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# A systematic review of ESG indicators and corporate performance: proposal for a conceptual framework

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## Abstract

Despite the attention given by global stakeholders to transparency and disclosure of nonfinancial corporate information, there is a lack of consensus regarding the disclosure and analysis of corporate results on ESG. The objective of this study is to identify the main environmental, social, and governance (ESG) indicators from the literature and analyze their impact on corporate company performances, as well as a conceptual structure that supports the understanding of these indicators. A systematic literature review was applied to raise and analyze relevant works in the field, following the guidelines of the Preferred reporting items for systematic reviews and meta-analysis (PRISMA). We identified and categorized the main indicators for each of the ESG dimensions, as well as the corporate performance (CP) variables impacted by ESG performance, allowing for a comprehensive analysis of their interrelations. Our results indicate that financial performance indicators must be assessed from a long-term perspective, as short-term analyses may show negative relationships with ESG performance. However, for nonfinancial aspects, the relationship with ESG performance is consistently positive across all time horizons. Additionally, we propose a conceptual framework that advances the ESG literature by establishing explicit connections between ESG dimensions and corporate performance variables. This framework categorizes CP into four key areas—financial performance, market and risk perception, strategic positioning, and capital structure—providing a structured approach for evaluating ESG impacts. Our study contributes to both theory and practice, offering insights that support corporate decision-making and sustainability strategies.

**Keywords** ESG, Indicators, Corporate performance, Long-term

## Introduction

Faced with the increasing behavioral change on sustainability coupled with the urgent demand for sustainable development, organizations are currently experiencing constant pressure from stakeholders to implement responsible social, corporate, and environmental practices [34].

This demand has contributed to a growing number of organizations adopting socially responsible investment (SRI) practices. It is a long-term approach which integrates environmental, social, and governance (ESG) metrics commonly used to measure research, analyses, and

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asset selection in an investment portfolio. It also aims to improve the identification of long-term returns for investors and benefit society by influencing the behavior of companies [39, 67].

Within this context, ESG emerged as an important theme for the development and analysis of sustainable, social, and corporate strategies, as well as a means for investors to evaluate companies based on nonfinancial factors [17]. This assessment is carried out through indicators that measure the performance of organizations from the perspectives of environment, society, and governance [52, 83]—aspects that are increasingly evaluated in organization practices and operations.

Over the years, ESG has also been used as an important source in assessing company corporate risk when seeking resources in the capital market. This comes from a need to finance investment projects to improve financial performance and has been shown in several studies (e.g., [1, 8, 10, 18]). As such, social, environmental, and responsible management actions reframe a company's value vision, promoting business longevity while avoiding resource scarcity and enabling the company's economic and operational continuity [76].

ESG metrics stand out as an organization's nonfinancial capacity indicators because they cover numerous factors that capture nearly all aspects of a company's operation [100]. This includes carbon footprint, pollution, energy consumption, diversity, labor practices, community relations, transparency, compensation, business ethics, corporate board structure, etc. [63, 100]. Thus, ESG indicators portray the impact of a companies' performance regarding the sustainability of the corporation.

Transparency in the disclosure of nonfinancial information generates benefits for the corporation's economic–financial performance [15]. Governmental institutions have promoted efforts on a global scale to demonstrate to the business sector that the adoption of ESG practices generates benefits that go beyond the social and environmental sphere. This optimizes a company's overall performance and adds value to institutions and their businesses [3].

Nevertheless, despite the impact of sustainable practices on companies, the lack of rules for disclosing ESG indicators [49] means that each organization's report has a different structure [13]. This undermines performance comparison between companies as well as the capacity to identify the most relevant indicators which should be given more attention. As such, establishing benchmarks is key to identifying the important guidelines and strategies for each company [112] and thus carrying out comparisons according to the most relevant aspects of the ESG approach.

Recent research has shown a positive correlation between corporate sustainability, adoption of ESG practices, and financial performance [2, 25]; however, there is still no consensus on general corporate results and disclosed data standardization. Furthermore, it is necessary to highlight that developing economies present results on a smaller scale when compared to developed economies [2]. Another point concerns analyses, which currently cover either the environmental or social dimension when verifying sustainable performance, thus ignoring the inseparability of the theme in addition to excluding governance.

Other publications reveal investor perception of sustainable practices in companies listed on the stock exchange, how these practices relate to the costs necessary for their implementation, and what the return is in terms of value creation [3, 15]. Despite recent studies relating ESG to topics such as corporate sustainability [1], disclosure of nonfinancial reports [13], systematic risk [37], and profitability [18], there are still gaps to be explored. Carrying out additional research will strengthen knowledge about ESG indicators and their impact on the corporate performance of organizations, contributing to the consolidation of this study field [2].

Despite the constant growth of research on ESG, there is still no consensus on the standardization of the main indicators relevant to corporate performance (CP). Furthermore, the lack of standardization leads to one-dimensional measures being taken that end up disregarding important stakeholders [9, 81]. Therefore, this study was carried out to answer three research questions through the execution of a systematic literature review and the proposition of a conceptual framework:

> **RQ1:** Based on the literature, what are the main ESG (environmental, social, and governance) indicators that can be standardized in each of these dimensions?
> **RQ2:** What are the most commonly used corporate performance indicators in the literature regarding ESG indicators?
> **RQ3:** Can we connect ESG indicators with corporate performance indicators?

This article aims to identify the main environmental, social, and governance (ESG) indicators based on the literature and analyze ESG performance impact on corporate performances, supporting the development of a conceptual framework that assists decision makers in the implementation and evaluation of ESG metrics.

This research advances discussions on the standardization of ESG and CP indicators by presenting a conceptual framework that unifies ESG indicators across multiple dimensions, thus providing a structured approach for

theoretical and practical applications. Among the main contributions, the findings can help academics or investors to identify a pattern in the main ESG indicators present in each category and how these indicators relate to the company's performance as a way to facilitate comparability.

In addition, the research can contribute to discussions on conceptual models for ESG standardization, given the focus on searching for literature that supports the use of ESG indicators. Unlike previous reviews that primarily map ESG indicators, this study goes further by suggesting the impact of indicators on CP over the planning horizon, offering actionable insights for decision makers.

From a practical standpoint, concerns may arise regarding the materiality of data (what truly deserves to be reported). Many organizations focus on disclosing indicators in which they excel, leading to biased conclusions about the impact of their operations on sustainability. Therefore, the impact of defining a standard with the key ESG indicators likely extends beyond investors and financial markets, as other stakeholders would have the opportunity to act based on the information provided in sustainability reports.

Furthermore, the article also presents implications for professionals by addressing the second research question regarding the main positive or negative impacts of ESG indicators on CP. The findings regarding the impacts of ESG indicators on corporate performance can serve as a practical reference for companies to formulate strategies to manage sustainability risks and opportunities, as well as activities related to ESG performance indicators.

## Literature review

### Standardization of ESG indicators and stakeholder theory

ESG metrics assess measures of corporate social responsibility (CSR) [66] and serve as crucial strategies to ensure the sustainable development of companies [35]. This assessment is conducted through indicators that gauge organizations' performance across environmental, social, and governance perspectives [52, 83].

However, despite the impact of these sustainability metrics, the lack of well-defined criteria for disclosing ESG indicators [49] results in each organization having different reports [13], complicating performance comparisons, as well as the identification of the most relevant indicators that deserve greater attention.

Therefore, it becomes necessary to establish benchmark indicators to identify important sustainable guidelines and strategies for each company [112]. This standardization is essential to enable comparability among organizations [13, 60], prevent selectivity and deficiencies in the disclosure of ESG information in sustainability reports [17, 51], as well as to avoid greenwashing practices [14, 17, 32].

Furthermore, the lack of standardization of ESG indicators has allowed organizations to adopt a one-dimensional approach to assess their ESG performance [9], as they end up considering only a specific dimension for evaluating sustainable performance, disregarding the indivisibility of the theme. This one-dimensional analysis of ESG indicators may result in excluding the interests of specific stakeholders.

Papasolomou-Doukakis et al. [81] used the stakeholder approach in the context of companies based in the Republic of Cyprus and identified six groups as the main organizational stakeholders, including employees, customers, investors, suppliers, the community, and the environment. They outlined relevant CSR actions for each cluster, as illustrated in Table 1.

Papasolomou-Doukakis et al. [81] found that neglecting a specific dimension of ESG can lead to excluding certain stakeholders. For instance, by solely considering indicators from the environmental dimension to assess the ESG performance of an organization, interests of employees, such as investment in their development and promotion of diversity, are being excluded, as these indicators are measured in the social category.

Therefore, the establishment of standard indicators in each dimension can also optimize organizations' investments in sustainability, resulting in an extended maximization of value for all stakeholders, in line with the principles of stakeholder theory [41]. Thus, we believe that standardized ESG indicators for all three dimensions respond to the demands of diverse stakeholders within an organization. The literature review allows the identification of specific ESG indicators that are widely used and recommended for each dimension, encompassing diverse stakeholders within an organization.

### ESG performance, resource-based view, and corporate performance

ESG performance refers to how a company manages environmental, social, and governance issues [35], including aspects such as environmental responsibility, diversity and inclusion practices, business ethics, and its impact on the community, among others. Classified as an indicator of an organization's nonfinancial capacity [100], the ESG performance of an organization relates to its ability to integrate environmental, social, and governance considerations into its operations and business strategies, aiming for long-term sustainability and meeting the demands of all stakeholders [10, 52].

