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Can innovation affect the relationship between Environmental, Social, and Governance issues and financial performance? Empirical evidence from the STOXX200 index

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Abstract

Innovation represents one of the most important drivers in the business context. Drawing upon the research on corporate social responsibility (CSR), shared value, and innovation, this paper aims to analyze the relationship between Environmental, Social, and Governance (ESG, a form of CSR) sustainability policies and corporate financial performance (CFP) by investigating the mediating role of Innovation (i.e., investment in research and development, R&D). Our sample comprises 148 European companies belonging to the Euro Stoxx index in the period 2009–2014. For high-innovation companies (HICs), we find positive relationships between some Social (S) issues and CFP and weaker linkages between Environmental (E) indicators and CFP. In contrast, Governance (G) issues (i.e., issues related to board structure and board function) negatively influence CFP. In contrast, for medium-innovation companies (MICs), these relationships are absent and low-innovation companies (LICs) show negative relationships. Adopting reporting frameworks or guidelines affects CFP only in HIC. We introduce an original interpretative model, which identifies innovation (R&D) as the main driver in corporate sustainability, particularly in light of Social issues related to the production of a good or service. In terms of managerial implications, we identify three key factors for effectively embedding ESG in organizations' policies: investment in product innovation, compliance with environmental regulations, and corporate choices on brands and channels of external communication.

KEYWORDS
corporate financial performance (CFP); corporate social responsibility (CSR); Environmental, Social, and Governance (ESG); innovation; research and development (R&D); shared value

1 | INTRODUCTION

Companies and society need each other and this relationship affects business strategies and social policies, both of which follow the principle of shared value (Hayes, 2013; Porter & Kramer, 2006, 2011, 2019).

Abbreviations: CFP, corporate financial performance; CSR, corporate social responsibility; ESG, Environmental, Social, and Governance; HICs, high-innovation companies; MICs, medium-innovation companies; R&D, research and development.

Accordingly, if community interests and corporate performance are no longer seen in antithesis but in an integrated and synergic approach, companies can develop new business models that adopt both structural and functional mergers of interests. Business activities and the value generated by businesses must also benefit the civil community (Karnani, 2007) and in turn, the civil community can increase the human, social, and environmental resources provided by the external environment (Matinheikki et al., 2018; Pfajfar et al., 2022). These increased resources may later be available to companies themselves, enabling further business growth and giving specific benefits such as reducing employee turnover, increasing customer satisfaction, and improving corporate reputation (Galbreath, 2010). A similar synergy is also shown, in a more limited context, in the relationship between the strategic plans and investments of the company's management and those of public institutions. In fact, public institutions have the function of creating common value from which the company may benefit, for example, in terms of productivity and innovation achieved by improving public education, infrastructure, legislative system, public health system, and so forth. Furthermore, according to Hayes (2013), a theoretical approach based on the vision of a shared value between a company and the external social environment makes it possible to outline a new and higher form of capitalism, which may be considered "sustainable": in the sense of corporate social responsibility (CSR). The new form of capitalism can be adapted and re-formulated according to the needs and conditions that the context entails and the goal to pursue (Banerjee, 2010; Chen & Marquis, 2022; Liu et al., 2022). This approach is increasingly integrated into corporate strategies and policies and can be considered a new source of competitive advantage in companies' business models (Avetisyan & Hockerts, 2017; Fontoura & Coelho, 2021; Kennedy, 2017).

As highlighted by Moore (1993, 1996) and Townsend (2007), the link between companies and their external environments is understood following an interpretative approach imported from the ecology field and based on the concepts of the firm's ecosystem and the ecological business model (Daou et al., 2020; Kim, 2016; Liu et al., 2022; Talbot et al., 2021). From this perspective, the company can be seen as an organism that interacts with various actors (customers, suppliers, investors, associations, institutions, etc.), each of which has its own goals and objectives, sometimes in contrast with each other and other times converging, but in both cases sharing the same habitat. This habitat is understood in ecological terms but can also be described in economic and financial terms.

Within this interpretative framework, the need to create shared value can be used to define and quantify the role of the company with respect to the external environment and stakeholders. Following this ecological perspective, according to Townsend (2007) and Moore (1996), the company and its environment can be considered to co-evolve. Co-evolution on the side of the company means technological and organizational innovations that involve various aspects of the company's activity (technical production cycle, financial cycle, management, supply chain, and customers). While on the side of the environment (within which the company operates), co-evolution may involve different social levels: individual, family, various community spheres, up to the national society in the broad sense; with wide-ranging consequences inside each level.

Based on these premises and using the frameworks proposed by Johansson and Lööf (2008) and Eccles and Serafeim (2013), our study investigates whether company innovation affects the link between sustainability performance and corporate financial performance (CFP).

Specifically, we measure sustainability in terms of Environmental (E), Social (S), and Governance (G) (ESG) issues, and we measure CFP using financial statement ratios and stock market benchmarks. Company innovation is measured using research and development (R&D) parameters.

The relationship between ESG sustainability (the main form of CSR) and CFP has been investigated in different contexts (e.g., Ameer & Othman, 2012; Bartolacci et al., 2019; Cohen et al., 2012; De Lucia et al., 2020; Michelon et al., 2012; Weston & Nnadi, 2021; Ye et al., 2021; Zhao et al., 2016).

Other studies focus on the role of Innovation in business development by demonstrating its impact on financial and sustainability performance (Busch & Schnippering, 2022; Cegarra-Navarro et al., 2016; Hull & Rothenberg, 2008; van Lieshout et al., 2021; Zhang et al., 2020). Given the important role of innovation in the ESG sustainable development of the private sector (Fagerberg, 2018; Fagerberg et al., 2016) particularly for ITs companies, greens companies, pharmaceuticals and health care, civil and military security, and automotive (Snihur & Bocken, 2022). Nevertheless, the persistence of inconsistent or mixed empirical evidence, in the case of other sectors (transport, organized distribution, and personal services), highlights an urgent need to investigate how innovation can contribute effectively to the embeddedness of ESG, sustainability policies in business activities and strategies (Busch & Schnippering, 2022). Addressing this research gap, the present paper extends knowledge on the shared value model and investigates the influence of business innovation on the link between non-financial (ESG sustainability) and CFP.

The reminder of the paper is organized as follows. The next section provides an overview of the literature; Section 3 develops research hypotheses, while Section 4 describes the methodology and research design. Section 5 presents the main empirical evidence, and then, Section 6 discusses the findings and proposes an original interpretative model. Finally, Section 7 concludes the paper by highlighting the study's contribution, managerial implications, and scope for further research.

2 | LITERATURE REVIEW

Prior studies have analyzed different aspects of the relationships among sustainability, financial performance, and company innovation, without excluding the contribution of structural, functional, and contingency factors. As highlighted by Kremen and Ostfeld (2005) and Campagne et al. (2017, 2018), structural factors include the type of goods and/or services produced by a company, the type of market (monopolistic, dualistic, and competitive), the firm's assets architecture (architecture of the company's assets, such as current assets,

fixed assets, deferred tax assets, and investment assets). Functional factors include, for example, the achievement of the market's objectives, technical production cycles, marketing, and the supply chain. These functional factors concern "how" and "how much" a sustainability strategy fits the company's core business strategies, the degree of integration, and the implementation and monitoring of such business strategies. Finally, contingent factors are those that depend on specific situations and contexts within which a company exists and operates. Within the structural, functional, and contingent factors and their related variables, ESG policies must first be set as strategic and programmatic objectives and then implemented at a functional level by evaluating tactical and operational aspects (Schneider et al., 2014). Integration of sustainability policies within the company's core business is done through these three factors (structural factors, functional factors, and contingent factors), even if numerous variables are involved in implementing ESG sustainability policies, affecting almost all aspects of the company life cycle: startup, growth, maturity, transition, and succession.

Management's motivation for carrying out corporate ESG sustainability policies is vital for their success (Tollin & Vej, 2012), and the drive for sustainability is a strong motivation that pushes firms toward clear, shared, and achievable objectives and, consequently, is vital to overcoming any difficulties and inconsistencies in the pursuit of sustainability objectives (Silvestre et al., 2022).

Some studies argue that the application of sustainability policies can be roughly divided into two phases: short and medium-long term. In the short term (first phase), sustainability policies and practices produce costs that are higher than the financial benefits they generate (Burritt & Schaltegger, 2010; Gabel & Sinclair-Desgagnè, 1993). Although this first phase is apparently counterproductive, its advantage would primarily derive from satisfying requests from the external environment and, in particular, those of investors. In the medium–long term (second phase), sustainability policies implemented to improve the production and distribution of new products or services (and mainly those policies focused on environmental and social dimensions) begin to generate profits.

Consequently, in the long term, the overall benefits of sustainability policies outweigh their costs. In particular, benefits clearly demonstrating its commitment to ESG sustainability allows a company to create and consolidate new communication channels and to strengthen and control more profitable forms of dialog between itself and various other entities that make up its business ecosystem. The long-term advantages of sustainability policies are to be understood in terms of improved economic-financial performance and, more generally, in a better balance between the company and its evolutionary niche in its own business ecosystem (Moore, 1993, 1996; Townsend, 2007).

According to Hill and Jones (2001), Margolis et al. (2007), and Eccles and Krzus (2010), the adoption and integration of sustainability policies within the company's core business consist in the shift, mainly carried on by the management, from a classic vision focused on achieving a profit based on traditional accounting values, to a strategic vision, by highlighting strategic and synergistic aspects in relation to the external environment within which the company operates.

The success of sustainability policies also depends heavily on the behavior of stakeholders, in particular financial investors, and their willingness to support commitments and investments in the medium-long term (Moneva et al., 2007; Steurer et al., 2005). An ideal investor should be willing to accept a lower profit in the short term, provided the company embeds appropriate sustainability strategies, integrates them within the company life cycle, and provides optimal disclosure by means of adequate forms of reporting (Adams et al., 1998; Dube & Maroun, 2017; Fulton et al., 2012; Knauer & Serafeim, 2014). Investors should be fully aware that reaping the rewards of their investments inside the company takes time and short-term expenses are paid off by future profits.

According to Johansson and Lööf (2008) and Eccles and Serafeim (2013), the nature of the link between a business's non-financial (ESG sustainability) and financial variables (CFP) is dependent on the degree of innovation of a company. This link (see Figure 1) is positive for high-innovation companies (HICs), neutral or negative for medium-innovation companies (MICs), and definitely negative for low-innovation companies (LICs).

Various articles have analyzed the links between innovation, ESG sustainability performance, and CFP and shown differing results, in some cases highlighting the mediating roles of certain variables, as summarized in Table 1.

Following Doorasamy and Baldavaloo (2016) and de Araujo and Robbins (2019), we evaluate our research question using the ratio of R&D costs to sales to measure the degree of corporate innovation (hereinafter referred to as RDxSAL[1]). The measure considers R&D costs on sales. By comparing the R&D costs on the sales achieved, a pure number is obtained (without units of measurement) and also allows us to better balance the R&D expenses, because it is compared to the sales achieved by the company, as evidenced by Xiaodan et al. (2015), Wang et al. (2016) and Aase et al. (2018).

This relationship also allows for a balancing of aspects related to the company dimension, the product sector, and the nation, for an optimal comparison between companies.

R&D is an annual cost in the financial statements, but its effects begin to manifest themselves in the medium to long term, while sales, at least at an accounting level, relate to the current year (sales made during the year). In this way, the R&D costs on the sales index make it possible to compare aspects in the short and medium-long term.

3 | RESEARCH HYPOTHESES DEVELOPMENT

Based on the considerations described in Section 2, we formulated a set of research hypotheses, positive and negative, as an interpretative

[1]According to the Worldscope Datatype Definition Guide (2007) made available by Thomson Financial, this indicator is given as the percentage ratio between R&D costs and net sales or revenues. R&D costs represent all direct and indirect costs related to the creation and development of a process, techniques, applications, or products with commercial possibilities. These costs can be divided into three costs: basic research, applied research and development of new products (often the main cost item in R&D).

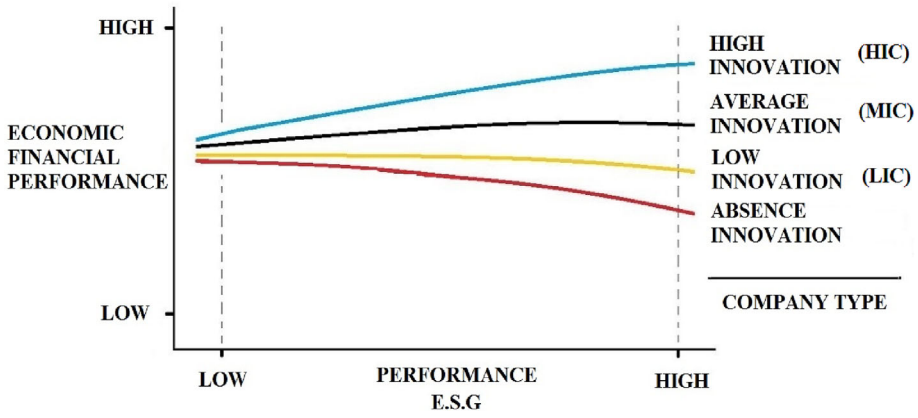

FIGURE 1 Curve of the relationship between ESG and financial performance in relation to the degree of company innovation. Author's elaboration according to Eccles and Serafeim (2013).

grid to optimally filter the possible network of relationships between ESG sustainability and CFP that will come from data analysis.

H1. There is no relationship (or a negative relationship) between ESG sustainability policies and corporate financial performance (CFP) variables for medium (MICs) and low (LICs) innovation companies.

H2. ESG sustainability policies are positively related to financial variables for High Innovation Companies (HICs).

H2a. There are positive relationships between social issues and the financial variable for R&D Investments (RDxSAL).

H2b. There are positive relationships between social issues and the financial variables measuring profitability, such as ROA (*return on assets*), ROE (*return on equity*), and ROI (*return on investment*).

H2c. There are positive relationships between social issues and financial variables based on stock data (CSHxSHR, *cash flow per share*; EARxSHR, *earnings per share*; and DIVxSHR, *dividend per share*) and with a variable from stock performance, named PRCERN (*price earning rate*).

A negative effect of ESG policies on stock data variables could be caused by financial and non-financial costs of the policies, for example, costs of training (*Training and Development*, SOC_TD) or reduction of opportunities and diversity (*Diversity and Opportunity*, SOC_DO) that influence business activities.

