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DOUBLE MATERIALITY AS A KEY CONCEPT IN SUSTAINABILITY REPORTS

Vlasta Roška, Libertas International University, Trg J.F. Kennedy 6b, 10 000 Zagreb, Croatia,
vroska@libertas.hr; ORCID: 0000-0002-6134-9068

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ABSTRACT

Double materiality was implemented by Directive 2022/2464, and the Sustainability Reporting Standards became the basis for disclosing sustainability information. Companies must present double materiality (impact materiality and financial materiality) in their annual report, starting in 2024. As double materiality is a key concept, this study explores (i) the literature review and (ii) the perception of entrepreneurs of ESG aspects in a balanced business model in Croatia. 210 Croatian entrepreneurs responded to an online survey. The hypothesis: A balanced business model contributes to satisfactory financial performance when incorporating environmental measures in line with double materiality, significantly influencing the implementation of ESG aspects in business operations, according to the Croatian entrepreneurs' opinion, is confirmed. The business model must incorporate ESG aspects that balance environmental consideration with business financial performance. The balanced business model must meet the needs of all stakeholders. The main limitation is the small sample size of respondents and country limited research. The paper contributes to understanding the concept of double materiality through a literature review and empirical research on how double materiality is applied in the Croatian business context.

1. INTRODUCTION

Sustainability reporting has evolved significantly over recent years, driven by increasing regulatory demands and stakeholder expectations for transparency. The traditional approach, focusing primarily on financial implications (single materiality), is being replaced by a more comprehensive concept known as double materiality (European Commission, 2023). Double materiality was officially introduced into the European Union's regulatory framework for sustainability reporting through the Corporate Sustainability Reporting Directive (CSRD), which was adopted in 2022. The first time double materiality was formalised in the non-binding guidelines on climate-related non-financial information in 2019.

The transition from non-financial reports prescribed in Directive 2014/95/EU, also known as the Non-Financial Reporting Directive (NFRD), in 2017 to CSRD sustainability reports in 2024 signifies a critical evolution in reporting requirements. The new sustainability reports under the CSRD and the European Sustainability Reporting Standards (ESRS) underscore double materiality.

The CSRD is pivotal in promoting transparency and accountability for companies regarding ESG (Environmental, Social, and Governance) issues. The structure of the report must adhere to ESRS standards. Double materiality, as promoted by the CSRD, promotes transparency and accountability in business practices, enabling investors and stakeholders to understand both financial risks and broader sustainability impacts.

Companies should be accountable to their shareholders and other stakeholders to adopt the corporate responsibility business model. The concept of corporate accountability refers to the company's responsibility for its impact on the natural environment, including its effects (Zyznarska-Dworczak, 2019). Accountability ensures companies follow through on their sustainability commitments, fostering stakeholder trust.

This research, which combines theoretical insights with empirical findings from a survey conducted among Croatian companies, is a significant contribution to the field. It addresses the integration of ESG practices into business strategies and models, testing the hypothesis that a balanced business model, incorporating both financial and sustainability measures, enhances corporate sustainability. By achieving these objectives, the paper seeks to contribute to a deeper understanding of how double materiality is being embraced and applied in the Croatian business context.

2. THEORETICAL BACKGROUNDS

This section explains the legislation governing sustainability reports, the methodology of a literature review based on Scopus and the Web of Science Core Collection (WoS CC), and the main conclusions of some authors.

2.1. Legislation of Sustainability Reports

At the end of 2022, the European Commission adopted the CSRD, which revises and expands the obligations established by the NFRD. A key concept in sustainability reporting under the CSRD is double materiality, which becomes a mandatory requirement, replacing the previous non-binding guidelines on climate-related non-financial information introduced in 2019.

Double materiality, a key concept in the CSRD (Directive 2022/2464) and the ESRS in 2023, is a significant departure from the previous reporting guidelines. The ESRS, which consists of 12 standards, including two mandatory cross-cutting standards (ESRS 1 and ESRS 2), requires companies to report on the remaining 10 thematic standards based on the outcomes of a double materiality assessment. This assessment determines whether a sustainability matter qualifies as material under the double materiality criterion, which is met if it is relevant from both an impact perspective and a financial perspective. A sustainability issue must not only affect the company's financial performance but also have a significant impact on the environment or society to be considered material (European Commission, 2023).

The revisions to the Accounting Directive (Directive 2013/34) and the introduction of ESRS were crucial steps towards achieving the United Nations' Sustainable Development Goals (SDGs), adopted at the 2015 UN Summit. These goals are a global roadmap to create a sustainable, just, and inclusive society by 2030.

Under the NFRD, single materiality was basis for non-financial reports. NFRD allow companies to independently choose their reporting frameworks, such as the Global Reporting Initiative (GRI) standards or others.

The CSRD renames the non-financial report as the Sustainability Report and expands the scope of entities required to provide sustainability reporting. Public-interest companies with over 500 employees, all large companies, and small and medium-sized companies whose securities are listed on EU-regulated markets (excluding micro companies) report according to the ESRS. Sustainability reports must be based on the principle of double materiality. According to ESRS 1, double materiality consists of impact and financial materiality. As defined in Articles 19a, paragraph 1, and 29a, paragraph 1 of Directive 2022/2464, “materiality encompasses both a company’s impacts on people and the environment (impact materiality) and the sustainability-related risks and opportunities that affect its development, financial position, performance, cash flows, access to financing, or cost of capital (financial materiality)”. The CSRD, EU Taxonomy (2020/852), and ESRS provide stakeholders with powerful tools to assess companies’ environmental, social, and governance (ESG) impacts. This new double materiality approach fosters transparency and contributes to creating a more sustainable economy.

Although 2024 marks the first year of implementation of the CSRD for certain entities, it has become evident that the increasing number of reporting obligations imposes unnecessary costs on many companies. At the beginning of 2025, the European Commission introduced the first Omnibus package (European Commission, 2025). This proposal directly addresses the content and scope of the CSRD. ESRS will significantly reduce the number of companies subject to CSRD obligations, particularly medium-sized companies, and lower the administrative burden by 25% to 35%. The CSRD and ESRS represent a significant shift towards greater transparency and accountability, providing a strong foundation for the future of corporate sustainability reporting.

2.2. Literature Review

This section has two parts. The first part explains the methodology, while the second presents a literature review based on Scopus and the Web of Science Core Collection (WoS CC) from 2019 to 2024, highlighting the main conclusions of various authors.

