation of long-term strategies aligned with both ESG requirements and profit.

ESG controlling: Monetize ESG data to improve granularity and understanding. Emerging trends in valuation are the monetization of i.e. CO_2 intensity and the social cost of carbon. This proactive approach can drive C-level discussions around sustainability as a value driver.

For practitioners, data granularity requires better IT infrastructure to improve data collection.

Impact taxation: Develop policies with taxation based on environmental impacts, such as on pollution or negative externalities in the next four years. Hence, ensure product pricing reflects environmental costs to motivate companies to prioritize ESG as a pathway to profitability.

Performance-linked concepts: Implement performance-based mechanisms to enhance sustainability practices. Establish clear, measurable ESG targets, backed by penalties for gross negligence, fraudulent misrepresentation, or willful intent. Similar to performance-based ESG

loans, this incentivizes companies to prioritize accurate data collection, impact measurement, and strategy development. It will require strong compliance systems to navigate evolving regulations and stakeholder expectations, positioning them as sustainability leaders.

Public, independent audit: Mandate that independent audits be carried out 100% by public sector auditors to strengthen the credibility and reliability of ESG impact data. This mitigates concerns about the dual role of paid auditors, in both advisory and audit positions, and ensure objectivity. Standardized public audits promote transparency, increase confidence in ESG data, and stirs companies to improve their measurement practices to align with credible benchmarks.

Limitations

The expert interviews and literature review mark limitations to the research. First, 70% of interviewees cite company size and maturity to significantly impact exposure to CSRD requirements and external pressures addressed by the recommendations. Larger companies often possess established ESG strategies and dedicated resources, providing initial implementation flexibility but facing challenges due to rigid structures. Smaller companies benefit from streamlined communication but often lack the resources and data necessary for comprehensive ESG integration. Second, uneven implementation of the CSRD across the EU, 17 member states have yet to adopt it, creates regulatory uncertainties. Third, limited access to ESG expertise due to low response rates and limited availability of experts, compounded by data privacy concerns, constrained the research's depth, particularly in ESG valuation. Finally, while the analysis of impact measurement approaches contributes theoretically, practical corporate application requires refinement. The immediate operational relevance of the findings is restricted by the strategic prioritization of ESG-related opportunities and risks, as well as their influence on competitiveness and performance (Calabrese et al. 2019).

Recommendations for future research

Future research should diversify the network of interview partners. Consultants hold a holistic view, but are typically engaged only after problems arise, limiting the scope of insights. Further,

all assertions are based on a single-point analysis. Given the dynamics in the field and ongoing discussions at the time of writing, it is crucial to reassess both primary and secondary sources. This will provide a more authentic and updated understanding of the field's evolution over time.

Conclusive remarks and outlook

The CSRD marks progress in impact measurement but remains largely compliance-driven, limiting its strategic utility. As highlighted in the interviews, its utility for strategic management remains limited due to the extensive scope of the ESG data it requires. While regulatory enforcement can improve disclosure practices in the short term, meaningful sustainable development requires companies to move beyond compliance, using ESG impact data to drive actionable change. Prescribed penalties and targets are expected to become efficient enablers. European historical trends indicate that regulation can spur innovation, suggesting that solutions should arise from creative exploration rather than restrictive policies alone. This emphasizes the need for collective accountability and cross-sector collaboration. Governments, businesses, and NGOs must jointly develop transparent, credible ESG impact data methodologies to support decision-making. A learning by doing approach will help standardize processes, optimize resource allocation, and produce innovative ESG reports. Ultimately, aligning compliance with strategic action is essential to achieving sustainability goals and enhancing business performance. Theoretical and practitioner-based insights suggest that integrated approaches to sustainability performance measurement, management, and reporting should be prioritized in C-level discussions. Whether focusing on compliance, communication, or decision support to enhance ESG performance and profitability, the objective remains to develop robust and credible impact measurement methodologies that balance compliance with actionable strategies for sustainable development.

