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RESEARCH ARTICLE

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Does it pay to be sustainable? Looking inside the black box of the relationship between sustainability performance and financial performance

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[Correction added on 25 June 2018, after first online publication: The title of this article has been updated in this version.]

Abstract

The last three decades have witnessed a huge amount of research exploring the linkage between companies' sustainability performance (SP), sustainability disclosure and financial performance (FP). Researchers have applied various methods and techniques to investigate this relationship, yet the results remain equivocal. In this article, we look inside this black box by considering various manifestations of sustainability practices and investigating their link with FP. We apply a manual content analysis technique to analyse the sustainability reports of the 100 best-performing US firms. Our results reveal that fragmentation in the results is caused by the SP measurement. Additionally, we note that the interlinkages between different SP dimensions and sub-dimensions are weak and somewhat contradictory. The results help draw important policy implications for the development of an SP reporting framework.

KEYWORDS

corporate sustainability performance, disclosure, financial performance, G3 guidelines, Global Reporting Initiative

1 | INTRODUCTION

Does it pay to be sustainable? This question has been asked by many studies in the last three decades, yet the results are fragmented (Callan & Thomas, 2009; Barnett & Salomon, 2012; Song, Zhao, & Zeng, 2017). Recent discursive and meta-analytical reviews by Horváthová (2010), Endrikat, Guenther, and Hoppe (2014) and Lu, Chau, Wang, and Pan (2014) suggest that the uneven application of sustainability performance (SP) measures is one of the main causes of the prevailing equivocality of results. The existing literature so far has neglected the multifaceted nature of sustainability measurement (Trumpp, Endrikat, Zopf, & Guenther, 2015). Most of the researchers in the given SP and financial performance (FP) nexus either used third-party SP measurement such as KLD[1] (e.g. Tang, Hull, & Rothenberg, 2012; Tebini, M'Zali, Lang, & Perez-Gladish, 2016; Waddock & Graves, 1997) or self-defined measurement (e.g. Mahoney, LaGore, & Scazzero, 2008; Godfrey & Hatch, 2007). This lack of congruent SP measurement has created confusion about the relationship between SP and FP (Horváthová, 2010). To clear up this confusion, we conduct an in-depth analysis of the relationship between sustainability disclosure (SD), SP and FP. Our measurement is based on a widely accepted reporting framework, i.e. the GRI framework.[2]

We analyse 152 sustainability reports from the 100 best-performing[3] US firms by applying a manual content analysis technique.

[1] Currently, Kinder, Lydenberg, Domini, and Co. (KLD) covers 3000 public companies and provides data on the corporate social performance of covered firms.

[2] The Global Reporting Initiative (GRI) was established in 1997 and is an international independent standards organization. The first guidelines were issued in the year 2000, and to date many updated versions have been launched.

[3] Fortune magazine issues a list of the 100, 250 and 500 best-performing companies every year. The companies on the list are ranked by revenue growth, increase in earnings per share and three-year total stock return. The overall ranking is determined by the sum of the three ranks.

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We categorize the SP information for each indicator category – economic, environmental and social – separately. Such a classification allows us to calculate an SP index for each indicator and sub-category (see Table 2 later for a detailed description). To test the inter-linkages (Antolin-Lopez, Delgado-Ceballos, & Montiel, 2016; Bradford, Earp, Showalter, & Williams, 2016; Lozano & Huisingh, 2011) between individual SP components, we collect data on sub-dimensions of the SP indicators. This helps provide fact-based results about the underlying relationship and points to the underlying causes of divergence among extant results. To shed further light on this relationship, we utilize third-party SD data as well.