2.2.1. Methodology of Literature Review

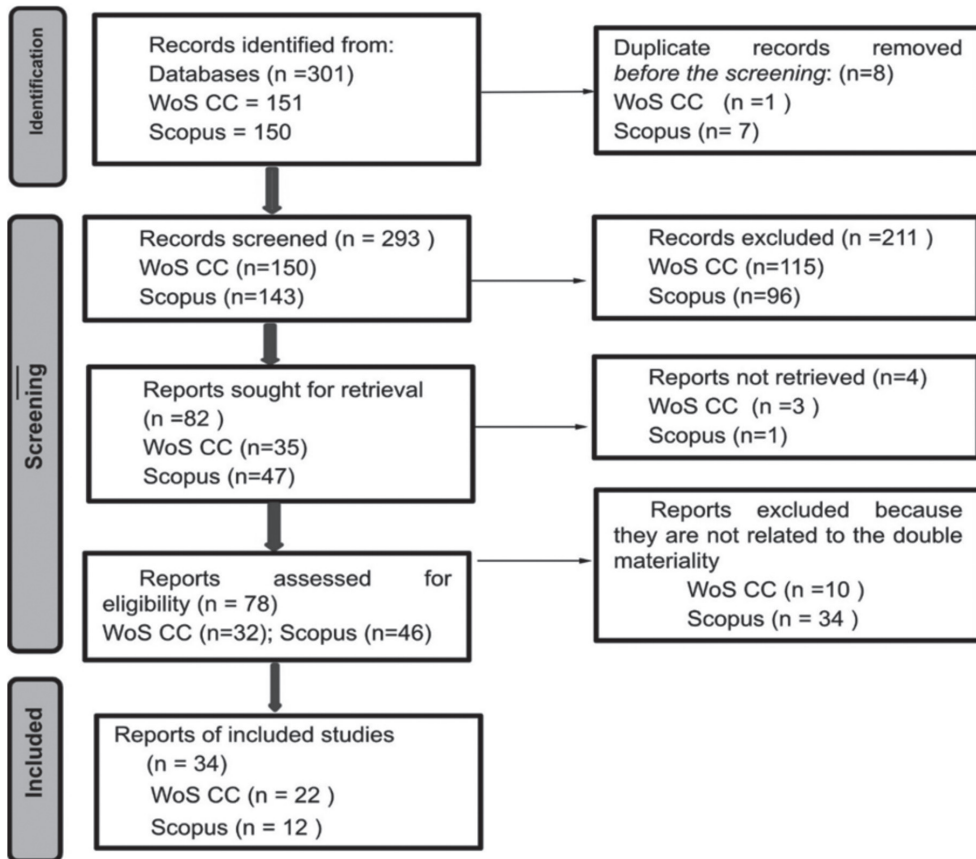
The primary objective of this study is to explore recent scientific papers on the double materiality of Directive 2022/2464 and the ESRS. The literature review outlines the systematic and objective process of this study’s, focusing on articles published in high-

impact scientific journals indexed in Scopus and the Web of Science Core Collection (WoS CC) between 2019 and 2024. To ensure the quality and transparency of the research, the study strictly adheres to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines (Moher et al., 2009).

In the Scopus and WoS CC databases, a relevant group of studies for analysis, based on specific inclusion and exclusion criteria, was identified. The study excluded papers from unrelated fields that were not relevant to the topic of double materiality. The search for scientific articles was meticulous, using a range of keywords such as “double AND materiality,” “financial AND materiality,” “social AND environmental AND materiality,” “stakeholder AND materiality AND ESG AND reports,” and “sustainable AND report”. This initial search yielded 301 papers: 150 from the Scopus database and 151 from the WoS CC database. Figure 1 illustrates the comprehensive identification and selection process of scientific papers indexed in Scopus and WoS CC databases, as outlined in the PRISMA guidelines.

In the first phase, eight papers were excluded. One paper was duplicated in the WoS CC database, reducing the number of unique papers to 150. Seven papers appeared in both databases and were excluded from the Scopus database to avoid redundancy. Additional refinement based on the research area, language (English), and open-access publications led to the exclusion of 211 papers. After applying these criteria, 82 papers met the predefined requirements: 35 from the Scopus database and 47 from the WoS CC database. These papers were not only numerous but also highly relevant, ensuring that the study was focused and purposeful. However, four reports were not fully accessible: three from the WoS CC database and one from the Scopus database, where only abstracts were available. Therefore, 78 papers were included in the final analysis, each making a significant contribution to the study’s objectives. A meticulous review of the 32 papers indexed in the WoS CC database revealed that 10 were unrelated to double materiality. This thoroughness ensured that only the most relevant scientific papers were included in the final analysis, instilling confidence in the study’s reliability. The final analysis comprises 22 scientific papers from the WoS CC database. Similarly, after reviewing the 46 papers cited in the Scopus database, 34 were deemed unrelated the concept of double materiality. The final analysis included 12 scientific papers from the Scopus database, further demonstrating the rigorous and comprehensive nature of the review process.

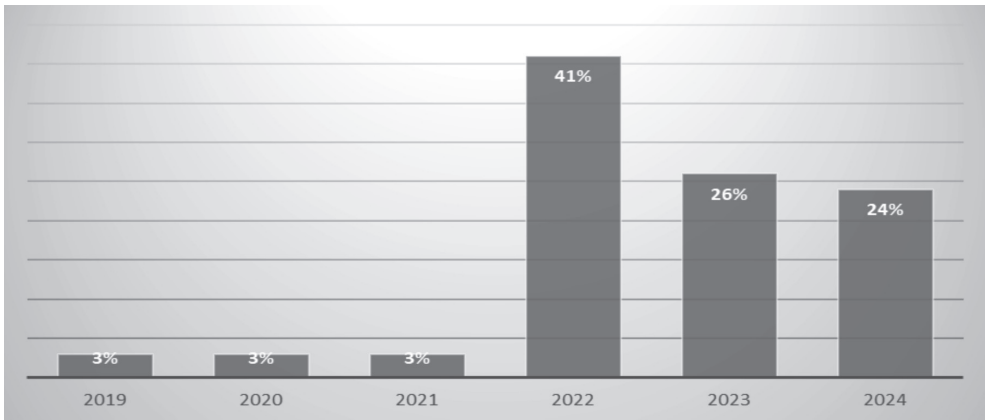
Figure 1. Process of identification and selection of studies from PRISMA



Source: Author from PRISMA

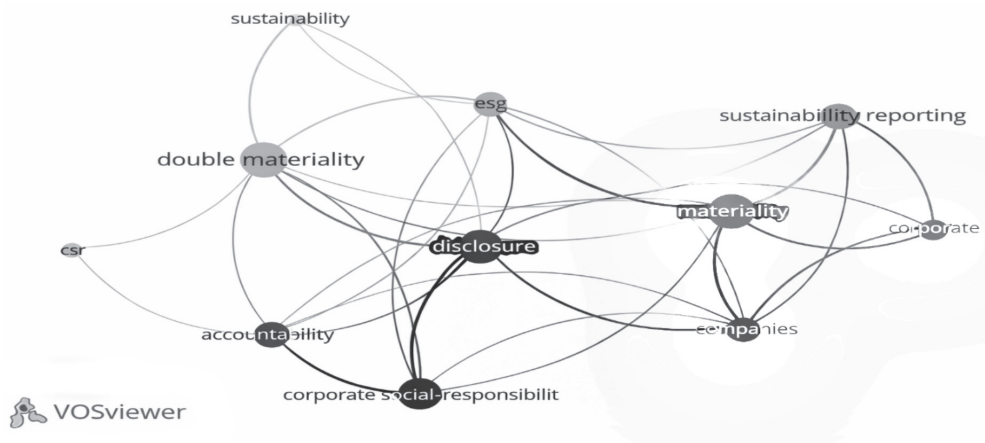
The detailed analysis, which is directly relevant to double materiality, involved 34 scientific papers from the WoS CC and Scopus databases. The bibliometric analysis of these databases provides crucial information on scientific papers related to double materiality. This study includes 34 scientific papers published between 2019 and 2024 after applying specific inclusion and exclusion criteria (Figure 2).

The majority of these papers were published in 2022, with 14 papers (41%), followed by nine papers (26%) in 2023 and 8 papers (24%) in 2024. One paper (3%) was published in 2021, 2020, and 2019, as shown in Figure 2.