Thus, the adoption of ESG practices can generate valuable strategic resources for an organization, as per the resource-based view (RBV) theory [7, 21]. Companies

**Table 1** Organizational CSR Actions Regarding Key Stakeholders. *Source*: Papasolomou-Doukakis et al. (2005)

| Stakeholder | Actions regarding key stakeholders |
|---|---|
| Employees | Provide a family-friendly work environment |
| | Engage in responsible human resources management |
| | Offer an equitable rewards and salary system for employees |
| | Promote open and flexible communication with employees |
| | Invest in employee development |
| | Encourage freedom of expression and promote employees' rights to voice concerns at work |
| | Provide support for childcare/paternity/maternity leave beyond legal requirements |
| | Promote employment diversity by hiring and promoting women, ethnic minorities, and people with disabilities |
| | Ensure fair and dignified treatment of all employees |
| Consumers | Respect consumer rights |
| | Offer quality products and services |
| | Provide truthful, honest, and useful information |
| | Ensure that products and services provided are safe and suitable for their intended use |
| | Avoid false and misleading advertising |
| | Disclose all substantial risks associated with the product or service |
| | Avoid deceptive/manipulative sales promotions |
| | Avoid manipulating product availability for exploitation |
| | Avoid involvement in price fixing |
| Community | Foster reciprocal relationships between the company and the community |
| | Invest in the communities where the company operates |
| | Engage in community development activities |
| | Encourage employee participation in community projects |
| Investors | Seek a competitive return on investment |
| | Engage in fair and honest business practices in shareholder relations |
| Suppliers | Conduct fair business transactions with suppliers |
| Environment | Demonstrate a commitment to sustainable development |
| | Demonstrate a commitment to the environment |

which adopt environmentally responsible practices, coupled with good social performance, can build a strong market reputation, and this reputation can attract loyal customers, enhance stakeholder relationships, and strengthen the brand, creating a valuable strategic resource [13, 21, 34, 43]. Therefore, valuable resources and competitive advantages (outcomes of adopting ESG practices) can impact CP, creating long-term value for stakeholders [99].

Despite studies examining the impact of ESG indicators on CP, most focus solely on the corporate financial performance. Additionally, many studies indicate that good ESG performance has a positive impact on the CP of companies [61, 77, 114]. However, other studies have identified a negative relationship between ESG performance and corporate financial performance [6, 84, 91], and some have not found a significant relationship between the two variables [53, 67, 96].

Cerciello et al. [18], for instance, asserted that investments made in organizations yield different effects depending on the industrial sector considered. Srivisal et al. [100] added that the impact of ESG may depend on the different nature or culture of markets. Buallay [16] supports this statement by illustrating that ESG practices positively affect company performance in the manufacturing sector but negatively in the banking sector.

Furthermore, Chen et al. [21] found that implementing various activities related to ESG performance indicators raises companies' operating expenses, resulting in a gradual decline in their financial performance. However, it is believed that this negative impact of ESG on financial performance becomes positive in the long term. This is because, in the short term, the implementation of ESG measures often involves significant costs that can be spread over time.

## Research method

The method used in the development of this research was the systematic literature review (SLR). The SLR is based on the application of search methods and literature

analyses that guarantee greater reliability, increasing result quality, while reducing errors, with conclusions based singularly on the researcher's perspective [26]. The SLR also enables the survey of works published in the research field, providing a solid base of existing knowledge on the subject [11, 106]. A conceptual framework was then elaborated from the analysis and codification of these data.

### Data collection

All four steps of the Preferred Reporting Items for Systematic Reviews and Meta Analysis (PRISMA) guidelines were followed to report the SLR: identification, screening, eligibility, and inclusion [80]. The adopted review process is illustrated in Fig. 1.

The used databases and search strings were defined in the identification step. Thus, the Scopus and Web of Science (WoS) databases were adopted through a combination of Boolean terms and operators: "TITLE-ABS-KEY

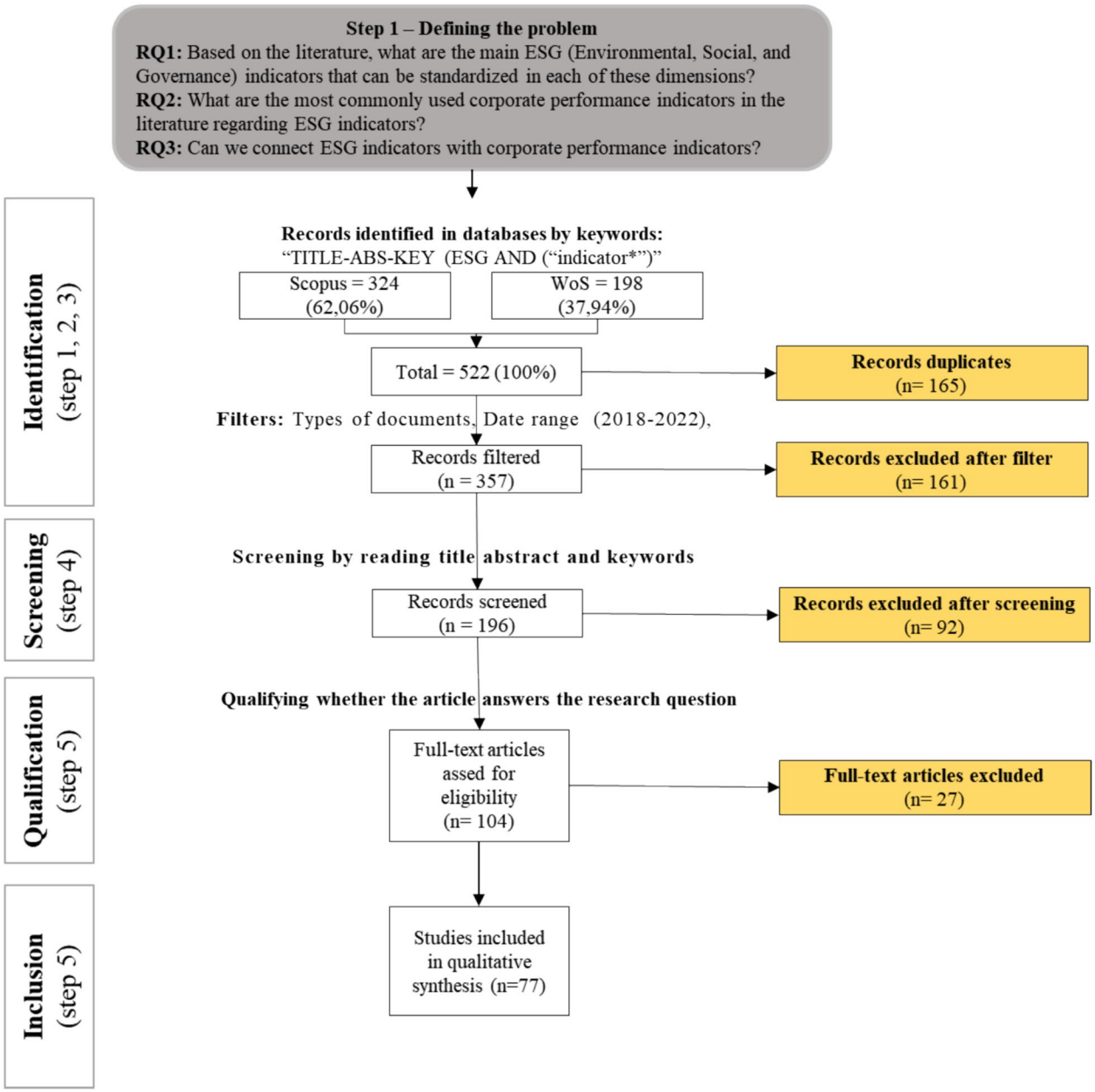



**Fig. 1** Article selection process based on the PRISMA guidelines

(ESG AND ("indicator*")." Truncation (*) was inserted to broaden the search and capture variations of the terms. The search terms were then applied to the title, keywords, and abstract fields of the articles as to guarantee the relevance of the results. The search provided 522 records.

Some exclusion criteria were also adopted in the identification stage: duplicated documents in both databases were removed through an analysis of the articles' unique identifiers (DOI, Unique WoS ID—UT and Entitlement ID—EID), the search was limited to academic journals (eliminating documents such as notes, conference papers, among others), and the research was restricted to a publication interval of five years (2018–2022). With the application of these criteria, 196 records remained. These were directed to the screening stage.

The abstracts of the 196 articles were checked based on the following analysis criterion in the screening phase: the article must have the term ESG Indicators as a research focus. At this stage, 92 articles were eliminated, most of them for just mentioning the term without discussing it as the central topic of the study. After this step, 104 articles remained.

The full text of selected articles was then reviewed to verify their eligibility. For this stage, two analytical criteria were used: (1) the article must be relevant to the main ESG indicators survey; (2) the article should identify the impact of ESG indicators on organizational performance. A set of 77 articles met at least one of these eligibility criteria and constituted the final record sample.

### Data analysis

The data analysis followed the qualitative content analysis process (Miles et al., 2014), and the coding, categorization, and examination of the data were conducted using MAXQDA® software, which is widely used for qualitative data analysis [72]. This enables the coding and categorization of text excerpts from each selected article in the data collection phase. All coded segments were reviewed by more than one author to ensure greater methodological rigor. The article set from the identification stage was analyzed in the screening and eligibility stages through a qualitative approach and a content analysis technique. This allowed a more comprehensive understanding of the reviewed documents [47].