Research hypotheses are based on the idea that the social dimension, and in particular *Customer/Product Responsibility* (SOC_PR), is the key to triggering sustainability policies in the core business. As underlined by Sutton (2004), Blomgren (2011), and, more recently, by Mihajlovic (2020). The reason for this is that SOC_PR (*social product responsibility*) depends on production factors from both business innovation and customers; the former is understood as a necessary, although not sufficient, element of social policies. The enjoyment of a good or service by a consumer is key to any market. Additionally, the satisfaction of the needs and desires of the consumer (a single individual or organization) for a certain good or service is the essence of any market. The ESG element SOC_PR, which is closely connected to SOC_C (*social community*) and SOC_HR (*social human right*), may have a greater relationship with a company's social value and social structuring as a whole.

As indicated by Visser et al. (2010), Wheeler (2015), Chou (2017), and Anbarasan (2018).

We think that SOC_PR may be important due to its intrinsic relationship with the community and the social consequences of the consumption of the good or service the company produces (Chen & Huang, 2018; Dangelico & Vocalelli, 2017; Khanra et al., 2021; Sánchez & Benito-Hernández, 2015).

Instead, the adoption of reporting guidelines and standards (indicated by the GEI dummy variables, the acronym for GRI, EMAS, and ISO9000) only affects HICs (Manupati et al., 2020; Rennings et al., 2006; Steurer et al., 2007; Ziegler & Nogareda, 2009). Accordingly, we formulated two additional hypotheses:

H3. For MICs and LICs, there is no relationship (or a negative relationship) between the adoption of reporting guidelines and standards and financial variables.

H4. For HICs, there is a positive relationship between the adoption of reporting guidelines and standards and economic–financial variables.

Starting from the variables illustrated in Paragraph 3, these hypotheses are inserted in an interpretative framework shown in Figure 15, to illustrate more comprehensively the link between ESG sustainability policies and CFP in the context of the degree of corporate innovation, with a focus on HICs.

TABLE 1 Innovation, ESG, and CFP: a literature overview.

Reference	Topic	Method	Results
Padgett & Moura-Leite, 2012	Analysis of the effects of innovation with high social benefit on financial performance	Panel data technique 2025 observations of 418 firms	Negative and significant effect between innovation with high social benefit and financial performance
Maletič et al., 2016	Effect of sustainability-oriented innovation practices on the overall organizational performance	Large-scale web-based survey 266 usable responses in 5 countries: Germany, Poland, Serbia, Slovenia, and Spain Regression analysis	The results demonstrate that sustainability-oriented innovation practices are positively related to overall organizational performance.
Cegarra-Navarro et al., 2016	Role of a company's innovation culture in linking economic and social responsibilities with financial performance	133 companies belonging to the Spanish social environmental agreement—SEM—factor analysis	Innovation outputs provide advantages only in terms of higher financial performance
Geissdoerfer et al., 2018	Comprehensive review of the sustainable business model innovation literature	Systematic database search and cross-reference snowballing	Sustainable business model innovation framework. That could guide companies through their business model innovation process by mapping the necessary key activities, potential challenges, and available tools.
Oskouei, 2019	Link between economic and social responsibilities and the assisting role of innovation	278 data samples from the staff working for an oil engineering and development company. Likert scale questionnaire SEM	The impact of economic responsibility on innovation is only positive and significant and social responsibility cannot affect innovation changes.
Alonso-Martinez et al., 2019	Proposal of a definition and a measure for corporate social innovation (CSI)	6-year longitudinal panel data, including 1122 firms in 29 countries.	Stakeholder engagement, the relevance of sustainable innovation business models, and social and environmental policies contribute to integrating corporate social innovation.
Bartolacci et al., 2019	Role of innovation and entrepreneurship and their impact on sustainability in SMEs	Bibliometric analysis and systematic literature review	Social responsibility is the key element for an SME's sustainable, long-term financial success
Li et al., 2019	Comprehensive corporate environmental responsibility (CER) engagement measurement to examine the relationship between CER engagement and firm value as well as explore the mediating effect of corporate innovation	Sample of 496 China's A-share listed companies from 2008 to 2016	Corporate innovation plays a mediating role in the relationship between CER and firm value
Ghassim & Bogers, 2019	Link of stakeholder engagement to profitability through sustainability-oriented innovation	Quantitative analysis—101 mineral companies in Norway	A mediation role to investigate the associations between stakeholder engagement (SE), sustainability-oriented innovation (SOI), and financial performance (FP).
Rezende et al., 2019	Green innovation and financial performance	365 multinational firms Fixed effect panel regression	No significant association of green innovation's intensity with firm financial performance in the immediate year. The association is positive, lasts during the subsequent years, and becomes expressively higher after 2 years.
Lee & Raschke, 2020	Role of a firm's innovative sustainability activities as a way to increase "firm performance with a purpose."	Content analysis and fsQC	Firms need to manage stakeholders with heterogeneous motives as a condition for effective sustainability in order to yield long-term financial performance

(Continues)

TABLE 1 (Continued)

Reference	Topic	Method	Results
Qiu et al., 2020	Analysis of the fields of environmental and innovation research	Mediation model and panel data—472 Chinese listed firms	Two different external factors drive firms to be green innovative: Environmental regulation and market turbulence.
Maletič et al., 2021	Analysis of the link between sustainability innovation practices, non-financial performance outcomes, and economic performance	Partial least squares path modeling (PLS-PM). 266 European organizations	Sustainability innovation practices directly and indirectly influence economic performance through non-financial performance outcomes (i.e., innovation performance, environmental performance, and social performance).
Busch & Schnippering, 2022	Revision of the functional relationship and examine moderation effects of R&D intensity	Fine-grained analysis on the role of R&D intensity in the CSP-CFP context, Use of the MSCI KLD database to compile different measurements of corporate social performance.	u-shaped relationship between R&D intensity and CFP
Hao et al., 2022	Relationship between green innovation (GI) and enterprise value	3212 enterprises in China's A-share market Use of ordinary least squares (OLS) and two-stage least squares (2SLS) regression	Green innovation (GI) has a positive lag effect on enterprise value.

Note: Authors' elaboration (the list of papers is not exhaustive).

4 | RESEARCH DESIGN AND METHODOLOGY APPROACH

4.1 | Sample selection

Our study uses a sample of 200 European companies on the Euro Stoxx 200 index.[2] We collected data for a 6-year period from 2009 to 2014. We decided to include in our study only the companies with RDxSAL greater or equal to 0.1 (all values in our sample were therefore between 0.1 and 25), giving a sample of 148 companies. This selection criterion led to the exclusion of 52 financial companies (financial, insurance companies, and banks), only 10 financial companies of this type remained in the sample.[3] The exclusion of 52 companies belonging to the financial, banking, or insurance sector is motivated by the diversity of their financial statements (Graham et al., 2011; Kvaal & Nobes, 2010) compared to non-financial (industrial) companies and the considerable heterogeneity between their business models and those of non-financial (industrial) company. In the present context, the differences between these two categories of companies (financial vs. non-financial) are underlined by the very low values of the ratio between R&D costs on sales shown by financial companies compared to non-financial ones, as described in Appendix A1. It is worth noting that the low values of this ratio for insurance, financial, and banking companies may occur because of the impact of the 2007–2008 global financial crisis on the banking system and financial sector more generally, as shown by Hodson and Quaglia (2009) and Carmassi et al. (2009), among others.

The subdivision of the three groups, starting from 148 companies, was done using each company's average RDxSAL for the 5-year period (from 2012 to 2014) and named this variable mRDxSAL.[4]

Two mRDxSAL values are chosen: 0.5 and 4, in line with what has been established by Aase et al. (2018). Companies (excluding banks and financial and insurance companies) that have an mRDxSAL lower than 0.5 belong to the LIC group; those companies (excluding banks and financial and insurance companies), which have an mRDxSAL between 0.5 and 4, fall into the MIC group. Finally, those companies (excluding banks and financial and insurance companies) that have mRDxSAL greater than or equal to 4 fall into the group called HIC.

Starting from our sample of 148 companies (excluding 52 companies, i.e., banks and finance and insurance companies), we obtain three sub-groups, with high (HIC, 32 companies; usually belonging to sectors: telecommunications, and automobiles and components), medium (MIC, 60 companies generally belonging to sectors: chemistry, health care, and trade), and low (LIC, 56 companies usually belonging to sectors: construction and materials, oil and natural gas, and real estate) levels of RDxSAL.

[2] https://www.stoxx.com/index-details?symbol=LCXP

[3] The insurance and financial companies and banks remaining in our sample are distributed between groups as follows: two in the "high" group, two in the "medium" group, and six in the "low" group. These companies are mainly financial companies involved in financial and market analysis, for which IT-related research and development may be necessary.

[4] This average on 5 years (2012–2016) values was considered a more reliable and accurate statistical representation of the company's innovation policies than a single annual value of RDxSAL. Furthermore, use of a single annual RDxSAL value would give rise to the problem of choosing which year to use, introducing ambiguity and subjectivity.

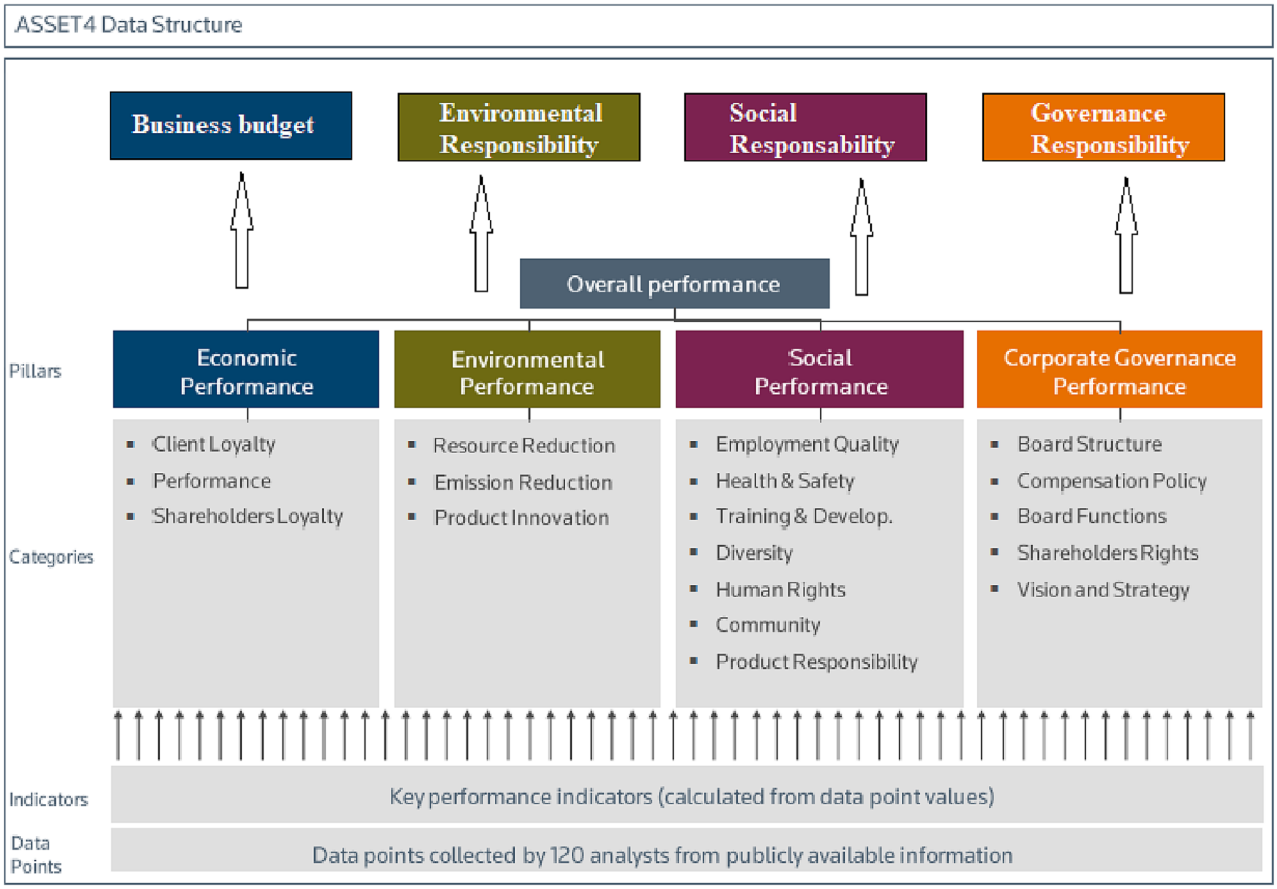

FIGURE 2 ASSET4 structure: four *pillars* and the relative categories.

Product sectors, nationalities, and other information are indicated in Appendix A1, starting from the partition of Thomson Reuters. Product Sector and the degree of R&D are in line with Ellzondo-Noriega et al. (2019), Galindo-Rueda and Verger (2015), and Bogliacino (2014).

Data representing sustainability policies (understood at an experimental level as independent variables, IVs) were extracted from Thomson Reuters' ASSET4 database[5] and grouped into macro-categories (pillars) for Environmental (E), Social (S), and Governance (G) measures.

4.2 | Asset4 database

Each macro-category (pillar) (see Figure 2) comprises multiple categories from the ASSET4 data: There are three environmental categories, seven social categories, and five governance categories.[6]

The constituent categories of the Environmental (E) pillar are Environmental Emission Reduction (ENV_ER), Environmental Product Innovation (ENV_PI), and Environmental Resource Reduction (ENV_RR).

The constituent categories of the Social (S) pillar are Customer/Product Responsibility (SOC_PR), Society/Community (SOC_C), Society/Human Rights (SOC_HR), Workforce/Diversity and Opportunity (SOC_DO), Workforce/Employment Quality (SOC_EQ), Workforce/Health & Safety (SOC_HS), and Workforce/Training and Development (SOC_TD).

Finally, the constituent categories for the Governance (G) pillar are Integration/Vision and Strategy (GOV_VS), Shareholders/Shareholder Rights (GOV_SR), Board of Directors/Compensation Policy (GOV_CP), Board of Directors/Board Structure (GOV_BS), and Board of Directors/Board Functions (GOV_BF). Each category has a score in the ASSET4 data.

We also use three dummy variables to denote whether each company has adopted the following guidelines and standards: GRI (Global Reporting Initiative), EMAS (Eco Management and Audit Scheme), and ISO9000. For example, the adoption of the GRI standard is indicated by the variable GEI_GRI,[7] which takes the value 1 if the company has adopted the standard, and 0, otherwise.