Figure 2. Year of publication of studies in the sample

Source: Author

The study used the VOSviewer software to analyse, systematise, and visualise the data obtained. The next step involved selecting 180 keywords from the 34 researched papers in the WoS CC and Scopus databases. Terms that appeared at least three times were selected, resulting in 11 keywords. Data from these 34 scientific papers were loaded into VOSviewer visualisation software, generating a map of relationships among these 11 keywords, as shown in Figure 3.

Figure 3. Keywords from Papers Indexed in WoS CC and Scopus Databases

Source: Author according to VoSviewer

Figure 3 presents a clear and comprehensive network of relationships among terms, with some terms showing stronger connections, as indicated by the proximity

of the labels. This visualisation identifies three clusters formed by the most common relationships among keywords. The keyword “double materiality” is closely linked to terms within the cluster and is directly connected to the concepts of Disclosure, Accountability, and Corporate Social Responsibility from the third cluster, as well as Sustainability Reporting and Materiality.

2.2.2. Literature review

The literature review on double materiality in the WoS CC and Scopus databases presents two areas: (i) a Literature review of the concept of materiality and double materiality and materiality in different standards, and (ii) research papers related to Corporate Social Responsibility (CSR) and materiality and double materiality. These two areas are central to understanding the evolving landscape of double materiality in sustainability reporting and corporate accountability.

Table 1 shows the path from materiality in financial and non-financial reports to double materiality in the sustainability report, shaped by various legal regulations. Double materiality is a key concept introduced in the sustainability report starting from the financial year 2024, as prescribed by CSRD. Materiality is one of the fundamental characteristics of financial statements (IAS 1, 2023) and should similarly be a core element in all other business reports, including sustainability reports, as presented in Table 1. The NFRD presents two conflicting views of materiality (Raith, 2023) based on GRI and the International Integrated Reporting Council (IIRC) frameworks. This conflict challenges us to evaluate and understand the different perspectives on CSR critically. The GRI guidelines propose a materiality matrix approach for determining materiality thresholds (Calabrese et al., 2019). Accountability is fundamental to building trust in corporate reporting (La Torre et al., 2022).

Table 1. Definition of materiality in different standards

Standards/ Intended audience	Definition / Level of impact
European Sustainability Reporting Standards (ESRS) EUROPEAN COMMISSION (2023). / Stakeholders	<p>Double materiality:</p> <p>(1) Impact materiality relates to impacts on people or the environment.</p> <p>(2) Financial materiality relates to risks or opportunities that affect the financial position, financial performance, cash flows, access to finance or cost of capital.</p> <p>Impacts indicate an undertaking’s actual or potential negative or positive contributions to sustainable development over the short, medium, and long term.</p>
Global Reporting Initiative (GRI), GRI (2021) / Stakeholders	Material issues present the companies’ most significant impacts on the economy, environment, and people, with an emphasis on human rights. The impact can indicate a negative or positive contribution to sustainable development.

Sustainability Accounting Standards Board (SASB), SASB (2017, 2021). / Investors'	Information is financially material and could influence investment or lending decisions, as well as companies' financial performance. Sustainability information has a material impact on short-, medium-, and long-term financial performance and enterprise value.
International Integrated Reporting Council, IIRC (2021). / Investors, providers of financial capital	An integrated report must display information that has a substantive impact on the creation of value. The impact can be an actual or potential effect on value creation over the short, medium and long term.
Accountability (2018). / Organisation and stakeholders	Materiality is the substantial influence of an organisation's stakeholders on its assessment, decisions, actions, and performance. The impact is on the organisation and its stakeholders in the short, medium and long term.
Social Value International, SVI framework (2018). / Stakeholders	Information must be readily available to all stakeholders so that they can draw reasonable conclusions about the performance of the decision.
Impact Management Project, World Economic Forum and Deloitte (2020). / Stakeholders	Materiality is the omission or misstatement of accounting information. The impact that stakeholders will have on changing their judgment.

Source: Author according to Fiandrino et al. (2022b, p. 670-671); European Commission (2023)

Various authors have discussed the definitions of materiality and double materiality, as presented in Table 2 (Luque-Vílchez et al., 2023; De Villiers et al., 2022; Delgado-Ceballos et al., 2023; Chiu, 2022; Baumüller & Sopp, 2022; Strat et al., 2022). The first theoretical and empirical research about double materiality is from 2024 (Suhardjo et al., 2024; Yu et al., 2024; Gourdel et al., 2024; Lu et al., 2024; Kulionis et al., 2024; Huq & Mohammadrezaei, 2024; Millar & Slack, 2024; Migliavacca, 2024). The literature review on sustainability (Luque-Vílchez et al., 2023) emphasised (i) the ongoing debate on single vs. double materiality, (ii) the need for high-quality, unified sustainability reports, and (iii) the demand for more transparent and more standardised guidance in reporting frameworks. Their emphasis on the distinction between single and double materiality highlights the importance of integrating environmental, social, and financial dimensions into a company's strategic framework. A unified, high-quality sustainability framework enhances corporate transparency and performance through stakeholder trust.

The ESRS and IFRS Foundation emphasise a shift from an investor-focused to a societal-focused approach, balancing "comparability and materiality" (De Villiers et al., 2022, p. 742). Delgado-Ceballos et al. (2023) highlighted several examples of how firm-level ESG factors correlate with specific societal-level outcomes. As they note (2023, p. 8), "double materiality serves as a framework to take into account the interests of all stakeholders and reconciles the opposing positions of investors (financial materiality) and other stakeholders (stakeholder materiality) concerning sustainability." ESG activities should generate measurable societal outcomes in addition to business results.

However, implementing double materiality poses challenges, including establishing standardised metrics and navigating qualitative assessments. Addressing these issues requires ongoing collaboration among policymakers, industries, and academic researchers (La Torre et al., 2020). This revelation highlights the disparity between the European Union's growing ESG agenda and actual market practices (Migliavacca, 2024). Corporate environmental responsibility and stakeholder perception mutually reinforce each other, particularly when companies integrate sustainability into their business models and implement continuous improvement systems (Strat et al., 2022). While double materiality aims to balance stakeholder interests, compromises inevitably arise between financial priorities and sustainable development goals. Prior research confirms that companies prioritise financial performance and shareholder interests over broader ESG concerns (Adams & Mueller, 2022; La Torre et al., 2020). Double materiality "may result in a risk management-oriented approach to stakeholder engagement, which may not reflect true corporate accountability to stakeholders." (La Torre et al., 2020, p. 718). According to Adams and Mueller (2022), integrating financial and impact perspectives into reporting frameworks enhances transparency and stakeholder trust. Notably, Artificial Intelligence (AI) and big data are increasingly strategic in sustainability reporting (Sætra, 2023), facilitating the digital transition and the efficient implementation of ESRS in the business model. A study by Opferkuch et al. (2022, p. 444) found that 85% of companies include materiality issues in at least one of their sustainability reports. However, only 28% reported material issues using circular economy terminology, indicating a gap in how companies integrate circular economy principles into their disclosure. The ISSB (Millar & Slack, 2024) emphasises financial materiality centred on enterprise value; many investors advocate for double materiality, arguing that it provides a more comprehensive view by considering an organisation's actions' broader environmental and social impacts. The research by Lu et al. (2024) emphasises corporate decision-making and social welfare. Companies should integrate environmental and financial aspects to achieve sustainable ESG performance (Luque-Vílchez et al., 2023; Delgado-Ceballos et al., 2023).