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Appendix

List of abbreviations

EFRAG
The European Financial Reporting Advisory Group is a private organization under the support of the European Commission. It contributes to the development of the International Financial Reporting Standards (IFRS) and participates in international debates in the field of financial reporting.

ESG
ESG stands for Environment, Social, and Governance. These three key dimensions build the foundation of methods, criteria, and frameworks. Though mostly encompassed in financial terminology, ESG in this study stands for all sustainability matters for corporations to account for their sustainability requirements.

ESRS
The European Sustainability Reporting Standards comprise a set of rules for standardized sustainability reporting. The disclosure requirements encompass about 1,000 ESG data points and address EU and non-EU corporations that are subject to the Corporate Sustainability Reporting Directive. The ESRS were developed by the EFRAG in November 2022 and enforced by the European Commission in July 2023.

GRI
The Global Reporting Initiative is an international and independent organization and developed a set of voluntary reporting standards for sustainability matters. The GRI framework was first published in 2000 and addresses all companies globally.

LCA
Life Cycle Assessment is a systematized, scientific method for aggregating and assessing a product or service´s inputs, outputs, and potential environmental impacts throughout its life cycle. With its detailed insights into inputs such as materials, natural resources, or energy consumed, it is often used as a tool to inform strategic decision-making.

NFRD
The Non-Financial Reporting Directive of the European Parliament mandates the disclosure of non-financial and diversity information of large corporations to provide transparency to investors, consumers, policymakers, and other stakeholders.

TCFD
The Task Force on Climate-related Financial Disclosures demands a comprehensive reporting of a company´s climate-related risks and opportunities and their financial impact on the corporation. The framework is established among public companies and other organization and integrated into existing reporting processes.

List of tables and figures

Table 1: List of interview partners, anonymized and categorized

Participant*	Position	Industry	Core Competency within ESG & Sustainability	Gender
P1.F	Senior Consultant	Finance & Consulting	ESG Compliance & Reporting	M
P2.I	Manager	Automotive	ESG Communication & Compliance	M
P3.C	Principal	Consulting	ESG Strategy; Impact Valuation	M
P4.C	Manager	Consulting	ESG Value Chain Strategy	M
P5.D	Director	Technology	ESG Data & Strategy	M
P6.C	Manager	Consulting & Science	ESG Data & Strategy; Impact Valuation	F
P7.C	Manager	Consulting & Science	ESG Data & Strategy; Impact Measurement	F
P8.I	Manager	Automotive	ESG Communication; Impact Valuation	F
P9.C	Consultant	Consulting	ESG Compliance & Reporting	M
P10.D	Lecturer	Science & Academia	ESG Data; Impact Measurement	M
P11.I	Director	Glass & Ceramics	ESG Strategy & Compliance	M

*with F = Finance, I = Industry, C = Consulting, D = Data

Table 2: List of codes deducted from interview transcripts

Code Number	Codes deducted from interviews
1	Shift from voluntary to mandatory reporting: recent developments, ESG ratings
2	Drivers: science, society
3	CSRD status quo: complexity, time- and knowledge-constraints
4	ESG & sustainability communication: investor-oriented vs. purpose-driven, report visualization
5	Governance structures: finance vs. marketing departments, dedicated ESG teams, top-down initialization
6	ESG & impact data shortcomings and improvements: scope, collection, quality, comparability
7	Desired impact measurement improvements: ESG controlling, guidelines, monetization
8	Influencing factors: audit rigor, company size and maturity, software solutions

Table 3: List of key insights clustered across stakeholder groups and deducted codes

