ISSN 2029-1701
ISSN 2335-2035 (Online)

Research Journal
PUBLIC SECURITY AND PUBLIC ORDER
2025, Vol. 37, Nr. 1

DIFFERENCES IN METHODOLOGY FOR ASSESSING DOUBLE MATERIALITY: DO ENTITIES UNDERSTAND THE ESRS REQUIREMENTS IN THE SAME WAY?

Eglė GRIGAITYTĖ
Vilnius University Kaunas Faculty
Muitinės str. 8, LT-44280 Kaunas, Lithuania
E-mail: egle.grigaityte@audifina.lt
ORCID ID: 0009-0009-1115-3110

Kristina RUDŽIONIENĖ
Vilnius University Kaunas Faculty
Muitinės str. 8, LT-44280 Kaunas, Lithuania
E-mail: kristina.rudzioniene@knf.vu.lt
ORCID ID: 0000-0001-8111-5675

DOI: 10.13165/PSPO-25-37-01-04

Abstract *The adoption of the European Sustainability Reporting Standards (ESRS) under the Corporate Sustainability Reporting Directive (CSRD) has made the concept of double materiality a mandatory component of sustainability reporting in the EU. While prior literature has explored the theoretical basis for double materiality, there is limited empirical research on how entities are applying the ESRS guidance in practice. This study investigates whether companies interpret and apply the ESRS 2 IRO-1 requirements on double materiality assessment in a consistent and transparent manner. A comparative case study of seven multinational entities—Sanofi, Ørsted, Maersk, Puma, Mercedes-Benz, Carlsberg, and Rockwool—was conducted using publicly available sustainability reports. The analysis focused on the methodological components required under ESRS 2 IRO-1, including scoring systems, materiality parameters, weighting approaches, treatment of human rights, use of likelihood, and materiality thresholds. The findings reveal significant variation in how entities structure and disclose their materiality assessments. While core ESRS parameters are broadly applied, approaches differ in scoring logic, weighting of impact factors, and threshold clarity. Some companies deviate from ESRS guidance by applying likelihood to actual impacts, and only a minority provide transparent thresholds for materiality. The results suggest a lack of methodological standardization in early ESRS reporting. This paper contributes to the growing literature on ESRS implementation by highlighting current inconsistencies and underlining the need for clearer guidance to improve the comparability, and reliability of double materiality disclosures.*

Keywords: *double materiality, ESRS, Sustainability reporting.*

Introduction

Sustainability reporting in the European Union has developed from a flexible, disclosure-based requirement into a structured, principle-driven framework. The European Union's Corporate Sustainability Reporting Directive (EU) 2022/2464 (CSRD) that is replacing Non-financial Reporting Directive 2014/95/EU (NFRD) and the accompanying European Sustainability Reporting Standards (EU) 2023/2772 (ESRS) represent a significant step forward towards harmonized disclosures of sustainability information designed to overcome the current lack of comparable, reliable and complete information and to bring sustainability and financial reporting on equal footing (The European Files, 2023). The standards cover the full range of environmental, social, and governance issues, including climate change, biodiversity and human rights (European Commission, 2023). As outlined in the European Commission's overview of corporate sustainability reporting, at the heart of these new reporting requirements lies the concept of double materiality, which requires entities to assess both impact materiality - entity's own impacts on people and the environment, and financial materiality- how sustainability issues might create financial risks for the entity (European Commission, 2021).

According to Chiara Del Prete, Chair, EFRAG's Sustainability Reporting Technical Expert Group the structure of the ESRS combines principles-based and rules based standard setting (The European Files, 2023), meaning it sets the general objectives and expectations of sustainability disclosures but leaves entities with substantial discretion in determining how to conduct their materiality assessments. This flexibility, while intended to account for organizational differences and sectoral specificities, introduces an inherent risk: inconsistent interpretations and methodologies that may reduce the comparability and reliability of disclosures. This concern is supported by a public consultation conducted by the European Commission, which highlighted widespread dissatisfaction with the quality of non-financial reporting. Notably, 72% of respondents supported requiring entities to disclose their materiality assessment process (European Commission, 2020). Several recent studies have since examined the application of double materiality in sustainability reporting. Correa-Mejía et al. (2024) showed that most entities claiming to apply double materiality do not follow EFRAG guidance. Dyczkowska and Szalacha (2025) explored practical challenges in implementation, while Bogdan et al. (2025), Beske et al. (2020), and Oll et al. (2024) identified inconsistencies in methodology, stakeholder engagement, and interpretation of ESRS.

However, while these studies address the conceptual and procedural complexity of materiality assessment, there is limited research comparing how different entities interpret and apply the ESRS double materiality requirements in practice. In particular, the disclosure practices under ESRS 2 IRO-1-which requires entities to describe their materiality assessment process-have not yet been systematically analyzed across companies.

This paper addresses that gap by examining whether entities understand and apply the ESRS requirements on double materiality in a consistent way. It presents a comparative analysis of seven multinational entities from different industries, focusing on how they disclose their materiality assessment methodology in alignment with ESRS 2 IRO-1.

