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**Investigating the practice of Financial Materiality
assessment within the EU after the introduction of the
CSRD**

Evidence from the Chemicals sector, with a focus on the
Environmental pillar

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Zia,

*It is my hope that you are proud of me,
even from your new position in the heavens*

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Introduction:

Investor's growing attention towards sustainability represents nowadays one of the most important challenges for businesses and is also shaping the way they report information at the end of the fiscal year. Most companies to this extent, along with the financial report, publish a document whose content is mainly non-financial and dedicated to sustainability. Despite the choices of undertaking on the content of the sustainability reports have been made coherently and with the help of dedicated teams, the main flaw is represented by the non-standardisation that still permeates this field of reporting, making comparability and verifiability cumbersome for the reports' end users.

Big steps are being taken now to fill the gaps between these documents, and the current landscape sees the presence of various standards and frameworks aimed at offering guidance to companies that are both embarked or embarking in the journey towards the achievement of the state of sustainability.

Companies can tackle sustainability under two perspectives: the inside-out one and the outside-in one. The first approach is focused on capturing the impact the company has on sustainability issues and hence aims at highlighting the ethical implications of the business on the outside world, while the second one aims at understanding the risks and opportunities for companies that might stem from sustainability-related factors, analysing the consequences on the value creation ability of the reporting entity. The scope of this dissertation is mainly concentrated on the outside-in perspective, and aimed at understanding how different standards approach sustainability-related risks and opportunities, as well as the adaptation of the existing management frameworks companies are using when developing their sustainability plans directed at tackling and then report on this new set of risks and opportunities, with a focus on the environmental topic of climate change due to its importance in the context we are living in nowadays.

Chapter One of this work is aimed at acknowledging the current state of the regulatory landscape in the field of sustainability reporting by considering existing standards whose focus is on financial materiality. First, readers are going to be presented with an overview on international standards, thus meant to be of worldwide applicability

on voluntary basis, hence depending on what companies' executives decide to align with. The second part of the chapter is dedicated to the evolution of the practice of sustainability reporting within the European Union and that culminated with the entrance into force of the European Corporate Sustainability Reporting Directive (CSRD) and with the introduction of a mandatory set of reporting standards with the aim of fostering harmonisation within sustainability documents as it is with financial ones. Lastly, the last part of the chapter is dedicated to the practice of materiality assessment by companies, aimed at providing end-users of sustainability reports with information that is relevant to a true and fair evaluation of the single entity, also by discussing on the cornerstone implementation observed at EU level, where materiality shall be assessed using a "double" approach – one concerned with the impact entities have on ESG-related issues, and the other assessing how ESG stemming risks and opportunities affect the ability of entities to conduct their business as usual.

In the second chapter a literature review presents evidence from past research in the field of sustainability reporting and its distinguishing features. Starting with a general overview of the evolution of this practice, the chapter aims at explaining how concepts traditionally associated with purely financial reporting have been adopted also in the sustainability world. The first concept that has been transposed, and that has also been introduced in chapter one, is the one of materiality, and the proposed articles will not only discuss on whether this transposition has been successful but will also investigate how investors are valuing such information in the sustainability field. Articles included in the proposed literature review will also tackle how ESG risks have gathered an increasing role in guiding investors' decision making and on an equally important increase in the practice of having sustainability information checked by third parties the same way it happens with financial information, that is to say the role of assurance.

Chapter Three is dedicated to the performance of a comparative analysis on a cluster of twelve EU companies operating in the Chemicals sector. Through an examination of sustainability reports published in the time window from 2021 to 2024 evidence will be presented in relation to the pre- and post- CSRD implementation, with the aim of providing readers with an in-depth understanding of how the practice of sustainability reporting has been increasing in sophistication and on how the

incorporation of the provisions introduced by European legislation contributes to this phenomenon. Retrieved information has also been tested against the world's most used reporting standard in the field of sustainability reporting when wanting to provide valuable information to investors, the SASB standards. The aim of this last comparison was to investigate the quality of the work done at European level in the field of sustainability reporting.

Lastly, chapter Four will be dedicated to conclude the proposed work by pointing out some of the encountered limitations, primarily due to the fact that the analysis of FY2024 reports is a novel field, and possible insights for future research.

The choice of presenting an empirical analysis based on companies operating in the Chemical sector stems from my internship being at the offices of a worldwide renowned Italian chemical company whose core business is the manufacturing of products for the protection, treatment and maintenance of luxury surfaces, like marble and natural stone. Despite being classified as an SME, the company is undergoing a period of profound transformation. This began with the conversion of its production from solvent-based to water-based products, which has significantly reduced its environmental impact, until arriving this January to a change in its legal form from PLC to Benefit Corporation. Furthermore, its commitment to The Climate Pledge initiative, its membership of the Green Building Council in Italy, and its goal of becoming carbon neutral by 2040 has earned it the Top Sustainability Award for four consecutive years, from 2021 to 2024. This places it among the hundred most sustainable companies in Italy. Having the possibility of experiencing in reality what I learned during the years of my master's degree in a local context instigated in me the motivation to research the prominent figures within the chemical industry.

Chapter I: The current regulatory landscape

Sustainability reporting practices are, for companies, the natural consequence of the definition of sustainable development, that firstly entered the picture in 1987 after the publication of the Bruntland Report stating that “sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are made consistent with future as well as present needs”.

KPMG’s 2022 “Big Shifts, Small Steps” sustainability reporting survey highlighted an increasing trend in the practice of sustainability reporting, taking as reference sample the World’s 250 largest companies by revenue according to the 2021 Fortune 500 ranking. 96% of these companies report on ESG matters, and 64% acknowledge climate change represents a threat to their business, with the research question of this thesis based primarily on this field. Among the most widely used reporting guidelines the survey spots the GRI standards, the SASB and the EU CSRD.

Depending on the applied standards or guidelines we can infer whether the company is adopting an inside-out or an outside-in perspective on the material topics it will report on at the end of the fiscal year. Exception made for the European Union, extensively discussed throughout the chapter and the thesis as well, there are no impositions for what concerns the framework to be applied, and companies might decide to apply more than just one set of guidelines, with the GRI being the most widespread, thus creating some sort of “level playing field”. This set of standards tracks the first perspective on sustainability, monitoring the impact companies have on its stakeholders. For what concerns the second perspective on sustainability the current landscape is more fragmented, leaving some room for criticism especially for what concerns credibility and comparability. We will now proceed, as the management of risks and opportunities represents the core of the dissertation, to present the main standards for capturing the outside-in perspective, starting from the ones having the environmental dimension at their core, up to those tackling all the three dimensions of sustainability, while the EU framework will be discussed separately due to its features. The third section of this chapter will then be dedicated to the analysis of the existing

approaches applicable for the determination of the information to be included in the reports.

1.1 International frameworks in sustainability reporting

Companies make use of reporting frameworks to collect, analyse and present their relevant data in an organised fashion, with the aim being enhancing the comparability and verifiability of essential KPIs across the years or against its industry peers. As it happens in financial accounting, also when it comes sustainability reporting, the existing frameworks are composed by a comprehensive set of guidelines, guiding the reporting entity on how to measure, present and disclose information. The main difference is represented by the process of recognising what to disclose in such documents, as different frameworks may tackle sustainability from different perspectives, and because of the idiosyncratic characteristics of the reporting entity, resulting in sustainability matters affecting them in completely different ways.

As discussed by Spandel et al., (2023), the guiding principle when it comes to disclosing information is the one of “materiality”, under which entities only report on relevant matters, whose omission or misstatement could, or is reasonably be expected to, influence decisions to be taken by the primary users of such information – investors. If the identification of the main stakeholder group to whom the report will be addressed is straightforward when it comes to financial reports, in sustainability reporting different information can be material to one or more groups, and hence the identification of the items to be disclosed becomes itself a challenge for the reporting entity. Being the scope of this Thesis the reporting on sustainability related risks and opportunities we will focus on the subset of materiality addressing such information from the outside-in perspective: financial materiality.

When defining financial materiality, we will note that we are, de facto, extending the principle used in corporate financial reporting by pointing out that sustainability factors generate, or are expected to generate, financial risks to businesses. Moreover, also the audience of such information is represented by the pool of primary users of financial reports. Its focus, as the name suggests, is financial, and hence related to the

impact these issues have on revenues, costs, assets, liabilities and capital expenditures, while the analysis is carried out by looking at quantitative measures, arriving at monetising the financial implications sustainability issues have, or are expected to have, on the reporting entity. All the reporting frameworks analysed here below provide the reporting entity with guidance on how to effectively apply the materiality principle and to report information for the benefit of investors, they have hence adopted an “outside-in” approach to sustainability issues.

1.1.1 The GHG Protocol

The need for a standardised set of measurements for GHG emissions was the main issue in the WRI, World Resource Institute, and the WBCSD, World Business Council for Sustainable Development, joint agenda directed at addressing climate change, leading to a multi-stakeholder standard development process started in the late 1990s, that resulted in the publication of the first edition of the Corporate Standard in 2001. At the very earliest the scope of the framework was to provide guidance on accounting for the direct emissions, now identified with the term “Scope 1”, meaning those coming from sources that are directly controlled or owned by the company; but as concerns over climate change are growing the scope has been broadened, and now companies are asked to report also on indirect emissions coming from the generation of purchased energy, Scope 2, and on all indirect emissions occurring throughout the value chain, Scope 3.

Throughout its measurement tools, this set of guidelines allows reporting entities to set develop a GHG inventory in order to understand the risks stemming from their GHG exposure and to identify the risks connected to them, as for example costs increase or revenues decrease in a rapidly-changing regulatory framework, and also to set GHG target strategies aimed at minimising and managing the risks acknowledged in the inventory phase. As a matter of fact, the Protocol website makes available to reporting entities a variety of guides and worksheets, serving as additional help in detecting emissions factors and the related unit conversion to estimate entities’ total emissions.

These tools can be either cross-sectoral or particularly customised for specific sectors or specific countries.

1.1.2 The TCFD

Established in 2015 by the FSB, Financial Stability Board, the Task Force on Climate-Related Financial Disclosures has been designed as a useful tool aimed at providing financial capital providers with information on what the reporting entity is actively doing to mitigate risks stemming from climate change, advocating transparency when disclosing such information. The ground for the establishment of the task force lies in the essential concept that financial markets ought to operate wisely, and this entails pricing risks in such a way to rule out misallocation of capital.

The disclosure is broken into four thematic areas, representing the core pillars of an entity's operations, with the first one being one's governance, followed by strategy, risk management and the quantitative pillar composed by metrics and targets. The main focus of governance recommendation is to assess the high-level organisational bodies role in the acknowledgement and management of climate related risks; the strategy recommendation includes all the disclosure addressing climate-related risks and opportunities, such as the identification of the risk and the timing in which the manifestation might occur, the impact on the company's core business and financials, and the resilience of the entity's strategy depending on the climate scenario under analysis; Risk management disclosures in a narrow sense require the reporting entity to disclose the materiality assessment it has conducted in order to identify such risks, and are connected to the "metrics and targets" section, used to both determine whether a particular climate related risk is relevant or not and future objectives to reach in order to reduce the exposure to those.

Despite businesses' idiosyncrasies, TCFD guidelines provide a set of likely-to-be-material issues, a comprehensive list derived from observing the category of the potential risk and the affected company financials. Risks have been classified in "physical" when they are connected to specific hazards or weather events, and "transition" when they stem from the de-carbonisation journey we are embarked in. Being exposed to such risks is expected to have repercussions on the business' revenues,

expenditures, assets and liabilities, capital and access to financing. To cite some examples, according to the 2017 TCFD Recommendations, the increased severity of extreme weather events may lead to revenue reduction derived from a decrease in production capacity, assets write-offs, an increase in capital costs and in insurance premia to be paid, thus pointing out that the resilience of a business may be severely threatened.

1.1.3 The CDP

Established in 2000 as the “Carbon Disclosure Project”, the now-called CDP is a charitable LLC working towards a thriving economy envisaged in the long-term. The organisation’s original work was to draft a questionnaire allowing entities to disclose their climate-related information, but now the scope has been broadened and the full survey tackles four main areas: climate change, the starting point, forests, biodiversity and water.

Purposeful to this thesis, in module 2 the full questionnaire addresses the “identification, assessment and management of dependencies, impacts, risks and opportunities introduction”, where entities are asked to disclose information relating to the time horizon considered when acknowledging environmental issues, as well as the entity’s definition of what is a substantive effect on the business, a concept that resembles the definition of “materiality” in the European framework we are going to analyse later on.

All the identifications and processes are then reflected in the third module of the survey, where the reporting entities are required to disclose their exposure to environmental risks that had or might have substantive effects on the whole value chain. This information is particularly targeted to investors and data users, as the effects we are referring to are those threatening the entity’s financial position and financial performance. After having identified such exposures, the entity is asked to provide numerical data, selecting the percentage of financials (assets, liabilities, equity, CAPEX or OPEX) vulnerable to physical and transition risks.

The last module of the survey, on the other hand, is focused on how environmental matters are managed by the entity's governance bodies, investigating the presence of top management involvement in environmental matters, and if they are receiving money incentives for doing so and for the attainment of environmental targets. This module also addresses the presence of environmental policies and their details.

1.1.4 The SASB standards

The concept of a better society being created also through investors' choices, reflected into the making of more informed capital allocation decisions, is the vision leading to the creation of the SASB Standards, firstly published in 2011, with the aim of supporting organisation in their disclosure related to risks stemming from sustainability issues that are expected to or could potentially have a negative effect on the entity's cash flow, access to finance or cost of capital, spanning along the three different time horizons. They are developed following an industry-based approach, as investors may want to compare information specific to the sector the reporting entity belongs to along with cross-cutting disclosures on matters that are meant to matter regardless of the different business models.

The identification of financially material issues, for entities adopting this set of guidelines, is done through the "SASB Materiality Map", providing users with a variety of likely-to-be material sustainability issues. Companies can then map these general issues to the sector it operates within, hence being able to rank from the most to the least pressing, and to develop a consistent action plan. Being investors the main audience of such reports according to the standards, we can also state that the SASB materiality map proves to be useful also for them, to assess their portfolio exposure on the basis of the identified salient issues.

Due to their characteristics this framework has been used as starting point for the development of the ISSB's – International Sustainability Standards Board – standards on sustainability reporting, discussed in the following section.

1.1.5 The ISSB Foundation

The announcement of the establishment of the ISSB – International Sustainability Standards Board – dates to November 2021, at the COP26 in Glasgow. The aim is to develop a global baseline of standards for sustainability disclosures targeted at fulfilling the information needs of investors and financial markets. Among the other key objectives of the Board we find the willingness to tackle the issue of the fragmentation permeating the field of sustainability reporting, and that’s why the standards have been developed building upon the work of pre-existing investor-oriented frameworks. To deliver efficient standards, allowing for addressing the needs of market participants at a global level, guidelines and recommendation deriving primarily from the TCFD and the SASB have been taken as a reference point. The choice of the ISSB foundation to build upon the SASB standards has been made on the grounds of their usefulness in terms of comparability across different reports in industries operating in the same sector and because of their recognition at international level across jurisdictions, as more than three thousand companies across eighty different jurisdictions chose them as their main reporting framework. The work of the ISSB led to the adoption of two sets of standards on sustainability reporting, named IFRS S1 and IFRS S2, effective for reporting periods starting after January 1st, 2024, and giving guidance on the general requirements for the disclosure of sustainability related financial information and climate related disclosures respectively.

In its IFRS S1, “General requirements for Disclosure of Sustainability-related Financial Information”, the Board requires the reporting entities to question themselves in relation to the information to be disclosed, it hence requires a materiality assessment. Companies are required to consider both quantitative and qualitative data, as well as the full range of potential outcomes, when considering the effect, actual or potential, of sustainability-related issues and events on the company’s future prospects. Information must, according to the standards, be reported to the users in such a way that it enables a complete, natural and accurate picture of risks and opportunities. This set of disclosures is related to information on the entity’s governance, strategy and risk management in relation to the identified material topics and backed up by appropriate metrics and targets. On the other hand, IFRS S2 is an industry-based set of standards,

hence companies are required to report on matters that characterise the sector they operate within, coherently with the criteria laid down in the General Disclosures standards.

1.2 The European Union sustainability reporting framework

The increasing importance sustainability reporting has gained throughout the years finds the European Union in a first-mover position, as it is the only jurisdiction worldwide where such practices have been translated into Law. The attention brought to these matters by European institutions dates to 2014, when the commission adopted the Non-Financial Reporting Directive – NFRD – aimed at mandating the disclosure of information that was not purely financial, and hence not suitable to be contained in the annual report. The first NDFR aligned reports were available for FY2017, reflecting also the steps that entities falling under the scope of the Directive started to take towards the attainment of the goals set out in the 2015 Paris Agreement, a milestone for the raising social awareness on climate change challenges and sustainable development.

The European Union went above and beyond on such important matters, and in 2018 the European Commission introduced the “Action Plan for Financing Sustainable Growth”, highlighting the need for re-orienting capital, broadening the scope of risk management analysis, and to enhance corporate disclosures of sustainability related information. Moreover, the introduction of the “EU Green Deal” with its ambitious objective of making the European Union reach net-zero emissions by 2050 and the entrance into force of the European Climate Law in 2021 contributed to substantial developments in sustainability disclosure legislation.

We will now proceed with an overview of the latest development in European legislation and reporting practices related to sustainability-related matters, with particular attention dedicated to the environmental dimension as it represents the core topic of this thesis.