Stakeholder group	CSRD industry status quo	CSRD-effect on ESG and impact data	Shift in sustainability communication	Improvements in impact measurement
CSRD & compliance expert from finance (F) n=1	• Shortcoming in guidance and standardized ESG methodologies	• Improvements in data quality due to audits	• Mostly investor-oriented, continuing from ESG ratings	• Improved metrics driven by better scope & depth of data enhance valuation data such as carbon intensity ratio
ESG data expert (D) n=2	• Lack of knowledge regarding ESG data collection and metrics	• Better comparability due to standardization • Differentiated data through broader scope	• Increase in depth & creativity of reports once CSRD becomes more established	• Targets improved calculation approaches & metrics but lacks standardization • Higher investments in IT infrastructure
ESG & compliance industry expert (I) n=3	• Too high complexity & resource consumption • Lack of ESG expertise. ESG data complexity is higher than finance data	• Improved collection through data software • Increased interlinkage of financial & non-financial data	• Better comparability through standardized visualization • Strategy reorientation aligned with investor interests, continuing from ESG ratings	• Increased pursue for ESG transparency exists • Communication objective should determine the impact assessment (end-to-front approach) • Implementation success is driven by employees´ intrinsic motivation but initiated top-down • Lack of clear guidelines & frameworks across all ESG dimensions impedes data credibility • CSRD alone is not sufficient for strategic reorientation, incl. impact assessment
ESG & compliance expert from consulting (C) n=5	• Regulatory pressure too high. Risks data quality and impact seeking • 1st year audit rigor is a burden, not a driver	• Increased data authenticity due to better defined & broader scope • Improved data harmonization the better the integration	• Higher transparency on S-topics • Broader stakeholder orientation	• Requires a more comprehensive measurement of the actual negative impact • Must be linked to clear boundaries & tipping points • Data sources must be well understood • CSRD supports the improvement but is not well suited for actual impact measurement

Table 4: Overview of key recommendations, including a proposed implementation strategy with short- and long-term horizon and monitoring KPIs

Activity*	Implementation steps	Short-term actions	Long-term actions	KPIs
Expert hubs	Establish 5 cross-functional ESG expert hubs within the EU	Years 1-2: Expert recruitment and set up of operational infrastructure for hubs. Draft, test, & refine harmonized ESG	Year 3: Finalize and publish methodologies, monitor sector success,	Number of operational hubs created within 24 months. Recruitment of

		impact measurement frameworks	and host dissemination events for stakeholders	50+ cross-functional experts
Structured timeline	Co-develop a clear timeline for ambitious sustainability goals across industries	Year 1: Co-create sector-specific sustainability guidelines with policymakers and industry. Years 2-3: Roll-out targets, balancing regulatory oversight & innovation potential	Years 4-5: Evaluate sector implementation success to refine policies and scale successful innovation and progress	Publication of refined, actionable guidelines within 12 months. Realization of 30% improvement in key ESG outcomes in year 5, externally validated
Refined governance structures	Restructure corporate responsibilities aligned with resource requirements	Months 1-6: Identify ESG resource requirements. Build a Sustainability Steering Committee or ESG Lead, collaborating with cross-departmental representatives	Months 6-12: Establish internal ESG training programs and co-create adaptive governance model with external consultants	Formalization of cross-functional steering committee by month 3. Organization-wide roll out by month 12, with $\geq$ 75% target achievement
Strategic tools	Integrate ESG in executive remuneration, creating a dual linkage to both ESG and financial performance	Months 1-6: Identify ESG KPIs and update remuneration policies. Initiate dual linkage and train management on integrating ESG metrics into strategic decision-making		80% increase in ESG data collection, verified by audits. Achievement of predefined ESG milestones. Positive correlation between sustainability performance and profit
ESG controlling	Adopt an ESG monetization strategy and improve accounting mechanisms	Year 1: Upgrade IT infrastructure and integrate monetization metrics into ESG reporting frameworks	Year 1+: Use granular ESG data for sustainability discussion at C-level	Adoption of ESG data in >2 valuation models
Impact taxation	Develop an impact-based taxation framework to align corporate pricing with sustainability performance	Year 1: Define impact metrics and discuss externality-based taxation frameworks with industry, policymakers, and ESG experts.	Years 2-3: Pilot program & ESG impact data collection in industries such as manufacturing. Develop compliance & monitoring tools, i.e. digital solutions for tax calculation	Publication of a draft framework within 12 months. 80% participation rate in pilot industries, incl. reports. 50% reduction in targeted externalities within 2 years post-implementation
Performance-linked concepts	Implement clear, measurable ESG targets and enforce penalties	Year 1: Form cross-functional working groups/ use expert hubs to defines ESG metrics, penalties, and incentives aligned with regulatory needs and industry benchmarks. Build and pilot compliance systems, incl. real-time ESG data monitoring platforms	Year 2-3: Conduct corporate trainings for new system, ensure stakeholder engagement, and enforce full-scale implementation across all CSRD-compliant organizations	Framework adoption by 90% of CSRD-reporting corporations until month 6. 85% improvement in ESG data accuracy, reported by audits in year 1. 15% increase in ESG-related investment flows into compliant organizations
Public, independent audit	Mandate ESG reporting audits to be conducted by public-sector auditors	Year 1-2: Expand public-sector auditing capabilities, incl. ESG training for specific skills. Refine standardized ESG audit protocols, aligned with international reporting standards	Year 3-4: Pilot public ESG audits across the manufacturing industry. Enforce full compliance with "reasonable assurance" verified by public-sector audits	Compliance of 90% CSRD-companies to public-sector ESG audit mandates in year 1. 100% elimination of dual roles (consulting + auditing) among public-sector audits by year 2