Theoretical Framework

Evolution of Materiality in Reporting Standards

The concept of materiality has long been foundational in financial reporting. Items disclosed in financial statements are often determined by their materiality. Thus, the content of financial statements is, in part, as a result of judgments exercised around materiality (Brennan and Gray, 2005). With the rise of sustainability disclosure regulation, the concept of materiality now extends beyond financial reporting. Materiality is used to 'filter in' the information that is or should be relevant to users. Particular information is considered 'material' - or relevant - if it could influence the decision-making of stakeholders in respect of the reporting company (GRI, 2022). The current materiality landscape consists of three main approaches: financial materiality, impact materiality, and double materiality. According to Global Reporting Initiative (2022), these approaches should not be seen as competing, but rather complementary. Each serves a different purpose and audience. Investor-oriented standards are rooted in financial materiality, while impact-oriented standards reflect the needs of a wider stakeholder base. Double materiality brings both perspectives together, aiming to deliver a more complete and balanced view of sustainability-related risks and impacts. The International Sustainability Standards Board (ISSB), established by the IFRS Foundation, has developed a framework based solely on financial materiality, aimed at investors. In contrast, the Global Reporting Initiative (GRI) Standards focus exclusively on impact materiality, emphasizing an organization's effects on the environment and society. The European Sustainability Reporting

Standards, under the EU's Corporate Sustainability Reporting Directive, incorporate both perspectives through the principle of double materiality.

Double materiality concept was formally addressed for the first time in the *Guidelines on Non-Financial Reporting: Supplement on Reporting Climate-Related Information* (European Commision, 2019). The document introduced a new perspective by highlighting the importance of considering the "impact of [the company's] activities" when assessing the materiality of non-financial information. Non-Financial Reporting Directive (NFRD) incorporated a double materiality perspective, consisting of two dimensions:

- The reference to the company's "development, performance and position" reflects financial materiality, in the broad sense of information that may affect the value or performance of the company.
- The reference to the "impact of [the company's] activities" reflects environmental and social materiality, focusing on the effects the company has on people and the environment.

According to the European Lab Project Task Force on Preparatory Work for the Elaboration of Possible EU Non-Financial Reporting Standards (PTF-NFRS, 2021) the operationalization of the concept of double materiality is key to sustainability reporting standard-setting in the EU. The standard-setter should therefore adopt conceptual guidelines addressing the definition and implementation of the concept of materiality in each of its two dimensions. The concept was further developed by the European Financial Reporting Advisory Group (EFRAG). In 2022 EFRAG provided guidelines for double materiality process, steps and factors ranking in paper *ESRG 1 Double materiality conceptual guidelines for standard-setting.* Miettinen (2024) analysis concluded that materiality has evolved from a very vague concept in the NFRD, which leaves wide discretion to the reporting entity to define materiality and its material topics, toward a more clearly defined concept of double materiality in the CSRD. The NFRD attempted to reconcile aspects of "financial materiality" and "impact materiality" but provided little practical guidance. The CSRD define the concept of double materiality, consisting of impact materiality and financial materiality. The establishment of mandatory common ESRS aims to ensure comparability and relevance of disclosed information.

ESRS Double Materiality: literature review

Recent academic literature reflects a growing interest in exploring how materiality and more specifically, double materiality is being interpreted, operationalized, and challenged in the context of the ESRS. The ESRS are designed as principle-based standards, providing high-level objectives rather than rigid rules, and allowing companies to exercise professional judgment in how they interpret and apply requirements. While this approach supports flexibility and adaptability across different industries and contexts, it also introduces the risk of inconsistent implementation and reduced comparability of disclosures (PTF-NFRS, 2021).

Unerman and Zappettini (2014) were among the early voices emphasizing the importance of embedding materiality into sustainability reporting frameworks. Their work underlined the need for greater transparency and accountability, particularly regarding the rationale behind what companies choose to disclose or omit. Torelli, Balluchi, and Furlotti (2020) expanded this discussion by examining how companies apply materiality assessments in connection with stakeholder expectations. They argued that well-structured assessments can enhance the legitimacy and clarity of sustainability disclosures.

With the development of the ESRS under the CSRD, Baumüller and Sopp (2021) documented the shift from voluntary non-financial reporting to a more integrated and regulated framework. Their findings point to a clear progression in EU sustainability reporting practices, where double materiality plays a central role. De Cristofaro and Raucci (2022) focused on the evolution of the materiality matrix, a once-dominant tool in sustainability reporting. Their research revealed how the traditional matrix has fallen short under newer expectations and has gradually been replaced by more nuanced double materiality models aligned with EU directives.

A common theme in recent studies is the inconsistency in how companies apply materiality under ESRS guidance. Miettinen (2024), for example, found substantial variation in how companies interpret and disclose material topics, calling for clearer standard-setting and implementation support. Similar concerns are raised by Anas and Baghad (2024), who advocated for standardized approaches and cautioned that the lack of shared understanding hinders comparability across reports.

Several recent studies investigate real-world implementation. Dyczkowska and Szalacha (2025) analyzed a construction company's efforts to adopt the ESRS materiality process and found difficulties around stakeholder inclusion, impact prioritization, and objective threshold setting. Likewise, Khairunnisa and Hartanti (2024) observed that companies in Indonesia struggled to integrate both financial and environmental perspectives in double materiality assessments.

Finally, Bogdan, Rus, and Matica (2025) explored how double materiality is incorporated into corporate strategy, using the fast fashion industry as a case. Their findings show that while alignment with ESRS is growing, entities still face significant complexity in translating regulatory expectations into strategy-driven decisions.