The empirical results provide several insights; first, mere SD does not show any significant relationship with any of the FP measures, while SP measures show a significant correlation with FP. We further observe that not all the sub-dimensions of the SP indicator are equally related to FP; however, some do show a significant relationship with FP. We also note that some sub-dimensions are negatively related within and across indicators. Second, environmental performance (EP) and social performance remain consistently positive and significant across all FP measures. Third, our results contribute to the existing debate on the SP–FP relationship by showing that using a stable and comprehensive SP measurement can yield conclusive results. Our results contribute towards stakeholder theory by showing that sustainability initiatives are positively linked with FP. The results have relevant policy implications for designing a comprehensive and value-relevant SP measurement framework. These results are useful for managers in demonstrating that real commitment towards sustainable corporate development pays off in terms of superior FP.

The remainder of the paper is organized as follows: the next section discusses the findings of the extant literature. Section 3 is devoted to discussion about theory and hypothesis development. Section 4 describes our methodology. In Section 5, we present the empirical findings. In the last two sections, we discuss our results and outline conclusions, implications and future research directions.

2 | PRIOR EVIDENCE

There are different schools of thought[4] concerning the SP–FP nexus (see Molina-Azorín, Claver-Cortés, López-Gamero, & Tarí, 2009; Revelli & Viviani, 2015). Proponents of the neoclassical school ('traditionalist view') have argued that sustainability initiatives impose additional costs (see, e.g., Walley & Whitehead, 1994; Hamilton, 1995), whereas Porter (1991) and Porter and Van der Linde (1995) support the 'revisionist view' and argue that such initiatives create win–win situations by enhancing FP and social welfare. Flammer (2015) and Marti, Rovira-Val, and Drescher (2015) note that investment in sustainability yields positive accounting performance. Similarly, Wang and Tuttle (2014) argue that sustainability has become an important contributor to investment returns by sending a positive signal to the financial market.

The third stream of research challenges both traditionalist as well as revisionist views and supports an inverse U-shaped relationship (Lankoski, 2000; Wagner, 2001) by arguing that sustainability is beneficial to a limited extent. Others have argued for a neutral association between firms' responsible behaviour and resulting benefits (McWilliams & Siegel, 2001). Table 1 provides an overview of the mixed empirical results. We systematically review the literature and present the competing approaches.

Literature supporting the revisionist view identifies several incentives for sustainability engagement. These benefits include improved competitiveness (Porter & Van der Linde, 1995), improved relations with stakeholders and compliance with regulations, higher return on investments and lower financing cost (Derwall & Koedijk, 2009; Orens, Aerts, & Cormier, 2010), higher shareholder value (Porter & Kramer, 2011) and better share performance (Eccles, Ioannou, & Serafeim, 2014).

Conversely, Shane and Spicer (1983), Cordeiro and Sarkis (1997) and Preston and O'Bannon (1997) argue that sustainability engagement is detrimental for FP. Hamilton (1995) finds a negative relationship between the Toxic Release Inventory and share price. Similarly, Khanna and Damon (1999) find a negative impact of Toxic Release Inventory on return on investment. Likewise, Konar and Cohen (2001) note that information about toxic chemical disclosure impacts financial performance negatively in the US manufacturing sector. On the other hand, Pava and Krausz (1996), King and Lenox (2001) and Link and Naveh (2006) report an insignificant relationship between SP and FP.

Similar competition among reported results can be seen in many other studies. Horváthová (2010) conducts a meta-analysis on 64 outcomes from 37 empirical studies and concludes that the inconsistency that prevails is due to methodical inconsistency. More recently, Wang, Dou, and Jia (2016) analysed 119 outcomes from 42 empirical studies and found that the measurement of the SP constructs creates variation in the results. The body of knowledge is growing, yet the results are inconclusive. Keeping in view the competing results, our study aims to fill this void by using a more refined measurement of SP.