1.2.1 The EU Taxonomy for Environmentally Sustainable Activities

Entered into force in July 2020, the EU Taxonomy Regulation performs the function of being a reference point for achieving what in the Green Deal. To meet the climate and energy targets defined at European Level and to align with the 2050 net-zero trajectories, companies, both financial and non-financial, must transition towards more sustainable practices, always bearing in mind that capital is the fuel for the achievement of these ambitious objectives. We can hence state that one of the primary roles is played by investors, which are required to channel funding towards sustainable activities.

But how can companies and investors agree on what activities to deem as sustainable or not? The level playing field is represented by the Regulation, which contains rules and criteria aimed at defining what can be named as “sustainable”. Along with the main document, the European Commission produced a list of technical and implementing delegated acts, primarily dedicated to the reporting entities, and aimed at providing guidance in the classification of the economic activities. The extensive efforts at the institutional level resulted in a cornerstone of the EU’s sustainable finance framework, ruling out divergences in the definition of sustainability, as now the whole Union is required to share the same view, and possibility of greenwashing, as the criteria build upon science-based targets and can be easily verified. The Regulation is directed at both non-financial and financial undertakings, but we can state to some extent that the latter’s sustainability alignment is almost entirely derived from the financing of non-financial undertakings’ economic activities included in the Taxonomy compass, being the extensive list of economic activities that are eligible to receive the label of “sustainable”.

To understand the criteria qualifying an economic activity as sustainable we can refer to the text of the Taxonomy, that in Article 3 defines four criteria to be met simultaneously:

- i) The economic activity substantially contributes to one or more of the environmental objectives set out in Article 9, in accordance with Articles 10 to 16;

- ii) The economic activity does not significantly harm any of the environmental objectives set out in article 9, in accordance with Article 17;
- iii) Is carried out in compliance with the minimum safeguards laid down in article 18;
- iv) Complies with technical screening criteria that have been established by the Commission.

This article provides us with evidence of the objectivity of the work that has been done by the European Commission in conjunction with scientists and sector experts, and that led to the definition of science-based thresholds for each economic activity under the scope of the regulation.

Important for the purpose of this thesis, and for the latest developments in EU sustainability reporting legislation is the definition of the environmental objectives set out in article 9, representing the main areas to be tackled by reporting entities when assessing and managing their environmental impacts, risks and opportunities (IROs). The Regulation, in its Article 9 identified six objectives:

- i) Climate change mitigation, with the focus being the maintenance of GHG concentrations in the atmosphere at a level consistent with the goals set out in the 2015 Paris Agreement;
- ii) Climate change adaptation, requiring entities to develop and implement solutions aimed at reducing the risks of adverse impacts stemming from the current and the expected future climate scenarios;
- iii) Protection of water and marine resources, focused on preventing the deterioration of bodies of water having a good status, or, in case of bodies of water not having a good status the focus is their restoration.
- iv) Transition to a circular economy, aimed at promoting a more efficient use of natural resources, waste prevention, reuse, and recycling. The article also promotes sustainable sourcing of such resources.
- v) Pollution prevention and control, as economic activities shall be directed at reducing pollutants into air, water, and soil, or at the improvement of their quality. Another focus area of this article is represented by people,

as economic activities shall prevent, or minimise when that is not practicable, adverse impacts on human health.

Not all economic activities have the potential to contribute or harm all the six objectives, so the Regulator, through the Climate delegated act, drafted for each of the ones included in the Taxonomy compass the related environmental focus, along with two thresholds, being respectively the substantial contribution and the DNSH ones. Assessing alignment with the EU Taxonomy regulation resembles statistical inference, as for each environmental objective we want to analyse the full range of potential outcomes and hence imagine a Standard Normal distribution: the threshold for substantial contribution will be placed bottom right, and the economic activity classifies as “environmentally sustainable” if reaches or goes beyond that value. On the other hand, the DNSH threshold will be placed bottom left, and by falling within the area of the distribution bounded by that value classifies the activity as “non-sustainable.”

The Taxonomy Regulation requires disclosure, in the form of ratios representing the reporting entities’ financial efforts towards its sustainability and aimed at capturing the shares of expenditures dedicate to Taxonomy alignment on the total expenditures. Those KPIs allow for enhanced comparability across companies and give insights, when monitored over an adequate time window, of the trajectory they are embarked into. KPIs are different, due to their nature, for non-financial and financial undertakings: Non-Financial undertakings must disclose their KPI related to turnover, CapEx and OpEx, having at the numerator the proportion derived or dedicated to taxonomy-aligned activities and at the denominator the total turnover or expenses for the reporting period. Due to the variety of non-financial undertakings operating in the market we use as example the KPI for credit institutions, that goes by the name of Green Asset Ratio, GAR, whose purpose is to show the proportion of assets financing and/or invested in taxonomy-aligned economic activities (numerator) over the credit institution’s total covered assets (denominator). Undertakings will then disclose these metrics in a tabular format, allowing easy readability from the reports’ end users.

1.2.2 The Corporate Sustainability Reporting Directive (CSRD)

Building upon the existing 2014 NFRD, the CSRD marks another remarkable milestone in sustainability reporting at European level. The main efforts of the Regulator were to fill the gaps regarding compatibility, consistency, and reliability of the information to be disclosed, as well as enlarging the number of undertakings under the scope of such legislation.

The work started in April 2021, after the passing of the proposal for an amendment to the existing legislation, and public consultation started with the aim of identifying the salient topics to revise. Incorporating also pillar 2 and 3 of the 2018 EU Action Plan, regarding the management of a non-traditional subset of financial risks and the implementation of a long-term orientation respectively, the amended legislation has been published in the Official Journal of the European Union on December 14th 2022, with the first compliant reports being the ones of FY2024, and hence made available to the public in the first half of 2025.

Among the most significant changes introduced by the amendment to the existing legislation we must mention the gradual expansion of the scope of the Directive, which aims at mandating around sixty thousand of companies to report on their sustainability related IROs. The first tranche of reporting entities consists of the ten thousand large public interest entities that are already complying with the existing NFRD, with their reports covering the period FY2024. From later the scope has been broadened until arriving in 2029 at non-European groups having either a subsidiary or a branch within the Union's borders. The Directive purportedly does not address the universe of non-listed SMEs as the costs for being compliant might be detrimental and drive them out of business.

Public consultation also shed a light on the need for having a common reference framework for what concerns the standards reporting entities will have to abide to when preparing their report. This bullet point makes us understand how we went from a more general to a stricter set of rules: the still-in-force NFRD leaves some degrees of freedom to the reporting entity, allowing the adoption of any internationally recognised reporting framework, with the most used being the GRI Standards. On the other hand, once it

enters into force, the NFRD will mandate all entities falling under its scope to report under the European Sustainability Reporting Standards that are being developed in conjunction with EFRAG, Europe's voice in corporate reporting. These standards, along with novel contents, build upon existing frameworks, hence allowing interoperability along with the most widespread international frameworks such as the GRI. Moreover, at COP29 the deepened ongoing cooperation between EFRAG and CDP resulted in interoperability between the European Standards and the CDP questionnaire.

By mandating reporting entities to adopt a unique set of standards the CSRD enhances the attention towards the double-materiality framework, contained also in the NFRD but not applied due to GRI Standards only focusing on impacts, and not on risks and opportunities. Materiality is an accounting principle guiding accountants and auditors in preparing the financial statements, stating that they must contain only relevant information. When defining "relevant" we can refer to all those items that will or are likely to impact investors' decision-making processes, while information not having such influence can be omitted from the documents. Due to a growing pool of conscious investors also sustainability-related information has the potential to influence their decisions, and this is ground for the introduction of materiality also in this field of corporate reporting. The word "double" refers to the two perspectives of sustainability, one relating to impacts and the other relating to risks and opportunities on the undertaking's financial performance, and hence two assessments are required, but does not mean that only information material to both perspectives must be contained in the sustainability statement: entities shall include information material from an impact perspective, from a financial one, or from both.

The CSRD also introduces as mandatory the auditing of sustainability statements, as per explicit request of the people interviewed throughout the 2021 public consultation: this represents a brand-new introduction because if we look at the text of the NFRD we observe that it was not required. At the time of the transposition into National Law, however, the Governments of Italy, Spain and France decided for the introduction of this practice. Sustainability reports being "assured" enhances the reliability of the information, allowing investors to make their decisions in an informed manner. Now assurance is still limited, as traditional auditors need to develop additional

skills and gain additional knowledge in this field, but in the future the introduction of reasonable assurance will take place.

1.2.3 The European Sustainability Reporting Standards (ESRS)

The proposal for the development of a common set of sustainability reporting standards at European level has been announced by the European Commission at the beginning of 2020 and, after the conduction of feasibility studies and consultations, at the end of 2022 the first draft of ESRS was adopted by EFRAG and submitted to the European Commission for approval, received in July 2023 when they entered into force by means of a Delegated Act.

Due to its interoperability primarily with the GRI Standards, the ESRS are structured into three categories: cross-cutting standards, topical and sector ones, with the current framework being composed only by the first two, as sector standards are still under development. These two available sets have the peculiarity of being “sector agnostic”, meaning that they can be applied to any reporting entity irrespective of the sector in which it operates, this always to keep comparability and verifiability into account.

The cross-cutting category is composed of two sets of standards, ESRS 1 and ESRS 2. The first contains the general reporting requirements, hence explaining to the reporting entities what the rules of the game are, while the general disclosures are contained in the second set. Fully capturing what in the CSRD, ESRS 1 explains the double materiality approach and provides guidance in the performance of the materiality assessment, representing the preliminary screening before disclosing what contained in the sector standards, always looking at the materiality guiding principle. Within ESRS 2, reporting entities must disclose the role and responsibilities of the governance bodies regarding sustainability, as well as providing information on the interconnectedness and synergies between the core business and ESG strategy. If on the one hand the ESRS 1 states the guiding principle for reporting, the ESRS 2 on the other requires disclosure on the proper steps taken by the entity during the assessment process. The entity shall also inform its stakeholders on the measurement of the IROs, and to this purpose the standards require

extensive disclosure of the targets to be achieved and the metrics in force to track the progress.

Topical standards provide additional disclosures, as well as guidance, related to material sustainability matters, categorised into the three sustainability dimensions. The environmental standards – ESRS E1 to ESRS E5 – representing the core disclosures we will look at during the empirical part of the thesis perfectly align with the six environmental objectives of the EU Taxonomy Regulation and give us powerful insights concerning the potential financial effects arising from dependencies on natural resources that are being employed in the production process. The social standards – ESRS S1 to ESRS S4 – analyses the working conditions of the reporting entities’ workers employed as well as the ones throughout the whole value chain and identify IROs stemming from the community where entities are located, consumers and end-users. ESRS G1 on Governance is focused on business conduct policies, aimed at preventing episodes of corruption from occurring, and at the management of the relations with the entities’ suppliers. The structure of the ESRS is presented in figure 1 here below:

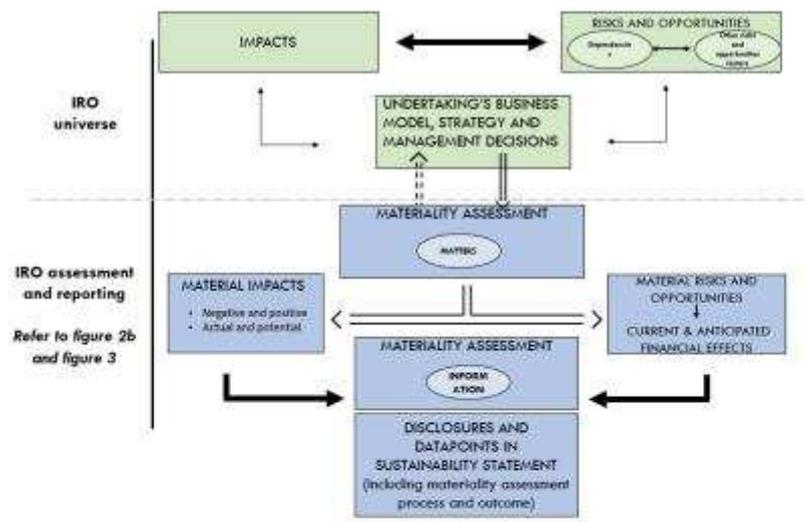


Figure 1: structure of the ESRS – envoria.com

To guide entities in the production of CSRD-aligned sustainability reports, and particularly for what concerns the two materiality dimensions, the EFRAG issued its “Materiality Assessment Implementation Guidance”. According to ESRS1 – “General Disclosures” – sustainability-related matters are material from a financial perspective if

they “trigger or could reasonably be expected to trigger material financial effects on the undertaking”. Completely aligned with the related recitals in the CSRD, reporting entities must assess severity and likelihood of such events over the short-, medium- and long-term and the influence they might have on their financial position and performance, cash flows, access to finance and cost of capital. In the context of financial materiality, risks and opportunities are generally derived from dependencies on other factors, some examples being the exposure to climate hazards or changing regulations. Guidelines also suggest engagement with business functions, investors, and other financial counterparties to validate the completeness of the identified material risks and opportunities’ list.

We can therefore state that, according to what included in the Implementation Guidance, EFRAG advises European companies to carry out the double materiality assessment as described by figure 2 here below:



- Influence of impacts, dependencies and other R&O factors on undertaking's business model, strategy and decisions, including OPEX, CAPEX, etc.
- ⇒ Materiality assessment inputs and process
- ⋯⇒ Influence of materiality assessment on undertaking's decisions
- ➡ Materiality assessment outcome in terms of sustainability reporting

Figure 2: materiality assessment under the EFRAG implementation guidance

When practically performing such an assessment, companies may want to start from an identification of the impacts they are having on sustainability matters, then moving on to an assessment of whether such identified impacts lead to possible risks and opportunities. IROs being intertwined is a phenomenon deriving from dependencies on resources. On the other hand, when risks and opportunities do not stem from an entity's identified impacts we are still dealing with dependencies, but on resources that are not being impacted by the entity's own activities.

When performing such an assessment, companies must consider as “material” not only matters that are as such from an impact and a financial perspective: according to what implemented by the EFRAG, and in full compliance with what in the Corporate Sustainability Reporting Directive, “the materiality of a matter is determined by either material impacts (impact materiality) or by material risks and opportunities (financial materiality). A matter can also be material from both perspectives”. Due to dependencies on resources, a matter that is material under an impact perspective can result, at the same time of the reporting period or in the future, in a set of material risks and opportunities, and this is a very important factor to keep monitored in order to understand whether to disclose on financial materiality: in this regard, EFRAG states that most of material matters will give rise to financial risks and opportunities, but it is only when the entity identifies the existence of such material risks or opportunity that the disclosure will be made. This in turn rules out disclosure on risks and opportunities related to matters material from an impact perspective only. Figure 3 depicts, by means of a Venn's diagram, what shall be reported when disclosing on material matters under the ESRS:

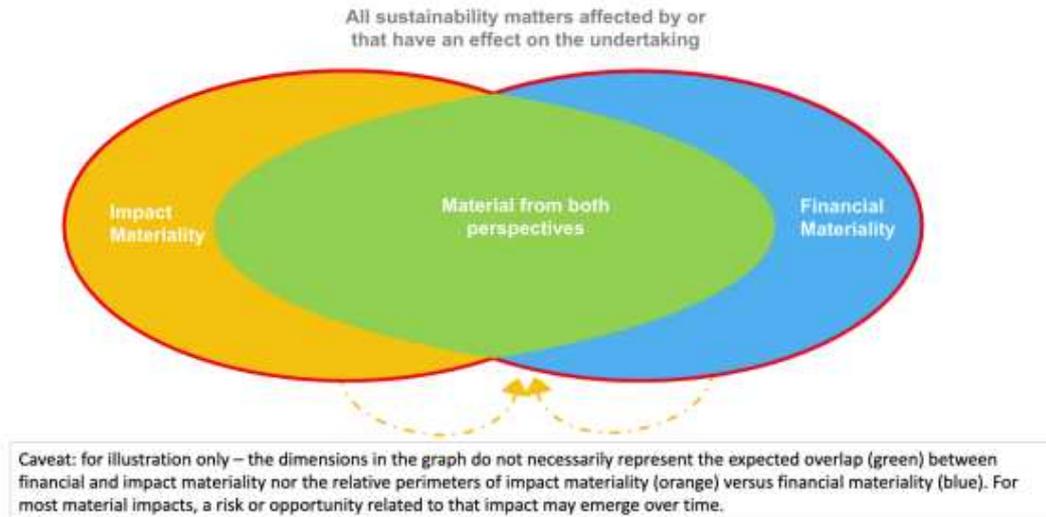


Figure 3: definition of material topic – EFRAG implementation guidance

The process for arriving at the reporting on material IROs shall be conducted in accordance with the idiosyncratic features of the undertaking, as no one size fits all. There is hence not a mandatory procedure to be followed, but general guidelines have been implemented:

- A. *Understanding the context* – first step. Here we expect companies to provide an overview of activities, relationships, key stakeholders to allow the users of sustainability reports to gain the necessary knowledge on the inputs representing the basis for the IRO assessment.
- B. *Identification of the actual and potential IROs related to sustainability matters* – second step. Here we expect the entity to come up with a long list of impacts, risks, opportunities stemming from its whole value chain, upstream and downstream.
- C. *Assessment and determination of material IROs related to sustainability matters* – third step. Not all the points included in the extensive list in point “B” are to be included in the “final” report, and the entity is required to develop and make available the criteria used for the determination of the actual material IROs. To arrive at a “list” of material impacts, risks and opportunities, reporting entities set materiality thresholds, and matters overshooting these limitations are to be treated as material and hence shall be included in the report.