[5] http://financial.thomsonreuters.com/en/products/data-analytics/company-data/esg-research-data.html

[6] These categories are made up of key performance indicators (KPIs) that aggregate 685 data points extrapolated by ASSET4 analysts from annual financial statements, sustainability reports, corporate websites, and other information sources made available by the companies.

[7] The acronym GEI refers to the three main sustainability guidelines or frameworks: GRI (G), EMAS (E), and ISO 9000 (I).

We collected CFP variables used as dependent variables (DVs) from the Thomson Reuters database. Specifically, CFP variables are taken from the Worldscope Database's Industrial Companies Template.[8] The chosen CFP variables are consistent with many other studies in the literature, such as Livnat and Zarowin (1990), Konar and Cohen (2001), Filbeck and Gorman (2004), and Eccles and Serafeim (2013). We also refer to the studies by Beurden and Grossling (2008) and Aggarwal (2013). The CFP variables are grouped into five categories, related to the company's stock values (*stock data*), the performance of its stock (*stock performance*), degree of indebtedness (*leverage*), earning interest for hypothetical investors to invest in the company (*profitability*), and annual growth rates for the main company indicators (*growth rate*). Overall, 15 DVs were used.

For the *stock data* category, the following indicators were used: cash flow per share (CSHxSHR), earnings per share (EARxSHR), dividends per share (DIVxSHR), and book value per share (BKVxSHR).

For the *stock performance* category, the stock's beta (which measures volatility) (BETA) and the average price/earnings ratio (PRCERN) were used.

For the *leverage* category, we used total debt over common equity (DEBxEQU).

For the *profitability* category, the ratios used were R&D over sales (RDxSAL), return on assets (ROA), return on equity (ROE), and return on investment (ROI).

Finally, for the *growth rate* category, the ratios used were market capitalization one-year growth (MKTCAP_Y), net sales/revenue 1-year growth (SALxREV_Y), total assets one-year growth (AST_Y), and operating income 1-year growth (INC_Y).

These DVs are extracted from the Thomson Reuters database and can be organized according to the scheme shown in Table 2.

The three sub-groups (i.e., high [HIC], medium [MIC], and low [LIC] degree of innovation based on mRDxSAL) are treated as independent samples and we collected time series data from 2009 to 2014 for each group separately.

Of these time series, for each of the three groups, we consider the year 2012 and year 2014, with a time lag of about 2 years, as evidenced by the works of Ernst (2001), Bowen et al. (2010), Varadarajan (2015), and Rezende et al. (2019).

The year 2012 indicates the start of ESG sustainability policies (IVs), while the year 2014 is used to detect the company's economic–financial performance (CFP) and DVs, accounted in the financial statements for the period to the end of 2014. Furthermore, it is assumed that the year 2013, intermediate between the two considered, can be understood as a year of implementation and effective "grounding" of ESG policies.

The comparisons between IV and DV within a single year are not tested because the effects of IV (applications of ESG policies) on DV (CFP variables), do not occur inside the same year, but are delayed and spread over some years (Al-Tuwaijria et al., 2004; Ernst, 2001; Ruf et al., 2001; Wang & Choi, 2013, among others).

[8]Worldscope Database Datatype Definitions Guide—Issue 6: April 2007 Thomson Financial, www.thomson.com/financial

4.3 | Authors' elaboration

The time lag of about 2 years, as evidenced by some of the aforementioned authors, depends on many factors, including the size of the company (Aguilar-Fernández & Otegi-Olaso, 2018; Dong et al., 2017; Triguero et al., 2017), the phase of its life cycle, (Huber, 2008; Jabłoński & Jabłoński, 2016; Mieras, 2014), its degrees of R&D (Eccles & Serafeim, 2013; Johansson & Lööf, 2008), and its relationship with stakeholders (Collins & Saliba, 2019; Fernandez-Feijoo et al., 2014; Pekovic & Rolland, 2016).

Moreover, the process of adopting ESG sustainability strategies is ever-changing and highly heterogeneous across various levels and cycles of the business chain (Deng et al., 2020; Koh et al., 2017; Najjar et al., 2020), and it is affected by differences in the degree of company's management control over the total ESG process.

To simplify this study, we formulate two assumptions:

1. The values of IV (ESG sustainability policies) in the year 2012 are not influenced by the activities carried out in the years preceding the application of the ESG policies.
2. Using the year 2012 allows us to avoid as much as possible the negative effects of the 2008 global financial crisis in terms of its economic and financial consequences.

Between the year 2012 (starting of ESG policies) and the year 2014 (evidence of CFP effects), the implementation of ESG policies, carried out by company management, is subject to continuous corrections, improvements, and adaptations (through feedback and feedforward dynamics) in the context of the specific operational reality inside which ESG sustainability policies are realized from the company, as highlighted by Holland (2011), Esch et al. (2019), Hsueh (2019), and others.

After the sample has been defined and divided according to the three levels of company innovation (HIC, MIC, and LIC) and the IVs (ESG policies, also called non-financial variables) and DVs (financial variables) have been identified, we next follow the below procedural steps:

1. Importing, filtering, and organizing raw data
2. Determining the most important descriptive statistics
3. Identifying the most significant bivariate Pearson correlations and their representation by means of correlation matrices
4. Measuring the significance of the most salient relationships identified in step 3 by means of a bivariate ANOVA (analysis of variance) and a simple linear model, always of a bivariate type
5. Proposing an interpretative model of the main findings of this research.

The statistical analyses were carried out using the R program[9] and a series of R packages freely downloadable and usable under a public license.

[9]https://www.r-project.org

TABLE 2 Financial variables, related acronyms, and categories.

Dimension analysis	Variable	Acronym	Formula
STOCK DATA	CASH FLOW PER SHARE	CSHxSHR	$\frac{OPER.CASH\ FLOW - PREFER.DIVIDENDS}{COMMON\ SHARE\ OUTSTANDING}$
	EARNINGS PER SHARE	EARxSHR	$\frac{NET\ INCOME - DIVIDENDS\ ON\ PREF.STOCKS}{AVERAGE\ OUTSTANDING\ SHARE}$
	DIVIDENDS PER SHARE	DIVxSHR	$\frac{SUM\ DIV.OVER\ A\ PERIOD - ONE\ TIME\ DIVID.}{SHARE\ OUTSTANDING\ FOR\ PERIOD}$
	BOOK VALUE PER SHARE	BKVxSHR	$\frac{TOTAL\ SHAREHOLDER\ EQUITY - PREF.EQUITY}{COMMON\ SHARE\ OUTSTANDING}$
STOCK PERFORMANCE (SP)	BETA	BETA	$\frac{\mathrm{Cov}(ASSETS\ N\ RET.; REF.PORTFOLIO\ RET.)}{\mathrm{Var}(TOTAL\ MARKET\ RET.)}$
	PRICE EARN. RATIO AVG	tPRCERN	$\frac{MARKET\ VALUE\ PER\ SHARE}{EARNING\ PER\ SHARE}$
LEVERAGE (L)	TOTAL DEBT ON COM. EQUITY	tDEBxEQU	$\frac{TOTAL\ LIABILITIES}{SHAREHOLDERS\ EQUITY}$
PROFITABILITY (P)	R&DON SALES	RDxSAL	$\frac{R\&D\ EXPENSENS}{TOTAL\ SALES}$
	ROI – RETURN ON ASSETS	ROA	$\frac{CURRENT\ PROFIT}{TOTAL\ ASSETS}$
	ROI – RETURN ON EQUITY	ROE	$\frac{NET\ INCOME\ FOR\ THE\ YEAR}{OWN\ MEANS}$
	ROI – RET. ON INVESTMENTS	ROI	$\frac{OPERATING\ INCOME}{NET\ INVESTED\ CAPITAL}$
GROWTH RATE (GR)	MARKET CAP. YEAR GROWTH	MKTCAP_Yr	$(N.OF\ SHARES * SHARES\ PRICE)_{(t+1)} - (N.OF\ SHARES * SHARES\ PRICE)_{(t)}$
	NET/SALES REV. YEAR GROWTH	NETSALxREV_Yr	$NET\ SALES_{(t+1)} - NET\ SALES_{(t)}$
	TOTAL ASSETS YEAR GROWTH	tAST_Yr	$TOTAL\ ASSETS_{(t+1)} - TOTAL\ ASSETS_{(t)}$
	OPER. INCOME YEAR GROWTH	oINC_Yr	$OPERAT.INCOME_{(t+1)} - OPERAT.INCOME_{(t)}$

5 | FINDINGS

We provide both descriptive and inferential statistical results. The main descriptive statistics (mean, median, standard deviation, minimum value, maximum value, range, and skewness) are shown in Figure 3 (IVs) and Figure 4 (DVs).

We provide inferential statistical results. Our first hypothesis, H1, is confirmed. For MICs and LICs, the absence of interaction between ESG sustainability policies and financial performance (CFP) can be interpreted as a consequence of the weak mediation effect of business innovation. Moreover, the majority of the correlations for HIC are negative. Therefore, H1 holds for HICs as well. In particular, for LICs, we find low levels for variables connected to the growth rate. In these companies, ESG policies do not generate positive effects in the medium to long term, but only negative effects in the short term (Burritt & Schaltegger, 2010; Gabel & Sinclair-Desgagnè, 1993).

H2a, H2b, and H2c are also confirmed. We find positive relationships between *Community* (SOC_C) and three financial variables for stock data, that is, CSHxSHR, EARxSHR, and DIVxSHR. Moreover, our findings show a positive influence of *Human Rights* (SOC_HR) on a financial variable on leverage named *Price Earning Rate* (PRCERN). These hypotheses are partially confirmed for some correlations of the MICs.

Evaluating H3 and H4, we find positive correlations between the adoption of ISO9000 and company Beta (a measure from the stock performance category) and between the adoption of the GRI and the *Price Earning Rate* (PRCERN also belonging to the stock performance category, see Table 2). EMAS is positively correlated with *Operative Income Year* (oINC_Y, belonging to the growth rate category, see Table 2). Operating income (oINC_Y) is an accounting figure that measures the amount of profit realized from a business's operations, after deducting operating expenses such as wages, depreciation, and cost of goods sold. In summary, these hypotheses are partially confirmed as some reporting frameworks are correlated with some financial variables.

5.1 | Correlation maps

Correlation maps are calculated for the three groups of companies (Figure 5 for HICs, Figure 6 for MICs, and Figure 7 for LICs), using Pearson's bivariate correlation. These figures show the correlations, both positive and negative, high and low, relative to +0.3 in blue and to −0.3 in red.

A simple visual analysis of these maps shows that there are correlations, both positive and negative, for HICs, fewer correlations for MICs, and no correlations for LICs except for the variables group labeled "growth rate."

In particular, for HICs, two trends are highlighted, one positive and the other negative. We find a positive correlation between *Product Responsibility* (SOC_PR) and R&DxSAL in 2014 and with the other three variables of profitability (ROA, ROE, and ROI), confirming H2, as also evidenced by Aggarwal (2013), Alshehhi et al. (2018). and Hussain et al. (2018).

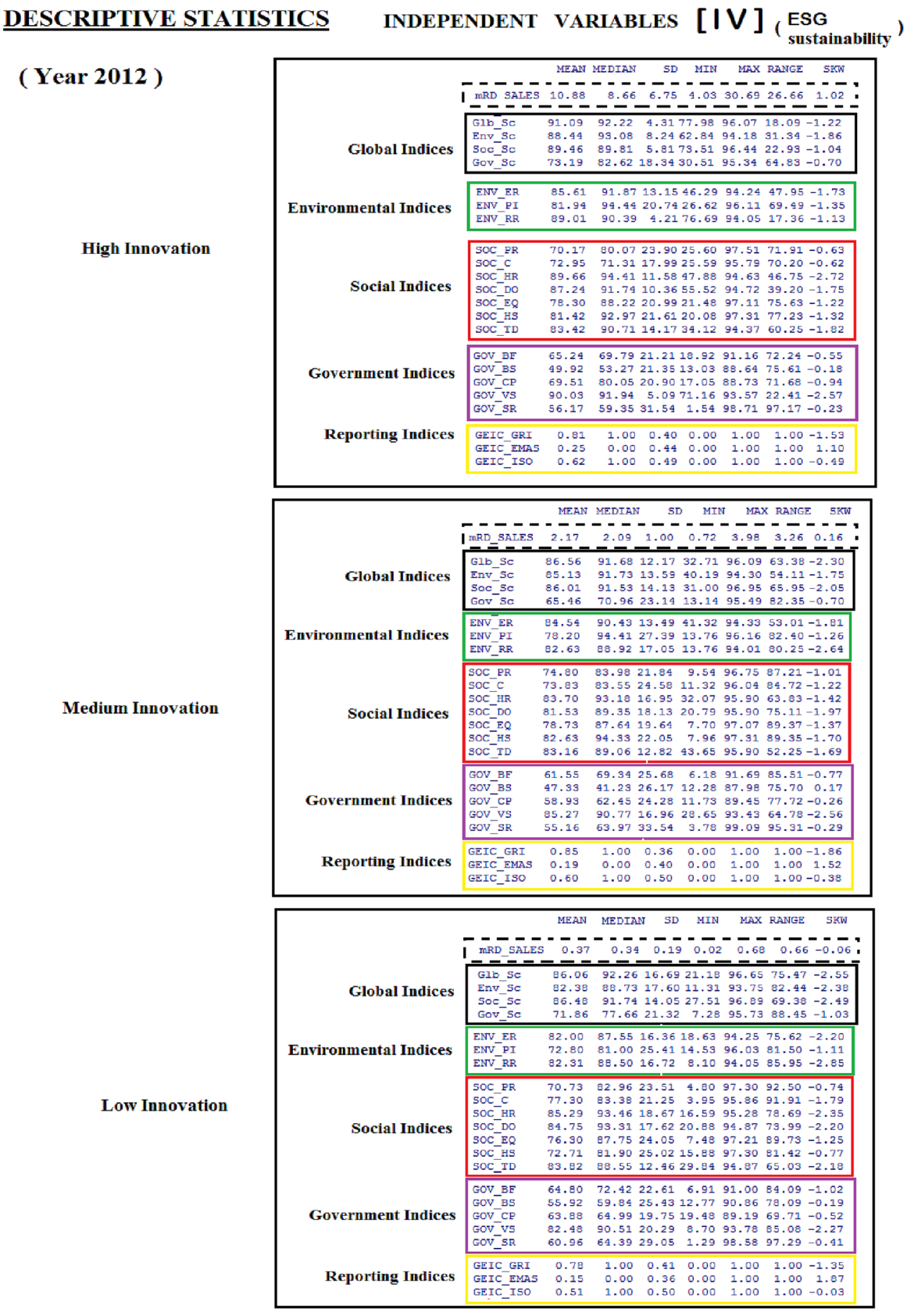

FIGURE 3 Main results of descriptive statistics on sustainability ESG factors for the three groups of companies: high-, medium-, and low-innovation. Authors' elaboration.