Existing academic research on double materiality in sustainability reporting has focused on its conceptual basis, the role of stakeholder involvement, and challenges related to defining thresholds and selecting relevant topics. Several studies examine how entities understand the idea of double materiality or how it is expected to be applied in sustainability reporting. However, with the European Sustainability Reporting Standards (ESRS) now in force, there is little research on how companies are applying the specific requirements in practice. In particular, ESRS 2 IRO-1 requires companies to disclose how they identify and assess material impacts, risks, and opportunities. While some studies point to inconsistencies in how materiality is interpreted or disclosed, there is limited comparative research on how companies approach these requirements in their actual reporting. This study helps fill that gap by comparing how companies describe their materiality assessment process and evaluating whether they apply the ESRS 2 IRO-1 guidance in a consistent way.

Methodology

This study examines how entities disclose their methodologies for assessing double materiality, as required by the ESRS. The focus is on Disclosure IRO-1, which addresses impact, risk, and opportunity assessment. The study applies analysis to sustainability reports from a sample of seven multinational entities. The analysis aims to evaluate how clearly and consistently entities define scoring parameters, apply weighting, and integrate ESRS disclosures.

Seven entities were selected using sampling based on four criteria:

1) Availability of a published double materiality methodology (within Disclosure IRO-1);
2) Clarity and relative detail of scoring systems or parameter definitions;

3) Sustainability report was audited;
4) Entities are from different sectors

The selected entities represent different industries and include: Sanofi, Ørsted, Maersk, Puma, Mercedes, Carlsberg, and Rockwool. All entities are subjects to EU sustainability reporting obligations and have published sustainability reports in accordance to ESRS and represent industries such as Alcoholic Beverages, Automobiles, Marine Transportation, Apparel, Accessories and Footwear, Building Products and Furnishings, Biotechnology and Pharmaceuticals, Electric Utilities and Power Generators.

To assess how entities understand disclosure ESRS 2 – IRO-1: Description of the process to identify and assess material impacts, risks, and opportunities, data was collected from the most recent sustainability reports of selected entities, for reporting period of 2024. The study focused specifically on whether and how entities report the required elements listed in paragraph 53 (a–h) of the ESRS IRO-1 Disclosure Requirement and aimed to identify whether entities use similar methodologies in practice.

The data was organized into comparative categories reflecting the structure and logic of the ESRS. For each entity, disclosures were reviewed for the presence and clarity of the elements provided in Table 1.

Table 1. Reviewed entities disclosures
Source: Authors, 2025

Category	Disclosure details
Scoring Scale	Whether the entity uses a numerical or qualitative scale to assess materiality.
Parameters for materiality	Whether the entity uses key parameters outlined in ESRS 1 section 3.4 for impact materiality- scale, scope, irremediability, and likelihood (for potential impacts), as well as key parameters for outlined in ESRS 1 section 3.5 for financial materiality- financial magnitude and likelihood.
Formula or calculation approach	Whether a specific formula is used to combine materiality factors or other calculation approach is disclosed.
Special considerations for Human Rights	Whether any explicit consideration is given to human rights impacts.
Weighting of Parameters	Whether all scoring factors are treated equally. If not, how weightings reflect the prioritization logic (e.g. squared severity).
Assessment of current risks and opportunities	Whether the entity uses probability criteria (likelihood) to evaluate current risks and potential opportunities.
Clarity of thresholds	Whether quantitative or qualitative thresholds are defined to determine materiality.

The collected data was analyzed using a qualitative comparative method, with an emphasis on identifying similarities and differences in how entities apply and disclose their double materiality assessment processes under ESRS 2 IRO-1. The analysis followed an interpretive orientation, focusing on how entities describe their internal logic, use of parameters, and methodological assumptions.

The analysis was carried out by comparing how each entity described its process for identifying and assessing material impacts, risks, and opportunities, based on the structure of ESRS 2 IRO-1. Multiple tables were created to compare all seven entities across the same key categories in order to see patterns, common practices, and key differences between entities in how they apply the double materiality assessment.

Each report was reviewed to check:
1) Whether the entity provided information for each ESRS IRO-1 requirement;
2) How clear and detailed the explanation was;

3) Whether the entity used similar or different approaches to other entities in the research.

Results

This section presents the findings from the analysis of how seven entities disclosed their methodology for assessing double materiality, based on ESRS 2 IRO-1. The comparison focused on whether entities followed a consistent structure and how clearly, they described key elements such as scoring, weighting, risk assessment, and thresholds.

Scoring Scale

All seven entities included in the analysis use a structured scale to evaluate impact and/or financial materiality, but the scales vary in design, range, and labeling (Table 2). These differences suggest that while a scoring system is commonly applied, there is no standardized approach across companies.