The coding process was conducted in two steps. The first coding step followed a deductive approach. For the coding of ESG indicators, the categories from Refinitiv were used, as it specializes in providing information on companies' ESG performance [58]. The Refinitiv ESG score database relies on publicly available data and calculates over 630 measures related to corporate enterprises. From this dataset, a subset of 186 of the most comparable and tangible measures is used to support the overall company evaluation process, as illustrated in Fig. 2.

The underlying measures are grouped into 10 categories (emissions, resource use, workforce, product responsibility, human rights, community, management, shareholder, and CSR strategy), which reflect the three ESG pillars [89]. The Refinitiv categories and database are widely used in the literature on corporate sustainability analysis, ESG performance, and social responsibility analysis (e.g., [44, 58, 87, 107]), as presented in Table 1. This first coding cycle resulted in 371 textual segments grouped into 10 different codes referred to the ESG categories (Table 2).

In the second stage, we created the codes related to the text elements that dealt with the impacts of ESG indicators on CP. At this stage, the coding process was conducted in two cycles. Table 3 presents an example of the coding process. Based on Eisenhardt et al. (2016), an

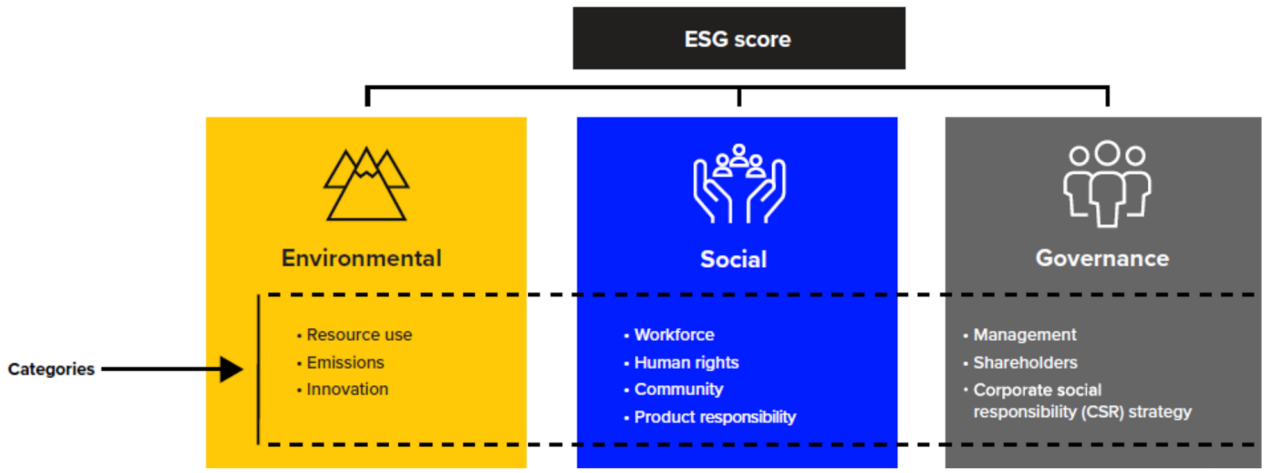



**Fig. 2** Refinitiv's categories

**Table 2** Main Refinitiv categories

| Dimension | Category | Description |
|---|---|---|
| Environmental | Emissions<br>Resource use<br>Innovation | Covers the impact of an organization's activities on the environment. This category assesses how a company uses the best management practices to reduce the impact of its activities on the environment and capitalize on environmental opportunities to generate value |
| Social | Workforce<br>Product responsibility<br>Human rights<br>Community | Evaluates a company's ability to generate trust and loyalty among its stakeholders through the adoption of best management practices. It reflects the company's reputation and the strength of its license to operate—key factors in determining its ability to generate sustainable value over the long term |
| Governance | Management<br>Shareholder<br>CSR strategy | Indicates whether a company's board of directors acts to secure the long-term interests of its shareholders. It also reflects the company's ability to direct and control its rights and responsibilities by establishing incentives and control mechanisms to generate long-term, sustainable value for shareholders |

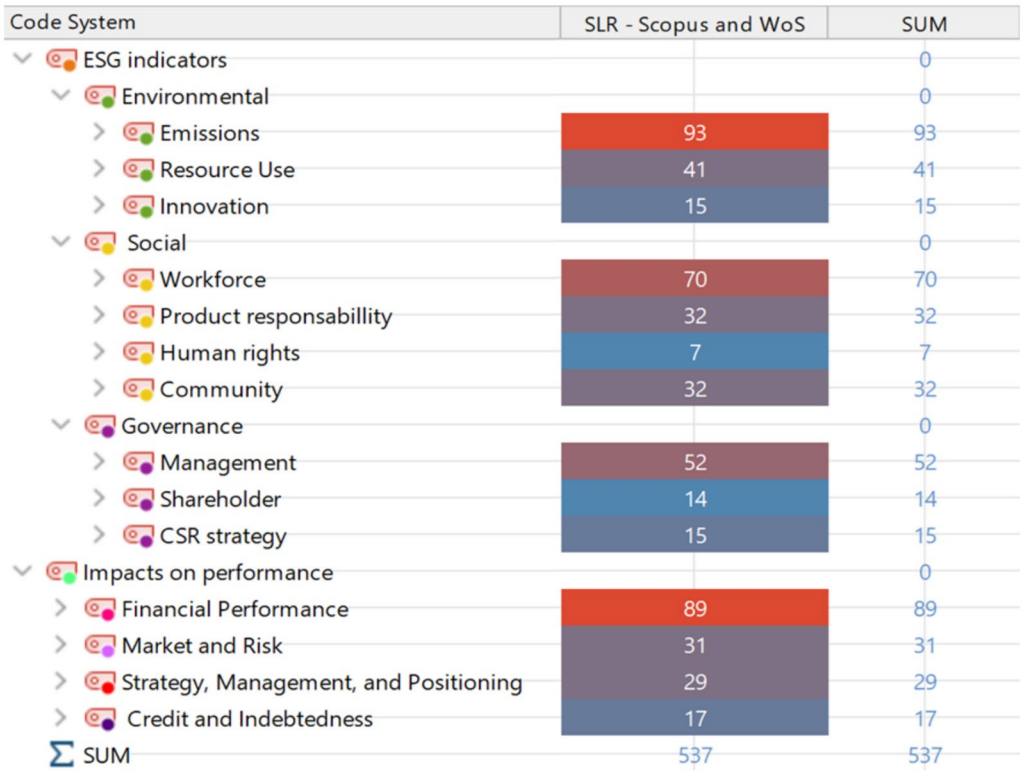
**Table 3** Example of the Coding Process

| Representative quotes | First cycle coding (sub-category) | First cycle coding (category) | Second cycle coding (sub-category) | Second cycle coding (category) |
|---|---|---|---|---|
| "As for year t, ROA ($\beta = 0.447$, $p < 0.001$), ROE ($\beta = 0.264$, $p < 0.05$), and ROS ($\beta = 0.367$, $p < 0.01$) were all significantly influenced by CSR investment significantly positively (+" [112], p. 10) | Financial indicators | - | ROA: positive effect | Financial performance |
| "As verified in the analysis of the results of our empirical study, there is a direct and positive relationship between the corporate financial performance measured through the ROA and ROE variables and the Governance variable" [90], p. 12) | Financial indicators | -<br>- | ROA: positive effect<br>ROE: positive effect | Financial performance<br>Financial performance |
| "This indicates that the better the company's performance in terms of E indicators disclosed by Bloomberg and E and G indicators disclosed by MSCI, the lower the stock price crash risk" [69], p. 9) | Stock price | - | Drop in stock price: positive effect | Market and risk |
| "An overarching conclusion to be drawn from this study is that disclosing ESG reporting coordinated with financial reporting mitigates business risks to avoid potential financial crises, promotes sustainability, and ultimately leads to stronger economies" [51], p. 16) | Business risks | - | Crisis: positive effect | Market and risk |

inductive content analysis approach was chosen for the first coding cycle, as the elements that could be impacted by ESG indicators were unknown and needed to be identified through content analysis. In this phase, all impacts were coded and segmented into four categories that portray different aspects of a company's analysis. At this stage, it was also determined whether the impact of ESG on CP elements was positive or negative.

Figure 3 shows the matrix with the segments (by article) resulting from the coding process of these two stages.

Impacts related to the overall financial health of an organization were coded under financial performance. Those dealing with the company's market and associated



| Code System | SLR - Scopus and WoS | SUM |
|---|---|---|
| ESG indicators | | 0 |
| Environmental | | 0 |
| Emissions | 93 | 93 |
| Resource Use | 41 | 41 |
| Innovation | 15 | 15 |
| Social | | 0 |
| Workforce | 70 | 70 |
| Product responsabillity | 32 | 32 |
| Human rights | 7 | 7 |
| Community | 32 | 32 |
| Governance | | 0 |
| Management | 52 | 52 |
| Shareholder | 14 | 14 |
| CSR strategy | 15 | 15 |
| Impacts on performance | | 0 |
| Financial Performance | 89 | 89 |
| Market and Risk | 31 | 31 |
| Strategy, Management, and Positioning | 29 | 29 |
| Credit and Indebtedness | 17 | 17 |
| SUM | 537 | 537 |

**Fig. 3** Coding matrix

risks constituted the market and risk categories. Questions related to culture, corporate management, reputation, and company values formed the Strategy, Management, and Positioning category. And the impacts related to the company's capital structure and debt management were coded in the credit and debt category.

Impacts coded within each category were also analyzed for their effect on CP. This step resulted in 166 textual segments grouped into four categories.

## Results

The descriptive results (country, year, and authors) of the studies included in the content analysis are available in Appendix 1.