3 | HYPOTHESIS DEVELOPMENT

The review of the existent literature shows that not only are the empirical findings contradictory, but the use of theories is also inconsistent (see Table 1). Moreover, theories used in existing SP–FP nexus literature are based on contending assumptions; for example, agency theory (Al-Najjar & Anfimiadou, 2012; Surroca & Tribó, 2008) and stakeholder theory (Hoepner, Oikonomou, Scholtens, & Schröder, 2016; Trumpp & Guenther, 2015) are based on opposing assumptions (Hussain, Rigoni, & Orij, 2016); yet many researchers use these two theories to provide the rationale for similar research questions (McWilliams, Siegel, & Wright, 2006; Wahba, 2008). Among all these theories, the stakeholder theory is the dominant theory, suggesting a positive relationship between corporate sustainability initiatives and FP (McWilliams & Siegel, 2001).

[4]Traditionalists and revisionists hold competing views about firms' engagement with sustainability initiatives and its impact on FP. Friedman (1962) considers economic profit making as the only social responsibility of the firm. He argues that CSR is a 'subversive doctrine' (p. 133). On the other hand, Porter (1991) and Porter and Van der Linde (1995) have formulated the 'Porter hypothesis', according to which the investment in sustainability is in the long-term benefit of stakeholders as well as investors.

TABLE 1 Review of empirical literature

Study	SP measures	FP measures	Sample size	Coverage years	Theory	Country	Results
Jaggi and Freedman (1992)	environmental performance	ROA, ROE, net income, cash flow	13	1	no specific theory	US	negative
Hamilton (1995)	SP disclosure	stock price performance	463	1	no specific theory	US	negative
Hart and Ahuja (1996)	SP disclosure	ROA, ROE, ROS	127	4	no specific theory	US	positive
Cordeiro and Sarkis (1997)	Toxic Release Inventory disclosure	analysts' earnings per share forecast	523	1	no specific theory	US	negative
Judge and Douglas (1998)	self-defined environmental measures	ROI, sales growth, earnings growth	196	1	resource-based view	US	positive
Wagner, Van Phu, Azomahou, and Wehrmeyer (2002)	environmental performance	ROE, ROS, ROCE	57	3	no specific theory	European firms	negative
Seifert, Morris, and Bartkus (2003)	SP disclosure	ROA, ROE, ROS	90	1	agency theory	US	insignificant
Goll and Rasheed (2004)	discretionary social responsibility	ROA, ROS	62	1	stakeholder theory	US	positive
Seifert, Morris, and Bartkus (2004)	corporate philanthropy	cash flow/sales	157	2	resource dependence theory	US	positive
Menguc and Ozanne (2005)	environmental orientation	sales growth	140	1	resource-based view	Australia	negative
Barnett and Salomon (2006)	self-defined measures of SP	risk-adjusted FP	61	28	stakeholder theory	US	positive
Brammer et al. (2006)	CSR performance	stock returns	296	1	no specific theory	UK	negative
Luo and Bhattacharya (2006)	CSR rating	Tobin's *Q*, stock returns	452	4	stakeholder theory	US	positive
Mahoney et al. (2008)	self-defined measures of SP	ROA	44	5	signalling theory	US	positive
Prado-Lorenzo, Gallego-Álvarez, García-Sánchez, and Rodríguez-Domínguez (2008)	SP disclosure	sales growth	117	1	stakeholder theory	Spain	positive
Scholtens (2008)	CSR rating	financial risk and return	289	13	no specific theory	US	insignificant
Surroca and Tribó (2008)	corporate social performance	ROA, Tobin's *Q*	448	4	agency theory	22 different countries	negative
Makni, Francoeur, and Bellavance (2009)	corporate social performance	ROA, ROE, market return	179	2	stakeholder theory	Canada	negative
Mishra and Suar (2010)	SP disclosure	ROA	150	1	signalling theory	India	positive
Orens et al. (2010)	web-based CSR disclosure	cost of financing	895	1	no specific theory	US and Europe	negative
Siregar and Bachtiar (2010)	SP reporting	ROA	87	1	stakeholder theory	Indonesia	insignificant
Keele and DeHart (2011)	partnership with USEPP	stock price reaction	103	1	efficient market theory	US	negative
Al-Najjar and Anfimiadou (2012)	environmental performance	market-based performance	350	10	agency theory	UK	positive
Fujii et al. (2013)	greenhouse gas emission disclosure	ROA	758	8	no specific theory	Japan	inverted U shaped