*based on insights from primary and secondary research.

Figure 1: PRISMA Abstract Checklist for scoping review

TITLE			
Title	1	Identify the report as a systematic review.	No
BACKGROUND			
Objectives	2	Provide an explicit statement of the main objective(s) or question(s) the review addresses.	No
METHODS			
Eligibility criteria	3	Specify the inclusion and exclusion criteria for the review.	Yes
Information sources	4	Specify the information sources (e.g. databases, registers) used to identify studies and the date when each was last searched.	No
Risk of bias	5	Specify the methods used to assess risk of bias in the included studies.	Yes
Synthesis of results	6	Specify the methods used to present and synthesize results.	Yes
RESULTS			
Included studies	7	Give the total number of included studies and participants and summarise relevant characteristics of studies.	Yes
Synthesis of results	8	Present results for main outcomes, preferably indicating the number of included studies and participants for each. If meta-analysis was done, report the summary estimate and confidence/credible interval. If comparing groups, indicate the direction of the effect (i.e. which group is favoured).	Yes
DISCUSSION			
Limitations of evidence	9	Provide a brief summary of the limitations of the evidence included in the review (e.g. study risk of bias, inconsistency and imprecision).	Yes
Interpretation	10	Provide a general interpretation of the results and important implications.	Yes
OTHER			
Funding	11	Specify the primary source of funding for the review.	Yes
Registration	12	Provide the register name and registration number.	Yes

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. 2020. "The PRISMA 2020 statement: an updated guideline for reporting systematic reviews." MetaArXiv. doi: 10.31222/osf.io/v7gm2. For more information, visit: www.prisma-statement.org

Figure 2: Exemplary interview transcript

Participation in an interview for empirical research
Interviewer: Lisa Marie Loehr
University: Nova School of Business & Economics
Date: 09.10.2024
Duration: 45min

Disclaimer: *the qualitative data collection serves empirical research for a master thesis at Nova School of Business and Economics. All data and personal information will be handled confidentially and will not be published without further consent.*

A. INTERVIEWEE PROFILE

1) What is your role and responsibility within your company?

As a Senior Consultant, the interviewee focuses on the financial aspects of ESG Compliance and Reporting. He advises clients across a wide range of industries, particularly on the implementation of frameworks like CSRD, guiding them through the intricacies of ESG integration. His expertise in ESG began during his master's studies in finance, where he explored its early development as an investor-driven initiative, primarily gaining momentum in the U.S.

2) Could you please share your expertise and experience about and with the evolvement of CSRD?