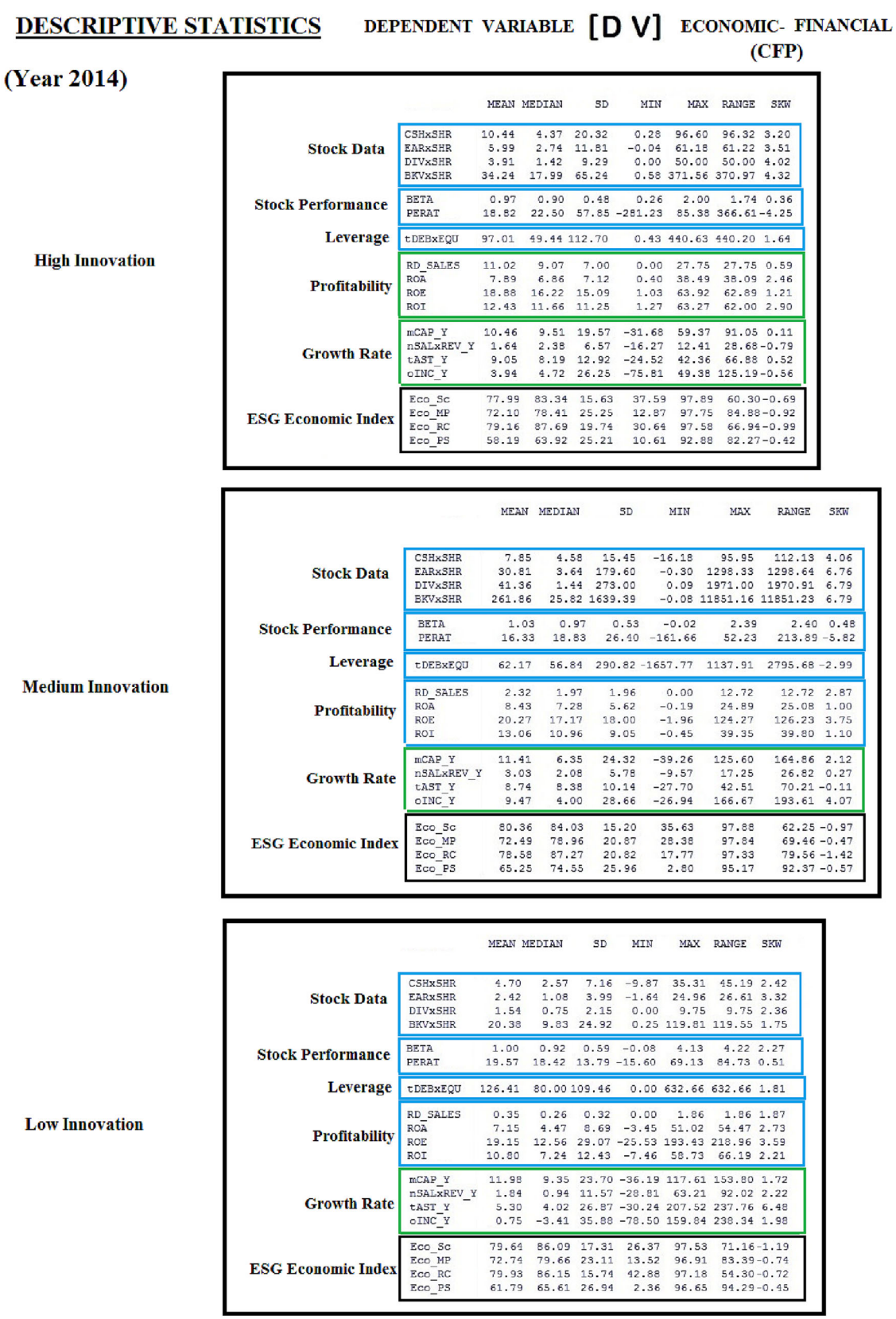

FIGURE 4 Main results of descriptive statistics on financial factors (CFP), grouped into five categories for each of the three groups of companies (HICs, MICs, and LICs). Authors' elaboration.

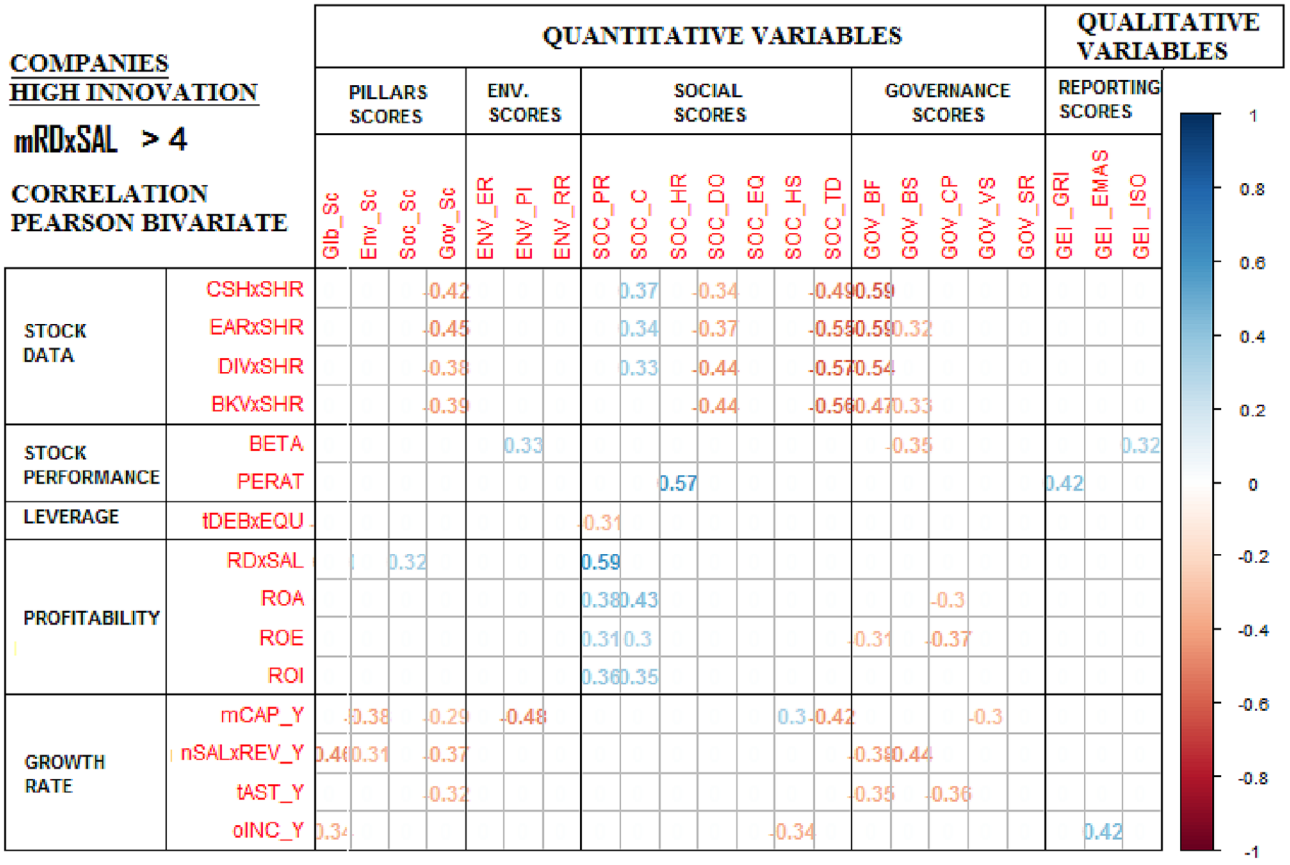

FIGURE 5 Correlation map for high-innovation companies (HICs). In this and subsequent figures, blue indicates positive correlations, and red negative correlations. Authors' elaboration.

Moreover, there are positive correlations between *Community* (SOC_C) and three variables of profitability, ROA, ROE, and ROI, as demonstrated by Yusra et al. (2022) and Carnini et al. (2022).

Furthermore, a positive link is highlighted between *Human Rights* (SOC_HR) and *Price Earning Rate* (PRCERN), belonging to the stock performance category. This result is shown by Martínez Ferrero et al. (2016) and Zagelmeyer and Sinkovics (2019).

We find negative correlations for *Training and Development* (SOC_TD) and *Social Diversity and Opportunity* (SOC_DO) with the four variables in the stock data category, that is, CSHxSHR, EARxSHR, DIVxSHR, and BKVxSHR, as suggested by Sprinkle and Maines (2010), Murray (2007), and Porter and Kramer (2006).

In particular, for Governance (G), negative links for GOV_BF and GOV_BS with variables in the stock data category (CSHxSHR, EARxSHR, DIVxSHR, and BKVxSHR) are identified.

A similar result was evidenced by Tosun and Leininger (2017) and Zeeshan et al. (2018).

Finally, for the dummy variables for the adoption of reporting frameworks or guidelines, that is, GEI (GRI, EMAS, and ISO9000), the correlation maps highlight correlations for HICs, whereas their equivalents are much weaker for MICs and inverted for LICs companies.

Analyzing MICs and LICs further, the absence or inversion of the relationships between sustainability variables and CFP variables is generally evident.

Research hypotheses H3 and H4 are both confirmed. This evidence also supports the hypotheses formulated by Eccles and Serafeim (2013), shown in Figure 1.

5.2 | Linear model and bivariate ANOVA

We develop a simple linear model (intercept, angular coefficient, and adjusted *R*) using the correlations with the strongest statistical significance, in particular focusing on HICs. In addition, the ANOVA between pairs of variables is also calculated, yielding corresponding Fischer's F values. Our findings are shown in Figures 8, 9, 10, and 11.

5.3 | Linear model and multivariate ANOVA

Based on the previous results, a multivariate linear model is developed that considers the actions of two IVs (means interaction between intra-pillar ESG factors) with respect to a single DV (CFP). For the two variables taken separately, and for their interaction, intercepts, angular coefficients, and *R*-adjusted values are calculated, in addition to the ANOVA and the Fisher *F* value (Figures 12, 13, and 14).

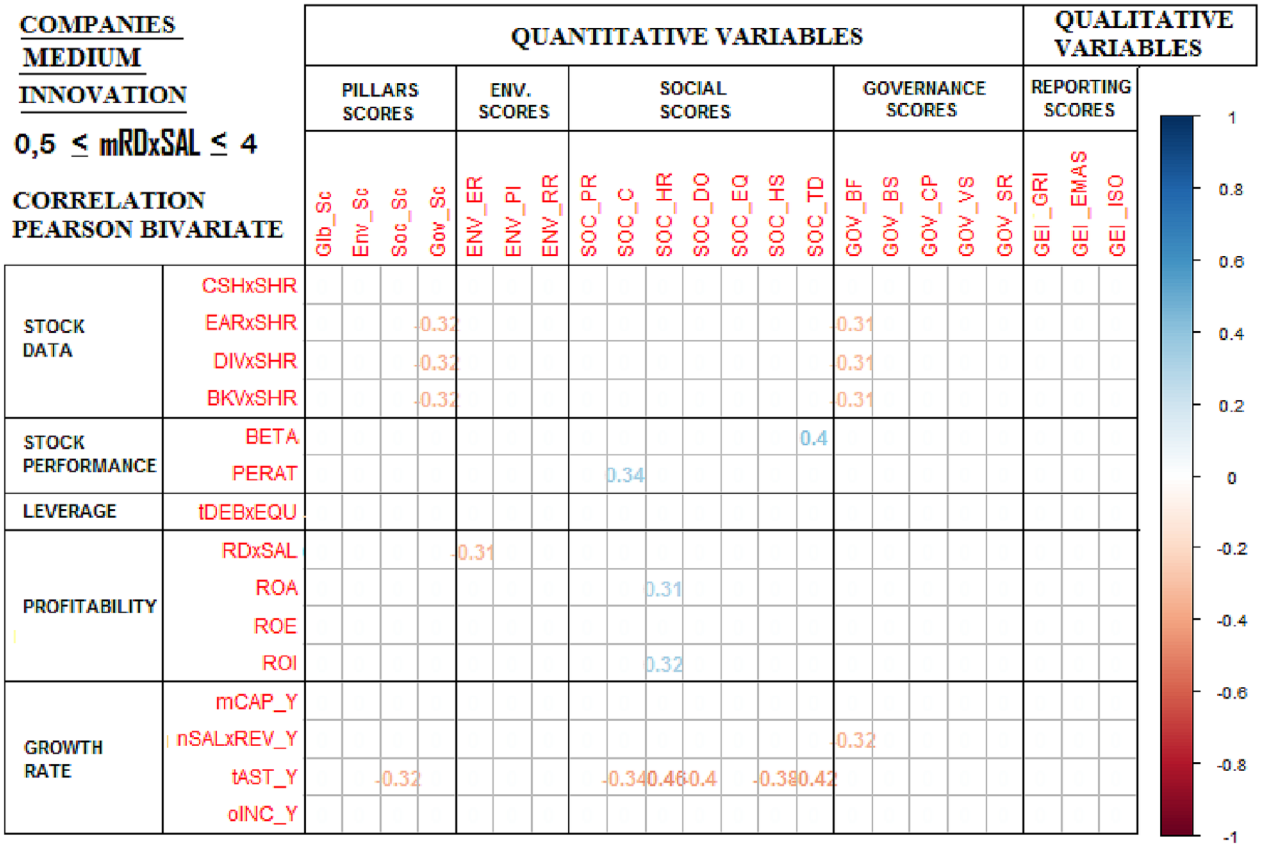

FIGURE 6 Correlation map for medium-innovation companies (MICs). Authors' elaboration.