(Continues)

TABLE 1 (Continued)

Study	SP measures	FP measures	Sample size	Coverage years	Theory	Country	Results
Gallego-Álvarez, García-Sánchez, and Silva Vieira (2014)	environmental performance	ROA	855	4	trade-off theory	international sample	positive
Wang, Li, and Gao (2014)	greenhouse gas emission disclosure	Tobin's Q	69	1	stakeholder theory	Australia	negative
Dangelico and Pontrandolfo (2015)	environmental performance	firm performance	122	1	no specific theory	Italy	positive
Trumpp and Guenther (2015)	environmental performance	changes in stock prices	696	5	stakeholder theory	US	U shaped
Yadav, Han, and Rho (2015)	environmental performance disclosure	abnormal stock returns	394	2	efficient market theory	US	positive
Gregory, Whittaker, and Yan (2016)	CSR performance	firm value	48 industries	18	no specific theory	US	positive
Hoepner, Oikonomou, Scholtens, & Schröder (2016)	sustainability performance	cost of debt	470	8	stakeholder theory	international sample	insignificant

Stakeholder theory assumes that a firm should take into consideration the needs of a wider variety of stakeholders and not only the profit requirements of its owners (Freeman, 1984). Endorsing stakeholder theory as a relevant theoretical lens, Freeman (2010) argues that, although shareholders' wealth creation is at the top of the corporate agenda, firms should not ignore the needs of a wider spectrum of stakeholders. He further argues that such stakeholders play a vital role for the success, survival and growth of a firm. Under a similar assumption, Russo and Fouts (1997) document a significant positive relationship between environmental disclosure and FP. Similarly, King and Lenox (2002) and Ducassy (2013) observe a positive relationship between EP and FP. Waddock and Graves (1997) argue that, if the firm does not incur the explicit cost of being sustainable, then it has to incur an implicit cost of losing competitive advantage. Likewise, Hull and Rothenberg (2008) maintain that SP is a tool to improve stakeholder management. Moreover, stakeholder theory supports a positive relationship between both SD and SP with FP. To validate theoretical claims and corroborate empirical findings we hypothesize following relationships.

H1 SD is positively linked to FP.

H2 SP is positively linked to FP.

4 | METHODOLOGY

4.1 | Sample design and data collection

We limit our research to US companies belonging to the Global Fortune 100 best-performing companies list. According to the GRI's annual list of reporting firms, we selected companies that have issued a sustainability report at least once during our study period, from 2007 to 2011.[5] This selection principle allows us to identify 44 companies belonging to 12 different industries. From the website of each company and the website of Corporate Register[6] (http://www.corporateregister.com/), we collected 152 sustainability reports issued by these companies.

4.2 | | Research design and variable measurement

4.2.1 | Research design

We employed three sets of panel regression models. All the models included a set of the relevant control variables identified in the prominent literature. In the first regression model, we include traditional SD indexes: *environmental*, *social* and *governance* (ESG parameters), as provided by Bloomberg and discussed in the next section. The dependent variables are firms' accounting (ROA and ROE) and market-based (Tobin's Q) FP measures. In more formal terms, we tested the following equation:

[5]The selected time range is the longest period without updates or modifications of the sustainability reporting guidelines (G3 guidelines).

[6]CorporateRegister.com Ltd is an independent and self-funded company, holding the world's largest directory of sustainability reports.