Table 2. Scoring scale disclosures

Source: Authors' own compilation based on entities annual reports, 2025

Entity name	Disclosed information analysis
Sanofi	Sanofi uses a numerical scoring scale of 1, 2, 3, and 5, rather than a continuous 1–5 range. This is applied to both impact and financial materiality assessments. The omission of "4" is not explained, it may reflect a preference for emphasizing clearer distinctions in priority levels. Entity has applied scoring from 1 to 4 for likelihood.
Ørsted	Ørsted uses a 1 to 5 numerical scale for scoring both severity and likelihood of impacts. What stands out is that Ørsted adds verbal labels to each level: 5 = Crucial 4 = Significant 3 = Important 2 = Informative 1 = Minimal This approach adds qualitative meaning to each numerical score, making the prioritization more understandable to non-expert stakeholders.
Maersk	Maersk applies a 1 to 5 scale to assess severity and likelihood. The scoring system appears standard but lacks further explanation regarding labels or how each score is defined or applied across topics.
Puma	Puma uses a broad numerical scale from 0 to 15, where 0 represents "no impact" and 15 indicates "maximum impact." This scale is applied to both severity and likelihood. The use of such a wide range suggests an attempt to allow for more granular distinctions, but the reasoning behind the choice of 15 as the upper bound is not disclosed. This approach differs significantly from the 1–5 convention and may challenge comparability across companies.
Mercedes	Mercedes applies a three-point qualitative scale: Low, Medium, and High to assess severity and likelihood. This simple structure makes reporting easier to understand but lacks the nuance of multi-point numerical scales. No numerical equivalents are provided
Carlsberg	Carlsberg applies a 1 to 5 scale to assess severity and likelihood. The scoring system appears standard but lacks further explanation regarding labels or how each score is defined or applied across topics.
Rockwool	Rockwool provides a detailed breakdown of its scoring parameters and includes definitions for each level on a 1 to 5 scale. Each parameter is supported with descriptive criteria for the lowest and highest scores, clearly linking to impact severity and financial relevance.

All seven entities in this study used a structured scoring approach, but the formats and definitions varied significantly, suggesting an absence of methodological convergence and limited standardization across the field. The most common approach was using a 1 to 5 numerical scale, applied by entities such as Ørsted, Maersk, Carlsberg, and Rockwool. Among these, Ørsted distinguished itself by adding qualitative labels to each score (e.g., 'crucial,' 'significant'), which may improve stakeholder understanding and interpretation of scores. However, the criteria for assigning these labels were not disclosed, limiting replicability. Only Rockwool provided a comprehensive breakdown of its scoring system, offering concrete descriptions of what constitutes low or high scores across parameters like scale, scope, and irremediability. This not only aligns well with ESRS, but also supports better stakeholder understanding.

Sanofi applied a non-linear scale (1, 2, 3, and 5) and used separate scales for likelihood (1–4). The omission of "4" from the severity scale is unexplained although mathematically structured and visualized. Puma, on the other hand, employed a broader 0 to 15 scale, which is unusual in the context of analyzed materiality assessments. This level of granularity suggests an effort to capture finer differences between topics, but without a justification for the 15-point ceiling, the interpretive value of the scale remains unclear. Mercedes-Benz used a three-level qualitative scale (low, medium, high). While this makes disclosures more accessible to a non-expert stakeholder, it lacks the nuance necessary to reflect the complexity of ESG impacts, risks and opportunities. The absence of numerical equivalence also limits its usability in comparative or quantitative analysis.

Overall, the variety in scoring systems used across entities reveals an early-stage inconsistency in methodological implementation of the ESRS standards. While the use of scoring itself is widespread, the lack of shared definitions, scoring logic, and rationales makes cross-entity comparability difficult.

Parameters for materiality

All entities used key parameters outlined in ESRS 1 section 3.4 to assess impact materiality by using severity (which consists of scope, scale and irremediability), combined with likelihood (for potential impacts) as the main factors for assessing impact materiality. For financial materiality all seven entities disclosed using financial magnitude and likelihood to assess risks and opportunities in line with the key parameters outlined in ESRS 1 section 3.5.

It is important to note differences in how the likelihood parameter is used across companies. ESRS 1 section 3.4. articles 45 and 46 states that likelihood should be applied only for potential impacts, however, some entities applied likelihood to actual impacts by automatically assigning the maximum score, which contradicts the intent of ESRS 1 to apply likelihood only in the context of potential impacts. This approach may lead to an overestimation of actual impacts, which could distort the materiality analysis and misrepresent the relative significance of sustainability issues.

Formula or calculation approach

There is significant variation in how entities disclose the formulas or calculation logic behind their materiality assessments. As detailed in Table 3, some provide explicit formulas for impact and/or financial materiality, while others describe general principles without precise calculations. A few entities do not disclose any methodology publicly.

Table 3. Formula or calculation approach disclosures
Source: Authors' own compilation based on entities annual reports, 2025

Entity name	Disclosed information analysis
Sanofi	Sanofi provides the most detailed formula for impact materiality: Impact Materiality = Severity² × Likelihood For financial materiality, Sanofi uses a similar approach: Financial Materiality = Financial Effect Size² × Likelihood Entity has provided a reasoning for use of this specific formula in the report: "Severity and financial effect were squared to give further emphasis to the severity over the likelihood of the impact, risk, or opportunity "
Ørsted	Ørsted refers to combining financial magnitude with likelihood, but does not provide a specific formula for either impact or financial materiality in its disclosures. The description is general and lacks methodological transparency.
Maersk	Maersk does not disclose a specific formula for impact scoring. For financial materiality, it refers to using scenario-based modeling, where the highest-impact scenario is used to assign risk scores. This suggests a qualitative-quantitative hybrid approach but lacks clear scoring logic.
Puma	Puma explains that it assesses impact materiality by combining a severity score- based on scale, scope, and irremediability- with a likelihood factor. The likelihood is expressed as a value between 0 and 1, representing the probability of the impact occurring. For financial materiality, Puma uses a similar method by combining a financial effect score (ranging from 0 to 5) with a likelihood factor between 0.65 (low likelihood) and 1 (almost certain). This approach introduces a weighted component into the scoring and suggests a tailored evaluation of risk based on probability.
Mercedes	Mercedes does not specify any formula or detailed approach for impact or financial materiality in its public reporting.
Carlsberg	Carlsberg applies parameters like severity and likelihood but does not disclose any formula or scoring calculation for either impact or financial materiality.
Rockwool	Rockwool states that severity is calculated by taking the average of the scores assigned to scale, scope, and irremediability, each rated from 1 to 5. For financial materiality, the entity combines the financial effect score and the likelihood score- each rated on a scale from 1 to 5- and calculates the average of the two.