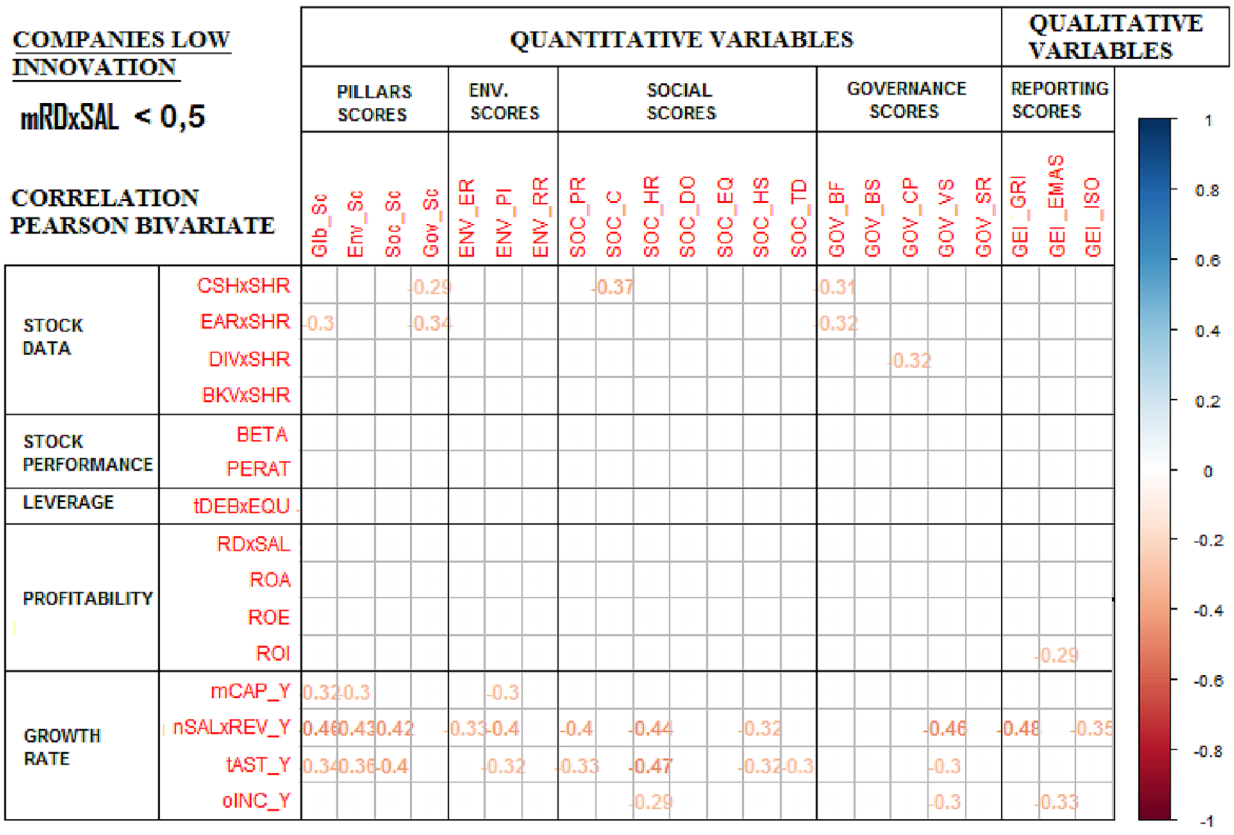

FIGURE 7 Correlation map for low-innovation companies (LICs). Authors' elaboration.

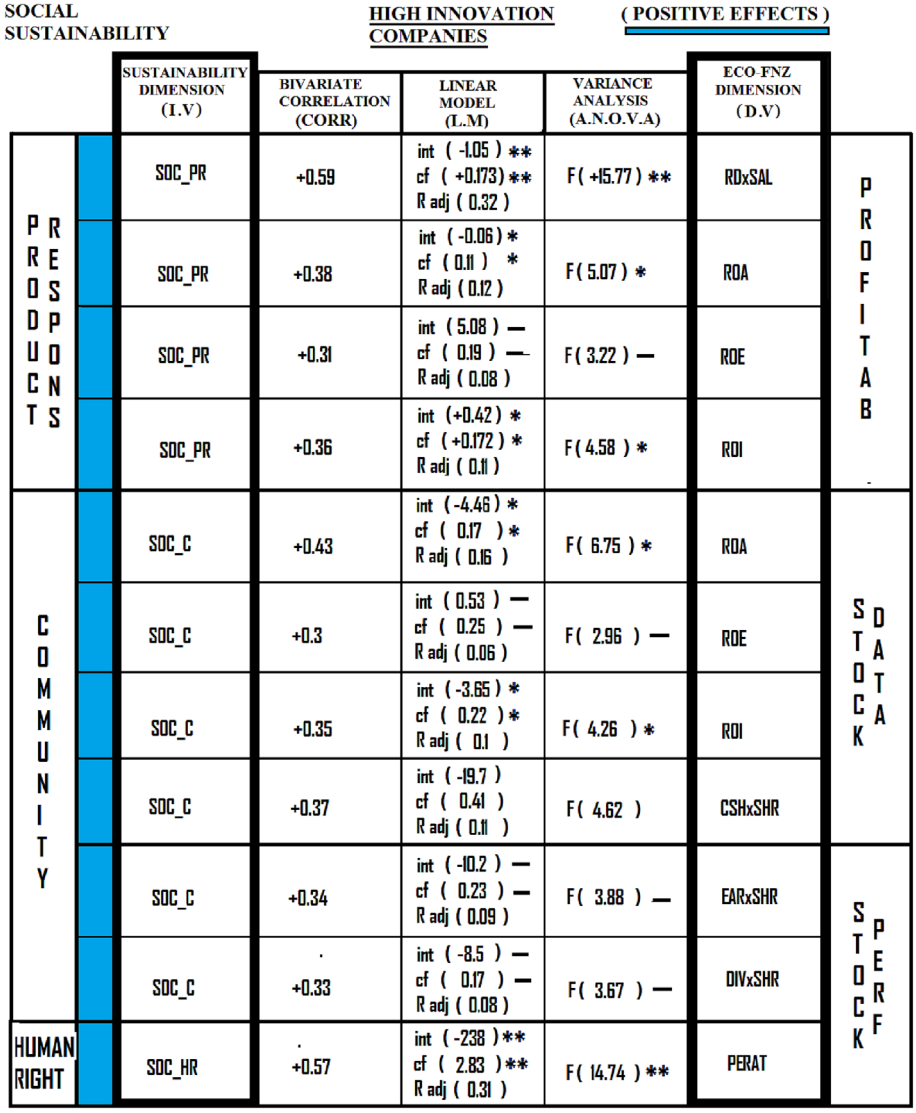

FIGURE 8 Bivariate relationship (linear model and ANOVA) between the main variables in the case of high-innovative companies (HIC): positive effects. In the present and subsequent figures, the blue color indicates positive correlations, while the red one indicates negative correlations. Authors' elaboration.

6 | DISCUSSION

Based on our empirical results, we develop a theoretical framework that summarizes the main hypotheses and the proposed interpretative model, with reference to HICs, and in agreement with previous results. A similar interpretative scheme can be applied to LICs and MICs, with the difference that the positive relationships found for HICs are not present, due to the weak or absent mediating effect of business innovation, measured by mRDxSAL.

The lower section of Figure 15 indicates a hypothetical company that implements a specific business model within a certain business ecosystem. The business activity entails the creation of value using a production cycle, which transforms a series of inputs and generates a certain amount of goods or services (output). The marketing policy and sale of these goods or services allow the company to make a profit, which is the key factor in the creation of corporate value. After the product or service has been purchased by the consumer, it may be enjoyed at different times and ways. In the proposed interpretation, the responsibility of the company, connected to the enjoyment of the product by the individual consumer, is understood as the cornerstone of social sustainability policies. From the company's point of view, the psychological and social aspects connected to the enjoyment of the product or service are considered in terms of *community* (social) responsibility. The elements outlined so far and illustrated in the lower part of Figure 15 are referred to as an ecological framework. Inside this framework, we insert the explanatory hypotheses about the relationships between non-financial and financial variables, in the case of HIC companies.

While the upper part of Figure 15 shows the main non-financial factors of ESG sustainability and their effects, on different time scales, on CFP variables, but only in the case of HICs. Contrarily in the case of the LICs and MICs, these relationships would be absent or very weakened, in accordance with what is claimed by Eccles and Serafeim (2013).

The ESG sustainability policies that management may implement within a company are shown in the upper part of Figure 15, which identifies the three pillars (Social in red, Environmental in green, and Governance in blue), and the temporal sequence in

FIGURE 9 Bivariate relationship (linear model and ANOVA) between the main variables for high-innovative companies: negative effects (or costs). Authors' elaboration.

SOCIAL SUSTAINABILITY — HIGH INNOVATION COMPANIES — (NEGATIVE EFFECTS)

		SUSTAINABILITY DIMENSION (I.V)	BIVARIATE CORRELATION (CORR)	LINEAR MODEL (L.M)	VARIANCE ANALYSIS (A.N.O.V.A)	ECO-FNZ DIMENSION (D.V)	
TRAINING DEVELOP		SOC_TD	-0.49	int (+69.7) ** cf (-0.7) ** R adj (0.22)	F(9.7) **	CSHxSHR	STOCK DATA
		SOC_TD	-0.55	int (44.2) ** cf (-0.46) ** R adj (0.28)	F(12.9) **	EARxSHR	
		SOC_TD	-0.57	int (35.4) ** cf (-0.38) ** R adj (0.31)	F(14.7) **	DIVxSHR	
		SOC_TD	-0.56	int (249) ** cf (-2.58) ** R adj (0.29)	F(13.7) **	BKVxSHR	
DIVERSITY OPPORTUN		SOC_DO	-0.34	int (67.9) — cf (-0.67) — R adj (0.08)	F(3.81) —	CSHxSHR	STOCK DATA
		SOC_DO	-0.37	int (42.9) * cf (-0.42) * R adj (0.12)	F(4.8) *	EARxSHR	
		SOC_DO	-0.44	int (38) * cf (-0.49) * R adj (0.17)	F(7.02) *	DIVxSHR	
		SOC_DO	-0.44	int (273) * cf (-2.74) * R adj (0.164)	F(7) *	BKVxSHR	

ENVIRONMENTAL SUSTAINABILITY — HIGH INNOVATION COMPANIES — (MIXED EFFECTS)

		SUSTAINABILITY DIMENSION (I.V)	BIVARIATE CORRELATION (CORR)	LINEAR MODEL (L.M)	VARIANCE ANALYSIS (A.N.O.V.A)	DIMENSION ECO-FNZ (D.V)	
ENVIRONMENTAL		ENV_PI	+0.33 —	int (0.35) — cf (0.008) — R adj (0.07)	F(3.64)	BETA	STOCK PERF.
		ENV_PI	-0.48 **	int (48) ** cf (-0.45) ** R adj (0.22)	F(8.92)	mCAP_Y	GROWTH RATE

FIGURE 10 Bivariate relationship (linear model and ANOVA) between the main variables for high-innovative companies: negative and positive effects. Authors' elaboration.

which we assume these policies will be activated. We have hypothesized that Social (S) policies will be the first implemented by management, followed by Environmental (E) policies, and finally Governance (G) policies. The Social pillar seems to have a greater role than the other two. Our empirical evidence highlights the functional subdivision of the social pillar's constituent categories. On the one hand, the categories related to SOC_PR, SOC_C, and SOC_HR are identified, and on the other hand, the categories that can be considered costs (SOC_TD and SOC_DO) are illustrated. The greater role of the Social (S) pillar is also proven by the fact that it has more categories and a greater number of KPIs than the Environmental (E) pillar.

While the Governance (G) pillar, despite having more categories than the Environmental one, plays a role of difficult evaluation and a certain ambiguity, because it is linked to corporate strategy factors and policies, which require a certain discretion and confidentiality in their release to the public, as evidenced by several works, that is, Wilkinson et al. (2001) and Zhao et al. (2016).

With regard to the connection between the Social (S) and Environmental (E) pillars (and their constituent categories), the link between SOC_PR (*Product Responsibility*) and ENV_PI (*Product Innovation*) is highlighted, as is the mediating role of degree of corporate innovation (in terms of R&D), which is also confirmed by previous studies (Gupta et al., 1986; Iyer & Soberman, 2016; Viscusi & Moore, 1987).

SUSTAINABILITY GOVERNANCE — **HIGH INNOVATION COMPANIES** — **(NEGATIVE EFFECTS)**

		SUSTAINABILITY DIMENSION (I.V)	BIVARIATE CORRELATION (CORR)	LINEAR MODEL (L.M)	VARIANCE ANALYSIS (A.N.O.V.A)	DIMENSION ECO-FNZ (D.V)	
BOARD FUNCTION		GOV-BF	-0.59	int (47.5) ** cf (-0.58) ** R adj (0.33)	F (16.27) **	CSHxSHR	STOCK DATA
		GOV-BF	-0.59	int (27.45) ** cf (-0.33) ** R adj (0.33)	F (16.1) **	EARxSHR	
		GOV-BF	-0.54	int (19.43) ** cf (-0.24) ** R adj (0.27)	F (12.5) **	DIVxSHR	
		GOV-BF	-0.47	int (127) ** cf (-1.44) ** R adj (0.19)	F (8.3) **	BKVxSHR	
BOARD STRUDC		GOV_BS	- 0.32	int (14.9) * cf (-0.18) * R adj (0.08)	F (3.5) —	EARxSHR	STOCK DATA
		GOV_BS	-0.33	int (84.8) * cf (-1.1) * R adj (0.08)	F (3.7) —	BKVxSHR	

FIGURE 11 Bivariate relationship (linear model and ANOVA) between the main variables, for HICs: negative effects (or costs). Authors' elaboration.

	INDEPENDENT VARIABLE (I.V)			DEPENDENT VARIABLE (D.V)
	1st VAR.	2nd VAR.	INTERACTION	
	SOC_PR	SOC_C	SOC_C X SOC_PR	
LINEAR MODEL (L.M)	INT 5.9 CF -0.014	INT 5.9 CF -0.014	INT 5.9 CF -0.014 R^2 0.41 R^2 ADJ 0.346	RDxSAL
VARIANCE ANALYSIS	F (16) **	F(2.43)	F(0.64)	
LINEAR MODEL (L.M)	INT 14.8 CF -0.25	INT 14.8 CF -0.182	INT 14.8 CF 0.005 R^2 0.35 R^2 ADJ 0.28	ROA
VARIANCE ANALYSIS	F(6.22) *	F(6.66) *	F (2.16)	
LINEAR MODEL (L.M)	INT 35.4 CF -0.46	INT 35.4 CF -0.38	INT 35.4 CF 0.008 R^2 0.2 R^2 ADJ 0.12	ROE
VARIANCE ANALYSIS	F(3.4)	F(2.59)	F(1.27)	
LINEAR MODEL (L.M)	INT 25.78 CF -0.38	INT 25.78 CF -0.32	INT 25.78 CF 0.008 R^2 0.28 R^2 ADJ 0.2	ROI
VARIANCE ANALYSIS	F(5.15) *	F(3.96)	F(1.86)	

FIGURE 12 Multivariate relationships (linear model and ANOVA) for the variables belonging to the social pillar (SOC_PR and SOC_C), for HICs. Authors' elaboration.