### ESG indicators from the literature

The SLR allowed to identify the main ESG indicators presented in the literature, and this result answers the first research question of the study (RQ1). Each dimension has main indicator categories, which in turn are composed of specific indicators that support the evaluation of a company's practices in relation to a certain dimension. The following classifications were based on the definitions from the Refinitiv database (Fig. 2), which was used to identify each category in its respective ESG dimension.

#### *Environmental dimension*

The emissions' category refers to greenhouse gas emissions and other environmental emissions (generated from energy consumption, waste management, etc.) that can affect air, water, and soil quality. As such, the emissions score assesses a company's commitment and effectiveness in reducing environmental emissions, particularly in operational and production processes.

The resource use category refers to the company's use of natural resources, including water, energy, and other nonrenewable resources. The category also considers the efficiency in the use of these resources. As such, the resource utilization score reflects a company's ability and performance to reduce energy, water, and material consumption, as well as finding more eco-efficient solutions that improve supply chain management.

The innovation category refers to the company's environmental innovation practices, including investments in product design and innovation, the research and development of environmental technologies and solutions, the use of sustainable materials, technologies for reducing waste, digitization, among others. Thus, the score for this group of indicators assesses a company's ability to reduce costs and environmental burdens for its customers, thus creating new market opportunities

**Table 4** Main ESG indicators in the environmental dimension

| Dimension | Category | Indicator | Selected references |
|---|---|---|---|
| Environmental | Emissions | Greenhouse gas emissions | [63, 71, 79, 101, 109] |
| | | Waste management | [51, 63, 74, 78, 82] |
| | | Pollution control | [52, 60, 63, 93] |
| | | Hazardous waste control | [63, 71, 79, 101, 109] |
| | | Recycling | [60, 63, 82, 101] |
| | | Climate change | [27, 58, 67, 74, 79] |
| | | Biodiversity | [62, 78, 82, 93, 102] |
| | Resource use | Water consumption | [33, 51, 52, 78, 109] |
| | | Energy consumption | [52, 58, 79, 109, 114] |
| | Innovation | Waste reduction | [58] |
| | | Financing of environmental projects | [58] |
| | | Product design and innovation | [17, 38, 58, 90, 115] |
| | | Life cycle management | [17] |
| | | Research and development | [38, 52, 115] |
| | | Environmental technology patents | [52, 115] |
| | | Reduction of greenhouse gas emissions | [58, 90] |
| | | Sustainable products | [58] |

through innovative technologies, design and processes, as shown in Table 4.

#### *Social dimension*

The social dimension is made up of four categories: workforce, product responsibility, human rights, and community. The workforce category deals with issues such as diversity and inclusion, employee satisfaction, turnover, health, and safety at work, among others. According to Refinitiv [89], the score in this category measures the effectiveness of a company in terms of practices and policies related to employees.

The product responsibility category refers to the responsibility of an organization in relation to the social impacts of its products or services, including product safety, customer satisfaction, data protection, among others. Thus, the score in this category reflects the ability of a company to develop quality goods and services with social responsibility.

The class of indicators referring to human rights includes issues such as child labor, forced labor, freedom of association, among others. The score in this category, therefore, measures the effectiveness of a company in terms of respect for fundamental human rights conventions in its processes and throughout its supply chain.

The last category of social dimension indicators is community. It refers to the company's impact and initiatives in the communities where it operates, including practices of corporate social responsibility and community engagement, such as relationship with the community, charitable actions, among others. Therefore, the score in this category measures the company's commitment to the community, as shown in Table 5.

#### *Governance dimension*

The governance dimension is divided into three categories: management, shareholder, and CSR strategy. The first refers to the functionality of a company's corporate governance structure, including the composition of the board of directors, executive compensation, among others. Thus, the management score measures a company's commitment and performance in adopting the best corporate governance practices [89].

The shareholder category deals with issues such as transparency and disclosure of relevant information to shareholders, shareholder rights, auditing, and control mechanisms, among others. As such, this class of indicators deals to the effectiveness of a company in its relationship with its shareholders and the use of anti-takeover mechanisms [89].

Finally, the CSR strategy category refers to a company's practices in relation to corporate social responsibility (CSR), including the code of ethics, anti-corruption and bribery policies, and capital structure, among others. Thus, this group of indicators measures a company's commitment to communicate in how it integrates the economic, social, and environmental dimensions into its decision-making processes [89] as shown in Table 6:

**Table 5** Main ESG indicators on the social dimension

| Dimension | Category | Indicators | Selected references |
|---|---|---|---|
| Social | Workforce | Diversity and inclusion | [17, 24, 28, 38, 51] |
| | | Employee satisfaction | [31, 48, 55, 97, 98] |
| | | Accident frequency | [48, 60, 100, 108, 114] |
| | | Number of fatalities | [48] |
| | | Employee turnover | [28, 33, 51, 63, 74] |
| | | Number of employees | [28, 33, 63, 70] |
| | | Education and training | [33, 51, 58, 63, 79] |
| | | Employee health and safety | [17, 21, 58, 67, 74] |
| | | Absences | [51, 60, 79, 108] |
| | Product responsibility | Product safety | [17, 27, 58, 63, 67] |
| | | Data protection | [38, 74, 90, 100, 102] |
| | | Product quality | [17, 38, 74, 100, 116] |
| | | Client satisfaction | [9, 21, 48, 74, 90] |
| | Human rights | Child labor | [9, 58, 74, 90] |
| | | Forced labor | [9, 58] |
| | | Freedom of association | [9, 58, 74] |
| | Community | Relations to the local community | [9, 17, 67, 74, 90] |
| | | Charitable actions | [33, 52, 60, 63, 114] |

**Table 6** Main ESG indicators on the governance dimension

| Dimension | Category | Indicator | Selected references |
|---|---|---|---|
| Governance | Management | Diversity on the board of directors | [10, 24, 28, 48, 93] |
| | | Structure of the board of directors | [28, 60, 67, 102, 114] |
| | | Remuneration policy | [14, 51, 52, 63, 74] |
| | | Career development policy | [70, 114] |
| | | Independence from the board of directors | [5, 28, 38, 67, 102] |
| | Shareholder | Audit and control mechanisms | [51, 60, 63, 74] |
| | | Transparency | [17, 27, 60, 67, 108] |
| | | Shareholders' rights | [38, 74] |
| | | Anti-takeover mechanisms | [74] |
| | CSR strategy | Anti-corruption and bribery policies | [13, 28, 48, 71, 79] |
| | | Code of ethics | [33, 63, 102] |
| | | Capital structure | [17] |
| | CSR strategy | Accounting Forensics | [17] |

#### Corporate performance indicators related to ESG

SLR presents perspective literature on the impact of ESG indicators on an organization's CP. The latter seeks to answer RQ2, and is shown in Table 6. The adoption of sustainable practices can impact a company in several aspects of corporate operations: i) financial performance, ii) market and risk, iii) strategy, management, and positioning, and iv) credit and debt. This result reinforces the findings of Eccles et al. [35], Koroleva et al. [64], Buallay [16], and Ye et al. [111].

The financial performance of an organization refers to the economic–financial assessment of a company. It measures the organization's ability to generate profits, achieve financial goals, maintain long-term financial sustainability, and provide an adequate return on investment for shareholders (Thomson [105]). The evaluation of a company's financial performance can be done through a set of financial indicators or even by using the company's value, that is, its book value or market value [23].

The market and risk aspect refers to the analysis of external factors that may affect a company's financial and operational performance, this implies understanding the market environment where the organization operates,

identifying relevant trends and economic conditions, as well as assessing the risks associated with these external variables [56]. Market and risk analysis allows organizations to identify opportunities and challenges, make strategic decisions, and implement risk mitigation measures to protect financial and operational interests.

In strategy, management, and positioning, the elements are interconnected and play essential roles in the success of a company. The strategy establishes the direction and long-term objectives, the management coordinates the implementation of this strategy, and the positioning defines how the company differentiates and places itself in the market in relation to the competition [65]. Analyzing these elements helps a company define its direction, create competitive advantages, and effectively connect with customers.

The last aspect is credit and indebtedness, and refers to the use of financial resources obtained through loans, financing, or the issuance of debt securities to finance the company's operations or investments [92]. Credit is the granting of financial resources by third parties, such as banks or investors, debt is the debt acquired by the company when receiving these resources or issuing instruments such as debentures [73]. A company's credit and debt analysis is essential when assessing its financial health, payment capacity, and risk, as shown in Table 7.

## Discussion

The adoption of ESG practices is not only a matter of social responsibility, but also of business opportunity and risk mitigation. Such practices may indicate the organization's commitment to the sustainability of its business and to changes in consumer habits that are increasingly aware of the environmental and social impact of companies on society [18]. Additionally, it provides valuable information on long-term decision-making [36]. The use of sustainable strategies by an organization can bring a significant impact on its CP by favoring dialogue with all stakeholder groups [35, 57], while ESG indicators denote how well the organization is performing in this regard.

Therefore, it is important that investors, decision makers, regulatory agencies, and governments evaluate the conduct of a company in each of the indicator categories. Stakeholders get insights that can help identify risks and opportunities through careful analysis [8].