Variation in disclosure practices highlights a broader lack of methodological alignment across reporting entities. While some, like Sanofi and Rockwool, offer clear and structured formulas, others disclose only general principles or omit calculation logic entirely. This lack of transparency reduces the comparability and auditability of materiality assessments and may limit stakeholders' ability to evaluate how consistently ESRS requirements are applied.

Special considerations for Human Rights

As outlined in ESRS 1 section 3.4 article 45, in the case of a potential negative human rights impact, the severity of the impact takes precedence over its likelihood. Several entities explicitly refer to human rights as a distinct category within their materiality assessments, often giving these impacts greater weight or attention due to their potential severity and ethical significance. While not all entities provide a specific methodology for treating human rights differently, those that do assign higher severity weighting or explicitly state that severity is prioritized over likelihood (Table 4).

Table 4. Disclosures regarding considerations for Human Rights
Source: Authors' own compilation based on entities annual reports, 2025

Entity name	Disclosed information analysis
Sanofi	Sanofi does not disclose any special considerations or adjusted weighting for human rights impacts.
Ørsted	Ørsted explicitly states that for potential negative impacts related to human rights, the severity score is weighted three times more heavily than likelihood. This 3:1 ratio reflects the entity's effort to emphasize the importance of these issues within its materiality framework.
Maersk	Maersk states that human rights impacts receive a higher severity weighting, recognizing their critical importance and potential consequences. In the case of human rights impacts, the entity adjusts this balance by applying a 75/25 weighting, giving more importance to the potential severity of those issues.
Puma	Puma does not disclose any special considerations or adjusted weighting for human rights impacts.
Mercedes	Mercedes does not disclose any special considerations or adjusted weighting for human rights impacts.
Carlsberg	Carlsberg states that human rights impacts are given specific attention, and indicates that these may carry higher severity weighting to reflect their critical importance. However, the entity does not provide a formula or describe how this prioritization is applied in practice.
Rockwool	Rockwool states that whenever a potential negative human rights impact was identified, the severity of the impact took precedence over its likelihood. However, the entity does not provide a formula or describe how this prioritization is applied in practice.

ESRS emphasizes that in cases of negative impact to human rights severity should take precedence over likelihood, however some of the reports are not aligned with this requirement. Only Ørsted, Maersk, Carlsberg, and Rockwool reflect this in their methodology, though the degree of detail varies. The remaining entities do not mention human rights-specific treatment. This inconsistency makes it difficult to compare material impacts between entities that may have similar negative impacts to human rights, but have not applied or applied different scoring to them.

Weighting of parameters

Companies' approaches to weighting parameters for materiality vary, particularly when evaluating potential impacts or human rights issues. While some apply equal weighting between severity and likelihood, others give greater emphasis to severity, either as a general rule or for specific categories. Not all entities disclose their weighting logic clearly or disclose it at all (Table 5).

Table 5. Disclosures regarding weighting of parameters
Source: Authors' own compilation based on entities annual reports, 2025

Entity name	Disclosed information analysis
Sanofi	Sanofi assigns greater importance to severity by applying a squared weighting, meaning severity has a stronger influence on the final score than likelihood.
Ørsted	Ørsted applies equal weighting for actual impacts, treating scale, scope, and irremediability equally. For potential negative impacts, severity and likelihood are weighted 1:1. However, in the case of human rights-related potential impacts, severity is prioritized using a 3:1 weighting over likelihood
Maersk	Maersk uses a 50/50 weighting between severity and likelihood for most impacts. In the case of human rights impacts, the entity adjusts this balance by applying a 75/25 weighting, giving more importance to the potential severity of those issues.

Puma	Puma combines the severity parameters- scale, scope, and irremediability- into a single value, which is then multiplied by a likelihood factor ranging from 0 (no chance) to 1 (almost certain).
Mercedes	Mercedes does not disclose any information regarding how severity and likelihood are weighted in its materiality process.
Carlsberg	Carlsberg states that severity is calculated as the average of three parameters: scale, scope, and irremediability (negative impacts only), with scores ranging from 1 to 5. The entity does not provide any information about how likelihood is weighted
Rockwool	Rockwool evaluates impact materiality using four parameters: scale, scope, irremediability, and likelihood. Each parameter is scored on a scale from 1 to 5, and the scores are treated equally in the assessment. For financial materiality, the size of the potential financial effect (risk and/or opportunity) is combined with its likelihood, with both scored on a scale of 1 to 5. The final financial materiality score is calculated as the average of the two values.