At the level of interpretative logic, the categories of each ESG pillar are understood as IVs that correspond to specific sustainability policies. These policies have begun at the beginning of 2012; were implemented in 2013; and showed their effects, measured through financial indicators (CFP), in 2014—a delay of 2 years. This lag effect as evidenced by Rezende et al. (2019) among others.

The main relationships between the ESG categories and financial indicators (CFP) are illustrated in Figure 15, with green arrows for positive relationships and red arrows for negative relationships. The mediating role of company innovation (measured as mRDxSAL) is indicated in the central part of Figure 15. Its effects are mainly on the Social (S) and Environmental (E) pillars, and more particularly on the categories SOC_PR (*Product Responsibility*) and ENV_PI (*Product Innovation*).

The dummy variables for the adoption of reporting frameworks or guidelines (GRI, EMAS, and ISO9000, represented by the acronym GEI) are not shown in the figure and are assumed to have a corollary role because they highlight (through appropriate management and

FIGURE 13 Multivariate relationships (linear model and ANOVA) for the variables belonging to the social pillar (SOC_TD and SOC_DO), for HICs. Authors' elaboration.

	INDEPENDENT VARIABLE (I.V)			DEPENDENT VARIABLE (D.V)
	1st VAR.	2nd VAR.	INTERACTION	
	SOC_TD	SOC_DO	SOC_TD X SOC_DO	
LINEAR MODEL (L.M)	INT 360 ** CF -4.22 **	INT 360 ** CF -3.98 **	INT 360 * CF 0.048 * R^2 0.49 R^2 ADJ 0.43	CSHxSHR
VARIANCE ANALYSIS	F(13.4) **	F(0.42)	F(13.13) **	
LINEAR MODEL (L.M)	INT 238 ** CF -2.86 **	INT 238 CF -2.66	INT 238 ** CF 0.03 ** R^2 0.63 R^2 ADJ 0.58	EARxSHR
VARIANCE ANALYSIS	F(22.6) **	F(0.68)	F(23.86) **	
LINEAR MODEL (L.M)	INT 197.8 ** CF -2.32 **	INT 197.8 ** CF -2.24 **	INT 197.8 ** CF 0.02 ** R^2 0.7 R^2 ADJ 0.66	DIVxSHR
VARIANCE ANALYSIS	F(30.2) **	F(2.38)	F(32.2) **	
LINEAR MODEL (L.M)	INT 1532 ** CF -18.05 **	INT 1532 ** CF -17.7 **	INT 1532 ** CF 0.21 ** R^2 0.78 R^2 ADJ 0.75	BKVxSHR
VARIANCE ANALYSIS	F(40.02) **	F(3.38)	F(56.3) **	

FIGURE 14 Multivariate relationships (linear model and ANOVA) for governance variables for HICs. Authors' elaboration.

	INDEPENDENT VARIABLE (I.V)			DEPENDENT VARIABLE (D.V)
	1st VAR.	2nd VAR.	INTERACTION	
	GOV_BF	GOV_BS	GOV_BF X GOV_BS	
LINEAR MODEL (L.M)	INT 30.84 CF -0.38	INT 30.84 CF -0.09	INT 30.84 CF 0.0015 R^2 0.35 R^2 ADJ 0.28	EARxSHR
VARIANCE ANALYSIS	F(15.4) **	F(0.0032)	F(0.082)	
LINEAR MODEL (L.M)	INT 194.36 * CF -2.42 *	INT 194.36 CF -1.92	INT 194.36 CF 0.02 R^2 0.24 R^2 ADJ 0.17	BKVxSHR
VARIANCE ANALYSIS	F(8.62) **	F(0.35)	F(0.79)	

reporting protocols) the implementation of a specific type of ESG sustainability policies, but are theoretically dissociated from the actual management of the policies they refer to (De Mendonca & Zhou, 2019; Fonseca & Lima, 2014; Marrucci et al., 2021).

Some studies have argued that business innovation, in terms of companies' investments in R&D, is one of the key factors in the relationship between non-financial ESG sustainability and financial (CFP) variables because such investments allow companies to explore, support, and re-elaborate alternative and increasingly optimal solutions in order to improve the company's adaptation within its ecosystem (Costa-Ciampi et al., 2017; Medeiros et al., 2014; Xie et al., 2022). Because selling goods and services to customers and generating profits are companies' main aims, we hypothesize that increasing investment in innovation (directly or indirectly connected to the relationship between the quality of the goods or services offered to a specific group of potential customers) represents the key element in achieving higher profits. At the level of company management, this kind of investment is particularly important and crucial for the optimal integration of ESG policies within the company's structure and for the accounting management of the company. In the present study, this is confirmed by the role of the SOC_PR index and, further, by the roles of SOC_C and SOC_HR, as highlighted by Marshall and Toffel (2005), Epstein and Buhovac (2010), Baumgartner and Ebner (2010), and Mokhtar et al. (2016).

In contrast, the variables SOC_TD and SOC_DO represent costs to companies, due to the need for staff training and the technical/logistical needs that this entails, at least in the short term, while in the medium to long term, the inclusion of professional figures trained within the business process aimed at sustainability is expected, as evidenced by Okoro and Washington (2012), Dorfleitner and Grebler (2020), and Wongsnuopparat and Chunyang (2021).

In the context of ESG sustainability policies, another key factor is environmental regulation adopted by many industrialized countries,

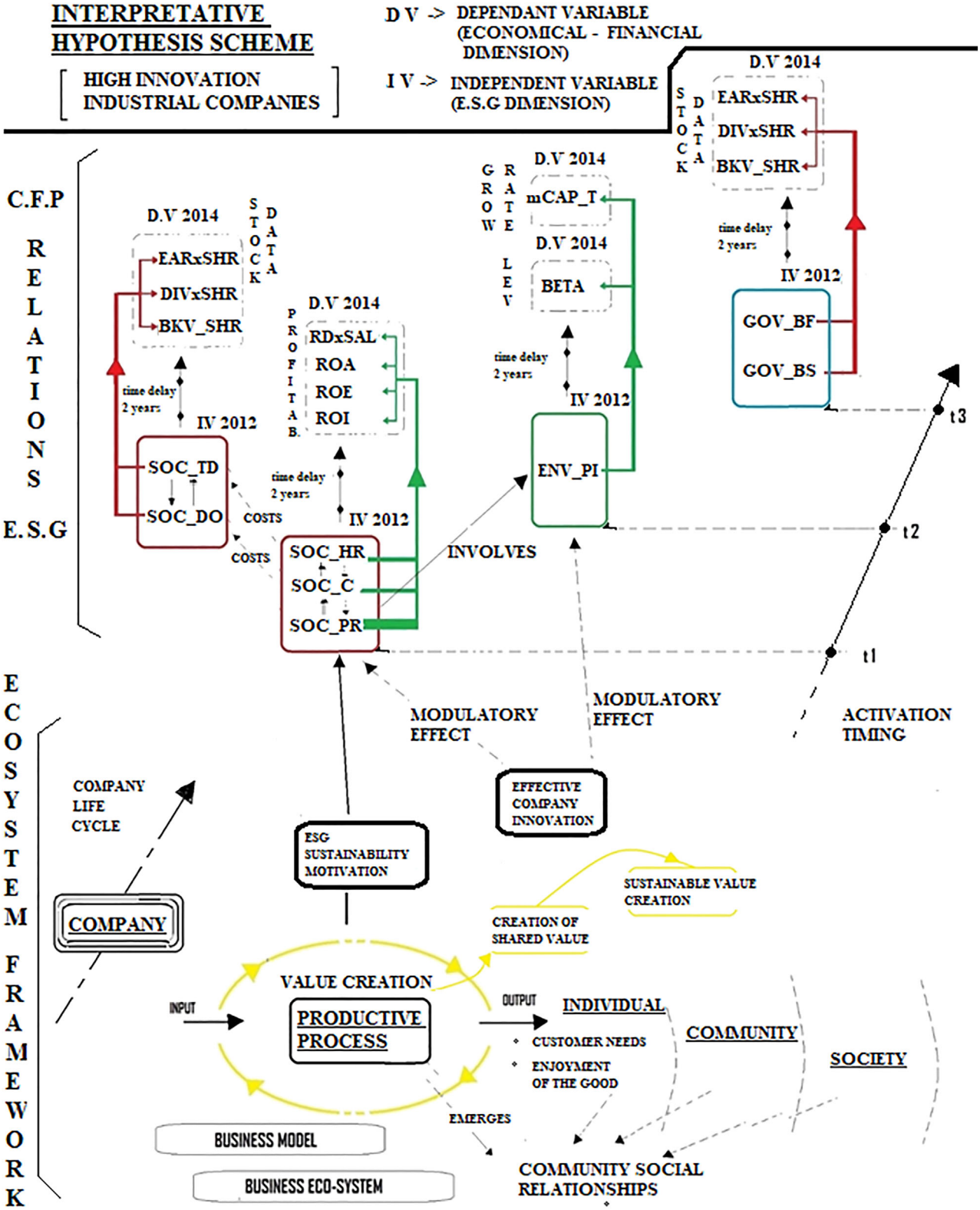

FIGURE 15 Interpretative model based on results observed the relationships between ESG factors and economic-financial factors (CFP) for HICs companies. Authors' elaboration.

which tends to promote environmentally sustainable behaviors and discourage behaviors with a highly negative Environmental (E) impact (Li et al., 2019; Qiu et al., 2020; Xie et al., 2022). These legislative choices shape and determine different pressures and underlying trends in the different and overlapping business ecosystems that make up the production system of a country. These elements are identified in the paper as belonging to the Environmental (E) category: ENV_PI, ENV_ER, and ENV_RR.

Finally, a third key factor in relation to ESG sustainability policies is management's choices regarding brands and channels of

communication with the external ecosystem (Cegarra-Navarro et al., 2016; Graham & Potter, 2015; Meyer & Rowan, 1977), both toward shareholders/investors and other stakeholders (suppliers, partners, employees, etc.). This factor derives from and depends on the previous two factors: the degree of innovation and environmental legislation. According to some previous studies (Ameer & Othman, 2012; Eccles & Serafeim, 2013; Porter & Kramer, 2006), ESG corporate sustainability depends on the degree of corporate innovation (R&D) for numerous reasons: structural, functional, ecological, and social.

Structural reasons relate to the company's life cycle and its core business. In this paper, functional aspects are exemplified by the three groups of companies: HICs, MICs, and LICs.

We observe that MICs, and in particular HICs company, have a lower average age than the other two groups, and this trait is typical of information and communications technology (ICT companies, which constitute the main type of companies that belongs to the HIC group. (Chin-Shien et al., 2015; Lawal et al., 2017; Li et al., 2016).

On the other hand, functional reasons must be identified in the fact that R&D and, more generally, exchange of information, play increasingly strategic roles in business activity. From this perspective, making a parallel with ecology, R&D means an increase in information exchange with the surrounding company's environment, as shown by Xue et al. (2019), Zandi (2019), and Chopra et al. (2021). If we consider the company's environment as an ecological framework, as described by some authors (Moore, 1996; Townsend, 2007), it is possible, somewhat suggestively, to draw a parallel between the R&D of a company (and its key role in terms of ESG sustainability), with the refinement of the receptive organs of a biological organism that lives in a certain environment. In fact, an optimal adaptation of the aforementioned sense organs to the surrounding environment allows one to better perceive and discern elements and dynamics around the organism. Surrounding environment allows to better perceive and discern elements and dynamics around the organism by producing an increase in its chance of survival.

The ecological reasons are that a company with a high degree of innovation (HICs) tends to have a network of knowledge exchange (know-how, know-what, etc.) with other entities in the ecosystem in which the company operates, as highlighted by Yun and Liu (2019) and Manab and Aziz (2019).

Regarding R&D activities, the exchange of information cannot be quantified in a strictly financial way because it involves the interaction and communication of information between research groups (private or public), the transfer of researchers or teams between laboratories and other departments, and more generally, all activities connected in some way to the company activities. R&D activity has a dual nature (quantitative and qualitative) and so lends itself to mediating (Hull & Rothenberg, 2008; Li et al., 2019; Oskouei, 2019; Qiu et al., 2020) between the financial dimension (quantifiable, by definition, according to financial parameters, CFP) and the non-financial dimension (linked to qualitative and less tangible aspects, ESG sustainability). As evidenced by Wang and Choi (2013), among others.

In contrast, Social (S) dimensions are connected to the information and communication networks within which the socialization process of knowledge is carried out by a company, with a strong commitment to ESG sustainability. The establishment of an optimal socialization context is, at times, the main goal of a whole series of activities, often of a governmental and non-profit nature, that aims to increase and improve the global and optimal community context for a company oriented towards ESG sustainability; in an ecological sense outlined above.

Some examples Burdusel et al. (2012), Tanaka and Tanaka (2022), and Linnenluecke (2022), among others, include synergies between private companies and universities, promotion of training activities by companies, and social, educational, and ethical responsibilities connected to the production of goods and services, especially those with high technological content and that are widely used.

7 | CONCLUSION

This study aims to investigate how the relationship between ESG sustainability policies and CFP is influenced by the mediating role of corporate innovation. Our main results reveal a series of statistically significant correlations for HICs companies, whereas for MICs and LICs the correlations are smaller or absent. Our findings are consistent with previous research (Eccles & Serafeim, 2013).

For HICs companies, we introduce an interpretative framework and a set of explanatory hypotheses to improve theorizing about the role of corporate innovation in non-financial (ESG sustainability) and financial (CFP) contexts. Our research design sheds light on organizations' strategic innovation orientation by providing a more comprehensive understanding of which ESG sustainability policies can enhance CFP.

Based on our empirical evidence, the contribution of this paper is threefold. First, we contribute to the literature on the shared value model (Porter & Kramer, 2006, 2011, 2019). Based on shared value theory,[10] the key element of this structured set of hypotheses appears to be the Social pillar, in particular, SOC_PR, with which SOC_C and SOC_HR are associated. In contrast, SOC_TD and SOC_DO are considered to be costs associated with Social and Environmental policies. For HICs, the costs would be offset and outweighed by the long-term positive effects of sustainability policies, whereas for MICs and LICs this compensation effect does not seem to occur, thus producing a trend like that described by Eccles and Serafeim (2013).