D. *Reporting* – final step. This last bullet point is concerned with making the outcome of the assessment process available to the public, thus based on the structure of the ESRS.

What included on double materiality in the EFRAG Implementation Guidance is based on section 3.3 of the ESRS 1 – General Requirements: according to what in the text of the standards, there is the need for detailed explanations on how the assessment is being conducted, as there is not a unique procedure that might be followed. For what concerns the reporting of material IROs, entities shall look at section 6 of ESRS 1, dedicated to time horizons. Here reporting entities can find information on the reporting period such document shall refer to (in general the period taken into account by the sustainability statement shall be consistent with traditional financial reporting), they receive guidance on how to increase the meaningfulness of the information they provide, as the standards clearly define how to implement the reporting of data against a selected base year and on how to link current with future information.

1.2.4 The “Omnibus Directive”

Going against the thesis of “state-of-the-art sustainability reporting” as an unvaluable source of competitive advantage” for European companies, one of the main critiques raised when the introduction of the CSRD and of the ESRS took place was related to possible excessive burdens to be borne by obliged entities, with the consequence of their competitiveness within the market to be lowered. This decrease would also make European obliged entities less appealing in financial markets.

Acknowledging that excessive bureaucracy is not what the European Union landscape needs in this particular historical context has been possible also through the work of former ECB’s President Mario Draghi, that in its paper “The future of European competitiveness” pointed out that a lot of effort shall be made in order to keep up with the pace of growth that is being observed in China or in the U.S.

Although not named explicitly in the report, the Corporate Sustainability Reporting Directive represents a core policy tool supporting several of the core pillars mentioned by Mr. Draghi: Green industrial policy, Market integration, Innovation-driven

competitiveness etc., all of them seen under the perspective of sustainability being at the forefront of all those drivers of competitive advantage, in order to ensure an EU-wide “competitive transformation” that is not only effective under a purely economic meaning, but also socially and environmentally responsible. An example of this interconnectedness between what proposed by Draghi and what at European level might be represented by the concept of “decarbonisation”: as Mr. Draghi commented, companies are increasingly asked to demonstrate sustainable practices. This finds a confirmation in the CSRD and on all the mandatory disclosures on ESG-related metrics aimed at having firms internalise sustainability into their strategy.

The main observed discrepancy lies in the fact that what proposed at Union level, the CSRD, might bear complexities concerning compliance requirements, going against what expressed in Draghi’s work, where the former ECB’s President calls for streamlining EU regulations. This represents essentially one of the most challenging and pressing issues the EU is facing right now – the need for balancing investors’ demand of reliable and consistent ESG-related data with the need for being as agile and competitive as possible, also for what concerns regulation.

This dichotomy led to a revision of the European Union regulatory package concerning sustainability-related matters by means of an all-encompassing Directive: published on the OJEU on April 16th, 2025, on April 17th the “Stop-the-Clock” Directive (Directive 2025/794 on the lessening of ESG-related normative requirements) entered into force, and for most businesses in Europe this means lesser requirements in the matter of sustainability at the environmental and social level. The driving force of this proposal was unleashing business investment potential through a reduction of administrative costs and excessive burdens – this has been translated in the scope of application of the CSRD being brought down by approximately 80% and in the shielding of small companies across the value chain with respect to sustainability-related disclosures that might be requested within an upstream / downstream assessment.

This “simplification” proposed at an EU-wide level needed to be transposed also in the adopted reporting standards: as a matter of fact, a revision of the delegated acts establishing the ESRS has been confirmed by the Commission in their Q&A held on February 26th, 2025. The expected outcome of such a process is to embrace a “less is

more” path, made from a reduced number of mandatory datapoints paired with the clarification of all those provisions that have been deemed as unclear. Reducing the number of datapoints was seen as an instrument to achieve both a smoother reporting process and to stress the importance of numerical disclosures, that have been prioritised with respect to those based on narrative. Following this line of thought also the provisions of the CSRD concerning the practice of assurance have been revised, stopping at the “limited” degree, and with no linkages to a future refinement of this practice (“reasonable” assurance).

The term “Stop-the-Clock” has something to do also with wave 2 and wave 3 companies, whose obligations concerning the alignment with the EU sustainability reporting directive has been postponed to 2028. It is important to stress the fact that no restrictions have been imposed on voluntary reporting by companies that currently do not fall within the scope of application of the directive.

1.3 Existing frameworks for the assessment of material information

Due to companies’ internal organisation being tailor-made and not standardised, all the reporting frameworks only give guidelines for the disclosure of material information, but not for defining what to deem as important and what to exclude. It is then up to them to design internal mechanisms in such a manner that they combine their ongoing business and their sustainable strategies. Companies must also implement adequate measures for the identification and the management of a whole new set of risks along with the traditional risk management processes already in place. All these processes, as we have seen in the previous section, must be discussed accordingly throughout the sustainability statement, allowing investors to gain a true and fair view of the reporting entity’s approach to sustainability practices. Financially speaking, ignoring the assessment of IROs stemming from sustainability issues – with particular attention to financial risks – might have implications in financial markets, as would not be reflecting a true picture.

Traditionally, organisations managed risks by strictly separating their business units, whose leader was the responsible for the management of risks falling within that

area of responsibility. This stove-pipe mechanism comes with some limitations, the main one being that some risks cannot be categorised and might have an impact on more than one business unit: managers may not be able to capture the potential threat as they are too focused on their unit and that might culminate in the occurrence of catastrophic events. Moreover, risks might not affect each unit in the same manner, and although different managers might evaluate sources in diverse ways the cumulative effect would still be detrimental to the entire organisation. The bounded reality managers are looking at when in a traditional approach might lead them to take decisions being appropriate for their division only, and this might trigger additional new risks on the others. The need for a comprehensive risk evaluation and assessment process made, over the decades, business leaders acknowledge that a novel approach was needed and started to embrace ERM mechanisms.

Enterprise Risk Management (ERM), contrary to the traditional stove-pipe mechanism addresses the business as a whole and aims at creating a portfolio of all those significant risks that might impact the company's viability both positively, hence presenting opportunities, and negatively. It represents a valuable strategic tool once implemented effectively, and detecting potential adverse impacts as well as opportunities might foster competitive advantage. From an internal perspective, on the other hand, tackling the entire organisation allows for the reduction of the likelihood of risks emerging and, if prevention is not possible, for the minimisation of the negative impacts they might come with.

When implementing risk management approaches it is important to point out that once the process is an ongoing one, as once risks emerge, they can evolve over time. ERM must then be subject to frequent updates and improvements, to foster a virtuous circle for the organisation. The starting point is represented by the Strategy setting phase, where the organisation identifies what are the current and the future value drivers, to assess what to keep an eye on to ensure the company's short- and long-term success. Once having identified the main drivers, the management must identify what could represent a threat for them and understand whether the internal risk management processes already in place are adequate or not. When reviewing the existing measures and in implementing additional ones there is the need for focusing

both on prevention and damage minimisation. This approach is top-down, meaning that the responsibility for an effective implementation is of the top management, and they are also tasked with appropriately communicating the results of the conducted analyses, as well as with keeping adequate oversight. The concept of constant revisions is tied to the speed of change of the business environment at a global level, whose risks trickle down in a granular way.

The concept of risk management has been evolving not only with reference to the procedures to be applied, but also on the topics to be assessed: nowadays companies must implement measures to acknowledge risks stemming from sustainability-related sources, because even though non-financial in nature the financial impact they might have on entities must be detected before it is too late. Naturalist David Attenborough, during his speech at the Glasgow's COP26, defined climate change as "the biggest threat to security that modern humans have ever faced"; a speech that was echoed by the UN's Secretary, affirming that climate-related shocks "not only damage the environment, but also weaken our political, economic and social systems". By focusing on the economic perspective only, we can state that climate change has a monetary impact, and that immediate actions are needed to allow organisations to thrive also in years to come. To address the pressure companies are facing right now, the WBCSD – World Business Council for Sustainable Development – created its climate-related financial impact guide, aimed at supporting businesses during their assessment and disclosure of risks and opportunities. The outcome of the guide is to help companies in understanding the implications of these risks on the financial statements, over the short- medium- and long-term.

The first step for an effective assessment is to scope both risks and opportunities and prioritise those that are likely to be material for the business. Companies must consider the full value chain, as negative impacts on a supplier or on a distributor have repercussions on the reporting entity. Prioritisation is based primarily on the severity of the impact, the likelihood of occurrence and on the importance, stakeholder give to that identified matter. The second step is represented by analysing the full range of the potential outcomes that might stem from the identified potentially material impacts: here the company assesses the financial damages it might incur, as well as its calculation

pathways for an effective performance of both risk adaptation and risk mitigation. The third step proposed by the guide is the one dedicated to data gathering and scenario analysis, essential for the determination of the current and future financial position.

Similar to the WBCSD guide, the European Commission has authorised the publication of the work by Alessi and Giacomelli (2024) aimed at providing insight for an effective quantitative assessment of the financial materiality of climate physical risks. The main objective of the case study is to become a reference for all those companies falling under the scope of the CSRD, and that are approaching the double materiality assessment in compliance with the ESRS 1- General Requirements. The main reason that led the Authors towards the writing of this working paper is the lack of specification related to methodologies aimed at understanding whether climate-related risks are material for the business or not. The choice of analysing risks stemming from climate change derives from specific provisions contained in the reporting standards stating that even though omission for non-material topics is allowed, climate change shall be a challenge for each and every company in the EU and hence should be material for all. Hence, the proposed assessment approach can represent a useful tool for all of them. The analysis of climate risks also comes with financial reasons attached: companies' sustainability reports are starting to become widely used by the financial sector to gain additional insights on entities' viability and to correctly price them in the market, and the response to climate risk is much more advanced with respect to other sources, due to its high impacts in the context we are living in. Before laying out the guidelines for an effective assessment the Authors' concerns relate to the sources of data to be used, with the aim of carrying out a process that is fully transparent and that has as reference science-based, objective and verifiable data. They also stress the importance of the choice of an adequate climate scenario, as well as an appropriate degree of information granularity when gathering data related to the risk-affected variables. For what concerns the financial effects on the company, they pointed out that there is no expert better than firm managers or auditors able to account for the idiosyncratic features of the firm when it comes to assess the financial impacts. When classifying climate related hazards Alessi and Giacomelli refer to the EU Taxonomy Regulation, as two of the six environmental objectives explicitly refer to climate change. This reference highlights the

interconnectedness of sustainability legislation at European level. Although risk factors are categorised in chronic, that relate to a long-term change, and acute, resulting from the increasing verification of extreme events, the financial materiality approach is applicable to both.

The “generalised two-steps materiality approach” (GMA) proposed by Giacomelli is based on a cause-effect relationship between the entity’s identified risk factor and the financial KPIs it affects, and differs from a traditional frequency-severity approach because it analyses, ensuring full compliance with ESRS 1, the full range of potential outcomes the analysed factor can have on the company, and not the probability of occurrence of one single event. When it comes to the analysis of the “cause,” and hence of the risk factor, the following path shall be followed:

- i) Defining the future time horizon to consider, in relation to whether we are conducting the assessment for acute or chronic events.
- ii) Identifying an indicator suitable for the measurement of the possible range of intensity. They are usually natural indicators such as temperature or wind speed.
- iii) Collecting information on the indicator and designing future projections once a statistical sample has been gathered.
- iv) Estimating the probability distribution of the cause indicator, with the aim of determining the likelihood of occurrence of both the baseline scenario and its related deviations
- v) The last step is to conduct a consistency check, to evaluate the consistency between the probability distribution and the future projections.

Once the risk factor has been determined and analysed, the management must evaluate the impact it might have on the viability of the organisation, and whether future financial performance might suffer. The process to undergo has been broken into various steps:

- i) Identify the “effect indicator”, corresponding to a financial KPI. It might be revenue or expenses.

- ii) Set the materiality threshold: the management of the firm is hence asked to state the risk appetite of the company, and hence the maximum number of losses they are willing to suffer to keep the company in the business.
- iii) Quantify the effects on the financial KPI of the different intensities at which the identified climate risk can materialise. In technical terms we are defining the firm's severity function based on the idiosyncratic characteristics of the firm and that allows for capturing the full range of potential future values on the effect indicator
- iv) By confronting the management's risk appetite statement with the firm's severity function a completely objective judgement on materiality can be made, and we deem the risk factor as material if its produced financial effects on the identified affected KPI exceed what stated by the management when disclosing the firm's risk appetite.

Giacomelli also points out that, for an effective management of risks, in case the risk factor is assessed as material, the management must develop an adequate action plan referring to both future KPIs to be reached and actions to target deviations from the baseline scenario. The proposed assessment is depicted in figure 4 here below:

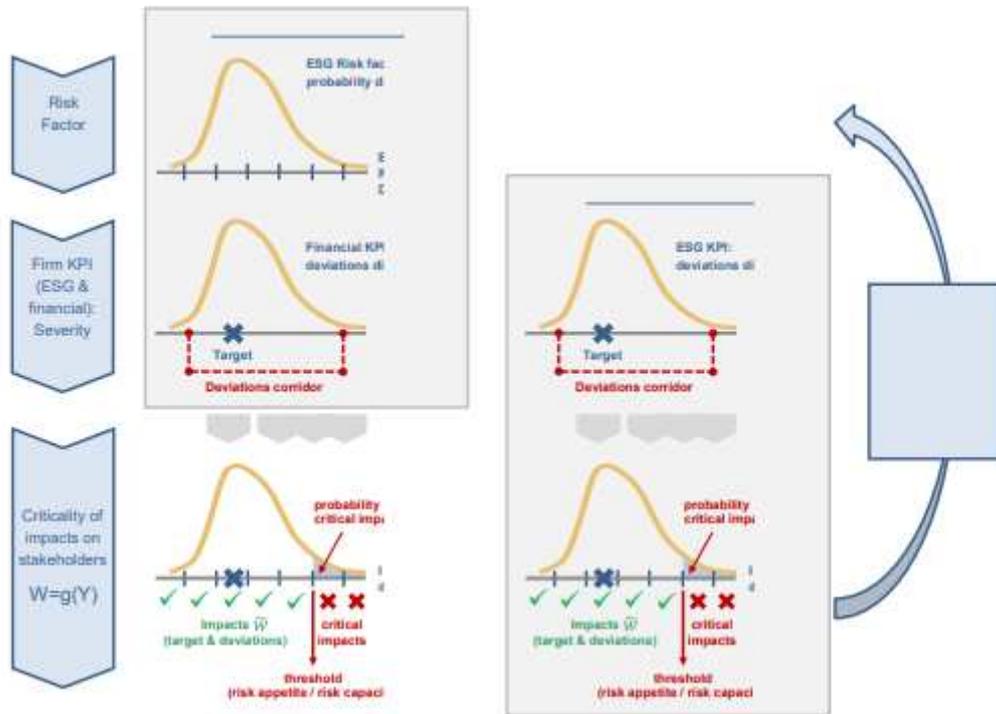


Figure 4: Generalised Materiality Approach – Alessi and Giacomelli (2024)

Chapter II: Sustainability Reporting in the literature

2.1 The Evolution of the practice of sustainability reporting

The introduction and continuous evolution of sustainability reporting sheds a light on how companies are increasingly paying attention to the acknowledgement of their responsibility towards the outside world, with the environment representing the main focus area. This is done coherently with the demand for accountability and transparency advocated by national competent authorities as well as stakeholders, and we can therefore confidently state that the roots of this practice can be found in Freeman's "Shareholder Theory", published in 1984. Freeman's work is deemed to be a disruption of traditional strategic management practices, as it overturns Friedman's 1970 dogma claiming that "the social responsibility of business is to increase its profits". According to this point of view, corporations are defined as artificial persons that are not bound to have responsibilities, and its executives the employees of everyone possessing shares of that business. This means that, unless investors are willing to pursue objectives other than making a profit, all the strategic decisions shall be taken with the aim of make as much money as possible. Freeman, on the other hand, highlighted the need for a new framework to be invented, as shareholder theory was inconsistent with the pace of changes that were taking place the time: 1980's economic recession, particularly heavy in the United States, proved traditional practices to be not enough, and that the scope of strategic management should have been enlarged to groups other than an organisation's stakeholders. As suggested, in order not to drive a company out of business, managers must prove their ability in managing different clusters of people in a strategic fashion; these clusters have been defined as "stakeholders" – "any group or individual who is affected by, or can affect, the achievement of an organisation's objectives". In-depth understanding of the relationship between each group with the organisation as well as the interconnections between them was seen as a prerogative for long-term success. Sceptics argued that companies adopting strategies directed at improving social performance would suffer from penalisation from those profit-oriented only investors, but the increase in the interest those "socially responsible" entities gauged from institutional ones is sufficient to confute that claim.

The evolution of traditional practices does not refer only to the universe of corporations but comprises also the universe composed by their owners – investors. Started as a niche religious-led exclusionary practice, as discussed by Martini (2021), socially responsible investing represents nowadays a staple strategy for those investors that we can call “conscious”. This pool of investors incorporates ESG-related issues into their portfolios as they represent an additional set of potential risks to account for. ESG risks incorporations proves, according to the Author, to be essential when looking at future performances under a long-term perspective, and to follow the path towards sustainable development. Historically, such practices were translated into action through exclusionary-based decisions, especially targeted at ruling out sin stocks at the beginning, and companies actively engaged as suppliers in the Vietnam war during the period in-between the 60s and the 70s, marking the exit of the practice of screening from a religious-only form of activism. It is also important to notice that the 70s mark the birth of the first conscious funds available also to the universe of retail investors.