Overall, the analysis reveals notable variation in how entities approach the weighting of materiality parameters. While some entities provide clear explanations of how severity and likelihood are balanced - occasionally adapting this balance for specific issues such as human rights - others do not disclose their weighting approach at all. This inconsistency in transparency makes it difficult to assess how rigorously entities apply the ESRS principles in practice and may affect the comparability and credibility of materiality outcomes.

Assessment of current risks and opportunities

According to ESRS 1 section 3.4, likelihood should only be applied to potential impacts, not actual ones. Actual impacts are those that have already occurred or are ongoing, and therefore their likelihood is not relevant. However, entities differ in how strictly they follow this guidance. Some explicitly separate the treatment of actual and potential impacts, while others assign a fixed likelihood score to actual impacts, which may contradict ESRS requirements (Table 6). This approach may lead to an overestimation of actual impacts, which could distort the materiality analysis and misrepresent the relative significance of sustainability issues.

Table 6. Disclosures regarding assessment of current risks and opportunities
Source: Authors' own compilation based on entities annual reports, 2025

Entity name	Disclosed information analysis
Sanofi	Sanofi states that if an impact is judged to be actual, its likelihood is automatically set to 4 (on a scale of 1 to 4).
Ørsted	Ørsted states that actual impacts are scored based only on current conditions, without applying likelihood.
Maersk	Maersk states that actual impacts are scored based only on current conditions, without applying likelihood.
Puma	Puma does not specify in public documents whether it distinguishes between actual and potential impacts in terms of likelihood application.
Mercedes	Mercedes does not specify in public documents whether it distinguishes between actual and potential impacts in terms of likelihood application.
Carlsberg	Carlsberg states that actual impacts are automatically scored as 5, while potential impacts, risks, and opportunities are scored on a scale from 1 to 4.
Rockwool	Rockwool states that if an impact is judged to be actual, its likelihood is automatically set to 5 (on a scale of 1 to 5).

Although ESRS 1 clearly states that likelihood should only apply to potential impacts (section 3.4, articles 45 and 46), some companies- including Sanofi, Carlsberg, and Rockwool-assign a fixed likelihood score (typically the maximum value) to actual impacts. This approach contradicts ESRS guidance and risks inflating the perceived materiality of issues that have already occurred. In contrast, Maersk and Ørsted actual impacts were assessed based on present conditions only, excluding likelihood, which is more in line with the standard.

Clarity of thresholds

The ESRS framework does not prescribe a specific numerical threshold for materiality but expects undertakings to explain how they determine what is considered material. As shown in table 7 entities apply a variety of thresholds- some numerical, some descriptive- based on internal scales for impact or financial risk and opportunity (IRO) scoring. However, the transparency and precision of threshold-setting vary significantly across the sample.

Table 7. Disclosures regarding applied threshold

Source: Authors' own compilation based on entities annual reports, 2025

Entity name	Disclosed information analysis
Sanofi	Sanofi applies a clear numerical threshold: issues scoring 18 or above are considered material for both impact and financial assessments. This threshold stems from their scoring formula, where severity is squared and multiplied by likelihood, creating a wide scoring range and emphasizing the importance of higher-severity topics.
Ørsted	Ørsted applies a verbal threshold. Impact or financial risks and opportunities are considered material if they are rated as 'significant' or 'crucial'. These categories correspond to the upper end of Ørsted's 1–5 scale, 4 and 5 numerical boundaries.
Maersk	Maersk applies a numerical threshold of 3 out of 5 for impact materiality. For financial materiality (risks and opportunities), the threshold is stated as lower than ERM (Enterprise Risk Management) thresholds, allowing ESG-related topics with moderate risk to be captured. No specific number is provided for financial materiality.
Puma	Puma applies a 0–15 scale and considers impacts scoring 8 or higher as material. For risks and opportunities, a separate threshold of 3 or above is applied.
Mercedes-Benz Group	Mercedes applies a qualitative threshold: issues with high severity are always material. Impacts with medium severity and high likelihood are also considered to be material. These categories are descriptive rather than numerical, the report does not provide exact values.
Carlsberg	Carlsberg does not specify thresholds applied for impact or financial materiality in its public documents.
Rockwool	Rockwool states that for impact materiality, the threshold is set at above two. Topics scoring two or less are considered to have minimal informative value. For financial materiality, the threshold is set at a score of three or above

The analysis shows a wide range of approaches to defining materiality thresholds, both in format and level of disclosure. Some entities, such as Sanofi, Puma, and Rockwool, provide clear numerical thresholds linked to their scoring models, while others rely on qualitative descriptions or omit threshold information altogether. The absence of a standard threshold-setting approach in the ESRS leaves room for interpretation, but inconsistent transparency makes it difficult to evaluate how rigorously materiality determinations are applied. As thresholds directly influence what is ultimately reported, their clarity is essential for ensuring the relevance and comparability of disclosures.

Discussion and Conclusions

This study contributes to the growing research on sustainability reporting by offering one of the first comparative assessments of how companies disclose their materiality assessment methodologies under the ESRS framework-specifically ESRS 2 IRO-1. While prior literature has explored the conceptual development of double materiality (Baumüller & Sopp, 2021; GRI, 2022) and its theoretical significance (Black, 2008; OECD, 2015), limited empirical research has been conducted on how entities interpret and implement this requirement in practice.