Second, this research sheds light on the link between the Social (S) and Environmental (E) pillars, because it primarily involves the relationship between SOC_PR and investment in the environmental side of ENV_PI. In this context, mRDxSAL appears to have a mediating role between the two categories. Accordingly, mRDxSAL can be considered a key factor for increasingly deep, insightful, and mutual interaction between the company and its surrounding ecosystem, increasing

[10]The various approaches envisaged by the authors for the creation of shared value also include the renewal and redefinition of products and markets. SOC_PR (Product Responsibility) falls within this approach: companies must identify the main unmet needs and develop and promote healthier and more environmentally friendly products and services, thus generating social benefits. Even entering previously neglected markets by supplying appropriate products to disadvantaged or low-income consumers can offer new avenues for innovation and opportunities to create shared value. Even in Porter and Kramer's theoretical model, therefore, innovation plays a strategic role (Porter & Kramer, 2006, 2011, 2019).

the chances of survival and sustenance of the company in the environmental context and the ecosystem within which it operates.

Third, our analysis introduces an interpretative model that suggests differences in the timing of activation of the three types of ESG sustainability policies. In particular, we assume that Social (S) policy will be implemented first, then Environmental (E) policies, and lastly, Governance (G) policies. This approach can be useful for top management and the board of directors to improve their decision-making processes by identifying social priorities in innovation-related strategic orientation and behavior. In particular, the company's responsibility in the production process and social issues such as respecting employees' Human Rights (SOC_HR) and the Community's needs (SOC_C) must be considered as key sources of competitive advantages in businesses with high levels of innovation.

7.1 | Further development of the research

The purpose of the interpretative framework and the related hypotheses is to suggest the development of a theoretical framework by proposing a preliminary clarification of the interpretative hypotheses based on the analysis of results derived from our research design. The analytical design can be further developed in theoretical and practical directions. The theoretical direction can be developed in the following ways:

1. It is necessary to identify other indicators, in addition to the relationship between turnover and R&D expenses, to quantitatively measure the degree of company innovation.
2. Following Fulton et al. (2012), it is considered necessary to analyze this study's explanatory assumptions, including that our variables measuring corporate liquidity are appropriate, which are primarily the *current liquidity ratio*, *cash and equivalent*, and *receivables and inventories variables* (which are scaled by total current assets). The reason for including these variables is that, in times of crisis such as recent decades in the global economy, a company's ability to generate liquidity, and so be able to finance itself, assumes fundamental importance.
3. The variables *total debt* (scaled by *total capital*) and *preferred stock* (scaled by *common equity*) should be included in the leverage category. The roles of these financial dimensions are highlighted by various authors, including Silver and Park (2011), Eccles et al. (2011), Eccles and Serafeim (2014), and Chou et al. (2015). Furthermore, the inclusion of these financial variables would make the investigation of the relationship between non-financial and financial elements more complete.
4. The interpretative hypotheses should be tested by considering a longer period than used in this exploratory analysis (2009–2014) thereby obtaining access to a greater amount of data.

In general, the use of a larger sample and analysis of multivariate time series would allow us to test the possibility that the increase in CFP could be driven by the increase in the degree of innovation (R&D) and not an increase in ESG performance. This possibility is partly contradicted by the comparison (made using the bivariate Pearson correlation) between mRDxSAL (average of R&D scaled by sales for the reference period, 2009–2014), and the DV. By analyzing multivariate time series data, the mediating role of the degree of innovation in the relationship between ESG sustainability variables and CFP variables could be quantified and assessed more precisely. However, it should be noted that ESG policies and the degree of corporate innovation are not easily separable; in fact, the latter is often a consequence of the former, like two sides of the same coin, because innovation necessarily implies a series of ESG sustainability policies, as an essential element for its support.

The research design of this study can be modified by running the results with all companies and utilizing Kruskal–Wallis and Mann–Whitney U tests to compare industries. Additionally, this analysis can be integrated by conducting the test of Kolmogorov–Smirnov, in order to have more statistically significant results.

At the theoretical level, the structural link between R&D policies (and investments) and ESG sustainability policies (in particular, Environmental [E] and Social [S] policies) has been highlighted by various authors, including Svensson (2008), Hrdlicka and Kruglianskas (2010), Seliger et al. (2011), and Nilsson et al. (2011). At a functional level, showing this theoretical structural link would require delineating and quantifying the mediating effect of the degree of R&D with respect to the categories of Product Responsibility (Social S pillar) and Product Innovation (Environmental E pillar), which are considered to be the core elements of ESG sustainability, based on our interpretative model, shown in Figure 15.

This study has managerial and practical implications. For businesses in Europe, the proposed interpretative framework can be applied to assess and quantify the effects of Directive 2014/95 EU on the disclosure of non-financial information. The adoption of this standard will significantly increase the number of companies for which information is available for analysis and will promote more complete, more homogeneous, and therefore more comparable reports than those currently provided by companies. In particular, our evidence can support managers and policymakers in view of an increased number of companies that will be included in the new scope of the new EU Corporate Sustainability Reporting Directive, CSRD (European Commission EC, 2022).

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CONFLICT OF INTEREST STATEMENT

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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APPENDIX A

Appendix A1 shows the 200 companies belonging to the sample, indicating the product sectors, the nationality, the average value of R&D on sales over the 5 years, and the level of innovation (H green, high-innovation companies 32; M yellow, medium-innovation companies 60; L red, low-innovation companies 56; and B black, banks and insurance and financial companies 52).

Num	Company		Media RD_Sales	Nation	National Sector	Macro-sector	Sector
1	AP MOLLER A/S	M	3,55	DENMARK	Industry	Industrial Products and Services	Trasporti Industriali
2	ABB LIMITED	M	3,55	SWITZERLAND	Industry	Industrial Products and Services	Industrial engineering
3	ACTELION	M	3,18	UK	Health	Pharmaceutical	Pharmaceuticals and Biotechnology
4	ADECCO SA	M	0,86	SWITZERLAND	Industry	Industrial Products and Services	Support Services
5	ADIDAS AG	M	0,86	GERMANY	Consumer goods	Products for the home and the perso	Products for the Person and Fashion
6	AEGON N.V.	B	0,00	NETHERLANDS	Finance	Insurance	Life insurance
7	KONINKLIJKE AHOLD NV	B	0,00	NETHERLANDS	Consumer Services	Trade	Sale of Foodstuffs and Medicines
8	AIR LIQUIDE	M	1,59	FRANCE	Chemistry and raw materia	Chemistry	Chemistry
9	AIRBUS GROUP SE	H	5,99	FRANCE	Industry	Industrial Products and Services	Aerospace and Defense Industry
10	AKZO NOBEL N.V.	M	1,71	NETHERLANDS	Chemistry and raw materia	Chemistry	Chemistry
11	ALLIANZ SE	B	0,00	GERMANY	Finance	Insurance	General Insurance Services
12	AMADEUS IT HOLDING SA	M	3,88	SPAIN	Industry	Industrial Products and Services	Support Services
13	ANGLO AMERICAN PLC	L	0,35	UNITED KINGDOM	Chemistry and raw materia	Raw material	Mining
14	ANHEUSER-B INBEV SA	L	0,46	BELGIUM	Consumer goods	Food	Drinks
15	ARM HOLDINGS PLC	H	30,69	UNITED KINGDOM	Technology	Technology	Computer hardware and tools
16	ASML HOLDING NV	H	15,82	NETHERLANDS	Technology	Technology	Computer hardware and tools
17	ASSA ABLOY AB	M	2,79	SWEDEN	Industry	Construction and Materials	Construction and Materials
18	ASSICURAZIONI GENERALI SPA	B	0,00	ITALY	Finance	Insurance	General Insurance Services
19	ASSOCIATED FOODS PLC	L	0,23	UNITED KINGDOM	Consumer goods	Alimentari	Production of Groceries
20	ASTRAZENECA PLC	H	14,89	UNITED KINGDOM	Health	Health	Pharmaceuticals and Biotechnology
21	ATLANTIA SPA	B	0,00	ITALY	Industry	Industrial Products and Services	Industrial Transport
22	ATLAS COPCO AB	M	2,05	SWEDEN	Industry	Industrial Products and Services	Industrial engineering
23	AVIVA PLC	B	0,00	UNITED KINGDOM	Finance	Insurance	Life insurance
24	AXA SA	B	0,00	FRANCE	Finance	Insurance	General Insurance Services
25	BAE SYSTEMS PLC	H	5,65	UNITED KINGDOM	Industry	Industrial Products and Services	Aerospace and Defense Industry
26	BARCLAYS PLC	B	0,00	UNITED KINGDOM	Finance	Banks	Banks
27	BASF SE	M	2,42	GERMANY	Chemistry and raw materia	Chemistry	Chemistry
28	BAYER AG	H	8,25	GERMANY	Chemistry and raw materia	Chemistry	Chemistry
29	BBV SA	B	0,00	SPAIN	Finance	Banks	Banks
30	BANCO SABADELL	B	0,00	SPAIN	Finance	Banks	Banks
31	BANCO SANTANDER SA	B	0,00	SPAIN	Finance	Banks	Banks
32	BHP BILLITON PLC	L	0,13	UNITED KINGDOM	Chemistry and raw materia	Raw material	Mining
33	BMW	H	5,00	GERMANY	Consumer goods	Automobiles and Components	Automobiles and Components
34	BNP PARIBAS SA	B	0,00	FRANCE	Finance	Banks	Banks
35	BOUYGUES SA	L	0,22	FRANCE	Chemistry and raw materia	Chemistry	Chemistry
36	BP PLC	L	0,21	UNITED KINGDOM	Oil and Natural Gas	Oil and Natural Gas	Production of Oil and Natural Gas
37	TOBACCO P.L.C.	M	0,64	UNITED KINGDOM	Consumer goods	Products for the home and the perso	Tabacco
38	BRITISH LAND COMPANY PLC	B	0,00	UNITED KINGDOM	Finance	Real estate	Real Estate Funds
39	BT GROUP PLC	M	3,18	UNITED KINGDOM	Telecommunications	Telecommunications	Fixed line telecommunications
40	BURBERRY GROUP	B	0,00	UNITED KINGDOM	Consumer goods	Products for the home and the perso	Products for the Person and Fashion
41	CAIXABANK S.A.	B	0,00	SPAIN	Finance	Banks	Banks
42	CAP GEMINI SA	B	0,00	FRANCE	Technology	Technology	Computer Software and Services
43	CAPITA PLC	B	0,00	UNITED KINGDOM	Industry	Industrial Products and Services	Support Services
44	CARREFOUR S.A.	B	0,00	FRANCE	Consumer Services	Trade	Sale of Foodstuffs and Medicines
45	CENTRICA PLC	M	0,65	UNITED KINGDOM	Public Services	Public Services	Gas, Water and Public Utility Services
46	CHRISTIAN DIOR	L	0,25	FRANCE	Consumer goods	Products for the Home and the Perso	Products for the Person and Fashion
47	RICHEMONT SA	M	2,41	SWITZERLAND	Consumer goods	Products for the Home and the Perso	Products for the Person and Fashion
48	COLOPLAST AS	M	3,50	DENMARK	Health	Health	Healthcare
49	COMMERZBANK	B	0,00	GERMANY	Finance	Banks	Banks
50	COMPASS GROUP PLC	B	0,00	UNITED KINGDOM	Consumer Services	Travel and Leisure	Travel and Leisure
51	CONTINENTAL AG	H	5,81	GERMANY	Consumer goods	Automobiles and Components	Automobiles and Components
52	CREDIT AGRICOLE SA	B	0,00	FRANCE	Finance	Banks	Banks
53	CREDIT SUISSE GROUP AG	B	0,00	SWITZERLAND	Finance	Banks	Banks
54	CRH PLC	L	0,52	IRELAND	Industry	Construction and Materials	Construction and Materials
55	DAIMLER AG	M	3,61	GERMANY	Consumer goods	Automobiles and Components	Automobiles and Components
56	DANONE SA	M	1,27	FRANCE	Consumer goods	Food	Production of Groceries
57	DANSKE BANK AS	B	0,00	DENMARK	Finance	Banks	Banks