As stated at the beginning of the chapter, the growing popularity SRI has gained throughout the years shall be backed up by true, precise and correct data on entities’ performance in the three dimensions of sustainability, whose purpose can double-up as a self-assessment exercise for the understanding, if we focus our analysis on the environmental dimension, of their alignment with the emissions target set by the 2015 Paris Agreement. Concerning sustainability reporting, Martini points out what has been discussed throughout the first chapter of this dissertation, hence the fact that along with practitioner-led initiatives also countries are requiring entities operating within their borders to disclose if and how ESG factors are taken into account, with the main fallacy being that, leaving out some rare exceptions, we are still in a “comply or explain” environment. There is hence the need for continuous improvements in the reporting landscape, not only to keep up with investors’ constantly changing expectations, but also to adapt to the pace of change of the reports’ underlying concerns, that are by definition of dynamic nature. Another hot topic addressed in the literature is represented by materiality: tailoring disclosures to the idiosyncratic features of each entity ensures sustainability-related issues to be treated as rigorously as purely financial data, and their correct incorporation as a de facto component of corporate performance. Du Toit (2024)

highlights how the introduction of the two IFRS S1 and S2 and the required degree of standardisation, as the pervasiveness of climate change is deemed to be sector-agnostic, marks a milestone in sustainability reporting, especially in terms of comparability and verifiability allowing for more informed assessments to be performed by users. We can therefore say that the challenges addressed by the ISSB Foundation resemble the main points raised through the public consultations conducted by the European Commission and that led to the NFRD amendment, culminating in the adoption of the CSRD.

The overall result we can arrive at by looking at Du Toit (2024), being a systematic literature review, is that although implementing different methods to gather information on companies and their reporting practices the common result is an enhanced corporate transparency and accountability, also because ESG-themed disclosures foster reciprocal trust between the reporting entity and its stakeholders. The author proposes, among the other findings, that a prosocial approach to sustainability allows companies to become “first-movers” – Kolk (2008) – in the development of KPIs and metrics to set goals and track progresses, and this has been made possible also through continuous enhancement of stakeholder-engagement practices aimed at active involvement in decision-making processes. It is also proposed, thus confirming the importance sustainability-related information has at a financial level, that high quality information, combined with high quality reports, can lead to meaningful improvements in both financial performance and financial markets confidence – Hummel and Schlick (2016).

2.2 The principle of “Materiality” in Sustainability reporting

The underlying driving force of a high-quality sustainability report is hence represented by information, that to fulfil its purpose must be, exception made for sector agnostic disclosures, targeted to the reporting entity’s idiosyncrasies. This concept has been incorporated from traditional financial reporting, but the approach to be followed slightly differs due to information being of a different nature. Applying the concept of “materiality” in this field is not as straightforward as it is when dealing with pure financial data, and this mainly refers to the dynamism characterising the set of risks and

opportunities we will be looking at. A leading example concerning the dynamic nature of materiality is the one proposed by Oll et. Al (2023), serving also as starting point for the empirical analysis to be performed within this dissertation: when looking at financial risks stemming from environmental topics, especially those related to the climate, entities must also account for transition risks and for the social impact of the products offered in addition to the physical risks connected to evolving climate conditions. Another criticality, that might mine the ability of users to correctly compare the information contained in different reports, is represented by the presence of two different perspectives when addressing such issues, thus leaving materiality to “lie in the eye of the beholder”. Most of the existing frameworks and standards rely on a single perspective and ask entities to report either on impact or financial materiality only, but interactions between the two dimensions are more frequent than we can imagine. The dynamicity materiality has in the field of sustainability has been introduced by the WEF, emphasising the existence of a link between impact and financial materiality, as the impact entities have might lead to adverse financial effects in the future. Even if not with the same wording as the World Economic Forum, dynamicity and the interrelatedness between the two dimensions of materiality represents the approach followed at the European level and can be found in the recitals of the ESRS. To this purpose, Mezzanotte (2024) reports the acknowledgement of changes in markets and public policies that might, in the future, lead to risks and opportunities that have the potential to affect entities’ financial performance.

Dynamism, and the current state of reporting obligations, also gave rise to some critics. Baumüller and Sopp (2021) points out how heavy requirements are de facto not leading to an increased transparency in favour of stakeholders, with companies attempting at limiting disclosure to the minimum, maybe representing the underlying for the introduction of MDRs within the European standards, and with an attitude towards the non-disclosure of unfavourable information. The authors also pointed out how the distance between impact and financial materiality is narrower than perceived, and that impacts will in the future translate into risks to mitigate and opportunities to exploit. The presence of this “feedback” channel between the entity’s sustainability impact and financial position in the short-, medium- and long-term is perceived as

misleading, and can give rise to an overlapping between disclosure, representing one of the main grounds upon which a universe of scholars finds more informative a “single materiality” approach based on the ISSB model. Although this claim is sensible, at European level the distinction between the two perspectives is deemed as essential for the fulfilment of the information needs of all those stakeholders having motivations other than a business view on sustainability. This is clearly visible by looking at the wording of the ESRS, according to whom a reporting entity shall disclose information that are material from a financial, impact, or both perspectives.

Along with the non-unanimity concerning the definition of materiality encountered when looking at the different existing sets of standards, some articles also point out that there is no formal definition except the one that is being used in traditional corporate reporting and no consensus in how to practically implement it. Padilla-Garrido et. Al (2024) raised this point considering how a wide pool of scholars defined this practice as “ambiguous, controversial, opaque, subjective” due to the presence of general suggestions rather than proper implementation guidelines in the current reporting landscape. Scholars also focused on the driving forces of materiality analysis, but still, consensus has been difficult to reach even though there are some factors representing redundancies. The most widespread approach is the one reported by Farooq et. Al (2020) and it is composed of four steps: identification of “likely-to-be” material topics, prioritisation through a sensible ranking of the identified issues, validation and review. The authors also highlight materiality being a “firm-specific construct”, as the ultimate decision on whether an issue proves to be material for the reporting entity will be taken from the BoD. Most reporting framework now ask for extensive disclosure of how the materiality assessment process, this to gather insights on how this subjective exercise has been carried out conforming to “best practice” rules and because it somehow justifies the non-disclosure on certain issues. To this purpose, the authors conducted a study on the “materiality assessment” practice focusing on the GCC region, a political and economic alliance composed by six Middle East countries – Kuwait, Saudi Arabia, UAE, Bahrain, Oman, Qatar—during a 5-year period between 2013 and 2017, and aimed at understanding the extent of materiality disclosures as well as the corporate characteristics influencing this practice. The result is an increase in

sustainability reporting rates, signalling the willingness of the companies composing the sample to actively transition towards more sustainable business models, despite operating mainly in industries that are non-sustainable by definition, and to align to international institutions' recommendations. This significant increase in reporting rates is, however, associated with a significant decrease in the disclosure assessments related to material topics, with the published ones bringing stakeholders a higher degree of information quality than the ones analysed at the beginning of the study. Among the reasons for such a deviant result we might find some motivations within those corporate characteristics that, in the literature, are deemed as drivers for materiality assessments: the study confirms both a positive association between financial performance and sustainability reporting and a negative relation between reporting and corporate leverage, due to the presence of financial burdens. It is important to notice that this study is limited in the sample, as roughly 60% of companies composing the Gulf Cooperation Council do not engage in the practice of sustainability reporting.

Another study interrogating the determinants of the materiality assessment process is the one proposed by Padilla-Garrido et. Al (2024), accounting for the European perspective since the observation sample is composed by those companies composing the IBEX 35, the Spanish Stock Exchange benchmark index. Data on disclosure of materiality analysis have been gathered, as it was in Farooq et. Al (2020), over a 5-year period spanning from 2018 to 2022. Among the main differences, all the components of the index were required by Law to disclose information of non-financial nature, so engagement in sustainability reporting does not represent a research question. The authors constructed a materiality disclosure assessment index, ranking each entity approach to such exercise, and then proceeded with the identification of the main disclosure determinants: the industry in which the reporting entity operates, the size of the entity – defined by the authors with the term “capitalisation” – and the disclosure experience within each industry, reflecting the claim that a learning-by-doing approach is what leads to enhancements in the quality of disclosed information. Among the results, it is important to notice that no dependencies have been observed between the size of the reporting entity and its materiality assessment, thus being in contrast with

the previously analysed study. The initial “lack-of-consensus” claim can be backed up by these pieces of evidence.

The opacity permeating the exercise of materiality assessment (Padilla-Garrido et. Al, 2020) is reflected also in the work of Beske et. Al (2019) that, through a sample composed of German reporting entities, was aimed at understanding the extent to which companies disclose their assessment process, as well as the methods used for a correct stakeholder engagement. The result is the tendency of entities to provide extensive disclosure on the topics that have been identified as material, but little to no explanation regarding the underlying process. The lack of detailed descriptions is in contrast with the increase in reporting requirements entities are demanded to abide to, but these limitations are likely to be overcome after the introduction of mandatory reporting standards at European level, with extensive focus on the assessment processes, as well as stakeholder determination. The Authors’ claim and the subsequent results of the study might not reflect the future landscape of sustainable reports, as it has been published prior to the adoption of the CSRD by the European Commission.

Before analysing the implications of materiality assessments on entities’ reports and the importance of such documents for their primary users a remark must be made, as there are some issues that are deemed to be material irrespective of the company’s sector, size, financial leverage, expertise in the field of reporting and other indicators. Such issues are external to the business, but if not tackled their adverse effects could severely impact an entity’s ability to create and deliver value. This progression towards a sustainable business strategy – Papagiannakis et. Al (2014) – is clearly visible within the architecture of the most widespread sets of standards for sustainability reporting, independently from their approach to materiality. Taking as reference the GRI, IFRS and the ESRS we notice that, despite approaching materiality under different perspectives, within their disclosure requirements there is a section dedicated to those issues deemed to be sector-agnostic, and hence material no matter the core business of the reporting entity. Among these issues, climate change is the most pressing concern, as it can amplify and increase the magnitude of extreme events. To this purpose, the ESRS, representing the first set of standards that have been made mandatory by Law worldwide, require company to extensively disclose on the impacts as well as risks and opportunities

stemming from it in addition to the disclosure of the existent or to-be-implemented action plan on order to reach zero emissions by 2050. There are grounds for omission within the standards, but climate change represents the exception: reporting entities shall disclose on this matter, both in case of “alignment” and in case an action plan has not been drafted yet, with extensive explanation for the non-alignment. The complexity of the sustainability challenge has been discussed also in Whitehead (2016), according to whom multiple domains are spanned. To address these challenges, the proposal is to focus on issues external to the business first, and building a more tailored strategy upon the positive results obtained, a course of action that once again reflects what will be discussed later on in the publication of IFRS and ESRS as well as in the revision of the GRI standards. When investigating the approach companies have towards materiality, especially after the regulatory changes that we will observe in the European Union, it is important to cite the work of Correa Mejia et al. (2024). One year prior to the entrance into force of the new European directive some entities, included in the study, already introduced the term “double materiality” in their sustainability reports, and the Authors wanted to investigate the consistency between this claim and the information actually included in such documents, thus understanding whether the true purpose of a materiality analysis bridging together impact and financial data has been incorporated in those early-aligned documents. The Authors wanted to check if there was a mismatch between what has been “advertised”, and the substance of what included in the report. Some interesting findings have been disclosed at the end of this study, as for example the presence of both committed and of label adopters, with the first explicitly identifying impact and financially material topics, and the second category failing to conduct such an all-encompassing assessment, thus not identifying both materialities. This failure is, according to the Authors, driven by the presence of legitimacy theory – such companies are hence seeking to improve the social perception of their activities, but this might lead to give mixed signals to the users of such reports: a prerogative for an effective assessment of materialities is represented by stakeholder engagement, meaning that companies shall proactively get in touch with them as well as disclosing the outcomes of such analysis. It has however been observed, in a small subset of those companies defined label adopters, that along with the non-disclosure of both the dimensions of materiality they also do not identify any stakeholder group, thus conflicting with the very

foundations of the study of double materiality. On the other hand, along with demonstrating true commitment towards the alignment with the European guidelines, early adopters are also having the chance to become pioneers in practicing sustainability reporting, thus gaining a considerable competitive advantage over their peers.

There is however the need for having a true and fair view of how the whole European Union is adapting to this massive change in its regulatory requirements, and that's why we may want to look at the interesting findings proposed by Dragomir et. Al (2024) in its study on the practice of Double Materiality conducted on a sample of 20 Romanian listed companies, where a high level of reporting on sustainability related matters has been observed: the companies used as "sample" for the study showed high expertise in the usage of existing standards, as well as national provisions, and this is expected to lay out a solid ground for the full implementation of the CSRD. Contrary to the so-called "Label adopters" in Correa Meija et. Al (2024), the companies included in this study demonstrated experienced disclosures concerning impact and risk assessment, thus disclosing on both materialities, and detailed descriptions of their internal processes, signalling their proactivity towards adapting to those incumbent changes.

We now continue our literature review by studying what is to be understood when encountering the term "ESG-risks" and on how their importance is growing in financial markets.

2.3 ESG Risks – definitions and the role they have in modern decision making

The acronym ESG was introduced in 2005 by the United Nations, and it stands for "Environmental, Social and Governance". It is a broad term encompassing a wide range of issues that might directly or indirectly impact or be impacted by companies. When it comes to ESG risks we include all those matters that could potentially lead to negative financial consequences for the reporting entity.

Under a purely financial perspective, in the last years ESG issues have been gaining importance within markets and are starting to be incorporated not only in new categories of funds, but also as an investment strategy performed by individual investors

– ESG Investing. This approach to decision making when investing considers the impact a company has towards its external stakeholders, and we can therefore say that to have all necessary information investors need new sets of information. This represents one of the main grounds that led on one hand companies to engage in sustainability reporting and on the other the European Union to start designing a unique architecture to meet the needs of both parts and thus encouraging individual investors to act directly on the market, as it happens in market-based economies as for example in the US.

However, as pointed out in De Giuli et. Al (2023), although ESG issues are being increasingly gaining relevance among investors and policymakers we do lack a clear definition of what might be universally considered as a “risk” in relation to these issues – to quote the Authors, “a clear taxonomy of ESG risks appears to be missing”. By looking at the context we are living in we might want to agree with this statement, because traditionally the sole metric for judgements has been the ESG “impact” an entity reports and this is also partially due to the standards those companies have been adopting prior to the introduction of the CSRD, but this aspect will be discussed more in depth in the third chapter. As for now, we do encounter ESG-stemming financial risks in the form of fines, sanctions, increased operational costs, reputational damages, but these are consequences of previously undertaken actions by the entity reporting on them.

By definition, we do find that:

- Environmental risks are defined as the potential for damage to the environment which has the capability to impact a company's operations and financial performance,
- The concept of social risks is associated with the rights and well-being of workers, communities and consumers, and
- The term 'governance risks' refers to those factors which pertain to the internal systems, controls, and procedures that govern corporate conduct and decision-making.

We may want to notice how also their definition reminds us of something vague, thus supporting the aforementioned thesis. It is to be said that not all companies share the same features, and that general definitions might allow for them to be able to

transform them into tailor-made insights, based on their idiosyncrasies. This is what is being currently discussed at an EU-wide level, where a completely new system of sustainability reporting is taking place: the selection of words both for the Directive and for the Standards has been set as wide as possible along with the introduction of mandatory requirements only on the process to be carried out for the identification of such risks. By leaving room to the single entity to adapt the processes to its own operations we avoid the risk of sustainability reports being off-track or disclosing either more or less information than needed, hence non-material for conscious investors' information needs. For the purpose of investors' decision making, disclosures on the exposure of companies to ESG risks represent a key strategic pool of information to evaluate, as they can arrive at gaining a more precise snapshot of the entity as a whole, as well as insights on potential future events that are by definition "non-traditional" sources of risks that can severely damage the financial position of the company, and this shall be taken into account when performing an investment decision: such disclosures sum up to traditional ones, and this might signal to the investor that the company is de facto riskier (or less in some cases) than its appetite.

It is fair to add that reporting on ESG risks will represent a challenge for European companies, as the previous reporting Directive left to the discretion of the single entity, but as we will disclose in more detail in chapter 3 most of them reported only on their impacts; FY2024 will be the first reporting year where mandatory assessments on both impacts and risks are required.

The next step, discussed in the next and last session of this chapter illustrates the practice of having such reports verified by third parties, with such opinions shaping the way materiality is to be interpreted.

2.4 The implications of materiality assessments for investors and the role of assurance

In the last part of this literature review we will analyse the degree upon which financial materiality in sustainability reports is valued by investors, as well as how are they incorporated within stock prices. Schiehl and Kolahgar (2021) in their study aimed at understanding whether stock price informativeness is affected by ESG disclosures

found that, despite the non-unanimity in the adopted reporting framework and in the absence of mandatory rules, the value relevance of such information is high, and stock prices positively benefit from it. The chosen investigation sample has been made from Canadian companies listed on the TSX composite index over the period in-between 1999 and 2014. The authors, when building their model, kept as reference the SASB framework, particularly for what concerned the identification of a structured materiality framework as the aim was to demonstrate the higher information quality contained in reports observing the “financial materiality” criterion. This enhancement in disclosure quality is reflected in entities’ stock prices, as a higher sensitiveness to material financial information with respect to general disclosures has been observed. We can therefore say that the work proposed in Schiehl and Kolahgar (2021) sheds a light on the importance nonfinancial disclosure has in reducing information asymmetry in financial markets, allowing for them to operate wisely, compliant with Fama’s Efficient Markets Hypothesis. It also allows for a deeper understanding of how materiality is indeed a subjective exercise that must be tailored to the sector the reporting entity operates within.