From the 18 research studies summarised in Table 2 on materiality, double materiality, and non-financial reporting, three key conclusions emerge: (i) there is a strong need for unified European sustainability standards to ensure consistency and harmonisation, (ii) further research and development of materiality and double materiality are essential to improve the quality and relevance of sustainability business model, and (iii) companies' digital transformation efforts have a significant positive impact on environmental efficiency, reinforcing the importance of data-driven in balanced business model.

Based on a detailed literature review, the first hypothesis (H1) is proposed: A balanced business model contributes to satisfactory financial performance when incorporating environmental measures in line with the concept of double materiality, significantly influencing the implementation of ESG aspects in business operations.

Table 2. Research on the materiality in studies

Authors and publications years	Research Sample	Main Findings
Suhardjo et al. (2024).	two Indonesian palm oil companies: PT Dharma Satya Nusantara Tbk (DSNG) and PT Triputra Agro Persada Tbk (TAPG).	The study reveals how disparities in reporting practices and stakeholder engagement may impact the reliability of ESG scores, thereby influencing investment decisions in environmentally sensitive sectors.
Yu et al. (2024).	is theoretical, focusing on the development of the MASI framework. The contributors include researchers from diverse academic backgrounds and experts in environmental sciences, engineering, and business from multiple universities and institutions.	The main finding of the research is the introduction and proposal of the Mining Area Sustainability Index (MASI), a novel framework designed to evaluate and promote sustainable practices within mining communities. The index aims to address the environmental, social, and economic impacts of mining activities.
Gourdel et al. (2024).	Based on theoretical economic modelling using the EIRIN model. This model integrates the interactions of various macroeconomic agents, including households, firms, banks, and the government, within the European Union's economic framework.	The study finds that an orderly transition to low-carbon investments yields early co-benefits, including reductions in CO2 emissions and support for economic growth. The research advocates for central banks and financial supervisors to incorporate climate risks into their macroeconomic models, emphasising the urgent need for financial systems to adjust their adaptive expectations to integrate climate risk assessments genuinely.
Lu et al. (2024).	No empirical data, but a theoretical model using a Cobb-Douglas production function. The model considers hypothetical firms with investments spanning GHG-related and non-GHG-related activities.	The effects of GHG disclosures depend on several factors, including the persistence of returns, productivity ratios, and social cost parameters.
Kulionis et al. (2024).	3000 large- and mid-capitalization companies from 23 developed 24 emerging markets globally.	It argues that failing to account for environmental impacts could pose significant financial risks to companies, particularly those dependent on ecosystem services.
Huq & Mohammadrezaei (2024).	a systematic review of 39 academic articles from peer-reviewed journals.	The researchers highlight the absence of empirical investigation into double materiality and the limited stakeholder engagement.
Millar & Slack (2024).	83 comment letters from investors, asset managers, and investment associations.	Key issues include the difference in materiality perspectives, the clarity of reporting guidelines, and the implementation challenges of Scope 3 emissions reporting.

Migliavacca, (2024).	3,025 non-financial companies operating in the eurozone, from 2005 to 2020. Analysis includes 58,884 firm-year observations from the Refinitiv database.	Traditional accounting information is losing its prominence in equity valuation, but ESG ratings have not yet filled this gap in terms of value relevance. The findings suggest that while sustainability considerations are becoming increasingly critical, ESG ratings are not yet fully aligned to capture or influence market perceptions and valuations. Implementing the concept of double materiality remains crucial for effectively addressing this issue.
Zhou et al. (2023).	The multinational organisation Exxon.	A new heterogeneity-accountability materiality model (HAM model) provides a rational basis for sustainable reporting and management.
de Cristofaro & Gulluscio (2023).	58 non-financial reports of European and non-European companies operating in 39 industries with headquarters in 21 countries.	Only a few European and in-service industry companies demonstrated a proactive attitude towards double materiality, primarily in their 2021 reporting.
Hoang & Phang (2023).	I experiment - 200 investors from Prolific, US citizens and native English speakers II experiment – 422 investors.	(i) stress of engagement in material CSR activities but not immaterial CSR activities, and (ii) positive immaterial CSR performance results in a more significant reduction in investors' willingness to invest.
Bendig et al. (2023).	515 Standard and Poor's 500 companies with 2,800 firm observations.	(i) digitalization of companies leaves a significant and positive effect on environmental performance, and (ii) it is particularly significant in a technologically turbulent business environment.
Adams & Mueller (2022).	577 academic submissions.	The majority (72%) of academic submissions were opposed to the IFRS Foundation on crucial issues (i) does not have the required expertise, (ii) lacks legitimacy to set sustainability reporting standards.
Lehner et al. (2022).	671 data points from 157 documents, 19 cases and 33 interviews.	Three issues challenging the significance of performance measurement: (i) the dynamic between economically powerful and objectified investment subjects; (ii) norms and standards of materiality; (iii) the relationship of stakeholders with different views towards radical or incremental materiality

Opferkuch et al. (2022).	138 reports from 94 European companies in 2020.	Almost all companies explicitly state CE, but only 7% integrate it within all five elements of sustainability reporting. Less than one-third of companies include both targets and indicators for CE, and therefore, the content of CE in sustainability reports is mostly superficial.
Jørgensen et al. (2022).	30 surveys and 6 qualitative interviews in Norwegian financial markets	Deficiencies in the availability and quality of information for the various needs of stakeholders in the financial markets are highlighted.
Ng et al. (2022).	6 listed energy and mining companies in Ghana.	(i) limited publication of climate-related information. (ii) publication of data on sustainability and the principle of double materiality is necessary if carbon neutrality is to be achieved by 2050.
Primec & Belak (2022).	11 companies listed on the Slovenian Stock Exchange.	Companies from countries with a longer culture and tradition of publishing non-financial reports have a higher level of social responsibility than companies from “younger“ transition countries.

Source: Author

3. METHODOLOGY OF RESEARCH AND DATA COLLECTIONS

The questionnaire examined entrepreneurs' understanding and perceptions of ESG business practices and double materiality in Croatia. The questionnaire was an online survey from June to the end of December 2023. The 100 email addresses received the first delivery of the survey. After that, using the Snowball Sampling method (Kubiciel-Lodzińska, 2021), the final sample consists of 210 respondents. The survey had three parts: (i) general respondents' characteristics, (ii) information on non-financial reports, and (iii) respondents' opinions about double materiality. Definitions and elements of ESG and Double materiality, as outlined in the CSRD (European Parliament, 2022) and ESRS (European Commission, 2023), served as the basis for the questions. Respondents had to rate, using a five-point Likert scale, how they perceived their sustainability contribution to business activities, as well as the impact of the environment on their business. Form 1 represented no contribution to sustainability, and 5 presented a valuable contribution.

The multiple regression analysis, a robust statistical tool, was employed to analyse the results and test the hypothesis, underscoring the thoroughness of the research methodology.

The research model, comprising four constructs, holds significant practical implications for businesses. The ESG aspect of business (ESGA) construct, a

dependent variable in the model, consists of 3 dependent variables: Business Financial Performance (BFP), Environmental Measures (EM), and Business Model (BM).

Elements of double materiality are not strictly prescribed but depend on the industry and companies' preferences. For this reason, calculate the average value for a group of questions. The mean value of the construct ESG aspect of business (A_ESGA) was used to test the set hypotheses.