By analyzing the methodologies disclosed by seven large entities across different industries, this study addresses key gaps identified in earlier research: the lack of methodological consistency (Miettinen, 2024), limited disclosure of scoring and threshold logic (Anas & Baghad, 2024), and challenges in stakeholder integration and weighting (Dyczkowska & Szalacha, 2025). In contrast to case-specific analyses, this paper offers a cross-sectional view, enabling comparative insights into how different interpretations of ESRS guidance may influence the reliability and comparability of sustainability disclosures.

This study analyzed how seven reporting entities from different industries disclosed their methodologies for assessing double materiality, based on the requirements of ESRS 2 IRO-1. The analysis focused on the structure and clarity of disclosures related to scoring systems, use of key parameters, weighting approaches, treatment of human rights, application of likelihood, and threshold definitions.

All entities used the key parameters outlined in ESRS 1 sections 3.4 and 3.5 to assess impact and financial materiality, combining severity (based on scale, scope, and irremediability) with likelihood for potential impacts and financial risks. However, the way these parameters were applied differed significantly. Entities used varied scoring scales, applied different weightings, and in some cases, incorrectly included likelihood for actual impacts, which contradicts ESRS guidance and may lead to overestimated materiality scores. The lack of standardization in methodologies impacts the comparability and reliability of double materiality assessments. Although all entities use structured scoring systems, the inconsistencies in scale ranges, weighting, threshold definitions, and likelihood application make it difficult to benchmark or aggregate results across organizations. For example, Puma's 0–15 scale is not easily comparable with Maersk's 1–5 scale, and Mercedes' qualitative categories cannot be mapped directly to numeric systems.

Alignment with ESRS requirements was partial. While most entities demonstrated understanding of core concepts, several deviated from guidance, particularly in applying likelihood to actual impacts and in applying prioritization of severity over likelihood in topics linked to negative impacts to human rights. The findings also show that methodological transparency is inconsistent. Some entities clearly disclosed weighting, formulas and thresholds, while others provided only general descriptions or omitted critical elements that are meaningful for non-expert stakeholders. Furthermore, some entities do not clearly disclose how thresholds for materiality are determined or applied. While some, like Sanofi and Puma, set explicit numerical thresholds, others rely on quantitative thresholds or do not provide them at all. This reduces transparency and undermines confidence in the consistency of what entities choose to report. The treatment of human rights impacts was mentioned in several cases, but only a few entities reflected the ESRS requirement to prioritize severity over likelihood in a clearly defined way. These differences suggest that entities are still in the early stages of interpreting and applying the ESRS framework. The lack of methodological consistency limits the comparability of materiality assessments across companies.

This study has a few important limitations. First, only public information was used: The analysis is based on what entities chose to publish in their reports. Internal methods or decision-making processes that were not disclosed could not be considered. Second, Early stage of reporting: Since ESRS is a new standard, many entities are still developing their approaches. Disclosures may improve or change in future reports. Third, Small and selective sample: Only entities that had relatively clear disclosures were included. The results may not represent all entities or industries. Additionally, some interpretation involved: Even though a consistent method was used, analyzing written reports always includes a degree of subjective judgment. Further research could explore how companies' methodologies evolve over time, whether disclosure practices converge across industries, and how regulatory oversight and assurance influence the implementation of ESRS-based double materiality processes.

References

1. Anas, B.M. and Baghad, H. (2024) 'Navigating materiality in sustainability reporting', *Zeszyty Teoretyczne Rachunkowości*, December 2024 [online]. Available at: https://doi.org/10.5604/01.3001.0054.8687 (Accessed: 18 March 2025).
2. Baumüller, J. and Sopp, K. (2021) 'Double materiality and the shift from non-financial to European sustainability reporting', *Journal of Applied Accounting Research*, 23(1), p.8–28. https://doi.org/10.1108/JAAR-04-2021-0114
3. Beske, F., Haustein, E. and Lorson, P.C. (2020) 'Materiality analysis in sustainability and integrated reports', *Sustainability Accounting, Management and Policy Journal*, 11(1), p.162–186. https://doi.org/10.1108/SAMPJ-12-2018-0343
4. Black, J. (2008) 'Forms and paradoxes of principles-based regulation', *Capital Markets Law Journal*, 3(4), p.425–457. https://doi.org/10.1093/cmlj/kmn026
5. Bogdan, V., Rus, L. and Matica, D.E. (2025) 'The interconnection of double materiality assessment, circularity practices disclosure, and business development in the fast fashion industry', *Sustainability*, 17(4), p.1619. https://doi.org/10.3390/su17041619
6. Brennan, N. and Gray, S.J. (2005) 'The impact of materiality: Accounting's best kept secret', *Asian Academy of Management Journal of Accounting and Finance*, 1, p.1–31.
7. Carlsberg Group (2024) *Annual Report 2024* [online]. Available at: https://attachment.news.eu.nasdaq.com/aa5bd828cb018ada1539307f9ac6d8d70 (Accessed: 18 March 2025).
8. Correa-Mejía, D.A., Correa-García, J.A. and García-Benau, M.A. (2024) 'Analysis of double materiality in early adopters: Are entities walking the talk?', *Sustainability Accounting, Management and Policy Journal*, 15(2), p.299–329. https://doi.org/10.1108/SAMPJ-07-2023-0469
9. De Cristofaro, T. and Raucci, D. (2022) 'Rise and fall of the materiality matrix: Lessons from a missed takeoff', *Administrative Sciences*, 12, p.186. https://doi.org/10.3390/admsci12040186
10. Dyczkowska, J. and Szalacha, P. (2025) 'Double materiality concept in practice: Impact in a construction entity', *Management Decision*. https://doi.org/10.1108/MD-06-2024-1350
11. European Commission (2019) *Guidelines on non-financial reporting: Supplement on reporting climate-related information (C(2019) 4490 final)* [online]. Available at: https://ec.europa.eu/info/publications/non-financial-reporting-guidelines_en (Accessed: 19 March 2025).
12. European Commission (2020) *Public consultation on the review of the Non-Financial Reporting Directive* [online]. Available at: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12129-Revision-of-Non-Financial-Reporting-Directive/public-consultation_en (Accessed: 18 March 2025).