At European Union level, however, this enhanced informativeness is not as sophisticated as it is in market-based financial systems, as disclosure of financially material sustainability information was enshrined in the text of the NFRD but the freedom of choice of the reporting framework led almost all entities under the scope of the directive to adopt the GRI standards, tackling such issues under the inside-out perspective. An interesting research question on this existing lack of informativeness is related to the attitude companies are showing in recent reporting practices, hence whether they have been anticipating the entry into force of the CSRD to disclose financial information following EU’s guidelines in the matter. The status of pioneering adoption of the DM principle has been studied by De Cristofaro and Gulluscio (2023), whose study incorporates the first attempts at exercising double materiality assessments due to the lack of pre-existing empirical evidence. The data have been gathered from Robeco, an international investment company whose main line of business being represented by sustainable investments, with half of the sample being composed of Europe-headquartered companies, and hence under the scope of European sustainability

legislation. The term “double materiality” has been significantly retrieved especially in 2021 reports, and this proves to be consistent with the adoption of the CSRD that occurred in 2020, even though this represents the minority of the observed sample. Among the companies making a reference to this newly-introduced principle it has been observed that not a lot of entities are currently approaching this exercise in a proactive fashion, and the Authors reconduct this to the willingness to conduct a more solid assessment after the introduction of appropriate reporting Standards, and, as a matter of fact, heterogeneity in the application of the double materiality principle has been observed throughout the entities composing the observation sample. Among the most important contributions of this work, the authors provide evidence on the current spread of the DM principle prior to the entry into force of the new Directive, as well as serving the purpose of “feedback” on the degree of knowledge on how to perform such exercise, in order to develop further adequate implementation guidelines. Reference to this first empirical study will be made in the design of this dissertation’s study on the evolution of reporting practices at European level.

Along with the practice of sustainability reporting and the different declinations of the materiality assessment process, several studies have been conducted on the evolution of the practice of reporting assurance, that at European Union level was voluntary under the NFRD but has been made mandatory under the CSRD. Assurance is a third-party verification of the quality of the disclosed information and is the transposition of auditing in financial reporting. Alsahali and Malagueño (2021) provides a mapping of the current level of assurance practices at worldwide level as well as highlighting possible future directions. As pointed out during the European Commission public consultations, assurance practices serve as an additional guarantee for investors, as information truthfulness and completeness is checked by a super-partes entity. It is however important to notice that this field, unlike traditional financial auditing, is still new, and hence less organised. Among the main fallacies the Authors highlighted the lack of a unique set of standards, recriminated also in the practice of reporting, and the presence of the distinction between limited and reasonable assurance without a clear definition of the depth of the investigation to be conducted in the two cases. Another point raised, contributing to the thesis of this field being still “immature” is the lack of

specific pieces of legislation in relation to the degree of expertise providers shall have, resulting in the existence of multiple providers, classified as “accounting” or “non-accounting” depending on their degree of expertise in the field of traditional financial auditing. Scholars have been debating on end users’ perceptions circa the credibility of such statements, and this might be partially due to the aforementioned lack of technical skills, but this stems also from the fallacies permeating non-financial information. As additional clarification, the Authors highlighted the distinction among the nature of the providers in the scheme here below.

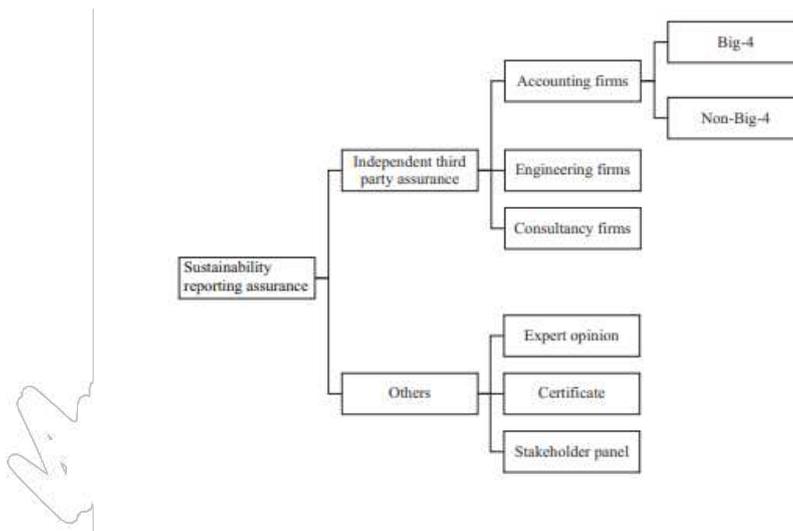


Figure 5: nature of assurance providers - Alsahali and Malagueño (2021)

Statistics suggesting an increase in sustainability reporting, according to the Authors, do not come with an equivalent increase in the number of produced assurance statements, signalling that up to 2021 this practice was not as widespread as it is now. The exception is being once again represented by the European Union legislation addressing sustainability issues: the amended NFRD, as a matter of fact introduced the concept of non-financial reporting assurance already in 2014, with three Member States (France, Italy and Spain) mandating assurance within their transposition of the Directive into National Law. The amendment to the Directive, and hence the entering into force of the CSRD starting from January 1st, 2025, mandates assurance throughout the whole EU, for all entities falling under the scope of the Directive. To deepen the understanding of the state-of-the-art at the date of publication, Alsahali and Malagueño (2021) conducted a study interrogating themselves on the timespan between companies’ first sustainability report and their first adoption of the sustainability assurance practice and

then proceeded at understanding the main existing trends in terms of market distribution per type, standards, scope and level. Confirming what stated in existing statistics, the percentage increase of sustainability reporting issuances was almost double the increase in assurance practices. It is important to note that, although this gap between reporting and “validation” exercises, the observed trend is nevertheless signalling an increase also in the practice of assurance, and that the difference in numbers is partially because companies have, since the beginning, been less inclined to have their first ever reports to be verified externally. Another important finding is the increase in the production of such documents derived from being listed on a Stock Exchange, a fact that is completely consistent with the most recent developments in the matter of sustainability reporting from a regulatory point of view. Surprising, on the other hand, the observed decrease in state-owned companies having their documents assured. The common conclusion we can arrive at is that assurance is still an emerging practice, whose distribution is subject to variables other than the decisions taken at a managerial level on whether to align to this practice or not.

We can conclude by saying that literates have been extensively studying the rising phenomenon of sustainable development, and its transposition into company documents since the very beginning, analysing the similarities and, most importantly, the factors differentiating such documents. The chapter was aimed at pointing out the main research fields, pointing out both what has been done so far and what more can be done in the future. From chapter 3 onwards we will start from this literature review for the empirical analysis that will be conducted.

Chapter III: The evolution of materiality disclosures in the EU Chemicals Industry

3.1 General overview of the chemicals industry within the European Union

According to the EU Commission's Factsheet, the chemicals industry has been defined as vital player for the economy of the European Union, as most of the manufactured goods' entrance into the market wouldn't be possible if chemical industries were not part of their value chain. As a matter of fact, with sales ranging between €700 and €800 billion, the EU is to be considered the second largest chemicals producer worldwide, second only to Asia. This industrial landscape is composed almost entirely from small and medium enterprises, accounting for a solid 96%, and characterised from a higher degree of labour productivity than in the EU manufacturing sector in general.

Despite all of this, we are about to delve into an industry that is not exempted from facing challenges: For the purpose of our analysis, it represents what we could call a "high emission" sector, and it is hence facing high external pressure for improvements in the sustainability practices being adopted by firms operating within. Due to its peculiar features the European Union has introduced a "chemical policy" whose key features revolve around climate neutrality and circularity with an emphasis on boosting competitiveness on a global scale, a combination of factors that highly resembles what in Mario Draghi's speech. This need to increase its sustainability score also stems from the EU's binding climate targets to be achieved within 2030 and 2050, comprised in the Chemical Industry Transition Pathway – designed by the European Commission together with the Member States and comprising insightful contributions from key sector stakeholders. For what concerns the theme of "competitiveness" on the other hand, the main points we may want to highlight are those related to the instability of the supply chains caused by the still ongoing Russia's war of aggression against Ukraine and global competition, especially for companies operating in contexts where sustainability-themed regulatory requirements are almost non-existent and where the price of energy is lower. As brought to our attention by European Chemical Industry Council, CEFIC, we are currently at a competitive disadvantage with respect to the USA, ME and China, with

the latter being a particularly attractive destination for those companies looking for highly skilled, low-cost workforce.

Addressing such challenges needs guidance, for the process to roll out seamless. This represents part of the work that at a European Union level is brought forward by the CEFIC, whose analyses highlight four main dimensions for an effective Transition to happen: “going circular”, “going digital”, “going climate neutral”, “transition to safe and sustainable chemicals”. Circularity is concerned with the overall reduction of the usage of single-use resources; digitalisation is intended as the development of new technologies for an effective monitoring of key parameters throughout the whole production process; climate neutrality represents the ultimate goal of the EU chemical industry to be achieved by means of disruptive innovations in the production processes by no later than 2050; the transition to safe and sustainable chemicals, partly connected with becoming climate neutral, has as main target ruling out all those chemicals that might be harmful for the end consumer. At the basis for a successful achievement of all these four pillars there is the need for new infrastructure and important investments, especially in R&D, with the main challenge being represented by minimising the risk of leaving “stranded assets” along the way.

To address the challenges brought by, the CEFIC together with the European Commission and the help of key stakeholders drafted a document laying out all the needs and conditions necessary for an effective transformation to take place. For what concerns funding, it is important to highlight that this sector is onerous and that does not only represents a barrier to entry, but also drives uncertainty for entities already operating in the sector that are approaching the transition: Initial investments require high CAPEX that shall be combined with all operating expenses (OPEX) needed for the modification of the production processes and for the purchase of energy from alternative sources. Ensuring such operations will bring a positive return on investment would strengthen investors’ confidence, thus leading to a significant increase in funding the transition for this sector and to the achievement of what in the four pillars. A summary of all the actions aimed at supporting the transition is shown here below in figure 6:

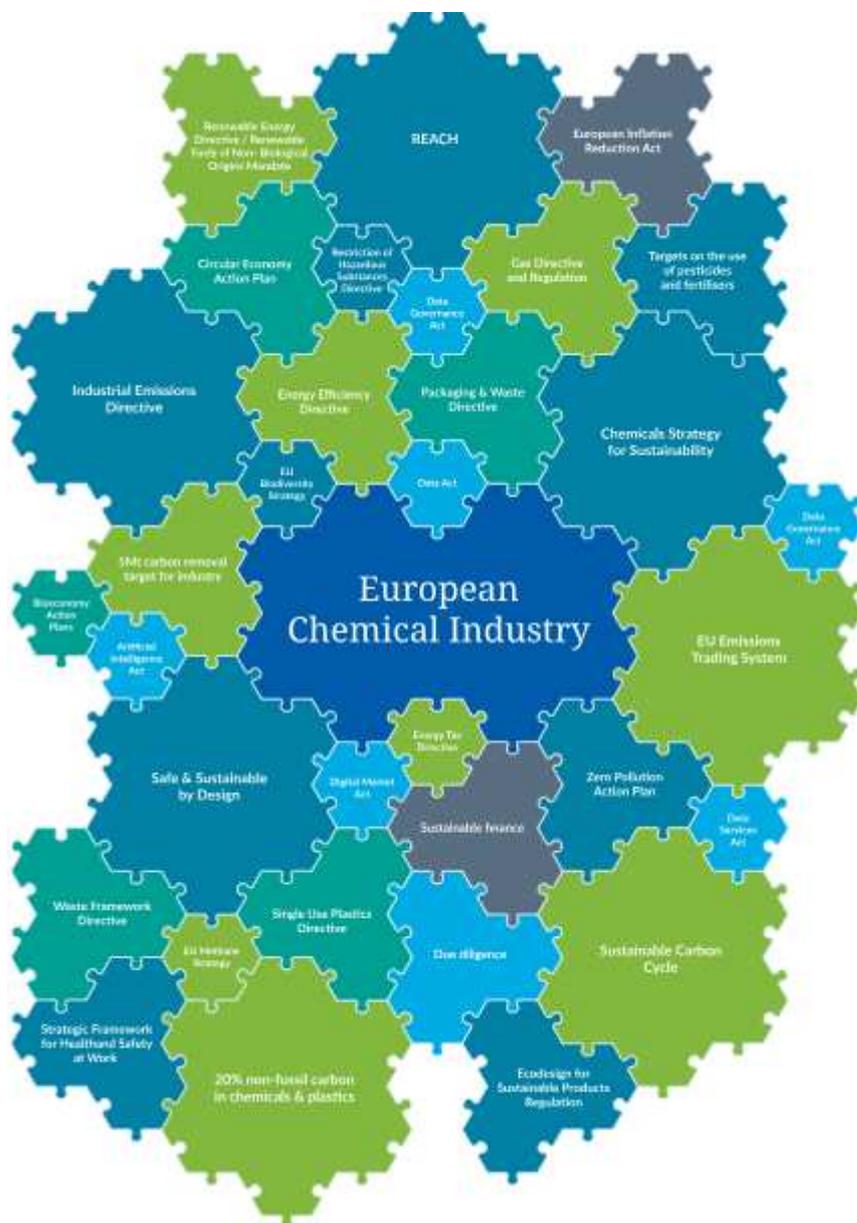


Figure 6: EU chemical industry regulatory breakdown - CEFIC

To attract such fundings companies shall communicate with investors, and they do so by means of yearly reports. When analysing the sustainability reports of European Union firms operating in this sector, we would expect them to be hinting to the contents of the transition pathway along with disclosures on both dimensions of materiality.

3.2 The choice of the dataset

As reported in the introduction to this work, the aim is to understand the steps that have been taken by companies in the matter of sustainability reporting. The choice of conducting our investigation by basing it on a cluster of obliged entities pertaining to the same industry has been driven by the willingness of allowing the audience to draw meaningful and sensible conclusions, based on comparisons across companies whose core business is, to a greater extent, the same. Prior to the conducting the analysis, a significant evolution of such a practice across the years and some degree of homogeneity in the topics deemed to be material by companies operating within the same segment was expected. The companies chosen for this study were selected from the STOXX Europe 600, an index comprising 600 major companies from different industries across European countries. Since the index's composition might vary, it is important to disclose that the composition of the index is the one as of May 2025. Under a strict economic lens, it is an index that gives investors meaningful insights into the well-being of such companies: if the index is up European companies are doing well, while the index going down signals a struggle. All the companies to be included in this analysis are part of the European Union chemicals industry – exceptionally, Swiss companies have been excluded, as the focus is to investigate the improvement in reporting practices within the EU, that does not comprise Switzerland. A list of the selected companies is provided in table 1, while figure 6 here below breaks down the composition of the study pool by country.

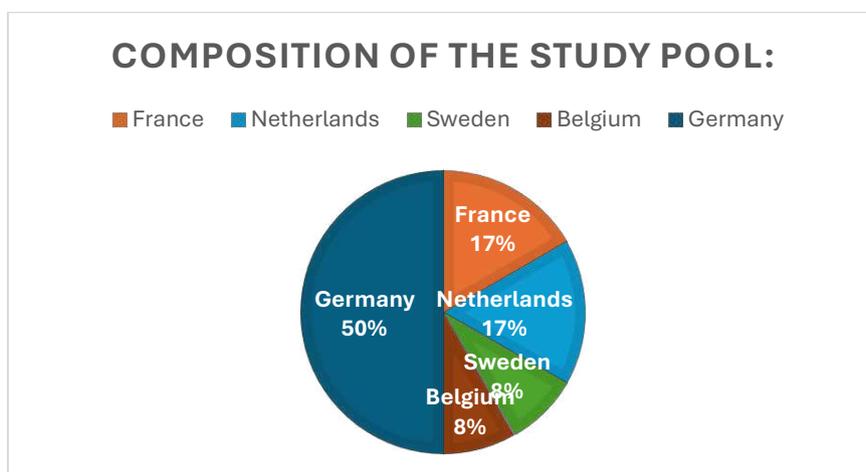


Figure 6: study pool breakdown by HQ-country

STOXX 600 EUROPE - Selected Companies		
Company	Country	Core business in brief
AIR LIQUIDE SA	France	World leader in gases, technologies and services for industry and healthcare
AZKO NOBEL SV	Netherlands	World leader in coatings and paints, active in more than 150 countries
ARKEMA	France	World leader in specialty materials - adhesive solutions, advanced materials - coatings
BASF SE	Germany	World leader operating in eight different segments of the chemical industry: chemicals, materials, industrial solutions, surface technology, nutrition, agricultural
BRENNTAG SE	Germany	Global market leader, 2nd in the World, in chemicals and ingredients distribution
EVONIK INDUSTRIES AG	Germany	One of the world leaders in specialty chemicals
HENKEL AG	Germany	Leading solution provider for adhesives, sealants and functional coatings
HEXPOL AB	Sweden	Global leader in polymer compounding and materials for industries like automotive, building, oil and gas
IMCD NV	Netherlands	Global leading distribution partner and formulator of specialty chemicals and ingredients
K&S AG	Germany	Europe's largest supplier of potash for use in fertilizers
LANXESS AG	Germany	Leading specialty chemicals company
SOLVAY SA	Belgium	Multinational chemical company producing essential chemistry products

Table 1: companies included in the study pool

What we do immediately notice is that within the twelve chemical companies included in the index, 50% is composed of German companies. Ranked first in Europe and third worldwide – after China and the US – the German chemicals industry stands as a cornerstone of the nation’s industrial economy while also representing a key player on the global stage. Germany can count on a strong historical background on scientific excellence, combined with state-of-the-art technological advancement. It is also important to notice, as Mr. Wolfgang Entrup – general director of the German Chemical Industry Association (VCI, Verband der Chemischen Industrie) – points out, that it is a sector that due to its interconnectedness to the “outside World” is navigating through a challenging path: Russia’s aggression of Ukraine led energy prices to skyrocket, and this combined with structural problems like bureaucracy and the slow procedures might cause productive lumps comparable only to what in the 2009 crisis, and this might raise concerns on whether the German industry will be competitive enough to profit from a global increase in the demand for chemical products. Narrowing down what in paragraph 3.1, the development and the implementation of new processes aimed at reaching Net Zero by 2050 is another trend that is being studied and addressed through the introduction of the “High-Tech-Strategy”, intended to facilitate the achievement of such goals. To address such challenges, Germany can count on almost forty chemical clusters spread throughout the whole territory that gave birth both to international staples and to highly specialised and innovative SMEs. This is combined with the availability of an educated workforce, thanks to a solid partnership between industries and academic realities and to their cutting-edge “duale System” model that allows high-school students to combine lectures with periods of on-the-job training and hence to continuously improve their abilities and capabilities – other than serving as an essential tool in fostering talent retention. In addition to that, we can infer from Entrup’s words that the transition is backed up not only by synergies between the entity and the local society, but also on a certain degree of “openness” towards more sustainable models, undoubtedly perceived by those working within this sector as an opportunity to take rather than a threat.