**Table 7** Impact of ESG factors on CP

| Category | Impact variable | Selected references |
|---|---|---|
| Financial performance | Return on assets—ROA | [1, 22, 63, 64, 68, 70, 84] |
| | Return on equity—ROE | [22, 63, 64, 70, 84, 90] |
| | Return on invested capital—ROIC | [34, 64, 84] |
| | Return over investment—ROI | [21, 88, 110] |
| | Return over capital employed—ROCE | [114] |
| | Market value | [54, 63, 104, 111] |
| | Added value (AV) | [97] |
| Market and risk | Tail risk | [12, 50] |
| | Profitability | [50, 114] |
| | Drop in stock price | [32, 43, 69, 98] |
| | Volatility | [50, 67, 103] |
| | Crisis | [32, 37, 40] |
| Strategy, management, and positioning | Sustainability | [21, 51, 57, 103, 112] |
| | Relationship with stakeholders | [12, 13, 22, 104] |
| | Competitive advantage | [13, 43, 64, 113, 116] |
| | Product differentiation | [18, 21] |
| | Reputation | [13, 14, 21, 34, 100, 104, 116] |
| | Information symmetry | [14, 50] |
| | Internationalization | [22] |
| | Quality of financial reports | [95] |
| Credit and debt | Loans | [31, 113] |
| | Bad debt | [31] |
| | Default | [14, 22] |
| | Capital cost and structure | [50, 104] |
| | Rating | [10, 14, 22, 100] |

This information is essential since through the multiple and simultaneous needs, these stakeholders can decide whether they want to invest or get involved with a company in some way, thus increasing the chances of adding value over time [16, 60].

### Positioning the relationship between ESG indicators and corporate performance

When analyzing the studies from the SLR dealing with the impacts of ESG indicators, we found that out of four categories, three had studies that show positive relationships in both the short and long term. These are the categories of market and risk, strategy, management, and positioning, and credit and debt. In these categories, the ESG indicators were qualitative. For the market and risk category, this meant that companies with high ESG scores had lower tail risk [50], higher profitability [114], less likelihood of a price drop in equities [43, 69], low volatility [103], and lower exposure to systematic risk, which is characterized by non-diversifiable risk. The latter involves the entire market structure in periods of crisis, such as the COVID-19 pandemic [37, 40].

A higher ESG score contributes to the sustainable development of the organization in the Strategy, Management, and Positioning category [51, 57]. It promotes a positive relationship with stakeholders, creates opportunities for new customers to join [13], improves the company's reputation, promotes product differentiation [21], reduces asymmetric information problems [50], raises the quality of financial reports [95], and contributes to internationalization as the market reacts positively to the increase in ESG activities [22]. This generates long-term value, making the company more competitive in the market [34, 64].

Regarding the credit and debt category, high ESG ratios generate a positive impact on the bond market, which may result in lower borrowing costs and a better capital structure [29], as well as encouraging banks to grant loans [113] through special lines of credit. A higher ESG score can also minimize bad debt rates, which is the resource lent by financial institutions and which was not returned on time [31], reduce the probability of default [14], contribute to lower capital costs [50], and allow companies into a higher credit rating profile [10, 100].

Unlike other categories, not all variables in financial performance showed a positive relationship with ESG indicators (Fig. 4) in the short and long term. There were also quantitative indicators found in the literature. In some studies, return on assets (ROA), return on equity (ROE), return on invested capital (ROIC), return on investment (ROI), and profitability were negatively related to ESG performance [18, 34, 68, 84, 91].

In cases where there was a negative relationship between financial performance and ESG score, we found that if carried out in excess, ESG practices may have a negative effect on financial performance, affecting a

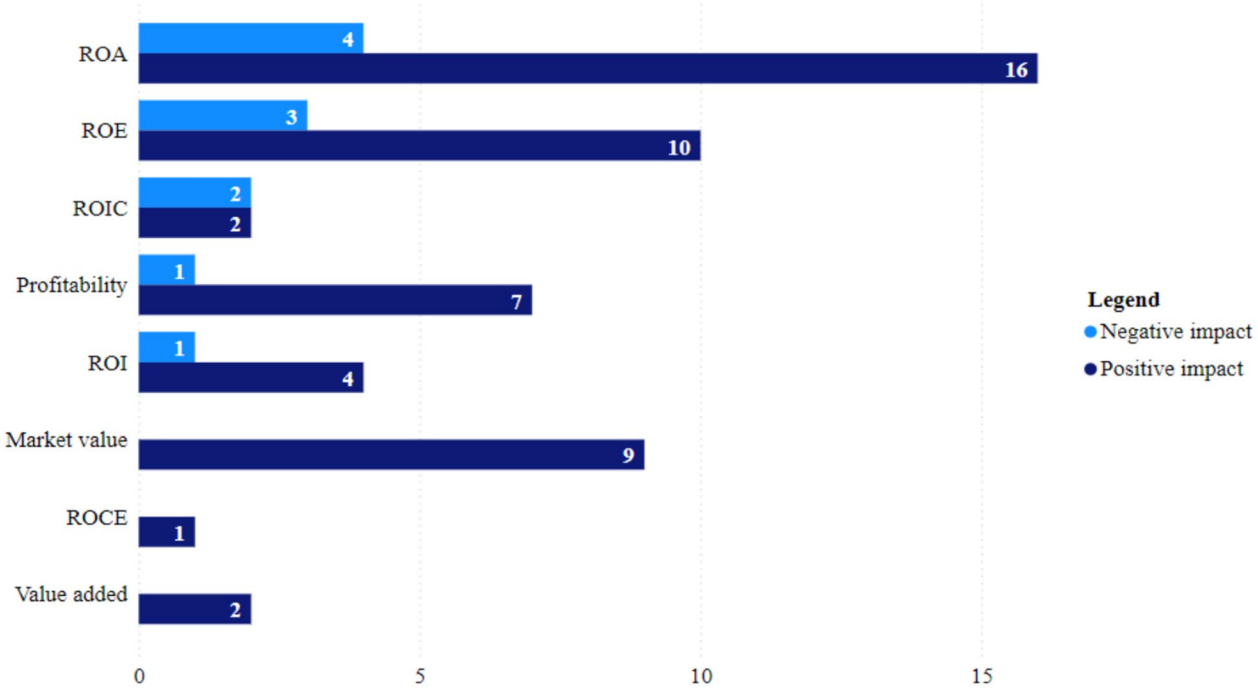



**Fig. 4** Expected impact of ESG indicators on financial performance

company's operating profits [21]. This is because a high investment in ESG practices can significantly increase a company's operating cost, precipitating in a lower short-term financial performance [21, 84]. Additionally, the short-term positive effect would only occur in the case of excess cash flow—in other words, when there was no high CAPEX (capital expenditure) investment in the companies' projects [42]. As such, investment in sustainable practices must be made judiciously, prioritizing the most compatible ones to the company's market segment, the context in which it presently operates, the feasibility analysis of the return on capital employed, and the return period of this investment.

### Temporal relationship between ESG indicators and corporate financial performance

The results indicated that the only category with variables impacted both positively and negatively by ESG indicators was "Financial Performance." All other variables in the remaining categories were positively influenced by strong ESG performance. Given this divergence, a content analysis of the articles was conducted to identify the reasons behind the differences in observed impacts across studies.

In the cases where there was a negative relationship between financial performance and ESG indicators, we found that if carried out in excess, ESG practices may negatively impact financial performance, affecting a company's operating profits [21]. This is because a high investment in ESG practices can significantly increase a company's operating cost, precipitating in a lower short-term financial performance [21, 84]. Additionally, the short-term positive effect would only occur in the case of excess cash flow, in other words, when there was no high capital expenditure (CAPEX) investment in the companies' projects [42].

As such, investment in sustainable practices must be made judiciously, prioritizing the most compatible ones to the company's market segment, the context in which it presently operates, the feasibility analysis of the return on capital employed, and the return period of this investment.

Therefore, from the content analysis of these papers, we propose the general patterns and trends of CP from the moment a company starts to invest in the adoption of ESG practices (Fig. 5).

The first milestone can be identified as the baseline phase or phase zero, when there is still no investment in ESG practices. As such, both the ESG investment and the ESG score are equal to zero. There is only the current financial performance value of the company, which varies between organizations and can be influenced by several factors, such as sales volume, interest rate, inflation level, credit availability, demand, and debt level, among others. Nevertheless, it is important to emphasize that the financial performance of companies not yet adopting