The Business Financial Performance construct represents elements of the Business Financial Performance variable in the research model and consists of 4 variables. The Business Financial Performance (A_BFP) is measured by: (1) Profit, (2) Dividend, (3) By caring for the environment, (4) Economic and social impact on the environment, (5) Socially responsible business profit, (6) Donations and sponsorships. The mean value of the construct Business Financial Performance (A_BFP) was used to test the set hypotheses.

The materiality of a construct presented by Environmental Measure (A_EM) in this research is an independent variable in the model. It consists of variables (1) to reduce energy consumption, (2) to reduce waste, (3) to reduce water consumption, (4) to reduce your fleet's greenhouse gas emissions, (5) to reduce the impact of your business on the environment and (6) to reduce the environmental impact on your business. The mean value of the construct Environmental measures (A_EM) was used to test the set of hypotheses. A good business model can only realise the ESG aspect. The business model construct consists of four key elements: (1) sustainability, (2) profitability, (3) liquidity, and (4) market growth. The mean value of the business model construct (A_BM) is used to test the set of hypotheses.

4. RESULTS OF THE RESEARCH

The research sample consists of 210 respondents. The most significant number of respondents are limited liability companies (59%), followed by joint-stock companies (30%), while 11% of respondents represent other forms. The research sample included 71% medium-sized companies and 29% large companies. Regarding the sample structure, according to the activities, 25% are from wholesale and retail, 13% from the manufacturing industry, and 51% from services activities. The survey investigated entrepreneurs' understanding of ESG business, regardless of the obligation to publish a non-financial report. In this survey, 26% of respondents' mandatory publish, 8% voluntarily publish, and 66% do not publish non-financial reports. The most significant number of companies that prepare non-financial reports, 53%, use the guidelines of the concern to which they belong. Additionally, 31% use the GRI guidelines, 3% use the UN Global Compact guidelines, and 14% do not use any of the guidelines. Regression analysis confirms the set hypothesis. Cronbach's alpha was calculated for each construct individually to test the scale's reliability. According to the general rule of thumb, it should be above 0.7. Results show that all three constructs have good

internal consistency, as indicated by values above 0.7 (ESG Aspects construct: 0.843, Environmental Measure construct: 0.909, Business Financial Performance construct: 0.740, and Business Model: 0.870). The results present a significant link among continuous improvement systems.

Table 3. Descriptive Statistic

	Mean	Std. Deviation	N
A_ESGA	2.96	1.545	210
A_BFP	3.02	1.208	210
A_EM	3.31	1.246	210
A_BM	3.16	1.581	210

Source: Author

Table 3 represents sample characteristics. The highest mean value is variable Environmental Measures at 3.31, compared to Business Model at 3.16, and the lowest is Business Financial Performance at 3.02.

The ANOVA Model Summary in Table 4 provides key statistical metrics to assess the fit and explanatory power of a regression model.

Table 4. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.824 ^a	.689	.674	.882

a. Predictors: (Constant), A_EM, A_BFP, A_BM

b. Dependent Variable: A_ESGA

Source: Author

According to the Table 4 model, the variables of business financial performance (A_BFP), environmental measures (A_EM), and business model (A_BM) explain 68.9% of the variance of the dependent variable (A_ESGA). The correlation coefficient or $R = 0.824$ indicates a strong positive correlation among the predictors (A_EM, A_BFP, A_BM) and the dependent variable (A_ESGA). The difference between R^2 (0.689) and Adjusted R^2 (0.674) is minimal, indicating that the predictors are relevant and not introducing excessive noise into the model. The dependent variable A_ESGA is significantly influenced by the predictors, as indicated by the high R value (0.824) and R^2 (0.689). The model exhibits strong explanatory power in predicting ESG adoption, with a high R^2 and a low standard error.

The model in Table 5 is statistically significant ($p < 0.001$) and explains 68.9% of the variation in A_ESGA. A high F-value suggests a strong model fit (F-Statistic =

144.919). The independent variables A_EM, A_BFP, and A_BM collectively have a significant impact on the dependent variable.

Table 5. ANOVA

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	338.583	3	112.861	144.919	.000 ^b
	Residual	160.430	206	.779		
	Total	499.014	209			

a. Dependent Variable: A_ESGA

b. Predictors: (Constant), A_EM, A_BFP, A_BM

Source: Author

Table 6 presents the coefficients that estimate the statistically significant contribution of each variable to the regression model.

Table 6. Coefficients of Model

Model	Unstandardised Coefficients		Standardised Coefficients	T	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1 (Constant)	-.567	.187		-3.036	.003	-.935	-.199		
A_BFP	.356	.075	.278	4.743	.000	.208	.504	.454	2.203
A_EM	.398	.063	.321	6.371	.000	.275	.521	.615	1.627
A_BM	.358	.053	.366	6.784	.000	.254	.462	.535	1.869

a. Dependent Variable: A_ESGA

Source: Author

Table 6 provides essential information regarding the relationship among the independent variables (A_BFP, A_EM, and A_BM) and the dependent variable (A_ESGA). Unstandardised beta values provide insight into the relative strength of the effect of each independent variable on the dependent variable, expressed in standard deviation units. If the p-value is less than 0.001, the predictor is considered statistically significant. All predictors (A_BFP, A_EM, A_BM) have p-values less than 0.001, indicating that each variable is statistically significant at the 1% level.

Tolerance and Variance Inflation Factor (VIF) are used to detect multicollinearity between the predictors. In this research, the VIF ranges from 1.627 to 2.203. The

model exhibits relatively good statistical characteristics, with no multicollinearity, as evidenced by VIF values less than 5 and tolerance values greater than 0.10.

The predictive ability of independent variables, *A_BFP*, *A_EM* and *A_BM*, is justified because all non-basic variables contribute statistically significantly to the model. (Table 6).

The function in an unstandardised form is (Table 6):

$$A_ESGA = -0.567 + 0.356 x1 + 0.398 x2 + 0.358 x3 \quad (1)$$

$$A_ESGA = -0.567 + 0.356 A_BFP + 0.398 A_EM + 0.358 A_BM \quad (2)$$

Coefficients (B) represent the actual change in the dependent variable (*A_ESGA*) resulting from a one-unit change in the independent variable, while holding all other variables constant. The Constant in the model is -0.567. If all independent variables are zero, the baseline value of *A_ESGA* is -0.567. The first independent variable in the model, *A_BFP*, has statistically significant predictive power in explaining the results of the ESG aspects of companies ($x_1 = 0.356$, $t = 4.743$, $p < 0.001$). For each unit increase in *A_BFP*, *A_ESGA* increases by 0.356, holding the other variables constant. The second element in the model is *A_EM*. *A_EM* has statistically significant predictive power in explaining the results of the ESG aspect of companies ($x_2 = 0.398$, $t = 6.371$). For each unit increase in *A_EM*, *A_ESGA* increases by 0.398, holding the other variables constant. The third element is *A_BM*. *A_BM* has predictive power in explaining the results of the ESG aspect of companies ($x_3 = 0.358$, $t = 6.784$, $p < 0.001$). For each unit increase in *A_BM*, *A_ESGA* increases by 0.358, holding the other variables constant.

According to the results of multiple regression analysis, the contribution of each independent variable is statistically significant ($p < 0.001$).