It is however important to highlight that a proactive approach towards reaching Net-Zero is not a feature uniquely of German companies but rather of European Union

ones, as ambitious pledges for the achievement of such an important milestone have been encountered in the front-page of every company website while drafting the above-discussed table. All companies, at a first sight, manifested a strong commitment in moving towards that direction, but what we do want to present the audience by means of this work is an in-depth analysis of how companies are putting that commitment into practice.

3.3 How was the analysis performed

With the help of companies' sustainability and annual reports, the past and current state of awareness they have in the field of non-financial reporting, especially for what concerns risks, have been investigated.

I proceeded by reading and analysing such documents for a period ranging from 2021 to 2024 with the aim of gaining insights into yearly improvements in the quality of the reporting and on the preparation of companies towards the incorporation of the European Sustainability Reporting Standards within their reports starting from FY2024. At first, I wanted this analysis to be carried out starting from 2019, but since also the year of the Covid-Pandemic was included, it has been decided to narrow our set in order not to have a statistically non-significant reporting year included.

When going through the documents I have been focusing on the types of standards that reporting entities have been adopting, especially prior to the introduction of the European ones, on the pillar(s) the identified risks were pertaining to, and on how such risks have been assessed and reported into the document itself. From the type of adopted standards it had been possible to understand the focus of the sustainability report, but it is also true that for what concerns this type of documents companies tend to report on a variety of different standards because there was not a mandatory set.

Although the identification of risks and the information on how they have been assessed and reported has been fundamental during all the data-collection process, during the examination of FY2024 reports the focus was not on the type of adopted standards but on how reporting entities incorporated the ESRS within their respective documents. In this second part it was hence analysed whether the standards have been

adopted because of the transposition of the CSRD into national law or on a voluntary basis, the extent to which companies have been disclosing in relation to stakeholder engagement and double-materiality assessment, and on the depth of their ESG disclosures – whether they just disclosed the datapoint as per the text of the related standard, or if there was some degree of tailoring of the disclosure to the reporting entity’s own operations.

I have also looked at the layout according to which data have been presented to the audience, and while we did not encounter differences between 2021 and 2023, the introduction of European common standards led to an increase in both standardization and comparability. By Law companies are now required to disclose data non only under a clearly defined set of standards, but also on a clearly defined section (right under the management’s report) and under precise metrics. Some may argue that those strict requirements represent a limit on the reporting entities’ image, but from the reports that have been analysed it was possible to notice how the aesthetics, one of the key elements differentiating one entity from another, has not been changing with the introduction of the new standards, thus maintaining the entity’s brand image clearly recognisable. This leads to the conclusion that, in relation to how data is presented to its end users, the only difference is a clearer definition of all those risks stemming from ESG dimensions, that are now invested with the same importance as more traditional risks and disclosed in the same way, that is to say with a dedicated section in the FY report. This enables an easier access to information for reports’ end users, as well as facilitating comparisons across companies operating within the same industry/sectors (= benchmarking) – this has been particularly useful for this work’s purposes, allowing for an easier identification of the section of the report corresponding to what was important for my analysis.

According to the latest developments at European Union level, especially with the introduction of the Stop the Clock directive some might have expected EU companies to slow down in their journey towards a comprehensive application of the CSR Directive. But this is not the result I have obtained by looking at the pool of entities whose reports have been selected for this study: although the Omnibus Directive extended the period

for the transposition into National laws, companies have been starting to produce their first ever reports incorporating the provisions decided at EU-Wide level.

On a pool composed by 12 reporting entities, only one FY2024 Financial Report has been deemed as non-material for the analysis as it clearly stated its non-abidance to the European Standards (Hexpol AB). For what concerns the remaining ones, a common line of thought among French and Dutch companies has been encountered, while German companies ranged from proactive to laggard with respect of both the materiality assessment and on the observation of the disclosure requirement. One case of sustainability report being separated from the integrated report has been observed, that is the case of Henkel AG.

As analysed in the first chapter, the most important introduction brought by the new European Union package is the introduction of double-materiality assessments and all the related guidelines and suggestions for its correct implementation. It is important to remark that all the Entities that have been selected are a part of the largest businesses throughout Europe, and more precisely of the European Union – that is to say, they were already mandated to report on materiality according to the 2024 Non-Financial Reporting Directive. Pointing this out allowed me to analyse the evolution in the conduction of such assessment throughout the years, and it leads me to say that the quality of the results is overall very high: all analysed companies' end-year reports contained a section dedicated to the analysis of material topics stemming from the ESG-dimension and, prior to 2024, the adopted set of reporting standard played a role in “influencing” such analysis: companies whose reports were mainly based on the GRI standards, for example, disclosed as topics material with an inside-out perspective, hence looking at its impact materiality. Companies that on the other hand adopted reporting standards like the SASB, whose interconnectedness with the European Union standards will be discussed at the end of the chapter, have started earlier to become familiar with outside-in material sustainability information.

An examination of the 2024 materiality assessments conducted by the study pool reveals a notable increasing trend in the disclosure of non-traditional financial risks, and this of course is primarily due to the new obligation that has been entering into force. To allow for a better understanding of the magnitude of such trend, looking at the evolution

of the average number of observed disclosures in the matter of financial materiality represents a viable proxy whose results are summarised in table 2 here below:

EVOLUTION IN THE NUMBER OF DISCLOSURES				
	FY2021	FY2022	FY2023	FY2024
Evaluated Reports	12	12	12	11
Observed ESG-risks (of whose attributable to more than a pillar)	103 (22)	120 (24)	141 (27)	140 (2)
Average n° of disclosures (per reporting entity)	9	10	12	13

Table 2: year-to-year evolution in the n° of ESG disclosures

This scheme shows how throughout the years composing the observation window the number of observed ESG-risks continued increasing, with the main result being a positive trend in the average number of disclosures per reporting entity, while at the same time highlighting a sharp decrease in overlapping being represented by disclosures encompassing more than a pillar. In relation to the second proposed observation, redundancies that priorly accounted for almost 20% of the gathered data at the beginning of the observation window went down to below 1% after the introduction of the CSRD, thus backing up the claims related to significant improvements in the quality of the proposed reports, as assessments performed under the newly introduced guidelines allowed for a more detailed mapping of potential factors affecting the single entity’s financial performance. Such improvements are to be considered of utmost importance also for the entity itself, as having the possibility to rely on a “state-of-the-art” document to make strategic decisions significantly reduces the margin of error.

Among other improvements that have been identified when comparing the first approaches at performing financial materiality in the years prior to the introduction of the Directive there is the progressive transition from broad descriptions of potential risks that could impact the financial performance of the company to more precise and detailed disclosures. It is hypothesised that this shift will be more beneficial for end-users of such documentation, that now can base their judgement on data that, according to our opinion, better reflect the situation of the entity under evaluation with respect to

what we have observed before. What is being presented in table ... here below points out what was argued in this section of the chapter: taken from Air Liquide SA sustainability statements, this summary shows how for the reporting entity an important source of financial risk is represented by shortages of qualified personnel, while also highlighting the fact that the company accounts for it as a recurring threat to its operations. However, what changed is how the company accounted for it, as the difference between its pre- and post-CSR disclosure is self-evident. Years from 2021 to 2023 are presenting the risk in a general wording, and the fact that this un-ability might affect the financial performance of the entity itself seemed left to the interpretation of the single user. In FY2024, on the other hand, we are presented with a detailed breakdown of the potential threat as well as an explicit reference to the financials that it could have a negative impact on. This evolutive progress has been summarised in table 3 here below:

FY2021	FY2022	FY2023	FY2024
Not being able to attract and retain the right skills at the right time	Not being able to attract and retain the right skills at the right time	Not being able to attract and retain the right skills at the right time	ESRS S1 - Own Workforce - employability, talent, skills mgmt: A too high turnover rate on the one hand or a lack of employee qualifications on the other hand can affect the availability of talent and could thus disrupt operations

Table 3: example of evolution in the quality of disclosure – Air Liquide SA

Another novelty beneficial for the end-user is represented by the introduction of a specific section dedicated to ESG-risks, as prior to the implementation of the directive, the discourse surrounding such risks was incorporated within the section designated for financial risks in financial statements. The absence of mandatory requirements pertaining to both location and assessment engendered a scenario wherein both the end-user and the reporting entity were at liberty to undertake a cursory examination of the risks. Lacking clear guidance for the performance of an effective assessment leads to altered results, with reporting entities that might underestimate the effects of potential

risks and end-users performing their decisions based on biased information. This possible scenario has been ruled out through the introduction of a structured architecture both in the matter of procedures to be implemented, as we have just pointed out, and in relation to the topics to be discussed if deemed as material as we will discuss in the forthcoming paragraphs to this chapter. It is therefore possible to say that all the entities included within this study have a certain degree of expertise in performing such analyses, with the only possible difficulty being now adopting both perspectives. Also, since disclosure has now become mandatory, as per the ESRS, all companies (exception made for the non-compliance case) presented in their FY2024 report a detailed analysis concerning their material topics paired with disclosures on stakeholder engagement.

To conclude the first part of the analysis, related to the formal application of the standards, I have investigated the presence of the report's assurance statement, that has been made mandatory under the CSRD. In this regard, it has been observed that all entities presented a limited assurance statement at the end of every analysed sustainability report, leading to the conclusion that for them it has become a common practice allowing for the enhancement of the quality of the produced documents. Even though non-relevant for this study's end analysis, to comment on the presence of assurance I have considered, for FY2024, also Hexpol's non-CSRD aligned report – so it can confidently be stated that having third parties verify the produced information has become a best practice for the selected entities. When looking at the bigger picture, one could arrive at the conclusion that ESG-related information represents for them an important source as much as purely financial one, and this line of thought precisely matches the context we are now living in, with investors' preferences that are changing. This is precisely what led legislators to adopt the “double-materiality” approach that has been discussed throughout this dissertation: we are not living in a one-dimensional context, companies are not only impacting the World we live in but are also impacted by it and that's why we are in need of both sources of information to gather a true and fair view of the current situation – plus a reliable forecast of what will be the future like – of the entities we are interested in.

3.4 The results of the performed analysis

3.4.1 Analysis of environmental-related disclosures

Since the focus of this thesis, as stated in the introduction and throughout the chapters, is being related to the investigation and the evolution of disclosures related to the environmental dimension of sustainability, one of the core analyses I have been carrying out has been a comparative assessment of the selected entities' environmental disclosures. Through such analysis I wanted to give an answer to the following questions: are companies acknowledging that the environmental changes we are observing might result in threats? Are they able to give a financial value to such threats? Have environmental disclosures changed with the introduction of the CSRD and the related ESRS?

As stated at the beginning of the chapter, due to the observation of a non-compliance case the analysis related to the implementation of the Directive will be based on a sample of 11 and not 12 sustainability reports. For all reports in this analysis, it has been observed how all selected companies have been proactive in disclosing environmental-related information, and this allowed me to compare such statements not only across the same reporting entity, but primarily across the whole observation sample, with the aim of arriving at depicting the current state of reporting of European chemicals companies in order to be able to draw some conclusions as well as possible suggestions for years to come. In figure 7 displayed here below we highlight per each of the five ESRS standards dedicated to environmental related matters the number of companies disclosing on their related risks:

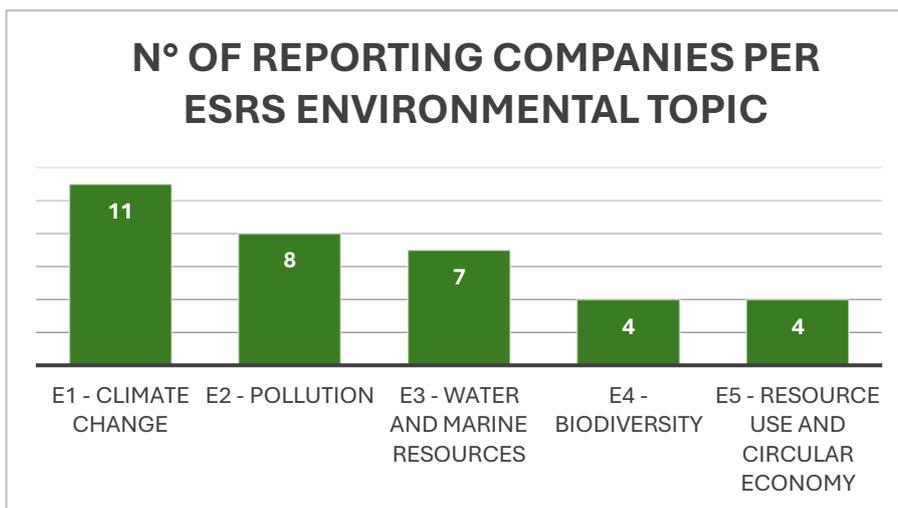


Figure 7: environmental disclosure breakdown

One of the most interesting findings is that, throughout all reports and throughout the years, climate change is given the utmost importance: as identified by sector experts, climate change represents the most severe challenge we are facing in this historical moment, and companies are acknowledging that. Year by year it is possible to notice how disclosures on this phenomenon and its related metrics are increasing while improving also in quality. The companies under evaluation indeed feel threatened by chronic and acute physical risks that might disrupt their production sites and in turn drive down the end-of-year economic result. By looking at what in the reports, climate change adaptation and climate change mitigation are being tackled in two separate ways, an observation that is in line with the intrinsic features characterising these two phenomena, and different methods mean different metrics used in disclosure: climate change adaptation is reflected into stress-tests and assessments aimed at inferring the resilience of the reporting company’s assets – plants, offices, production sites – against possible future extreme events. Such testing has been based primarily on scenario analysis paired with forecasting to evaluate responses contingent on multiple possible outcomes and thus lead to tailored action plans when needed. In relation to climate change adaptation, it has been observed that such a procedure, due to its lack of “standardization” and its high adaptability to different cases depending on each entity’s idiosyncrasies, has been taken as a reference point for most companies, almost representing a best practice – companies did not only disclose the risk they might face in the future, but disclose detailed information regarding the performance of the

assessment, the results, and the concrete actions to be undertaken to tackle the identified risks. In relation to climate change adaptation, I have been able to appreciate the evolution of each entity's reporting: year after year it was possible to notice how the quality of the information increased, and how the metrics started being refined until arriving at being state-of-the-art, thus leading to an increase in reporting quality. Another aspect I have been focusing on is the consistency of those reports: in most of the disclosed "corrective" actions we noticed the presence of deadlines, a detail that might make the difference when read by an end user being a stickler for detail. The presence of targets to be achieved and the related allotted time might represent a key information source, as end users are able to evaluate not only the projects per se, but also the capabilities of the responsible persons to deliver the expected outcome in a timely fashion. In all the analysed cases it can be seen how year by year companies disclosed on how they were keeping up with the evolution of the project and on the effort being made to fall within the deadlines. It is however important to remark that the topic of climate change does not represent itself a novelty, given that also in the observed reports prior to the introduction of the CSRD disclosure on this matter could have been found – thus supporting the proposed claims on observed consistency within the reports and on the proactivity characterising all the companies composing our study pool. If I were to suggest to the reader where to fully capture the results of this ongoing evolution in environmental disclosures, I would advise to delve into information related to the presence of long-term measures for the attainment of climate-related goals: when discussing on the presence of implemented corrective actions and stress tests being or to-be performed at entities' locations it is observable how such practices started in previous years, and are therefore included in more subsequent reports. This allows end-users to better understand the evolution of such ambitious projects, even though in the period preceding 2024 results were mainly presented in the form of a narrative, and not with numbers. In relation to this topic, the progressive shift towards quantitative-based disclosures serves not only the purpose of creating a complementary subset of data for reports users to gather insights upon, but it also represents a powerful tool to map the progress reporting entities are making towards the attainment of targets that have been set at EU-wide level, especially those related to emissions reduction.