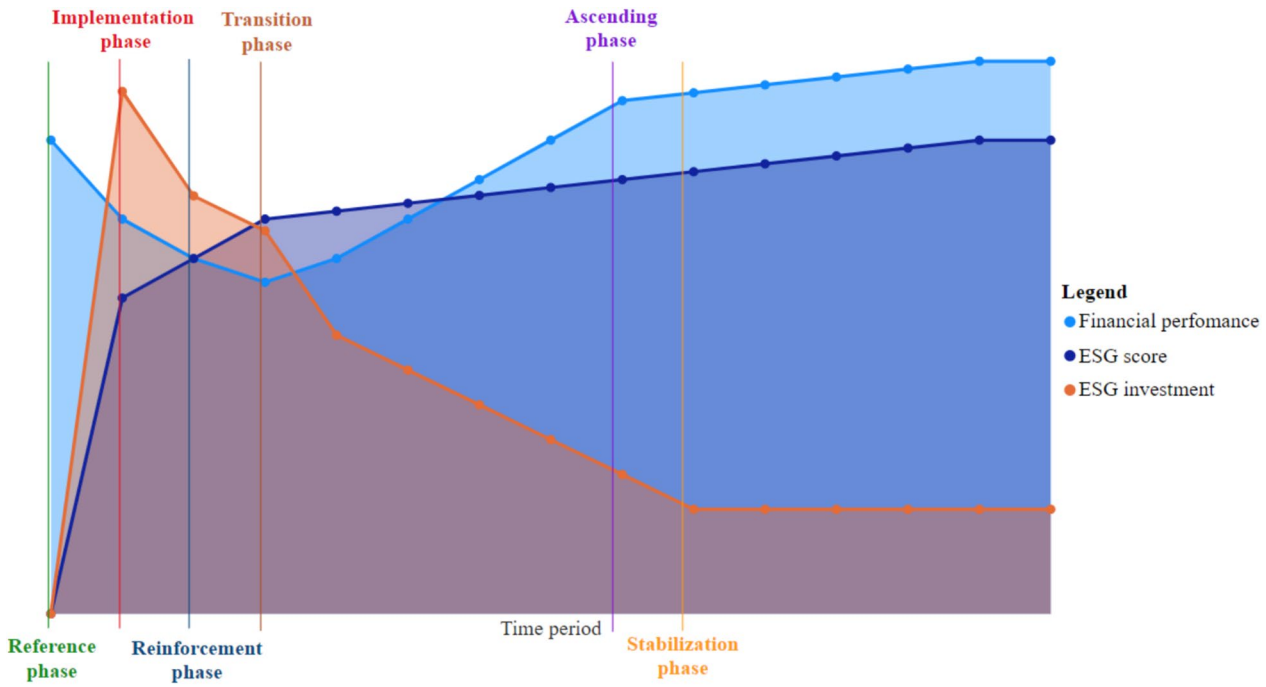



**Fig. 5** Relationship between the adoption of ESG practices and financial performance

these practices may face challenges related to sustainability, which will eventually be translated into financial risks, such as higher operating expenses and lower investor attractiveness [111].

The second milestone refers to the implementation phase of ESG practices, when a large investment is usually made to boost ESG initiatives [22, 31]. This phase often implies changes in operational processes, employee training, and adoption of more sustainable technologies, among other factors. For this reason, ESG investment is high and the company's financial performance can be negatively impacted [21, 84]. This phase is additionally marked by the beginning of ESG measurement/scoring.

The third milestone is the Reinforcement Phase of ESG practices. Investment in ESG practices still exists in this phase, but less than in the previous implementation phase. This happens because there is a significant increase in investments for the implementation of activities related to ESG practices in the previous phase, which consequently increase operating expenses [21]. The investment is lower in the reinforcement phase, since it is not about the implementation of these activities, but rather their maintenance and complementation. The ESG score continues to grow in this phase as sustainable initiatives begin to take hold. Additionally, financial performance shows a slightly gradual decline because despite being lower than in the implementation phase, investment in ESG is still high [21].

The fourth milestone in the adoption of ESG practices is the medium/long term, from which the variables begin to present significant changes in behavior. For this reason, it can be identified as the transition phase. From that point on, ESG investment declines, as there is a transition to the ESG practices maintenance phase. The ESG score increases smoothly, while the financial performance gradually rises again due to the consolidation of these implementation stages, as well as the incorporation of sustainable practices [66].

The fifth milestone represents the results of adopting sustainable practices in the long term. This point is the ascending phase, where the value of the organization's financial performance becomes greater than that of the reference phase. This stage supports the statement that the expected impact of ESG factors on financial performance is positive, provided that it is analyzed in a long-term context [1, 66, 93, 104]. Therefore, it can be said that as in the other categories, the impact of ESG indicators on financial performance is positive (Table 8), which corroborates the findings of Signori et al. [97].

**Table 8** Expected impact of ESG indicators on long-term corporate performance

| ID | Category | Expected result |
|---|---|---|
| F | Financial performance | Positive |
| MR | Market and risk | Positive |
| SP | Strategy, management, and positioning | Positive |
| CD | Credit and debt | Positive |

The last milestone refers to the stabilization phase, when the ESG score and financial performance continue to grow smoothly. This is because the investment in ESG is considerably lower than the initial phases, and it is an expense with the objective of maintaining the functionality of previously implemented initiatives. As such, this expenditure does not tend to present large variations. It is important to point out that if the need to implement new ESG practices is identified, the required investment will again increase as the implementation phase is once again retaken (Fig. 4).

#### Synthesis: conceptual framework

The model developed in this study (Fig. 6) establishes the relationship between ESG indicators and CP. It can help guide managers in the construction and implementation of sustainable actions that reduce corporate risk, while improving financial performance and profitability, especially in developing countries. This proposal attempts to bridge the gap identified by Aydoğmuş et al. [4] and Garcia & Orsato [45], who identified a negative impact of ESG scores on the financial performance of corporations in emerging countries. More information about the information present in the conceptual framework is described in Appendix 2.

Figure 6 presents the conceptual framework illustrating the relationship between CP indicators and the three ESG dimensions. These indicators are classified into four main categories (Table 7), encompassing different aspects of CP as value creation and resource allocation efficiency (F), company stability and market perception (MR), reputation and competitive advantage (SP), and capital structure (CD).

The central focus is on CP indicators that interact with all ESG dimensions, making them the most versatile. Additionally, the literature suggests that these indicators have broad connections with most ESG indicators, reinforcing their relevance in assessing sustainable CP.

Regarding the specific relationships between ESG dimensions and CP indicators, the literature highlights

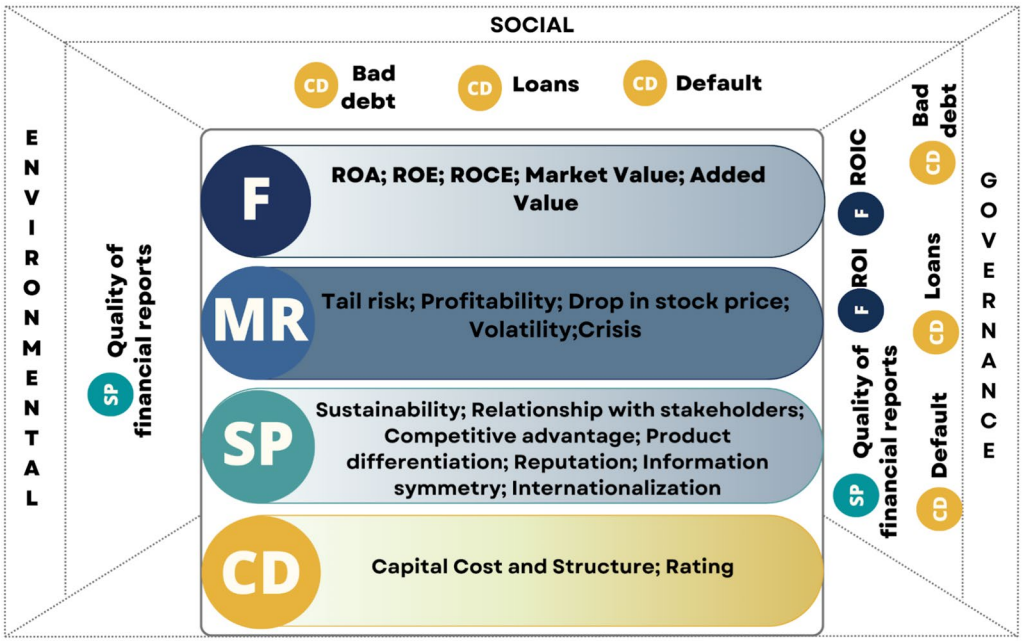



**Fig. 6** Conceptual framework on the relationship between ESG dimensions and CP indicators

that the environmental dimension is strongly associated with quality of financial reports, emphasizing the importance of transparency and standardization in data disclosure for assessing environmental risks. The social dimension, in turn, is linked to loans, indicating that social practices within the ESG framework can influence access to financing and a company's attractiveness to investors and financial institutions. Governance-related indicators interact with ROI, ROIC, quality of financial reports, and loans, suggesting that strong governance practices enhance investor confidence through transparency in financial disclosures and a commitment to sound management practices.

Thus, the conceptual framework demonstrates how CP indicators are interconnected with ESG dimensions, reinforcing the need for standardized metrics to effectively assess the sustainable impact of organizations.

It is, therefore, possible to increase confidence and guarantee the commitment of managers in the pursuit of sustainable objectives through a framework which demonstrates the viability of investments in ESG. This emerges as a way to improve financial returns in the long term, confidence in management, and improvement in capital rates cost. The relationship between ESG indicators and CP plays a key role in improving a company's decision-making process.

With this approach, companies assume a position aligned with sustainability, responding to governmental pressures and simultaneously achieving environmental and social goals. This proactive attitude toward ESG practices has the potential to generate positive financial results. In short, understanding and effectively disclosing the relationships between ESG indicators and CP contribute to informed decision-making toward sustainability and is reflected both in environmental, social, governance, and financial results.

The proposed framework plays a key role by describing the main indicator categories addressed in each dimension of the ESG metrics, as well as by presenting the interrelationships between these dimensions. This means that the framework shows how indicator categories of a given dimension are interrelated in addition to encompassing all the impact variables influenced by the ESG indicators.

This conceptual framework contributes to the body of research on ESG, aiming primarily to bridge the gap resulting from the lack of well-defined criteria for the disclosure of ESG indicators, which leads to non-standardized reports [13, 49]. As identified in the theoretical foundation, the absence of a standardized framework not only hinders the comparability of corporate efficiency in relation to ESG but also fosters the predominant adoption of one-dimensional measures

[9], potentially leading to the neglect of certain stakeholders [81].

Thus, developing a conceptual structure that highlights the connection between ESG indicators and their respective dimensions, as well as their relationship with CP indicators, facilitates the establishment of a conducive environment for standardizing common measurement criteria for ESG. This process is grounded in stakeholder theory and the resource-based view, both of which suggest that balanced investment across all ESG dimensions enhances stakeholder value perception and contributes to building a strong market reputation. In the long run, this effect tends to translate into a positive impact on CP [21, 41, 81].