TABLE 2 Dependent, independent, and control variables

	Description
Dependent	
TOBINQ	Tobin's Q ratio
ROA	return on assets
ROE	return on shareholders' equity
Independent	
ESG_Environmental	environmental disclosure score
ESG_Social	social disclosure score
ESG_Governance	governance disclosure score
EC_SUST	economic sustainability performance; a product variable of relevance quantity and quality indexes
EN_SUST	environmental sustainability performance; a product variable of relevance quantity and quality indexes
SO_SUST	social sustainability performance; a product variable of relevance quantity and quality indexes
EC_SUSTsub1	direct economic performance (economic sub-dimension 1); a product variable of relevance quantity and quality indexes
EC_SUSTsub2	market presence of a company (economic sub-dimension 2); a product variable of relevance quantity and quality indexes
EC_SUSTsub3	indirect economic effect (economic sub-dimension 3); a product variable of relevance quantity and quality indexes
EN_SUSTsub1	input (environmental sub-dimension 1); a product variable of relevance quantity and quality indexes
EN_SUSTsub2	output (environmental sub-dimension 2); a product variable of relevance quantity and quality indexes
EN_SUSTsub3	environmental compliance (environmental sub-dimension 3); a product variable of relevance quantity and quality indexes
SO_SUSTsub1	labour practices & decent work (social sub-dimension 1); a product variable of relevance quantity and quality indexes
SO_SUSTsub2	human rights (social sub-dimension 2); a product variable of relevance quantity and quality indexes
SO_SUSTsub3	society (social sub-dimension 3); a product variable of relevance quantity and quality indexes
SO_SUSTsub4	product responsibility (social sub-dimension 4); a product variable of relevance quantity and quality indexes
Control	
ENV_SENS	dummy variable taking value 1 if firm belongs to an environmentally sensitive industry, 0 otherwise
SIZE	log of total assets of the firm as measure of size
CAP_INT	capital intensity of the firm as ratio of capital expenditure and total assets
RD_INT	R&D intensity of the firm as ratio of research and development expenditure to total sales
SALE_GROW	one year growth in sales
D/E	ratio of debt to equity in the capital structure

$$\mathbf{FP}_{it} = \alpha + \beta_1 \mathbf{ESG}_{\mathbf{environmental}it} + \beta_2 \mathbf{ESG}_{\mathbf{social}it} + \beta_3 \mathbf{ESG}_{\mathbf{governance}_{it}} + \beta_x \mathbf{controls}_{it} + \varepsilon_{it}. \quad (1)$$

Our next two regression equations test the relationship between SP and FP. Formally, our second and third equations are

$$\mathbf{FP}_{it} = \alpha + \beta_1 \mathbf{EC_SUST}_{it} + \beta_2 \mathbf{EN_SUST}_{it} + \beta_3 \mathbf{SO_SUST}_{it} + \beta_x \mathbf{cntrols}_{it} + \varepsilon_{it} \quad (2)$$

$$\begin{aligned}\mathbf{FP}_{it} = \alpha &+ \beta_1 \mathbf{EC}_{\mathbf{SUSTsub1}_{it}} + \beta_2 \mathbf{EC}_{\mathbf{SUSTsub2}_{it}} + \beta_3 \mathbf{EC}_{\mathbf{SUSTsub3}_{it}} \\ &+ \beta_4 \mathbf{EN}_{\mathbf{SUSTsub1}_{it}} + \beta_5 \mathbf{EN}_{\mathbf{SUSTsub2}_{it}} + \beta_6 \mathbf{EN}_{\mathbf{SUSTsub3}_{it}} \\ &+ \beta_7 \mathbf{SO}_{\mathbf{SUSTsub1}_{it}} + \beta_8 \mathbf{SO}_{\mathbf{SUSTsub2}_{it}} + \beta_9 \mathbf{SO}_{\mathbf{SUSTsub3}_{it}} \\ &+ \beta_{10} \mathbf{SO}_{\mathbf{SUSTsub4}_{it}} + \beta_x \mathbf{controls}_{it} + \varepsilon_{it}.\end{aligned} \quad (3)$$

Based upon the Hausman (1978) specification test results, we apply fixed-effect panel regression analysis for all our equations.