Therefore, the first hypothesis, H1: A balanced business model contributes to satisfactory financial performance when incorporating environmental measures in line with double materiality, significantly influencing the implementation of ESG aspects in business operations, according to the Croatian entrepreneurs' opinion, is confirmed.

5. DISCUSSION

Theoretical research mentioned above predicted that balanced business models integrating environmental and financial considerations would enhance ESG adoption and the application of the double materiality framework. Empirical results of this research confirm this relationship with strong, significant coefficients and high explanatory power. The high R^2 value (0.689) also shows that the interconnectedness of research factors can explain a substantial portion of ESG variance. This result confirms the theoretical argument that double materiality is part of the company's value-creation process. Cronbach's alpha coefficients exceeded 0.7 for all constructs,

indicating that companies implementing continuous environmental improvements and aligning strategic and financial priorities achieve higher ESG performance.

The research empirically confirms the interconnection proposed by findings from Luque-Vílchez et al. (2023), Delgado-Ceballos et al. (2023), and Strat et al. (2022), which suggests that financial performance, environmental measures, and strategic business models are not separate but mutually reinforcing pillars of ESG implementation. The result of regression model demonstrates that the business model (A_BM) and financial performance (A_BFP) are both statistically significant predictors of ESG adoption (A_ESGA), with $\beta = 0.358$ and $\beta = 0.356$ respectively ($p < 0.001$) indicates that companies integrating sustainability within their core strategic and financial planning achieve stronger ESG outcomes, precisely the type of alignment envisioned in Luque-Vílchez et al. (2023) theoretical framework.

The environmental measures (A_EM) exhibit the most substantial standardised effect ($\beta = 0.398$, $p < 0.001$) on ESG adoption, supporting Delgado-Ceballos et al. (2023) claim that environmental actions are pivotal drivers of sustainable business transformation. Moreover, the positive and simultaneous contribution of A_EM and A_BFP in regression shows that environmental responsibility and financial success can coexist, reflecting the “dual value creation” perspective described in Delgado-Ceballos et al. (2023). The empirical synergy contradicts earlier fears that environmental initiatives might compromise profitability. The findings that environmental measures have the highest mean (3.31) and that the business model variable (3.16) also performs well suggest that firms perceive sustainability not as a cost but as part of their competitive and reputational strategy, consistent with Strat et al. (2022) argument.

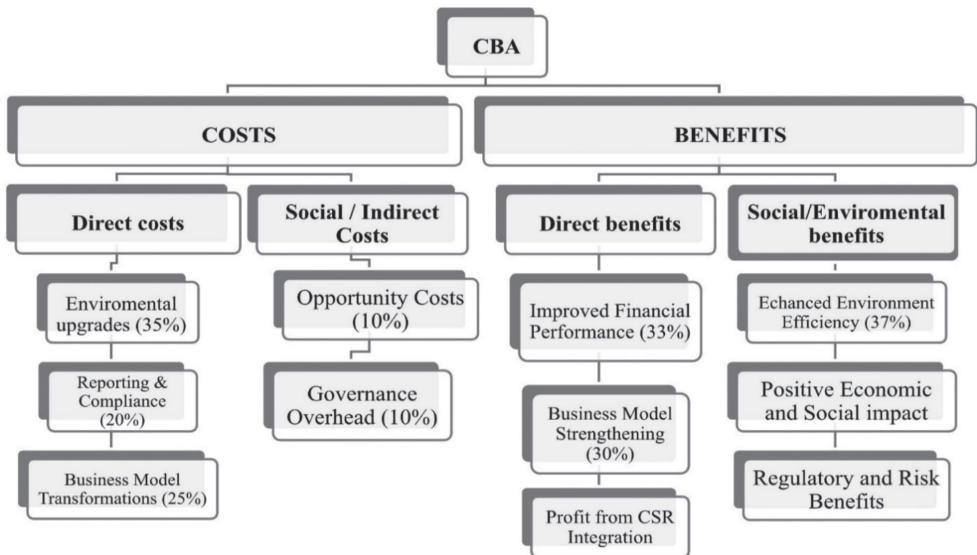
Literature highlights environmental responsibility as a key driver of double materiality (Strat et al., 2022; Kulionis et al., 2024). Empirical results validate the theory, with A_EM = 0.398 ($p < 0.001$), and environmental measures exerting the most substantial impact on ESG adoption. Prior studies (Adams & Mueller, 2022) reveal a tension between profit and sustainability, yet potential synergy under a double materiality approach. Result A_BFP = 0.356 ($p < 0.001$), confirms partial synergy: financial performance enhances ESG aspects rather than opposing them. Literature reports fragmented adoption and low standardisation (Opferkuch et al., 2022), which is confirmed by research showing that only 34% of firms publish ESG reports. To satisfy investors’ needs and expectations, it was necessary to develop comprehensive materiality measures and incorporate them into regulatory practices to ensure meaningful sustainability disclosures (Huq & Mohammadrezaei, 2024). Today, the ESRS defines sustainability reports for all EU countries, with the GRI standards serving as the initial framework. Notably, 31% of this research was on the results of 78% of the largest 250 companies and 68% of N100 companies that have implemented them (KPMG, 2022, p. 24).

The active involvement of stakeholders is crucial in this process, as it ensures a collaborative approach to sustainability and transparent communication. Cost-benefit analyses (CBA) offer a consistent methodology for evaluating the potential

consequences of decisions, enabling firms to assess their environmental, social, and financial impacts (European Commission, 2021). A portfolio-based decision rule (Zebre & Scott, 2014, p. 25) supports the idea that benefit-cost analysis enhances social welfare for all. Investors have not yet fully integrated sustainability data into their business models. Digital technologies facilitate data integration, reducing costs and enabling the accurate and timely disclosure of sustainability information (Moher et al., 2009). The CBA shown in Figure 4 represents the primary characteristics of the balanced business model derived from the theoretical and empirical research conducted in this paper.

A CBA (Figure 4), constructed based on the research findings and theoretical background, combines economic interpretation and qualitative valuation, thereby turning ESG research outcomes into measurable managerial insights. CBA evaluate the costs and benefits of integrating Environmental Measures (A_EM) 37 %, Business Model Adjustments (A_BM) 30 %, and Business Financial Performance (A_BFP) 33 % into ESG adoption (A_ESGA) in accordance with the principle of double materiality.

Figure 4. Cost-benefit Analysis



Source: Author

The regression model indicates that all three independent variables have a positive and statistically significant influence on ESG adoption, providing a quantitative basis for assigning relative benefit weights in the CBA. Based on the survey, the estimated cost impact, as a percentage of the ESG investment budget, can be split into direct and indirect, or social costs. Direct costs consist of 35% environmental upgrades (investments in energy, waste, and emission management), 20% in reporting and

compliance (preparation of ESG and sustainability reports and 25% of business model transformation (digitalisation, staff training, ESG strategy creation). Indirect or social costs consist of 10% of opportunity Costs (short-term profit decline from sustainability spending) and 10% of governance overhead (including board committees, consultancy, and stakeholder communication). Companies split benefit components into direct benefits and social/environmental benefits. Direct benefits include a 33% improvement in financial performance (higher profitability and increased capital access) and a 30% enhancement in business model (innovation, efficiency, and profit from CSR Integration – ESG investments contributing to brand value, investor confidence, and long-term competitiveness). Social / Environmental Benefits comprise 37% enhanced environmental efficiency (lower emissions, energy savings, and resource optimisation), a positive social and economic Impact – including reputation gains, stakeholder trust, and community well-being and regulatory and risk benefits (reduced exposure to compliance fines and climate-related risks). Approximately 69% of ESG performance variance is explained by the regression, with an R^2 of 0.689. Thus, the effective realised benefit = 69 benefit units for every 100 cost units invested. The faster introduction of innovations as a strategic element of ESG development will lead to increased reputation, reduced risk, and other benefits for companies.