### Answering the research questions

RQ1 was proposed as an attempt to determine the main ESG indicators that can be standardized in each of its dimensions, based on the literature. Following the categorization suggested by Refinitiv [89] in the previous section, 17, 18, and 13 indicators were identified in the environmental, social, and governance dimensions, respectively. These can be standardized in the analysis of behavior and organizational responsibility.

RQ2 proposes an understanding of the most commonly CP indicators used in the literature regarding ESG. We identified 25 impact indicators that were segmented into four categories that portray different aspects of CP: i) financial performance, ii) market and risk, iii) strategy, management, and positioning, and iv) credit and indebtedness.

It was found through content analysis that among the four categories that were identified, three showed a positive relationship with the adoption of ESG practices regardless of the evaluation period (short, medium, or long-term). They were: market and risk, strategy, management, and positioning, and credit and debt. The financial performance category in some studies showed a negative relationship with ESG metrics in the short term. More precisely, the ROA, ROE, ROIC, ROI, and profitability variables (Fig. 4).

RQ3 investigates the need for explicit connections between ESG indicators and CP indicators. Content analysis, conducted using MaxQDA, revealed interconnections between text segments coded as CP indicators and the ESG dimensions. The findings indicate that integrating these two sets of indicators is feasible, and our conceptual framework can assist in identifying which CP indicators correspond to each ESG dimension. However, a detailed understanding of the impact of each indicator and its connections to ESG indicators requires the application of quantitative methods and the use of a comprehensive database.

## Conclusions

This study provided an overview of key ESG indicators that can be standardized across each dimension and presented the impacts of these indicators on CP. As such, the proposed research questions were answered. The framework also helped to better understand how the indicator categories affect a company's performance.

We suggest a model (Fig. 5) that presents the general trends and patterns of CP from the moment a company starts to invest in the adoption of ESG practices. This is achieved through a detailed analysis of the studies with results on the relationship between ESG indicators and financial performance. Based on this model, a negative relationship was verified only in short-term analyses. It is possible to notice a positive relationship between ESG performance and CP in a long-term context, which in this study is called the ascending phase.

The results of this study suggest that the impact of adopting ESG practices on overall CP is positive, corroborating the more than 2,000 empirical studies by Friede et al. [42]. It is, therefore, necessary to assess the long-term impact, so that organizations and their stakeholders are aware of corporate sustainability on financial performance. This is considered given the importance of promoting the financial resilience and reputation of companies, attracting investors committed to ESG criteria, and meeting consumers' growing demands for socially responsible companies. Additionally, ESG aspects can mitigate operational, regulatory, and legal risks, strengthening the competitive position of organizations in the market.

### Theoretical contributions

This study makes a valuable contribution by addressing key research gaps in the ESG field, particularly the lack of standardized indicators and clear guidelines for disclosing corporate performance (CP). Additionally, it highlights the limitations of existing studies, which often adopt a one-dimensional approach and fail to consider the interconnected nature of ESG dimensions.

By refining the analysis, this study uncovers a relational convergence between these gaps. The findings suggest that the absence of standardized ESG indicators introduces bias in performance assessments, ultimately hindering the accurate identification of risks and opportunities.

Another significant contribution is the development of a conceptual framework that systematically maps the relationship between ESG performance and corporate performance. This framework considers multiple dimensions of corporate performance, addressing a gap in the literature where most studies focus primarily on financial aspects while neglecting other relevant performance dimensions.

#### Practical contributions

The conceptual structure was developed considering the corporate context with wide application in several areas, but mainly contributing for financial market investors and corporate organizational managers.

The structure can be unfolded and explored to compose a framework proposing standards and guidelines for disclosing documents on ESG practices. This helps promote transparency and consistency in the communication of data related to environmental, social, and governance issues. This framework can bring other significant benefits, including comparability, investor confidence, improved ESG performance, and progress in corporate sustainability.

This framework not only contributes to a clearer understanding of the relationships between the different ESG dimensions, but also highlights the positive impact of adopting these sustainable practices on CP. By considering all these elements, the framework becomes a useful tool to guide decision-making in relation to corporate sustainability and boost an organization's performance.

#### Limitations and future work

The findings and discussion presented in this study are derived from a systematic literature review; therefore, it is limited by the inclusion and exclusion criteria used in defining the set of selected documents. As an example, there is an interest in studies that only contemplate the analysis of ESG indicators.

The findings and discussion presented in this study are derived from a systematic literature review; therefore, it is limited by the inclusion and exclusion criteria used to define the set of selected papers. For example, there is interest in studies that consider only the analysis of ESG indicators.

In addition, the reliance on secondary data introduces potential biases, such as the predominance of studies focused on specific regions, which may not fully represent ESG practices in other contexts. Another limitation lies in the categorization of ESG indicators, as different studies adopt varied definitions and frameworks, leading to potential inconsistencies in the classification, which hinder comparability.

Future research should address these gaps by conducting empirical studies that validate the proposed conceptual framework in real-world settings. In this sense, conducting case studies or quantitative analyses in different sectors and contexts could provide a more nuanced understanding of how ESG indicators influence CP. Furthermore, cross-sector comparisons would help identify whether ESG indicators have similar significance across sectors or require sector-specific adjustments. Finally, exploring how standardizing ESG indicators aligns with sustainable development goals can contribute to the formulation of global reporting guidelines.

## Appendix 1

| ID | Country | Year | Title | References |
|---|---|---|---|---|
| 1 | Spain | 2019 | Corporate sustainability and institutional shareholders: The pressure of social responsible pension funds on environmental firm practices | [1] |
| 2 | Spain | 2019 | Sustainable compensation policies and its effect on environmental, social, and governance scores | [5] |
| 3 | Italy | 2022 | Going Deeper into the S of ESG: A Relational Approach to the Definition of Social Responsibility | [9] |
| 4 | India | 2019 | Do environment, social, and governance performance impact credit ratings: a study from India | [10] |
| 5 | USA | 2019 | Corporate Treatment of Veterans as an ESG Factor and a Potential Source of Incremental Returns | [12] |
| 6 | Hungary | 2022 | New Aspects of Sustainability: Analysis of the European Practice of Non-Financial Reports | [13] |
| 7 | Italy | 2022 | Are ESG Female? The Hidden Benefits of Female Presence on Sustainable Finance | [14] |

| ID | Country | Year | Title | References |
|---|---|---|---|---|
| 8 | Italy | 2021 | The Divergence of ESG Ratings: An Analysis of Italian Listed Companies | [17] |
| 9 | Italy | 2022 | The effect of sustainable business practices on profitability. Accounting for strategic disclosure | [18] |
| 10 | Taiwan | 2021 | Using Environmental, Social, Governance (ESG) and Financial Indicators to Measure Bank Cost Efficiency in Asia | [19] |
| 11 | China | 2021 | Social responsibility portfolio optimization incorporating ESG criteria | [20] |
| 12 | Taiwan | 2022 | Impacts on the ESG and financial performances of companies in the manufacturing industry based on the climate change related risks | [21] |
| 13 | Russia | 2022 | Investment in ESG Projects and Corporate Performance of Multinational Companies | [22] |
| 14 | USA | 2020 | Application of ESG measures for gender diversity and equality at the organizational level in a Korean context | [23] |
| 15 | Canada | 2022 | What Really Explains ESG Performance? Disentangling the Asymmetrical Drivers of the Triple Bottom Line | [27] |
| 16 | Romania | 2022 | Environmental, Social and Governance Credentials of Agricultural Companies—The Interplay with Company Size | [28] |
| 17 | Romania | 2021 | The Determinants of Green Bond Issuance in the European Union | [29] |
| 18 | Ukraine | 2021 | Creating a Regulatory Framework for the ESG investment in the Multimodal Transportation Development | [30] |
| 19 | Romania | 2021 | The Impact of Macroeconomic, Social, and Governance Factors on the Sustainability and Well-Being of the Economic Environment and the Robustness of the Banking System | [31] |
| 20 | Canada | 2021 | ESG Didn't Immunize Stocks During the COVID-19 Crisis, But Investments in Intangible Assets Did* | [32] |
| 21 | Czech Republic | 2018 | Comparison of Sustainable Environmental, Social, and Corporate Governance Value Added Models for Investors Decision-Making | [33] |
| 22 | Brazil | 2022 | Sustainable Culture Rings with Good Performance? A Study of Companies Listed in The Business Sustainability Index (ISE) | [34] |
| 23 | Estonia | 2022 | The Impact of ESG Ratings on the Systemic Risk of European Blue-Chip Firms | [37] |
| 24 | Turkey | 2022 | The Impact of ESG Scores on Bank Market Value? Evidence from the US Banking Industry | [38] |
| 25 | Italy | 2020 | ESG risks in times of Covid-19 | [40] |