In table ... here below it is presented an example of disclosure tackling the topic of climate change through the performance of a resilience assessment taken from an entity present in our study pool, IMCD NV. It has been decided to present these pieces of information here below in table 4 because of its straightforward nature and because it offers a great support in better understanding what is being done by reporting entities in relation to this topic, other than serving as a visual representation of the proposed findings on consistency among pre- and post-CSR sustainability reports.

FY2021	FY2022	FY2023	FY2024
<p>Climate Change - general: Physical and transition risks might pose significant challenges to ecosystems and the natural environment, thus resulting in risks like disruptions to transportation infrastructures due to extreme weather events, or shortages of some feedstock due to agricultural losses.</p> <p><u>This can, in turn, have an impact on the Group's operations.</u></p> <p><u>The identified climate change-related risks and opportunities will be further analysed in 2022, including the impact on financial performance and financial planning in the short, medium, and long term.</u></p>	<p>Climate Change - general: Physical and transition risks might pose significant challenges to ecosystems and the natural environment, thus resulting in risks like disruptions to transportation infrastructures due to extreme weather events, or shortages of some feedstock due to agricultural losses.</p> <p><u>This can, in turn, have an impact on the Group's operations.</u></p> <p><u>The assessment of the Group's resilience tested against TCFD recommendation will be finalised in 2023</u></p>	<p>Climate Change - general: Physical and transition risks might pose significant challenges to ecosystems and the natural environment, thus resulting in risks like disruptions to transportation infrastructures due to extreme weather events, or shortages of some feedstock due to agricultural losses.</p> <p>This can, in turn, have an impact on the Group's operations.</p>	<p>E1 - Climate Change - adaptation: Increased frequency and intensity of extreme weather events, especially floods, can disrupt operations, leading to increased capital and operational expenditure costs and reduced revenue. Extreme weather events causing disruptions of value chains or raw material supplies could lead to longer lead times, increased costs and reputational damage.</p> <p>E1 - Climate Change - logistic decarbonisation (adaptation): The investment costs that IMCD's partners face in relation to decarbonisation could be passed on to IMCD, leading to higher transportation costs and consequently increased costs of IMCD's products.</p>

Table 4: evolution in climate change reporting – IMCD NV

The mention of climate change as a major risk factor for IMCD operations has been encountered in all the observed reports in the analysed timespan – and in relation to this I can therefore say that the documents are consistent with one another – but I can also directly infer that the degree of knowledge the company had over those years did not stay the same: the report published at the beginning of the observation window disclosed not only climate change as a risk per se but also the intention of performing a comprehensive assessment of all companies locations. The FY2022 and FY2023 one disclosed data directly related to the assessment and on the methodology that was being applied to it, with the choice of using scenario analysis allowing for a more in-depth assessment of the consequences that different climate permutations might have on the organisation as a whole – especially for what concerns the financial side, as they are

claiming. Moreover, not finding mentions in the 2023 statement of further developments to be carried out in relation to this assessment in future years signalled the ability of IMCD NV of completing the assessment in a timely manner respecting what was put into writing, and it is expected that end-users value this positively. The results of the work precedingly done are then displayed in the FY2024 sustainability report, whose disclosure complies with the CSRD: the company, instead of disclosing on climate change in general as it did before, identified two potential threats connected to this phenomenon, and correctly placed them within the ESRS E1, thus also further confirming what discussed at the beginning of the chapter in relation to disclosures becoming more detailed and less general in order to facilitate their understanding.

Consistency has been observed also when analysing the topic of climate change mitigation, whose main metrics are represented, according to what contained in the sustainability reports, by CO2 emissions. Entities under analysis extensively disclose their alignment with the provisions of the 2015 Paris Agreement, and the steps they undertook towards Net-Zero. To report on their progress, scenario analysis has been widely used, serving as a guide for companies in finding the emissions abatement schedule that better aligns with their business model and strategies. Emissions reduction schedules have been discussed and disclosed through action plans primarily based on IPCC's climate scenarios – throughout the years we have been able to appreciate the implementation of new actions and the progress on the attainment of prior-defined targets, whose measurement metrics' sophistication grew year by year.

An example of growth in sophistication might be represented by all metrics adopted and implemented to account for Scope 3 GHG emissions, regarded to as one of the most difficult fields to report on. Difficulties lie in the fact that such emissions are to be detected among those not coming directly from the entity itself but strictly related to it, as for example emissions resulting from product usage by customers, and hence there is the possibility of giving misleading information to end-users. In relation to S3 emissions we have been able to appreciate the increasing efforts undertaken towards the implementation of internal programs aimed at a correct reporting and based on engagement with external subjects.

At a first glance, discussions related to entities' emissions might be perceived as non-relevant when talking about ESG-Risks as emissions are traditionally associated with the "impacts" a company has on the environment. I do find this claim to be partially true, but emissions targets and their attainment are reflected in the company's reputation among the general public and this in turn has the potential to become a significant threat to a company's financial performance: all entities in this sample acknowledge the presence of an increased number of regulatory requirements non only within the chemical industry but throughout the EU as a whole and concerning emissions reduction: the non-compliance with such rules or the failure in reaching predetermined targets might lead to sanctions other than a reputation loss, especially in a sector that is traditionally considered highly-pollutant, and this in turn might severely threaten companies' financial positions. It can therefore be said that within this segment of environmental disclosures risks stem mainly from a bureaucratic dimension. This, in turn, has led to the implementation and the refinement of internal mechanisms related to carbon pricing, allowing entities to take into evaluation also environmental-related aspects when performing investment decisions – just this observation might be, in my opinion, powerful enough to represent the growing interconnectedness between traditional and ESG-stemming sources of risk.

Procedures based on assessments and stress tests served as a basis for incorporating other environmental factors within sustainability reports other than climate change: Pollution, water and marine resources, biodiversity, circular economy. Although the reporting requirements, as per the ESRS, are the same with respect to climate change, a major difference lies in the fact that, if nonmaterial, disclosures on such topics could have been omitted. Omittance, on the other hand, is not permitted for topics related to climate change, and this might be rooted in the fact that the EU is acting as a first mover in addressing this important challenge – based on this observation, climate change shall be material for all companies headquartered in the EU. This helps to contextualise the possible differences to be encountered when analysing different reports because, as a matter of fact, not all reporting entities although operating within the same industry deemed as material the same risk and/or environmental topic. Despite more lenient requirements in the matter of omittance, datapoints and narratives

have been refined over years, until arriving at being state-of-the-art with the introduction of the CSRD. Going through the sections dedicated to these topics, the impact of the materiality analysis was once again something that was able to be clearly perceived, as idiosyncrasies paired with extensive studies conducted on entities' own sites led each report to be characterised by unique features. Companies reported on these environmental topics each of them in a different way, and this is the result of the assessment process described earlier, but with the aim of highlighting the efforts towards a more efficient production process. As I have been able to observe when going through disclosures on climate change mitigation, also for these topics one of the main reported source of risk stems from changes in the regulatory landscape revolving around them: limitations to the usage of water, more stringent measures related to emissions of substances of high concern to air, as well as restrictions on emissions to soil might lead to production stoppages and to significant increases in costs incurred for new machinery allowing for alignment to this demanding rules. The combination of these two factors impacts on profitability directly, as entities will have to sustain increased expenses, and indirectly, as being in a situation of under-delivery of the products to its customers equals lower revenue at the end of the year.

All entities deeming such factors as material for their core activities have been implementing and disclosing their action plans within the sustainability report in the same manner that was adopted for climate change. Of course, entities showing a proactive commitment towards the alignment to current and future measures are looked upon favourably by end-users of such documents.

Environmental disclosures are not only based on the new European reporting standards, but also on the 2020 EU Taxonomy for sustainable environmental activities, a powerful instrument aimed at guiding companies towards their transition to net-zero. Reporting entities have started to map all those activities that are contained in the Regulation implementing Acts and that are a part of their core business, to assess whether they are to be considered "sustainable" or if they are eligible to undergo processes aimed at making them sustainable. As the quality of sustainability reports started improving, so did disclosures on eligibility and alignment with respect to the European Taxonomy. Within the 4-year period that have been considered, one was

clearly able to appreciate how the number of eligible and aligned activities increased periodically and the fact that almost all entities adapted to the disclosure layout required by the Law. The observed pathway connected to entities' alignment with the European Taxonomy for environmentally sustainable economic activities is summarized in table 4 here below:

EVOLUTION IN ALIGNMENT TO THE EU-TAXONOMY REGULATION				
	FY2021	FY2022	FY2023	FY2024
Evaluated Reports	12	12	12	12
N° of reports incorporating the EU-Taxonomy	7	12	12	12
(of whose in abbreviate form)	(3)	(5)	(4)	(0)

Table 5: year-by-year alignment with the EU-Taxonomy

By considering the numbers that are being presented it is important to notice how the number of reports disclosing on the EU-Taxonomy by means of its abbreviated form progressively diminished and arrived at zero in FY2024, once again highlighting the efforts entities are making to enhance the quality of the disclosed non-financial information. Another observation is that starting from FY2022 all reports have been incorporating the provision of the Regulation, while in FY2021 only seven of them were aligned – this is not to be attributable to the entities, but to the fact that the Legislator's work did not stop at the moment the Regulation entered into force and this led the list of eligible activities to undergo some revisions.

Even though not directly connected with the text of the EU CSRD, considering disclosures made in accordance with the EU Taxonomy might be another interesting tool for end-users, as it is indeed representing a new subset of financial indicators along with its uniform requirements in terms of disclosures, thus allowing for a higher degree of reliability when presenting and analysing information. The presence of science-based thresholds to test against creates a pool of standardised results allowing for unbiased benchmarking when it comes to the analysis of different entities' environmental performances. On the other hand, the quantitative disclosures to be done under the Taxonomy take as inputs monetary data that are completely dependent on the idiosyncratic features of each company – investors in this case, as KPIs are computed as ratios, might decide to set a benchmark and take into account only companies whose

results are at least equal or above this “artificial” threshold, thus pursuing a “positive screening” strategy when performing the final investment decision.

To allow for a more general overview of how the topic of disclosures on environmental-stemming disclosures, a summary of the most encountered discussion topics throughout the study is presented here below. The overall result confirms what discussed within this paragraph:

Pre-CSR Reporting FY2021 - FY2023	CSR-aligned Reporting FY2024
Climate Change	Climate Change
GHG emissions	GHG emissions
Water Scarcity	Water management
Circular Economy	Air pollution
Regulatory compliance	Resource and circular use
	Regulatory compliance

Table 6: high-frequency disclosed E-risks sources

3.4.2 Analysis of social- and governance-related disclosures:

Although nowadays financial markets participants are nowadays considerably more conscious, their attention towards ESG-stemming risks is mainly concentrated on environmental aspects, rather than social and administrative ones – and that is one of the main grounds upon which it was decided to focus almost the entirety of our analysis in relation to such topics. At an EU-wide level this claim is supported by the fact that a Taxonomy has been enforced now for environmental activities only. However, to allow the audience to fully capture the groundbreaking effects of the entrance into force of the CSRD, I wanted to comment also on the results we have observed in relation to the S and G pillars respectively.

Concerning social-related disclosures, ESRS tackle the entity’s own workforce, workers along the value chain – especially in relation to their supplier’s employees – and affected communities, meaning all people living in the whereabouts of production plants and other sites, and the end-users of the finished product. There is also a standard dedicated to consumers, but within the analysis not enough information was made

available to be acquired to allow for meaningful conclusions. In figure 8 here below a breakdown of the ESRS Social standards indicating the number of companies in our sample disclosing on them is being presented:



Figure 8: social disclosure breakdown

As an overall result I observed how most of the implemented activities are directed to their own workforce, increasing both in number and in hours dedicated to them along the years. One of the complexities encountered when analysing the distinctive features characteristic of the chemical sector is its competitive labour market – an issue that has been confirmed in each of the analysed reports, as the main identified risk stemming from the S dimension is the entity’s “inability to attract, retain and contribute to the development of its employees”. High employee turnover represents both an operational and a reputational damage: a shortage of skilled workforce, as stated in the reports, might lead to production stoppages, thus impacting the company’s financial performance. In addition to that, high employee turnover taints the reputation of the company as an employer, thus leading to distrust among community members and capital providers and to negative financial effects for the business. Activities put in place by companies are aimed at reducing the probability of occurrence of such events by granting employees opportunities to expand their knowledge and to grow both personally and professionally within the organisation. Moreover, the overall observed growth in the number of hours for activities and directed towards “diversity and inclusion” practices allowing to conclude that companies are really committing themselves to adapting their organisational culture to a context that is changing. While activities consist in training courses, workshop and other initiatives, diversity and

inclusion are fostered also through policies setting targets to be reached in due time concerning the addition of new resources, as it can be understood by looking at each reporting entity's organization chart. Each reporting entity comments on the diversity of their employees as their pride and joy, and provides information circa the year-to-year change in the composition of the workforce – among these data we do find also those related to the percentage of women within the workforce and of women in positions of power, with the overall evidence on this second metric signalling that the “glass ceiling” is an issue that entities acknowledge but its effective management is a timely process.

In relation to entities' workers along the value chain, the main risks derive from the fact that there is not a direct contact between the reporting entity and the workers, we could hence use a metaphor and state that they are some sort of indirect employees – and due to this fact they are not subject to the rules and activities implemented by the reporting entity. All reporting entities have adopted, in this regard, a supplier code of conduct that gets submitted to new companies when signing cooperation agreements. By following this procedure, the reporting entity can confidently state that its suppliers committed to its high standards in terms of employees' wellbeing, safety and working conditions. This commitment is evaluated through regular assessments performed by the reporting entities with the aim of detecting possible deviations from what in the code in a timely manner, to provide guidance to its supplier when necessary, or in case of severe and continued non-compliance episodes it can interrupt the cooperation. The main source of risk disclosed in this regard is represented by possible lawsuits and the resulting fines, should the relevant competent authorities certify non-compliances, as well as human rights violations – and of course this last risk shall be included also within the ESRS S1 “own workforce”.

In relation to affected communities not enough disclosures have been observed to allow for the identification of a possible trend, as although four companies in our sample disclosed according to the ESRS S3 – Air Liquide, BASF, Evonik and IMCD – we found that the former disclosed on IT and cybersecurity risks that might represent a threat for customers and patients, IMCD and BASF focused on reputational damages arising from non-compliances in the environmental sector, while the latter accounts for possible environmental damages. Since IT and cybersecurity risks are pertaining to the

G pillar and environmental damages are a part of the E one, one may want to conclude that the current level of disclosure regarding this issue is still in its infancy, and it is hypothesised that more interesting and significant progress can be expected in the near future. Consequently, it is posited that the interaction between the entity and affected communities constitutes a compelling point of departure for future research endeavours.

Also in relation to social-related disclosures it has been decided to present a comparison between the most common, and thus observed with a higher frequency, disclosures before and right after the introduction of the EU Directive. Results confirm an increase in the discussed topics, but important insights in the number of entities reporting on them will be discussed at the end of the paragraph:

Pre-CSR Reporting FY2021 - FY2023	CSR-aligned Reporting FY2024
Talent attraction and retention	Attractiveness as an employer
Process safety	Occupational Health & Safety
Regulatory compliance	Sustainable procurement
	Regulatory compliance

Table 7: high-frequency disclosed S-risks sources

Concerning the G pillar, disclosing information on the organisation’s good business conduct is a practice that companies have been implementing already before sustainability reporting became mandatory as such practices date back to the very beginning, when we were discussing about CSR. In the matter of governance-related risks disclosures in accordance with the ESRS G1 standard we found disclosures in 7 out of 11 reports. By knowing that this is a long-established assessment I could only appraise how such disclosures evolved during time, adapting to changes in the context we are living in. All companies have now to face growing threats to their operational safety as cybercriminals are becoming increasingly skilled and the magnitude of their attacks is increasing. Reporting entities have been starting to establish and develop procedures to prevent attacks and to timely mitigate their possible negative effects. This represents a risk not only per se, but also because such attacks might compromise operations, disrupt internal systems and hinder business functions with consequences not only on operational costs needed to recover, but also contributes to reputational damages. In

case of serious data breaches also consumers might be harmed, and in such cases the company might be subject to heavy fines. The risk of incurring in fines for companies of large dimensions as the ones in our sample might also stem from traditional non-compliances with business conduct rules: bribery, corruption, anti-trust violations. Also, in this case reporting entities disclosed on the implemented action plans to prevent, or remediate in a worst-case scenario, such violations from manifesting. In relation to that, it can be concluded that no relevant evidence of implementation in reporting practices under this pillar has been inferred from the analysis. This is further confirmed in table 8 here below that compares the most frequently disclosed G-stemming risk factors in the time window before and right after the introduction of the CSRD:

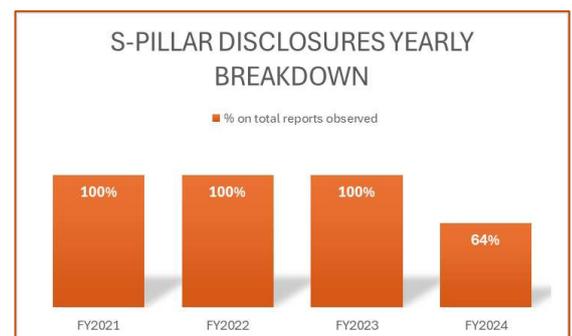
Pre-CSR Reporting FY2021 - FY2023	CSR-aligned Reporting FY2024
Business Conduct	Business Conduct
IT & Cybersecurity risks	IT & Cybersecurity risks
Regulatory compliance	Regulatory compliance