4.2.2 | Measurement of variables

To test our first model, we used the ESG parameters provided by Bloomberg. Bloomberg ESG scores range from 0 to 100 depending on the number of data points disclosed by companies. The more the company discloses, the higher the score. ESG estimation covers a broad range of items (Lo & Kwan, 2017). ESG scores are broad, although not verifiable, measures of firm sustainability disclosure. Despite their limitations, we use ESG scores to understand whether SD is relevant for firms' FP.

In Models 2 and 3 we use verifiable SP measures that are based on GRI guidelines. GRI argues that sustainability reports based on its guidelines can be used as a benchmark for organizational performance and demonstration of organizational commitment towards sustainable development goals (GRI, 2006). GRI reporting framework challenges firms to report on both positive and negative aspects of their performance, according to a specific list of items classified in three distinct dimensions (economic, environmental and social dimensions) broken down into various sub-dimensions. The economic dimension is measured by nine items divided into three sub-dimensions: direct economic performance (1–4), market presence (5–7) and indirect economic impact on society (8, 9).

The environmental dimension is also composed of three sub-dimensions: inputs (material, energy and water), outputs (emissions, effluents and waste) and compliance (environmental compliance, and other relevant information such as environmental expenditure and the impacts of products and services). Each sub-dimension is determined by 10 out of a total of 30 items. The social dimension of sustainability is composed of four sub-dimensions. These sub-dimensions are labour practices and decent work (Items 1–14), human rights (Items 15–23), society (Items 24–31) and product responsibility (Items 32–40). According to GRI indications, we measured the performance of the economic, environmental and social dimensions as well as the performance of each sub-dimension of the three sustainability pillars.

For each dimension and sub-dimension, we measured the disclosure level on a binary scale (1 when the information on an item is provided and 0 otherwise). This procedure allows us to generate for each level a disclosure index as the ratio between the number of items disclosed and the overall number of items included in the dimension or sub-dimension. As for the quality of the sustainability disclosure, we calculated a *quality index* based on the classification of positive and

TABLE 3 Descriptive statistics

Panel A	Sustainability disclosure measures (ESG parameters)				
		Full sample	Not environmentally sensitive industry (ENV_SENS = 0)	Environmentally sensitive industry (ENV_SENS = 1)	Wilcoxon rank-sum test
Environmental disclosure transparency (ESG_Environmental)	*N* mean	143 38.888	92 36.866	51 42.536	**
Social disclosure transparency (ESG_Social)	*N* mean	144 41.201	92 39.363	52 44.453	**
Governance disclosure transparency (ESG_Governance)	*N* mean	144 63.951	92 62.927	52 65.762	***
***$p < 0.01$. **$p < 0.05$.					
Panel A provides the main descriptives for the ESG indicators (ESG_Environmental, ESG_ Social and ESG_Governance).					
Panel B	**Sustainability performance measures (our indicators)**				
		Full sample	**Not environmentally sensitive industry (ENV_SENS = 0)**	**Environmentally sensitive industry (ENV_SENS = 1)**	**Wilcoxon rank-sum test**
Economic sustainability performance (EC_SUST)	*N* mean	152 0.412	99 0.412	53 0.411	not sig.
Environmental sustainability performance (EN_SUST)	*N* mean	152 0.452	99 0.458	53 0.441	not sig.
Social sustainability performance (SO_SUST)	*N* mean	152 0.467	99 0.478	53 0.447	not sig.
Panel B provides the main descriptives for the sustainability performance indicators (EC_SUST, EN_SUST and SO_SUST).					
Panel C	**Financial performance measures (dependent variables)**				
		Full sample	**Not environmentally sensitive industry (ENV_SENS = 0)**	**Environmentally sensitive industry (ENV_SENS = 1)**	**Wilcoxon rank-sum test**
ROA	*N* mean	151 7.344	98 7.266	53 7.488	not sig.
ROE	*N* mean	151 18.621	98 19.822	53 16.402	not sig.
TOBINQ	*N* mean	151 2.867	98 3.150	53 23.452	*
*$p < 0.1$.					
Panel C provides the main descriptives for the financial performance measures used in the regression models (ROA, ROE and TOBINQ).					
Panel D	**Firm-specific control variables**				
		Full sample	**Not environmentally sensitive industry (ENV_SENS = 0)**	**Environmentally sensitive industry (ENV_SENS = 1)**	**Wilcoxon rank-sum test**
SIZE	*N* mean	152 11.322	99 11.443	53 11.097	not sig.
D/E	*N* mean	152 30.438	99 32.028	53 27.468	not sig.
CAP_INT	*N* mean	152–0.06	99–0.0447	53–0.099	***
RD_INT	*N* mean	152 0.0304	99 0.027	53 0.062	***
SALES_GROWTH	*N* mean	150 8.255	98 7.897	52 8.928	*
***$p < 0.01$. *$p < 0.1$.					
Panel D provides the main descriptives for the control variables used in the regression models.					