He has a deep and well-rounded expertise in ESG, beginning with his master's thesis, which focused on this area. Early in his career, he worked as a portfolio manager with a focus on ESG investing, further expanding his knowledge. He also holds the CFA ESG Investing certificate, enhancing his professional qualifications in this field. Currently, he leads the CSRD initiatives at his consulting firm, where he plays a key role in guiding clients through the evolving regulatory landscape. Additionally, he is a member of a voluntary expert group with EFRAG, contributing to the development and interpretation of CSRD standards.

B. SUSTAINABILITY REPORTING AND ITS EVOLUTION

3) Could you elaborate on the integration of sustainability into the financial reporting of your client´s companies and have you recognized a development in recent years?

The consultant has observed that integrated sustainability reporting largely **correlates with company size**. Larger companies tend to perform better in this area because they have more resources, dedicated full-time employees, and greater access to investors who, nowadays, prioritize ESG factors. These companies are generally better equipped to implement and report on sustainability initiatives. However, some smaller firms, despite having fewer resources, can excel in this area due to specialized expertise, making them noteworthy outliers in the broader trend.

4) What do you perceive as the most significant drivers, limitations or constraints for the integration of ESG into financial reporting?

He perceives several key drivers and constraints when it comes to integrating ESG into financial reporting. Overall, he highlights **management as the most significant stakeholder**. On the driver side **intrinsic motivation** plays a crucial role. When both management and employees are genuinely committed to making a positive impact, the integration of ESG becomes more effective. Additionally, the **political dynamics** within a company also influence ESG adoption. As for constraints, he notes that a **top-down approach** driven by regulatory pressures can sometimes hinder progress. For instance, management may refuse to disclose certain data due to cost concerns, or there may be a lack of employee motivation and insufficient

capabilities within the organization, which can slow down the ESG integration process and thus, data collection.

C. REGULATORY INFLUENCE OF THE CSRD

5) In your opinion, will the CSRD drive greater standardization in impact measurement frameworks across large manufacturing companies? If so, how might this affect the comparability of data across sectors?

   Observing the evolving landscape, the interviewee believes that **regulatory force**, such as the CSRD, will indeed drive **greater standardization** in ESG impact measurement. Historically, voluntary ESG data reporting has been more individualized, with companies often choosing to disclose only what presents them in the best light. However, the regulatory force of the CSRD will increase **comparability across sectors**, putting pressure on companies to improve their ESG data measurement and transparency.

   One area where improvement is necessary concerns the **double materiality assessment**, an integral part of the CSRD. For this requirement, standardization from a regulatory perspective is still evolving. Currently, there is a **lack of clarity** in the **assessment methodologies**, as such is mostly handled individually by companies. Those use different double materiality assessment approaches such as stakeholder evaluations or deviating scoring systems. This leads to **inconsistent comparability** of ESG data. Further, **several interpretations of impact exist**. While definitions for ESG impact exist from EFRAG, they are complex and **not always well understood**. The first wave of companies reporting under the CSRD may face challenges due to the absence of clear, comparable references, but this pressure is expected to **refine the standards over time**.

6) Do you believe that the requirement for external assurance of sustainability reporting, as outlined in the CSRD, will improve the credibility of impact measurement methodologies?

   He believes that the requirement for external assurance of sustainability reporting under the CSRD will put **pressure** on companies, but not necessarily in a constructive way. One key issue is the **lack of capabilities among auditors**, as inconsistencies exist between auditors in how they handle this emerging topic.

While companies are calling for a smoother, more supportive approach, auditors often impose stricter requirements, which can be more **burdensome** than helpful.

As a result, the consultant expects the impact on the credibility of ESG data to be minor, especially in the early stages of CSRD reporting. Auditor constraints and the learning curve associated with this new requirement may lead to weaker data quality in the first year, as companies and auditors alike adjust to the new standards through a "**learning by doing**" approach.