Table 8: high-frequency disclosed G-risks sources

In the matter of Social and Governance disclosures one may also argue that, after the introduction of the CSRD and the subsequent refinement of the criteria guiding reporting entities in their materiality assessments, in this first year of mandatory reporting in compliance with the ESRS standards companies decided to focus mainly on the E pillar, thus leaving S and G ones in the background. The trend that can be inferred from the entities composing the study pool for this thesis is summarised in tables 9 & 10 and in figures 9 & 10 presented here below:

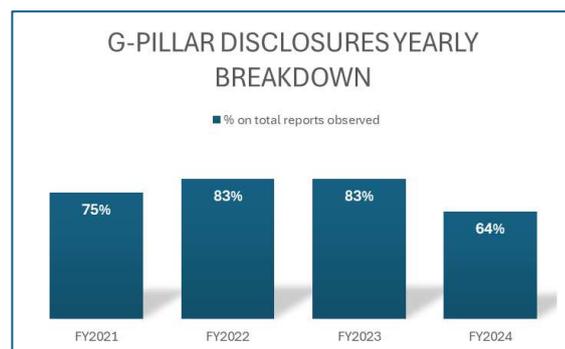
EVOLUTION IN THE PRESENCE OF "SOCIAL" DISCLOSURES				
	FY2021	FY2022	FY2023	FY2024
Reports observed	12	12	12	11
Reports disclosing S information	12	12	12	7
% on the total reports observed	100%	100%	100%	64%

Table 9 & Figure 9: evolution of reporting according to the S pillar



EVOLUTION IN THE PRESENCE OF "GOVERNANCE" DISCLOSURES				
	FY2021	FY2022	FY2023	FY2024
Reports observed	12	12	12	11
Reports disclosing G information	9	10	10	7
% on the total reports observed	75%	83%	83%	64%

Table 10 & Figure 10: evolution of reporting according to the G pillar



According to the information contained in the tables, the sharpest decline is related to the social pillar, and this can lead to the conclusion that an overall improvement in the quality of the disclosed information is associated with a decline in the number of observed disclosures. Through a more in-depth analysis on this phenomenon, it has been found out that, in our sample, the companies omitting reporting on social and/or governance issues are mainly headquartered in Germany, followed by Belgium and The Netherlands – all Member States whose transposition of the CSRD into national Law has yet to be observed. Among these companies we do encounter Brenntag AG (GER), not disclosing on social-stemming risks, Lanxess AG (GER), not disclosing on governance-related ones, Azko Nobel SV (NED), omitting both. It is in any case important to stress the fact that the non-presence of risks tied to the social and governance dimensions of sustainability does not mean that information on related topics was not present, as it has been retrieved and assessed as high quality, but rather that it was not classified as material for our analysis. To correctly interpret the results presented in the tables it shall be remembered that this output is based on the analysis social and governance related risks, and not on the general level of disclosure observed with respect to S and G matters, that we expect to have notably increased after the entrance into force of the EU CSRD. Future increases both in the number of disclosures and in the number of reporting companies on these issues may qualify as possible subjects for future investigations on this topic.

3.4.3 Use of the “SASB Chemicals” standard as a comparison tool for the observed disclosures:

As a concluding remark of the analysis performed on the observation sample, I wanted to compare the work that has been done at European level with the latest version of the SASB Chemicals Standard, that although valid starting from January 1st, 2025, allows for early adoption and fully captures what topics and associated metrics are to be deemed as useful by investors when performing their decisions.

As described in its “use of standards” section, the SASB Standards served as a useful tool for benchmarking the disclosure on sustainability-related risks encountered within the sample, based on a newly introduced set of reporting standards, against the most widely acknowledged source of standards targeted at capturing the financial aspects of disclosures in the sustainability field. Concluding this work with such a comparison was believed to be possibly helpful in gaining additional insights on the work that has been done at a Union level in the matter of interoperability within the ESRS and other well-established guidance sources other than serving as a further evaluation metric for the companies in the proposed sample.

By looking at the topics and metrics within the SASB standards it became self-evident why an interoperability guidance has been published by the EFRAG and the IASB Foundation, as the similarities between the two are clearly visible. What I want to present in table 11 here below is the summary table that can be encountered within the 2023-12 SASB Chemicals Standard, highlighting the most valuable sources of information for investors in the context of sustainability-related risks and opportunities, and what one may want to notice is how similar they are to the disclosure requirements EU-headquartered reporting entities have to align with according to the ESRS – proven that they are material for the single entity.

TOPIC	METRIC	TOPIC	METRIC
Greenhouse Gas Emissions	Gross global Scope 1 emissions, percentage covered under emissions-limiting regulations	Workforce Health & Safety	(1) Total recordable incident rate (TRIR) and (2) fatality rate for (a) direct employees and (b) contract employees
	Discussion of long- and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets		Description of efforts to assess, monitor, and reduce exposure of employees and contract workers to long-term (chronic) health risks
Air Quality	Air emissions of the following pollutants: (1) NO _x (excluding N ₂ O), (2) SO _x , (3) volatile organic compounds (VOCs), and (4) hazardous air pollutants (HAPs)	Product Design for Use-phase Efficiency	Revenue from products designed for use-phase resource efficiency
Energy Management	(1) Total energy consumed, (2) percentage grid electricity, (3) percentage renewable and (4) total self-generated energy ¹	Safety & Environmental Stewardship of Chemicals	(1) Percentage of products that contain Globally Harmonised System of Classification and Labelling of Chemicals (GHS) Category 1 and 2 Health and Environmental Hazardous Substances, (2) percentage of such products that have undergone a hazard assessment
Water Management	(1) Total water withdrawn, (2) total water consumed; percentage of each in regions with High or Extremely High Baseline Water Stress		Discussion of strategy to (1) manage chemicals of concern and (2) develop alternatives with reduced human or environmental impact
	Number of incidents of non-compliance associated with water quality permits, standards and regulations	Genetically Modified Organisms	Percentage of products by revenue that contain genetically modified organisms (GMOs)
	Description of water management risks and discussion of strategies and practices to mitigate those risks	Management of the Legal & Regulatory Environment	Discussion of corporate positions related to government regulations or policy proposals that address environmental and social factors affecting the industry
Hazardous Waste Management	(1) Amount of hazardous waste generated, (2) percentage recycled	Operational Safety, Emergency Preparedness & Response	Process Safety Incidents Count (PSIC), Process Safety Total Incident Rate (PSTIR), and Process Safety Incident Severity Rate (PSISR) ²
Community Relations	Discussion of engagement processes to manage risks and opportunities associated with community interests		Number of transport incidents ³

Table 11: SASB Chemicals reference table

Through a thorough examination of the data presented in the table and the observations documented in this chapter, it becomes evident that significant progress has been made at EU level when implementing the ESRS standards. A notable congruence has been observed between the ESRS standards and the SASB standards, particularly regarding their terminology and metrics. This alignment has consequently been identified in the present analysis of FY2024 sustainability statements for the eleven companies in the sample that disclosed in accordance with the European standards. It is however important to notice how European companies were in some cases already familiar with the older version of the SASB Standards, as they have been adopted prior to the CSRD, in the window from FY2021 to FY2023, as one of the many reporting standards for drafting sustainability statements. This is a trend that has been identified also in the analysed pool of reporting entities, and a summary of data related to the adoption of the SASB Standards is presented in Figure 11 here below:

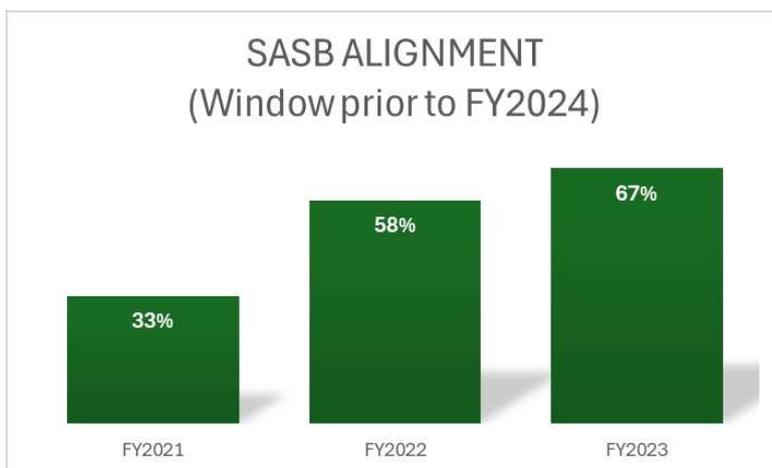


Figure 11: pre-CSR D SASB Standards alignment

This growing alignment with the SASB Standards, even though not being the only reference frameworks reporting entities complied with, confirms the efforts undertaken from the companies composing our sample towards an all-encompassing approach to sustainability – leading to outstanding results in the matter of alignment with the newly introduced European Directive. An increase in the number of reports accounting for this set of standards within the first years of our observation window, combined with the publishing of interoperability statements between the work done by the IFRS Foundation and by the EFRAG led to question whether information gathered within our sample reflects what in the SASB Standards – by taking the reference summary presented in table 11 and the results observed in tables 6,7 and 8, dedicated to the disclosure of frequently observed risk sources for the E, S, and G pillar respectively, the following table highlighting the topics for which most disclosures have been observed has been drafted:

SASB CHEMICALS (2023 - 12)	FY2021 - FY2023	CSR (FY2024)
GHG Emissions	GHG Emissions	GHG Emissions
Air Quality	Climate Change	Climate Change
Energy Management	Water Scarcity	Pollution to air
Water Management	Circular Economy	Energy efficiency
Hazardous Waste Management	Talent attraction and retention	Water management
Community Relations	Process Safety	Resource & circular use
Workforce Health & Safety	Regulatory Compliance	Attractiveness as an employer
Product Design	IT & Cybersecurity	Occupational Health & Safety
Safety & Environmental Stewardship	Business Conduct	Sustainable procurement
GMOs		Regulatory Compliance
Management of legal and regulatory environments		IT & Cybersecurity
Operational Safety		Business Conduct

Table 12: ESRS-SASB comparative alignment

To perform this comparative analysis, it has been decided to follow the criteria adopted when observing similarities and differences between reporting topics taken singularly by pillar, thus dividing the observation window in a pre- and in a post-CSR periods, and then the analysis has been expanded in order to test the most common topics within all the sustainability reports that have been analysed against the SASB guidelines. By looking at the results presented in the table, three interesting observations can be commented: the degree of alignment between the SASB chemicals and the level of disclosure at EU-level between 2021 and 2023; the degree of alignment between the SASB chemicals and FY2024 CSR-aligned discussion topics; and the increase in the number of disclosures pre- and post-CSR – as the latter is a topic that has been extensively tackled throughout the chapter, in this concluding section the focus will be on the first and second observations. In relation to the first claim, we do observe a narrower pool of common disclosures among European entities with respect to what in the Standards, although similarities have been observed, hence signalling that reporting on the financial side of sustainability-stemming matters was – and is still nowadays as it has been extensively discussed upon – undergoing an evolution phase. This serves as further evidence confirming what was inferred from the empirical analysis in relation to companies adopting the SASB as one of their sustainability reporting frameworks in the period prior to the introduction of the EU-Directive. On the other hand, when comparing EU FY2024 most common discussed topics with the SASB reference table the discourse surrounding the publishing of their interoperability statement is entirely logical, given the clear overlaps. To provide our readers with further

insights on this second observation it has been thought to present an example: The decision has been taken to make a comparison between the “Greenhouse Gas Emissions” topic we find on the table and the disclosures to be done on the same topic in accordance with ESRS E1 – Climate Change, opting for this topic because of restrictions imposed by the European legislator on its omittance.

Figure 12 here below, taken from the ESRS E1 2023 Delegated Act, shows what European companies falling under the scope of the CSRD shall report on when disclosing on Scope 1 GHG Emissions:

	Retrospective				Milestones and target years			
	Base year	Compa-rative	N	% N / N-1	2025	2030	(2050)	Annual % target / Base year
Scope 1 GHG emissions								
Gross Scope 1 GHG emissions (tCO ₂ eq)								
Percentage of Scope 1 GHG emissions from regulated emission trading schemes (%)								

Figure 12: GHG Emissions reporting metric – ESRS E1 Delegated Act

When looking both at the metric and at its unit of measure users can clearly see the congruence that I just pointed out, thus further confirming that the degree of interoperability between the standards is high and offers curious insights that might be interesting for future research as it will be discussed in the forthcoming chapter dedicated to the conclusion of the proposed work.

Chapter IV: Conclusion, limitations to this study and insights for future research

The aim of this paper was to provide readers with additional knowledge of sustainability reporting, particularly in relation to important EU-level developments surrounding this practice. The focus of this research has been the growing interest of investors in analysing sustainability reports, based on the significant changes introduced by the Directive in materiality assessment performance. The CSRD introduced a double-materiality approach, whereby reporting entities must report on their impacts, as well as the risks and opportunities arising from sustainability-related matters. Reporting on these is defined as 'financial materiality', an umbrella-term aimed at providing end-users with a valuable source of information: ESG risks, if not accordingly accounted for and tackled, could jeopardise the ability of reporting entities to continue operating, which would have a significant impact on their financial performance. For individuals working in the financial sector, this additional source of information is enabling a more objective evaluation of the entity in question. It is however important to point out that, due to the growing interest arriving from the financial sector, improvements in the quality of information contained in sustainability reports were needed.

The empirical analysis, based on a sample of companies operating within the chemicals sector, aimed to evaluate and observe possible trends connected to the need for higher-quality information. This informed the decision to focus on the financial perspective of information regarded to as "material" for an external audience. Through a thorough observation of the selected entities' sustainability-related published documents from FY2021 to FY2024 it has been possible to observe the year-to-year increase in the number of disclosures, signalling an ongoing refinement in the materiality assessment processes, and a growing attention to the financial aspect connected with the disclosed risks (and opportunities) that peaked in the last observed reports, signalling in the majority of the observed cases a full alignment with the provisions contained in the EU Directive, the CSRD, even if we were observing the first ever reports to be published and for which compliance was required. This empirical study has been conducted as a comparative analysis of selected entities' reports. This has been achieved by comparing information disclosed by the same entity over time, as well as by

conducting peer-to-peer comparisons among different entities. Observations have been drawn up by examining claims retrieved from the sections of the reports dedicated to analysing risks. It is also clear that companies operating in traditionally highly emitting sectors, such as chemicals, are taking a proactive approach to sustainability. All observed entities are actively addressing issues related to their greenhouse gas emissions, as well as accounting for other material aspects, which will be positively received by the audience.

However, the study has some limitations. First, it was conducted on a narrow set of entities representing the top players in the chemicals sector. Expanding the cluster of entities under evaluation would have produced a wider variety of results, leading to the conclusion that our results are objective because they are based on the analysed reports. However, they should not be treated as absolute truth. Furthermore, the selection of an index other than the Stoxx 600, or the selection of the Stoxx 600 whose composition may have changed since its last access in June, would have resulted in a different composition of the study pool and different results. Of course, different results might have been observed if the focus had been placed on another industry, especially one not traditionally regarded as 'high emitting'. Another significant limitation is that EU companies' sustainability reports for FY2024 are the first to align with the CSRD's provisions, so they may be subject to uncertainty as entities are not yet fully familiar with this new set of disclosures. Although this was not directly observed, it is not possible to rule out the possibility of some results being biased.

This might represent an interesting starting point for future research building up on the comparative methodology adopted in this study, as setting up an analysis whose observation window starts year 2024, the first upon which reports had to be published incorporating the Directive, allows for observing how reporting entities became familiar with the CSRD provisions, and on how full-alignment reports shall incorporate also phased-in provisions that were not required during the first year of reporting. Using 2024 as a base year allows for future studies in the evolution of sustainability reporting within the EU if the simplified version of the ESRS enters into force as forecasted in 2026 – until then, and in case of possible delays, European entities shall align to the version that is already entered into force. In case of reporting according with the simplified ESRS

comparative analyses might represent a tool for gaining insights into how entities adapted not only to the first set of Standards, but also to their simplification, and this allows for meaningful observations on the work that has been done at EU-wide level, often criticised for excessively burdening companies in the field of reporting.

Alongside observing the evolution of European companies' sustainability reporting practices in relation to their alignment with the Standards, disclosing information on each of the three pillars (E, S and G) could be a good place to start for future research. Regarding the environmental pillar, the year 2030 has been identified as the deadline for emission reduction targets in the majority of reports in our study pool. This could be investigated further in future sustainability reports to determine whether European companies are meeting their targets. Regarding Social and Governance disclosures, we found limited information in CSRD-aligned reports, suggesting that companies were in the early stages of reporting according to the ESRS Standards. Further research in this area could allow us to gain a deeper understanding of future developments in these two important areas. Furthermore, there is an ongoing discussion at EU level concerning the introduction of a European Union Social Taxonomy to achieve social goals across the EU. This would build on European and internationally recognised documents. Such developments will impact future sustainability reports, as has been seen with the EU Environmental Taxonomy. This opens the door to future studies in this area.

Moving away from standards implemented only at the EU level, the final part of the analysis observed the similarities between the SASB Chemicals Standard and the ESRS implementation by European companies in the chemicals sector. The evidence retrieved shows a high degree of alignment between the disclosures observed in the study pool and the SASB reference table. It is indeed possible to expand this comparison to include actual disclosures made under the SASB and conduct a comparative analysis between EU and non-EU companies that adopt these globally recognised standards, based on the interoperability statement published by the EFRAG and the ESRS foundation

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