| ID | Country | Year | Title | References |
|---|---|---|---|---|
| 26 | China | 2022 | Environmental, social and governance performance: Can it be a stock price stabilizer? | [43] |
| 27 | Greece | 2020 | Looking back and forging ahead: the weighting of ESG factors | [46] |
| 28 | Germany | 2022 | Managing sustainability—Does the integration of environmental, social and governance key performance indicators in the internal management systems contribute to companies' environmental, social and governance performance? | [48] |
| 29 | UK | 2019 | Foundations of ESG Investing: How ESG Affects Equity Valuation, Risk, and Performance | [50] |
| 30 | Spain | 2022 | Disclosure of Environmental, Social, and Corporate Governance Information by Spanish Companies: A Compliance Analysis | [51] |
| 31 | China | 2022 | Research on Performance Evaluation of Coal Enterprises Based on Grounded Theory, Entropy Method and Cloud Model from the Perspective of ESG | [52] |
| 32 | Iran | 2021 | Information Content Measurement of ESG Factors via Entropy and Its Impact on Society and Security | [54] |
| 33 | Ukraine | 2020 | Accounting Model of Human Capital Assessment Within The Information Space Of The Enterprise | [55] |
| 34 | China | 2022 | Environmental, social, and governance (ESG) and market efficiency of China's commercial banks under market competition | [57] |
| 35 | Egypt | 2021 | The sustainable development goals and corporate sustainability performance: mapping, extent and determinants | [58] |
| 36 | USA | 2019 | Corporate Governance, ESG, and Stock Returns around the World | [59] |
| 37 | France | 2019 | Perception of ESG criteria by mainstream investors: evidence from Tunisia | [60] |
| 38 | New Zealand | 2022 | Credence Attributes in the Forestry Sector and the Role of Environmental, Social and Governance (ESG) Factors | [62] |
| 39 | Czech Republic | 2020 | Sustainable Investing Model for Decision Makers (Based on Research of Manufacturing Industry in the Czech Republic) | [63] |
| 40 | Russia | 2020 | Company Performance: Are Environmental, Social, and Governance Factors Important? | [64] |
| 41 | Taiwan | 2021 | Do corporate social responsibility practices improve financial performance? A case study of airline companies | [66] |
| 42 | Vietnam | 2022 | The moderating effects of power distance on corporate social responsibility and multinational enterprises performance | [68] |

| ID | Country | Year | Title | References |
|---|---|---|---|---|
| 43 | China | 2022 | Evaluation of ESG Ratings for Chinese Listed Companies From the Perspective of Stock Price Crash Risk | [69] |
| 44 | Italy | 2020 | Does Good ESG Lead to Better Financial Performances by Firms? Machine Learning and Logistic Regression Models of Public Enterprises in Europe | [70] |
| 45 | South Africa | 2022 | Appraising Executive Compensation ESG-Based Indicators Using Analytical Hierarchical Process and Delphi Techniques | [71] |
| 46 | Italy | 2022 | ESG dimensions and bank performance: an empirical investigation in Italy | [74] |
| 47 | Romania | 2021 | The Impact of Mergers and Acquisitions and Sustainability on Company Performance in the Pharmaceutical Sector | [75] |
| 48 | Australia | 2020 | Catastrophic tailings dam failures and disaster risk disclosure | [78] |
| 49 | Estonia | 2021 | Evaluating the potential of Estonia as European REE recycling capital via an environmental social governance risks assessment model | [79] |
| 50 | UK | 2020 | Does disclosure in sustainability reports indicate actual sustainability performance? | [82] |
| 51 | Sweden | 2022 | Do sustainability practice influence financial performance? Evidence from the Nordic financial industry | [84] |
| 52 | India | 2020 | Relating environmental, social, and governance scores and sustainability performances of firms: An empirical analysis | [87] |
| 53 | India | 2020 | Exploring the sustainability performances of firms using environmental, social, and governance scores | [85] |
| 54 | India | 2022 | Corporate social performances of firms in select developed economies: A comparative study | [86] |
| 55 | UK | 2022 | ESG Disclosure and Idiosyncratic Risk in Initial Public Offerings | [88] |
| 56 | Spain | 2019 | Influence of ESGC Indicators on Financial Performance of Listed Travel and Leisure Companies | [90] |
| 57 | India | 2022 | An empirical study of supply chain sustainability with financial performances of Indian firms | [91] |
| 58 | India | 2022 | Environment–Social–Governance Disclosures nexus between Financial Performance: A Sustainable Value Chain Approach | [93] |
| 59 | Turkey | 2022 | ESG practices and corporate financial performance: Evidence from Borsa Istanbul | [94] |
| 60 | Turkey | 2021 | The Impact of Environmental, Social, and Governance (ESG) Performance on Financial Reporting Quality: International Evidence | [95] |

| ID | Country | Year | Title | References |
|---|---|---|---|---|
| 61 | Italy | 2021 | Stakeholder Value Creation: Comparing ESG and Value Added in European Companies | [97] |
| 62 | Portugal | 2022 | Crash risk and ESG disclosure | [98] |
| 63 | Thailand | 2021 | Environmental, Social And Governance And Creditworthiness: Two Contrary Evidence From Major Asian Markets | [100] |
| 64 | Sweden | 2022 | Prediction of environmental controversies and development of a corporate environmental performance rating methodology | [101] |
| 65 | Italy | 2019 | Impact of Environmental, Social, and Governance Information on Economic Performance: Evidence of a Corporate 'Sustainability Advantage' from Europe | [102] |
| 66 | Indonesia | 2021 | Can we expect contribution from environmental, social, governance performance to sustainable development? | [103] |
| 67 | Poland | 2022 | Exploring the Nexus Between Fundamental Strength and Market Value in Energy Companies: Evidence From Environmental, Social, and Corporate Governance Perspective in Poland | [104] |
| 68 | Italy | 2020 | Does the ESG Index Affect Stock Return? Evidence from the Eurostoxx50 | [67] |
| 69 | Netherlands | 2020 | ESG Indicators as Organizational Performance Goals: Do Rating Agencies Encourage a Holistic Approach? | [108] |
| 70 | China | 2022 | Consortium blockchain-enabled smart ESG reporting platform with token-based incentives for corporate crowd sensing | [109] |
| 71 | China | 2018 | Risk assessment of China's Belt and Road Initiative's sustainable investing: a data envelopment analysis approach | [110] |
| 72 | China | 2022 | Corporate sustainability performance, stock returns, and ESG indicators: fresh insights from EU member states | [111] |
| 73 | Korea | 2022 | Analysis of the Relationship between Corporate CSR Investment and Business Performance Using ESG Index—The Use-Case of Korean Companies | [112] |
| 74 | China | 2022 | Evaluating green supply chain performance based on ESG and financial indicators | [113] |
| 75 | China | 2018 | ESG and Corporate Financial Performance: Empirical Evidence from China's Listed Power Generation Companies | [114] |
| 76 | China | 2022 | Can Green Innovation Affect ESG Ratings and Financial Performance? Evidence from Chinese GEM Listed Companies | [115] |
| 77 | China | 2022 | Exploring the relationship of ESG score and firm value using fsQCA method: Cases of the Chinese manufacturing enterprises | [116] |

## Appendix 2

| Category | Impact variable | E | S | G | References |
|---|---|---|---|---|---|
| Financial performance | Return on assets—ROA | X | X | X | [1, 22, 63, 64, 68, 70, 84] |
| | Return on equity—ROE | X | X | X | [22, 63, 64, 70, 84, 90] |
| | Return on invested capital—ROIC | - | - | X | [34, 64, 84] |
| | Return over investment—ROI | - | - | X | [21, 88, 110] |
| | Return over capital employed—ROCE | X | X | X | [114] |
| | Market value | X | X | X | [54, 63, 104, 111] |
| | Added value (AV) | X | X | X | [97] |
| Market and risk | Tail risk | X | X | X | [12, 50] |
| | Profitability | X | X | X | [50, 114] |
| | Drop in stock price | X | X | X | [32, 43, 69, 98] |
| | Volatility | X | X | X | [50, 67, 103] |
| | Crisis | X | X | X | [32, 37, 40] |
| Strategy, management, and positioning | Sustainability | X | X | X | [21, 51, 57, 103, 112] |
| | Relationship with stakeholders | X | X | X | [12, 13, 22, 104] |
| | Competitive advantage | X | X | X | [13, 43, 64, 113, 116] |
| | Product differentiation | X | X | X | [18, 21] |
| | Reputation | X | X | X | [13, 14, 21, 34, 100, 104, 116] |
| | Information symmetry | X | X | X | [14, 50] |
| | Internationalization | X | X | X | [22] |
| | Quality of financial reports | X | - | X | [95] |
| Credit and debt | Loans | - | X | X | [31, 113] |
| | Bad debt | - | X | X | [31] |
| | Default | - | X | X | [14, 22] |
| | Capital cost and structure | X | X | X | [50, 104] |
| | Rating | X | X | X | [10, 14, 22, 100] |

**Abbreviations**

| | |
|---|---|
| CAPEX | Capital expenditure |
| CD | Credit and debt |
| CP | Corporate performance |
| CSR | Corporate social responsibility |
| ESG | Environmental, social, and governance |
| F | Financial performance |
| MR | Market and risk |
| PRISMA | Preferred reporting items for systematic reviews and meta-analysis |
| RBV | Resource-based view |
| ROA | Return on assets |
| ROCE | Return over capital employed |
| ROE | Return on equity |
| ROI | Return over investment |
| ROIC | Return on invested capital |
| ROS | Return on sales |
| SLR | Systematic literature review |
| SP | Strategy, management, and positioning |
| WoS | Web of science |

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**Author contributions**
IGFC drafted the original manuscript, collected the data, analyzed the results, and concluded the draft. RVSP contributed to the analysis of the results, the conclusions, and the final revision. PCSO contributed to the methodology, the analysis of the results and conclusions, and reviewed the manuscript. ECA contributed to the conclusions and the revision. DANR contributed to the methodology, study design, and the manuscript revision. All authors have read and approved the final version of the manuscript.

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**Availability of data and materials**
The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Declarations

**Ethics approval and consent to participate**
Not applicable.

**Consent for publication**
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**Competing interests**
The authors declare that they have no conflict of interest.

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