D. FORWARD LOOKING: FROM VOLUNTARY TO MANDATORY REPORTING

7) What do you see as the ultimate objective of the shift from voluntary sustainability reporting to mandatory sustainability reporting? *(e.g. induced by CSRD)*

The consultant sees the ultimate objective of the shift from voluntary to mandatory sustainability reporting, such as that driven by the CSRD, as a response to the **growing demand for ESG data from multiple stakeholders**. Society and investors are particularly interested, although their motivations differ: investors focus on the financial implications of ESG, while society is more concerned with the broader impact by companies on sustainability. This shift reflects a **paradigm change toward a sustainable economy**, where transparency and accountability in ESG performance are essential.

While the **initial push** for sustainability reporting may have come from shareholders, as seen with the early **development of ESG ratings** in the U.S., it has since evolved into a wider societal demand for data transparency. Significant **political interest** ensures that companies contribute to global sustainability goals, reinforcing the need for standardized, reliable ESG data measurement and reporting.

8) Have you recognized a change in motivation to implement and drive impact measurement in large manufacturing corporations?

Stemming from client observations, the motivation to implement and drive impact measurement currently centers around CSRD compliance, especially among first movers. The **complexity of the regulations** and the pressure to meet them have made **compliance the primary focus**. However, the interviewee anticipates that as companies adapt and allocate more resources, the CSRD could eventually foster intrinsic motivation, particularly within management. Over time, companies may

begin to see sustainability reporting not just as a compliance task, but as a **strategic communication tool** to demonstrate their ESG efforts.

He compares this to the evolution of compliance in the past, which was initially unpopular but have since become normalized. Similarly, as the disruption caused by the political push for CSRD settles, he expects that ESG reporting will follow a similar trajectory, becoming more integrated and valued within corporate cultures.

9) What is your expectation about a changing approach to sustainability in large manufacturing corporations? How will the governance process and responsibility for integrated sustainability reporting change *(e.g. shift to legal team)*?
Responding to the question, the interviewee expects a significant change in the governance structure of sustainability reporting within large corporations as ESG reporting matures. Historically, sustainability has often been handled by marketing and communications teams, as it was primarily used as a branding and public relations tool. However, with the advent of regulations like the CSRD, he anticipates a shift in responsibility toward the **finance department** or the creation of a **new dedicated department** for sustainability reporting.

This shift is crucial because **marketing** teams often **lack the expertise** needed to handle complex **ESG KPIs and audit requirements**. In contrast, departments like finance or controlling are better equipped to manage the rigorous data analysis and compliance demands. As sustainability reporting becomes more integrated into financial reporting, the governance process will likely formalize, with clearer roles and responsibilities for ensuring accurate and accountable ESG reporting.

10) What comes next? How do you expect CSRD-induced integrated reporting practices and impact measurement to evolve in the nearby future?
With about 98% assurance, the interviewee expects that ESG data and impact measurement will evolve positively in large corporations, though the **progress will be gradual**. The current complexity of the requirements needs to be reduced for smoother implementation. Despite this optimism, the upcoming regulatory additions, such as the 35-40 sector-specific standards, reasonable assurance, and

ISEF tagging, could be constrained. The current regulatory complexity may limit the financial resources available for expanding these requirements further.

Looking ahead, he hopes for more comprehensive and effective use of data transparency. He believes that **industry-specific lighthouse projects** could emerge through **greater comparability**, driving sustainable development in the long term. Achieving this, however, depends on key factors, such as **measuring actual ESG performance versus simply reporting data**. High-profile scandals, like the VW emissions scandal, highlight the need for transparent performance benchmarking, causing the risk for companies of reputational damage and financial losses.

He also anticipates that **societal pressure** will play a significant role in enforcing accountability, with **reputational risks** acting as penalties for poor ESG performance. Exemplarily, the S3 standard, which targets society as the key affected stakeholder by business activities, will be increasingly important in comparing reported ESG performance with actual business outcomes. Stakeholder dialogue will become even more critical for large corporations as transparency expectations rise. Overall, his main concern is that the **CSRD's rapid evolution** is **asking too much of companies too quickly,** which may create challenges for full compliance and integration.

Figure 3: CSRD-affected ESG data criteria, primarily identified from expert interviews and complemented by secondary research. Summarized and ordered along the reporting process.