13. European Commission (2021) *Corporate sustainability reporting* [online]. Available at: https://ec.europa.eu/newsroom/fisma/items/754701/en (Accessed: 20 March 2025).
14. European Commission (2023) *Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023 supplementing Directive 2013/34/EU as regards sustainability reporting standards* [online]. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R2772 (Accessed: 18 March 2025).
15. European Commission (2023) 'Commission adopts European Sustainability Reporting Standards', *European Commission Newsroom, 31 July* [online]. Available at: https://finance.ec.europa.eu/news/commission-adopts-european-sustainability-reporting-standards-2023-07-31_en (Accessed: 19 March 2025).
16. European Lab Project Task Force on Preparatory Work for the Elaboration of Possible EU Non-Financial Reporting Standards (PTF-NFRS) (2021) *Report on the proposal for a European sustainability reporting standard-setting* [online]. Available at: https://finance.ec.europa.eu/system/files/2021-03/210308-report-efrag-sustainability-reporting-standard-setting_en.pdf (Accessed: 18 March 2025).
17. European Union (2014) *Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 as regards disclosure of non-financial and diversity information* [online]. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014L0095 (Accessed: 19 March 2025).
18. European Union (2022) *Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 as regards corporate sustainability reporting* [online]. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022L2464 (Accessed: 17 March 2025).
19. Financial Services Authority (2007) *Principles-based regulation: Focusing on the outcomes that matter* [online]. Available at: https://webarchive.nationalarchives.gov.uk (Accessed: 17 March 2025).
20. Global Reporting Initiative (GRI) (2022) *GRI perspective: The materiality madness* [online]. Available at: https://www.globalreporting.org/resource-library/gri-perspective-the-materiality-madness.pdf (Accessed: 19 March 2025).
21. Khairunnisa, R.Y. and Hartanti, D. (2024) 'Analysis of double materiality application for sustainability reports 2023', *Jurnal Ilmu Sosial Mamangan*, Special Issue 2024, p.1619–1633. https://doi.org/10.22202/mamangan.v12i3.8420
22. Mercedes-Benz Group AG (2024) *Annual Report 2024* [online]. Available at: https://group.mercedes-benz.com/documents/investors/reports/annual-report/mercedes-benz/mercedes-benz-annual-report-2024-incl-combined-management-report-mbg-ag.pdf (Accessed: 19 March 2025).
23. Miettinen, M. (2024) 'Are materiality determination practices evolving in the wake of increasing legislation on sustainability reporting?', *International Journal of Law and Management*, 66(3), p.363–392. https://doi.org/10.1108/IJLMA-09-2023-022
24. OECD (2015) *OECD Regulatory Policy Outlook 2015* [online]. Available at: https://www.oecd.org/gov/regulatory-policy/oecd-regulatory-policy-outlook-2015-9789264238770-en.htm (Accessed: 19 March 2025).
25. Ørsted (2024) **Annual Report 2024** [online]. Available at: https://cdn.orsted.com/-/media/annual2024/orsted-annual-report-2024.pdf (Accessed: 19 March 2025).

26. PUMA SE (2024) *Annual Report 2024* [online]. Available at: https://about.puma.com/sites/default/files/financial-report/2024/puma-annual-report-2024-en-final_0.pdf (Accessed: 19 March 2025).
27. Rockwool Group (2024) *Annual Report 2024* [online]. Available at: https://attachment.news.eu.nasdaq.com/af5fffe3ef739e79c3c46ee2c49f2ab9a (Accessed: 19 March 2025).
28. Sanofi (2024) *Sustainability Statement 2024* [online]. Available at: https://www.sanofi.com/assets/dotcom/content-app/publications/esg-reports/sustainability-statement-2024--ESG-Report-.pdf (Accessed: 19 March 2025).
29. The European Files (2023) 'European Sustainability Reporting Standards (ESRS): A complete coverage of E, S, and G disclosures under double materiality to support high-quality reporting', *The European Files*, 9 February [online]. Available at: https://www.europeanfiles.eu/non-classe/european-sustainability-reporting-standards-esrs-a-complete-coverage-of-e-s-and-g-disclosures-under-double-materiality-to-support-high-quality-reporting (Accessed: 19 March 2025).
30. Torelli, R., Balluchi, F. and Furlotti, K. (2020) 'The materiality assessment and stakeholder engagement', *Corporate Social Responsibility and Environmental Management*, 27(2), p.470–484. https://doi.org/10.2139/ssrn.3433149
31. Unerman, J. and Zappettini, F. (2014) 'Incorporating materiality considerations into analyses of absence from sustainability reporting', *Social and Environmental Accountability Journal*, 34(3), p.172–186. https://doi.org/10.1080/0969160X.2014.938470