negative information disclosed. Our classification technique relied on the definitions provided by Patten and Crampton (2003, p. 40). This approach is consistent also with the work of Plumlee, Brown, Hayes, and Marshall (2015)). The classification of the sustainability information as positive and negative allowed us to calculate a quality index, which is a normalized algorithm proposed by Krajnc and Glavič (2005) and used by Hussain et al. (2016) for SP measurement:

$$\text{quality index}_{it} = \frac{(\text{real score}_{it}) - (\text{minimum score}_{it})}{(\text{maximum score}_{it}) - (\text{minimum score}_{it})}. \quad (4)$$

In Equation (4), 'real score' is the algebraic sum of positive and negative scores; 'minimum' is the minimum potential score assigned to each sustainability category, which occurs when all the information provided has been classified as negative, while 'maximum' indicates the contrary: the maximum potential number of information items with a positive sign.

Finally, we calculate our measure of SP, multiplying the disclosure index and the quality index of each dimension and sub-dimension. Table 2 summarizes the sustainability indexes. We winsorized data at 1st and 99th percentiles.[7] To ensure the reliability of content-analysis-based measures, we calculated the 'Krippendorf alpha' as the reliability measure. We calculate inter-coder reliability using the Krippendorf

[7]As a robustness check, we winsorized our variables at 10th and 90th percentiles. The results do not show any significant differences.