Regulators propose that companies use CBA as a guiding tool in tailoring disclosure requirements to maximise social welfare (Kulionis et al., 2024). The implication is that broader disclosure under mandatory regulations does not automatically lead to better social outcomes, and CBA can play a pivotal role in this regard. Double materiality frameworks are associated with higher market valuation and reduced costs (La Torre et al., 2020), according to CBA. A Balanced Business Model, as explored in this empirical research, not only supports the positive correlation between robust ESG practices and improved corporate performance but also heralds a promising shift towards a sustainable economic paradigm (Migliavacca, 2024).

6. CONCLUSIONS

Double materiality is a key concept in sustainability reporting, referring to a dual perspective on materiality. The research provides robust evidence that double materiality is not merely a reporting principle but a strategic orientation, where sustainability and profitability operate in a symbiotic relationship. The findings bridge theoretical and empirical perspectives, confirming that double materiality serves as a practical framework for linking corporate profitability with environmental and social accountability. The findings aim to assist entrepreneurs and public authorities in developing socially responsible business practices while highlighting the associated benefits, risks, and responsibilities.

A limitation of this study is the relatively small sample size, comprising only 210 companies and drawn from a single EU country. In Croatia, only around 100 entities

are obliged to publish sustainability reports. Future research should expand this scope through comparative analyses across multiple EU countries and explore sector-specific effects and the role of governance mechanisms in strengthening ESG integration.

A balanced business model, aligned with the principles of double materiality, can contribute to strong financial performance and improved environmental outcomes, significantly influencing the successful implementation of ESG goals. Incorporating double materiality, CBA can support stakeholders, including investors, to make more informed decisions on sustainability-related matters. Sustainable development, focusing on reducing negative environmental impacts and advancing decarbonisation processes, should represent a fundamental strategic pillar of every company's business model in line with ESG principles.

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BIBLIOGRAPHY

Adams, C.A., & Mueller, F. (2022). Academics and policymakers at odds: the case of the IFRS Foundation Trustees' consultation paper on sustainability reporting. *Sustainability Accounting, Management and Policy Journal*, 13(6), 1310–1333. <https://doi.org/10.1108/SAMPJ-10-2021-0436>

Afolabi, H., Ram, R., & Rimmel, G. (2023). Influence and behaviour of the new standard setters in the sustainability reporting arena: implications for the Global Reporting Initiative's current position. *Sustainability Accounting, Management and Policy Journal*, 14(4), 743-775. <https://doi.org/10.1108/SAMPJ-01-2022-0052>

Baumüller, J., & Sopp, K. (2022). Double materiality and the shift from non-financial to European sustainability reporting: review, outlook and implications. *Journal of Applied Accounting Research*, 23(1), 8-28. <https://doi.org/10.1108/JAAR-04-2021-0114>

Bendig, D., Schulz, C., Theis, L., & Raff, S. (2023). Digital orientation and environmental performance in times of technological change. *Technological Forecasting and Social Change*, 188, 122272. <https://doi.org/10.1016/j.techfore.2022.122272>

Calabrese, A. A., Costa, R., Ghiron N.L., & Menichini, T. (2019). Materiality analysis in sustainability reporting: a tool for directing corporate sustainability towards emerging economic, environmental, and social opportunities. *Technological and Economic Development of Economy*, 25(5), 1016-1038. <https://doi.org/10.3846/tede.2019.10550>

Chiu, I.Y. (2022). The EU Sustainable Finance Agenda: Developing Governance for Double Materiality in Sustainability Metrics. *European Business Organization Law Review*, 23, 87–123. <https://doi.org/10.1007/s40804-021-00229-9>

Delgado-Ceballos, J., Ortiz-De-Mandojana, N., Antolín-López, R., & Montiel I. (2023). Connecting the Sustainable Development Goals to firm-level sustainability and ESG factors: The need for double materiality. *BRQ Business Research Quarterly*, 26(1), 2-10. <https://doi.org/10.1177/23409444221140919>

de Cristofaro T., & Gulluscio, C. (2023). In Search of Double Materiality in Non-Financial Reports: First Empirical Evidence. *Sustainability* 15(2), 924. <https://doi.org/10.3390/su15020924>

de Villiers, C., La Torre, M., & Molinari, M. (2022). The Global Reporting Initiative's (GRI) past, present and future: critical reflections and a research agenda on sustainability reporting (standard-setting). *Pacific Accounting Review*, 34(5), 728-747. <https://doi.org/10.1108/PAR-02-2022-0034>

European Commission. (2025). Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directives (EU) 2022/2464 and (EU) 2024/1760 as regards the dates from which Member States are to apply certain corporate sustainability reporting and due diligence requirements. *European Union*. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52025PC0080>

European Commission. (2023). Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023 supplementing Directive 2013/34/EU of the European Parliament and of the Council as regards sustainability reporting standards. *Official Journal of the European Union*. December, 22 2023. Available at: https://eur-lex.europa.eu/eli/reg_del/2023/2772/oj/

European Commission. (2019). Communication From the Commission Guidelines on non-financial reporting: Supplement on reporting climate-related information. *Official Journal of the European Union C 209/01*. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=oj:JOC_2019_209_R_0001

European Parliament. (2022). Directive (EU) 2022/2464 of the European Parliament and of the Council of December 14 2022. *Official Journal of the European Union*. Available at: <https://eur-lex.europa.eu/eli/dir/2022/2464/oj/>

European Parliament. (2020). Regulation (EU) 2020/852 Of the European Parliament and of the Council of June 18, 2020, on the establishment of a framework to facilitate sustainable investment and amending Regulation (EU) 2019/2088. *Official Journal of the European Union*. Available at: <http://data.europa.eu/eli/reg/2020/852/oj>

European Parliament and Council. (2014). Directive 2014/95. *Official Journal of the European Union L 330/1*. November, 15 2014. Available at: <http://data.europa.eu/eli/dir/2014/95/oj>

European Parliament and Council. (2013). Directive 2013/34/EU. *Official Journal of the European Union L 182/19*. June 26 2013. Available at: <http://data.europa.eu/eli/dir/2013/34/oj>

Fiandrino, S., di Trana M.G., Tonelli, A., & Lucchese, A. (2022a). The multifaceted dimensions for the disclosure quality of non-financial information in revising directive 2014/95/EU. *Journal of Applied Accounting Research*, 23(1), 274-300. <https://doi.org/10.1108/JAAR-04-2021-0118>

Fiandrino, S., Tonelli, A., & Devalle A. (2022b). Sustainability materiality research: a systematic literature review of methods, theories and academic themes. *Qualitative Research in Accounting & Management*, 19(5), 665-695. <https://doi.org/10.1108/ORAM-07-2021-0141>

Gourdel, R., Monasterolo, I., Dunz, N., Mazzocchetti, A., & Parisi, L. (2024). The double materiality of climate physical and transition risks in the euro area. *Journal of Financial Stability*, 71, 101233. <https://doi.org/10.1016/j.jfs.2024.101233>