Num	Company		Media RD_Sales	Nation	National Sector	Macro-sector	Sector
58	DELHAIZE GROUP	L	0,18	BELGIUM	Finance	Banks	Banks
59	DEUTSCHE BANK	B	0,18	GERMANY	Finance	Banks	Banks
60	DEUTSCHE BOERSE AG	H	4,03	GERMANY	Finance	Financial Services	Financial Services
61	DEUTSCHE POST AG	B	0,00	GERMANY	Industry	Industrial Products and Services	Industrial Transport
62	DEUTSCHE TELEKOM AG	L	0,19	GERMANY	Telecommunications	Telecommunications	Mobile Telecommunications
63	DIAGEO PLC	L	0,18	UNITED KINGDOM	Consumer goods	Food	Drinks
64	DNB ASA	B	0,00	NORWAY	Finance	Banks	Banks
65	E. ON SE	L	0,04	GERMANY	Public services	Public services	Gas, Water and Public Utility Services
66	EDP - S.A.	M	0,66	PORTUGAL	Public services	Public services	Electricity
67	ENEL SPA	L	0,09	ITALY	Public services	Public services	Electricity
68	ENGIE SA	L	0,04	FRANCE	Public services	Public services	Gas, Water and Public Utility Services
69	ENI - ENTE ZIOLE IDROCARBURI	L	0,16	ITALY	Oil and natural gas	Oil and natural gas	Produzione di Petrolio e Gas turale
70	ERICSSON	H	13,98	SWEDEN	Technology	Technology	Computer hardware and tools
71	ESSILOR SA	M	3,66	FRANCE	Health	Health	Healthcare
72	EXPERIAN PLC	M	2,38	IRELAND	Industry	Industrial Products and Services	Support Services
73	FERROVIAL SA	M	1,28	SPAIN	Industry	Edilizia e Materiali	Construction and Materials
74	FIAT CHRYSLER AUTOMOBILES NV	M	1,28	UNITED KINGDOM	Consumer goods	Automobiles and Components	Automobiles and Components
75	FRES MEDICAL CARE AG-CO	M	0,82	GERMANY	Health	Health	Healthcare
76	FRESENIUS SE & CO KGAA	M	1,51	GERMANY	Health	Health	Healthcare
77	GEBERIT AG	M	2,44	SWITZERLAND	Industry	Edilizia e Materiali	Construction and Materials
78	GIVAUDAN SA	H	8,36	SWITZERLAND	Chemistry and raw materia	Chemistry	Chemistry
79	GLAXOSMITHKLINE PLC	H	13,30	UNITED KINGDOM	Health	Health	Pharmaceuticals and Biotechnology
80	GLENCORE PLC	M	2,95	SWITZERLAND	Chemistry and raw materia	Raw material	Mining
81	SOCIETE GENERALE	B	0,00	FRANCE	Finance	Banks	Banks
82	HEIDELBERGCEMENT AG	M	0,64	GERMANY	Industry	Construction and Materials	Construction and Materials
83	HEINEKEN NV	L	0,40	NETHERLANDS	Consumer goods	Food	Drinks
84	HENKEL AG AND CO. KGAA	M	2,57	GERMANY	Consumer goods	Products for the home and the perso	Household and housing products
85	HENNES - MAURITZ AB	L	0,53	SWEDEN	Consumer Services	Trade	General trade
86	HSBC HOLDINGS PLC	B	0,00	UNITED KINGDOM	Finance	Banks	Banks
87	IBERDROLA S.A.	L	0,60	SPAIN	Public services	Public services	Electricity
88	IMPERIAL BRANDS PLC	L	0,54	UNITED KINGDOM	Consumer goods	Products for the home and the perso	Tabacco
89	INFINEON TECH AG	H	12,77	GERMANY	Technology	Technology	Computer hardware and tools
90	ING GROEP N.V.	H	4,17	NETHERLANDS	Finance	Insurance	Life insurance
91	INTESA SANPAOLO SPA	B	0,00	ITALY	Finance	Banks	Banks
92	INVESTOR AB	B	0,00	SWEDEN	Finance	Financial services	Financial services
93	ITV PLC	L	0,35	UNITED KINGDOM	Consumer Services	Media	Media
94	INDITEX	L	0,51	SPAIN	Consumer Services	Trade	General trade
95	JOHNSON MATTHEY PLC	M	1,08	UNITED KINGDOM	Chemistry and raw materia	Chemistry	Chemistry
96	JULIUS BAER GROUP AG	M	0,62	SWITZERLAND	Finance	Banks	Banks
97	KBC GROUP NV	B	0,00	BELGIUM	Finance	Banks	Banks
98	KERRY GROUP PLC	M	3,23	IRELAND	Consumer goods	Food	Production of Groceries
99	KINGFISHER PLC	B	0,00	UNITED KINGDOM	Consumer Services	Trade	General trade
100	KONE OYJ	M	1,19	FINLAND	Industry	Industrial Products and Services	Industrial engineering
101	KONINK_DSM	H	4,14	NETHERLANDS	Chemistry and raw materia	Chemistry	Chemistry
102	KONINK_KPN	L	0,22	NETHERLANDS	Telecommunications	Telecommunications	Fixed line telecommunications
103	KERING	M	0,77	FRANCE	Consumer Services	Trade	General trade
104	L'OREAL	M	3,51	FRANCE	Consumer goods	Products for the home and the perso	Products for the Person and Fashion
105	LAND SECURITIES GROUP PLC	B	0,00	UNITED KINGDOM	Finance	Real estate	Real Estate Funds
106	LEGAL & GENERAL GROUP PLC	B	0,00	UNITED KINGDOM	Finance	Insurance	Life insurance
107	LEGRAND S.A.	H	4,66	FRANCE	Industry	Industrial Products and Services	Electronics and Electrical Products
108	LINDE AKTIENGESELLSCHAFT	M	0,68	GERMANY	Chemistry and raw materia	Chemistry	Chemistry
109	LLOYDS BANKING GROUP PLC	B	0,00	UNITED KINGDOM	Finanza	Banks	Banks
110	LONDON STOCK EXCHANGE GROUP PL	L	0,37	UNITED KINGDOM	Finance	Financial Services	Financial Services
111	LUXOTTICA GROUP SPA	M	3,51	ITALY	Consumer goods	Products for the home and the perso	Products for the Person and Fashion
112	LVMH SE	L	0,25	FRANCE	Consumer goods	Products for the home and the perso	Products for the Person and Fashion
113	LAFARGE HOLCIM	L	0,25	SVIZZERA	Chemistry and raw materia	Chemistry	Chemistry
114	MARKS – SPENCER GROUP PLC	L	0,52	UNITED KINGDOM	Consumer Services	Trade	General trade
115	MERCK KGAA	H	14,84	GERMANY	Health	Health	Pharmaceuticals and Biotechnology

Num	Company		Media RD_Sales	Nation	National Sector	Macro-sector	Sector
116	MICHELIN SCA	M	3,13	FRANCE	Beni di Consumo	Automobiles and Components	Automobiles and Components
117	MUENCHENER AG	B	0,00	GERMANY	Finance	Insurance	General Insurance Services
118	TIOL GRID PLC	L	0,10	UNITED KINGDOM	Public services	Public services	Gas, Water and Public Utility Services
119	NESTLE S.A.	M	1,58	SWITZERLAND	Consumer goods	Food	Production of Groceries
120	NEXT PLC	L	0,32	UNITED KINGDOM	Consumer Services	Trade	General trade
121	NOKIA CORPORATION	H	14,36	FINLAND	Technology	Technology	Computer hardware and tools
122	NORDEA BANK AB	B	0,00	SWEDEN	Finance	Banks	Banks
123	NOVARTIS AG	H	16,32	SWITZERLAND	Health	Health	Pharmaceuticals and Biotechnology
124	NOVO NORDISK AS	H	14,05	DENMARK	Health	Health	Pharmaceuticals and Biotechnology
125	OLD MUTUAL PLC	B	0,00	UNITED KINGDOM	Finance	Insurance	Life insurance
126	ORANGE SA	L	0,31	FRANCE	Telecommunications	Telecommunications	Fixed line telecommunications
127	PANDORA A/S	L	0,14	DENMARK	Consumer goods	Products for the home and the perso	Products for the Person and Fashion
128	PEARSON PLC	B	0,00	UNITED KINGDOM	Consumer Services	Media	Media
129	PERNOD RICARD	L	0,52	FRANCE	Consumer goods	Food	Drinks
130	KONINKLIJKE PHILIPS NV	H	6,89	NETHERLANDS	Industry	Industrial Products and Services	Other Industrial Products
131	PROSIEBENSAT MEDIA AG	L	0,57	GERMANY	Consumer Services	Media	Media
132	PRUDENTIAL PLC	B	0,00	UNITED KINGDOM	Finance	Insurance	Life insurance
133	PUBLICIS GROUPE SA	M	1,50	FRANCE	Consumer Services	Media	Media
134	RECKITT BENCKISER GROUP PLC	M	1,58	UNITED KINGDOM	Consumer goods	Products for the home and the perso	Household and housing products
135	RELX PLC	L	0,31	UNITED KINGDOM	Consumer Services	Media	Media
136	RELX NV	L	0,42	NETHERLANDS	Consumer Services	Media	Media
137	REULT (REGIE TIOLE DES USINES) SA	M	2,78	FRANCE	Consumer goods	Automobiles and Components	Automobiles and Components
138	REPSOL SA	L	0,55	SPAIN	Oil and Natural Gas	Oil and Natural Gas	Production of Oil and Natural Gas
139	RIO TINTO PLC	L	0,33	UNITED KINGDOM	Chemistry and raw materia	Raw material	Mining
140	ROCHE HOLDING	H	18,85	SWITZERLAND	Health	Health	Pharmaceuticals and Biotechnology
141	ROLLS ROYCE HOLDINGS PLC	H	4,07	UNITED KINGDOM	Industry	Industrial Products and Services	Aerospace and Defense Industry
142	ROYAL BANK OF SCOTLAND GROUP PL	B	0,00	UNITED KINGDOM	Finance	Banks	Banks
143	ROYAL DUTCH SHELL PLC	L	0,30	NETHERLANDS	Oil and Natural Gas	Oil and Natural Gas	Production of Oil and Natural Gas
144	RYAIR HOLDINGS PLC	L	0,51	IRELAND	Consumer Services	Travel and Leisure	Travel and Leisure
145	SABMILLER PLC	L	0,04	UNITED KINGDOM	Consumer goods	Food	Drinks
146	SAFRAN	M	2,60	FRANCE	Industry	Industrial Products and Services	Aerospace and Defense Industry
147	COMPAGNIE DE SAINT GOBAIN SA	M	1,00	FRANCE	Industry	Construction and Materials	Construction and Materials
148	SAMPO OYJ	B	0,00	FINLAND	Finance	Insurance	General Insurance Services
149	SANDVIK AB	M	2,76	SWEDEN	Industry	Industrial Products and Services	Industrial engineering
150	SANOFI S.A.	H	14,47	FRANCE	Health	Health	Pharmaceuticals and Biotechnology
151	SAP AG	H	13,86	GERMANY	Technology	Technology	Computer Software and Services
152	SCHNEIDER ELECTRIC SE	M	3,98	FRANCE	Industria	Industrial Products and Services	Electronics and Electrical Products
153	SSE PLC	L	0,03	UNITED KINGDOM	Public services	Public services	Electricity
154	SES S.A.	L	0,25	LUXEMBOURG	Consumer Services	Media	Media
155	SGS SA	M	1,68	SWITZERLAND	Industry	Industrial Products and Services	Support Services
156	SHIRE PLC	H	17,95	IRELAND	Health	Health	Pharmaceuticals and Biotechnology
157	SIEMENS AG	H	5,37	GERMANY	Industria	Industrial Products and Services	Other Industrial Products
158	SKANDIVISKA ENSKILDA BANKEN	L	0,59	SWEDEN	Finance	Banks	Banks
159	SKY PLC	L	0,59	UNITED KINGDOM	Consumer Services	Media	Media
160	SMITH & NEPHEW PLC	H	4,39	UNITED KINGDOM	Health	Health	Healthcare
161	SM SPA	M	0,97	ITALY	Public services	Public services	Gas, Water and Public Utility Services
162	SODEXO	L	0,52	FRANCE	Consumer Services	Travel and Leisure	Travel and Leisure
163	STANDARD CHARTERED PLC	B	0,00	UNITED KINGDOM	Finance	Banks	Banks
164	STANDARD LIFE PLC	B	0,00	UNITED KINGDOM	Finance	Insurance	Life insurance
165	STATOIL ASA	L	0,26	NORWAY	Oil and Natural Gas	Oil and Natural Gas	Production of Oil and Natural Gas
166	STEINHOFF INTL.HDG.(XET)	M	0,91	GERMANY	Finance	Banks	Banks
167	SVENSKA HANDELSBANKEN AB	B	0,00	SWEDEN	Finance	Banks	Banks
168	SVENSKA HANDBKN . 'A'	M	2,39	SWEDEN	Finance	Banks	Banks
169	THE SWATCH GROUP SA	B	0,00	SWITZERLAND	Consumer goods	Products for the home and the perso	Products for the Person and Fashion
170	SWEDBANK AB	B	0,00	SWEDEN	Finance	Banks	Banks
171	SWISS RE AG	L	0,13	SWITZERLAND	Finance	Insurance	General Insurance Services

Num	Company		Media RD_Sales	Nation	National Sector	Macro-sector	Sector
172	SWISSCOM	H	8,96	SWITZERLAND	Telecommunications	Telecommunications	Fixed line telecommunications
173	SYNGENTA AG	M	1,84	SWITZERLAND	Chemistry and raw materia	Chemistry	Chemistry
174	TELECOM ITALIA SPA	M	0,60	ITALY	Telecommunications	Telecommunications	Fixed line telecommunications
175	TELEFONICA SA	L	0,34	SPAIN	Telecommunications	Telecommunications	Fixed line telecommunications
176	TELENOR GROUP ASA	L	0,34	NORWAY	Telecommunications	Telecommunications	Mobile Telecommunications
177	TELIASONERA AB	L	0,48	SWEDEN	Telecommunications	Telecommunications	Mobile Telecommunications
178	TESCO PLC	L	0,53	UNITED KINGDOM	Consumer Services	Trade	Sale of Foodstuffs and Medicines
179	THYSSENKRUPP AG	M	1,26	GERMANY	Industry	Industrial Products and Services	Other Industrial Products
180	TOTAL SA	L	0,49	FRANCE	Oil and Natural Gas	Oil and Natural Gas	Production of Oil and Natural Gas
181	UBS GROUP AG	B	0,00	SWITZERLAND	Finance	Banks	Banks
182	UCB SA	H	26,57	BELGIUM	Health	Health	Pharmaceuticals and Biotechnology
183	UNIBAIL-RODAMCO	B	0,00	FRANCE	Finance	Real estate	Real Estate Funds
184	UNICREDIT SPA	B	0,00	ITALY	Finance	Banks	Banks
185	UNILEVER_NL	M	2,09	NETHERLANDS	Consumer goods	Food	Production of Groceries
186	UNILEVER_UK	M	2,09	UNITED KINGDOM	Consumer goods	Food	Production of Groceries
187	UNITED UTILITIES GROUP PLC	L	0,08	UNITED KINGDOM	Servizi Pubblici	Public services	Gas, Water and Public Utility Services
188	VALEO SA	H	4,44	FRANCE	Consumer goods	Automobiles and Components	Automobiles and Components
189	VEOLIA SA	L	0,26	FRANCE	Public services	Public services	Gas, Water and Public Utility Services
190	VESTAS WIND SYSTEMS AS	M	0,72	DENMARK	Oil and Natural Gas	Oil and Natural Gas	Alternative energy
191	VINCI	M	0,77	FRANCE	Industry	Construction and Materials	Construction and Materials
192	VIVENDI SA	M	1,67	FRANCE	Consumer Services	Media	Media
193	VODAFONE GROUP PLC	M	0,65	UNITED KINGDOM	Telecommunications	Telecommunications	Mobile Telecommunications
194	VOLKSWAGEN AG	M	3,04	GERMANY	Consumer goods	Automobiles and Components	Automobiles and Components
195	VOLVO AB	H	5,26	SWEDEN	Industry	Industrial Products and Services	industrial engineering
196	VONOVIA SE	B	0,00	GERMANY	Finance	Real estate	Real Estate Services and Investments
197	WHITBREAD PLC	L	0,58	UNITED KINGDOM	Consumer Services	Travel and Leisure	Travel and Leisure
198	WOLSELEY PLC	L	0,27	SWITZERLAND	Industry	Industrial Products and Services	Support Services
199	WPP PLC	L	0,54	UNITED KINGDOM	Consumer Services	Media	Media
200	ZURICH INSURANCE GROUP	B	0,00	SWITZERLAND	Finance	Insurance	General Insurance Services