Hoang, H., & Phang, S-Y. (2023). Building Trust with Material and Immaterial Corporate Social Responsibility: Benefits and Consequences. *Contemporary Accounting Research*, 40(2), 868-896. <https://doi.org/10.1111/1911-3846.12838>

Huq, A. M., & Mohammadrezaei, M. (2025). A review of ex ante and ex post materiality measures, and consequences and determinants of material disclosures in sustainability reporting. *Journal of Accounting Literature*, 47(5), 71-98. <https://doi.org/10.1108/JAL-04-2024-0084>

- International accounting standard (IAS). (2023). *1 Presentation of Financial Statements*. IFRS Foundation, A973-A1026. <https://www.ifrs.org/content/dam/ifrs/publications/pdf-standards/english/2023/issued/part-a/ias-1-presentation-of-financial-statements.pdf?bypass-on>
- Jørgensen, S., Mjøs, A., Jacob, L., & Pedersen, T. (2022). Sustainability reporting and approaches to materiality: tensions and potential resolutions. *Sustainability Accounting, Management and Policy Journal*, 13(2), 341-361. <https://doi.org/10.1108/SAMPJ-01-2021-0009>
- KPMG International. (2022). *Big shifts, small steps: Survey of Sustainability Reporting 2022*. Available at: <https://assets.kpmg.com/content/dam/kpmg/se/pdf/komm/2022/Global-Survey-of-Sustainability-Reporting-2022.pdf>
- Kubiciel-Lodzińska, S. (2021). Snowball Sampling vs. Respondent Driven Sampling in Regional Research. Comparing the use of the Methods to Study Migrants Working in Elderly Care. *Migration Studies – Review of Polish Diaspora*, 1(179), 149-180. <https://doi.org/10.4467/254444972SMPP.21.007.13319>
- Kulionis, V., Pfister, S., & Fernandez, J. (2024). Biodiversity impact assessment for finance. *Journal of Industrial Ecology*, 28(5), 1321-1335. <https://doi.org/10.1111/jiec.13515>
- La Torre, M., Sabelfeld, S., Blomkvist, M., & Dumay, J. (2020). Rebuilding trust: sustainability and non-financial reporting and the European Union regulation. *Meditari Accountancy Research*, 28(5), 701-725. <https://doi.org/10.1108/MEDAR-06-2020-0914>
- Lehner, O. M., Nicholls, A., & Kapplmüller, S. B. (2022). Arenas of Contestation: A Senian Social Justice Perspective on the Nature of Materiality in Impact Measurement. *Journal of Business Ethics*, 179(4), 971–989. <https://doi.org/10.1007/s10551-022-05158-2>
- Lu, T., Ruan, L., Wang, Y., & Yu, L. (2024). Real effects of greenhouse gas disclosures. *China Journal of Accounting Research*, 17(2), 100360. <https://doi.org/10.1016/j.cjar.2024.100360>
- Luque-Vílchez, M., Cordazzo, M., Rimmel, G., & Tilt, C. A. (2023). Key aspects of sustainability reporting quality and the future of GRI. *Sustainability Accounting, Management and Policy Journal*. 14(4), 637–659. <https://doi.org/10.1108/SAMPJ-03-2023-0127>
- Migliavacca, A. (2024). Value relevance of accounting numbers and sustainability information in Europe: Empirical evidence from nonfinancial companies. *Journal of International Accounting, Auditing and Taxation*, 55, 100620. <https://doi.org/10.1016/j.intaccudtax.2024.100620>
- Moher D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement., PRISMA Group. *Journal of Clinic Epidemiology*, 62(10), 1006–1012. <https://doi.org/10.1016/j.jclinepi.2009.06.005>
- Ng, A. W., Yorke, S. M., & Nathwani, J. (2022). Enforcing Double Materiality in Global Sustainability Reporting for Developing Economies: Reflection on Ghana's Oil Exploration and Mining Sectors. *Sustainability*, 14(16), 9988. <https://doi.org/10.3390/su14169988>
- Opferkuch, K., Caeiro, S., Salomone, R., & Ramos, T. B. (2022). Circular economy disclosure in corporate sustainability reports: The case of European companies in sustainability rankings. *Sustainable Production and Consumption*, 32, 436-456. <https://doi.org/10.1016/j.spc.2022.05.003>
- Prakash, S., & Mitchell D. (2015). Probabilistic Benefit Cost Ratio. Australasian Transport Research Forum 2015 Proceedings 30 September - 2 October 2015, Sydney. Available at: <http://www.atrf.info/papers/index.aspx>
- Primec, A., & Belak, J. (2022). Sustainable CSR: Legal and Managerial Demands of the New EU Legislation (CSRD) for the Future Corporate Governance Practices. *Sustainability* 14(24), 16648. <https://doi.org/10.3390/su142416648>

Raith, D. (2023). The contest for materiality. What counts as CSR? *Journal of Applied Accounting Research*, 24(1), 134–148. <https://doi.org/10.1108/JAAR-04-2022-0093>

Sanchez D. G., Heintges, S., Mazzeo, P., Villacorta, V., & Trouvain, E. (2023). *Implementation guidance for the materiality assessment*, 06-02 Materiality Assessment SRB meeting August 23, EFRAG.

Sætra, H. S. (2023). The AI ESG protocol: Evaluating and disclosing the environment, social, and governance implications of artificial intelligence capabilities, assets, and activities. *Sustainable Development*, 31(2), 1027–1037. <https://doi.org/10.1002/sd.2438>

Strat, V.A., Grosu F.S., Murafa, C., Chicu, N., & Zgura, J.D. (2022). Is Corporate Environmental Responsibility A Meaningful Factor for Romanian Consumers? *Economic Computation and Economic Cybernetics Studies and Research*, 4(56), 55-70. <https://doi.org/10.24818/18423264/56.4.22.04>

Turner, L., & Weirich, T. R. (2023). Expanding the Concept of Materiality to Environmental, Social, and Governance: Audit Issues and Implications. *Current Issues In Auditing, American Accounting Association*, 17(1), A50–A58. <https://doi.org/10.2308/CIIA-2022-010>

United Nations. (2015). *The Sustainable Development Goals*. Available at: <https://www.undp.org/sustainable-development-goals>

Zerbe, R. O. (2007). The Legal Foundation of Cost-Benefit Analysis. *Charleston Law Review*, 2(1), 93-184.

Zerbe, R. O., & Scott, T. (2014). *(Almost) Everybody Wins: A True Pareto Justification for Practical Welfare Economics and Benefit-Cost Analysis*. SSRN. <http://dx.doi.org/10.2139/ssrn.2466101>

Zetzsche, D. A., Bodellini, M., & Consiglio, R. (2022). The EU Sustainable Finance Framework in Light of International Standards. *Journal of International Economic Law*, 25(4), 659–679. <https://doi.org/10.1093/jiel/jgac043>

Zhou, Y., Lamberton, G., & Charles, M. B. (2023). An Explanatory Model of Materiality in Sustainability Accounting: Integrating Accountability and Stakeholder Heterogeneity. *Sustainability*, 15(3), 2700. <https://doi.org/10.3390/su15032700>

Zyznarska-Dworczak, B. (2019). The impact of the accountability on accounting development as the essence of sustainability accounting. *Problems of Management in the 21st Century*, 14(1), 73-83. <https://doi.org/10.33225/PMC/19.14.73>