TABLE 4 Spearman correlation statistics

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	ESG_Environmental	1.000																		
2	ESG_Social	**0.477**	1.000																	
3	ESG_Governance	**0.488**	**0.593**	1.000																
4	EC_SUST	**0.251**	**0.331**	**0.393**	1.000															
5	EN_SUST	0.123	−0.067	−0.027	**0.348**	1.000														
6	SO_SUST	**0.179**	−0.039	0.003	**0.287**	**0.724**	1.000													
7	EC_SUSTsub1	0.143	**0.302**	**0.289**	**0.696**	0.102	0.151	1.000												
8	EC_SUSTsub2	**0.219**	**0.241**	**0.356**	**0.881**	**0.404**	**0.278**	**0.398**	1.000											
9	EC_SUSTsub3	**0.169**	0.106	**0.165**	**0.543**	**0.275**	**0.227**	0.017	**0.404**	1.000										
10	EN_SUSTsub1	**0.243**	0.161	**0.217**	**0.504**	**0.476**	**0.467**	**0.353**	**0.453**	**0.261**	1.000									
11	EN_SUSTsub2	−0.057	**−0.198**	**−0.208**	0.006	**0.683**	**0.453**	**−0.203**	0.096	**0.198**	−0.127	1.000								
12	EN_SUSTsub3	0.038	−0.084	−0.045	**0.234**	**0.808**	**0.568**	0.083	**0.293**	0.144	0.147	**0.480**	1.000							
13	SO_SUSTsub1	0.066	−0.022	−0.033	**0.270**	**0.436**	**0.583**	0.114	**0.331**	0.129	**0.403**	**0.208**	**0.321**	1.000						
14	SO_SUSTsub2	0.130	−0.014	−0.010	**0.257**	**0.640**	**0.750**	**0.178**	**0.240**	0.132	**0.303**	**0.423**	**0.536**	**0.381**	1.000					
15	SO_SUSTsub3	0.083	−0.095	−0.035	0.038	**0.350**	**0.557**	−0.039	0.014	**0.166**	**0.230**	**0.284**	**0.211**	−0.008	**0.256**	1.000				
16	SO_SUSTsub4	0.141	0.147	0.163	0.077	**0.272**	**0.396**	0.048	0.048	0.130	0.112	**0.212**	**0.256**	**−0.243**	0.097	**0.284**	1.000			
17	ROA	0.124	0.063	−0.037	**0.269**	**0.643**	**0.680**	0.127	**0.300**	**0.174**	**0.331**	**0.438**	**0.540**	**0.503**	**0.601**	**0.170**	**0.206**	1.000		
18	ROE	0.014	−0.003	−0.079	**0.169**	**0.626**	**0.585**	0.055	**0.235**	0.070	**0.304**	**0.463**	**0.491**	**0.430**	**0.558**	**0.184**	0.150	**0.821**	1.000	
19	TOBINQ	−0.013	−0.097	−0.162	**0.175**	**0.641**	**0.594**	0.011	**0.274**	0.061	**0.288**	**0.444**	**0.544**	**0.583**	**0.541**	0.138	−0.029	0.675	**0.759**	1.000

alpha on 25% of the data coded by two researchers. The value of alpha should be 'greater than 0.67 for useful conclusions' (Krippendorff, 2004, p. 241). We find that all the alpha values for disclosure and quality indexes are above the acceptable threshold value.

To proxy a firm's performance we use both market and accounting performance measures. In the first category, we select the Tobin's Q ratio, which measures the market appreciation/depreciation of the firm's value with respect to the book value of the company (Lindenberg & Ross, 1981). We select ROA and ROE as proxies for accounting performance. We select a set of control variables according to the extant literature. More specifically, we use firm size, sales growth, capital intensity and debt-to-equity ratio as firm-specific controls. In line with Hussain et al. (2016), we include ENV_SENS, a dummy variable capturing whether the company belongs to an environmentally sensitive industry.

5 | EMPIRICAL RESULTS

5.1 | Descriptive statistics

We present the descriptive statistics in Table 3 for the entire dataset and by type of industry (environmentally sensitive or not). More specifically, Panel A reports statistics referring to the SD measures while Panel B shows details for the SP dimensions that we extracted from the sustainability reports of the reporting companies. Panel C provides details for the dependent variables and Panel D for the controls used in the regression analysis.

Panel A documents that, as expected and supported in the literature (see, e.g., Xu, 1999), the mean disclosure level of the sustainability issues (as measured by the ESG parameters) depends systematically on the kind of industry considered: the ESG scores of the environmentally sensitive industries are greater than the scores attributed to environmentally less sensitive industries. The Wilcoxon rank-sum test results support this notion. This results further support the idea that environmentally sensitive industries have multifaceted pressure from various stakeholder groups and that such companies disclose more (Lyon & Maxwell, 2011). On the other hand, Panel B shows that the SP does not vary by industry type. In other words, the environmental sensitivity trait does not affect the average level of the SP significantly. Combining the evidence, we document that GRI reporting firms can differ in the level of SD, but they perform similarly from a SP perspective. More specifically, the differences between the environmentally sensitive and insensitive industries are not significant in most cases, indicating no systematic relation between SP and industry characteristics.

In addition to the descriptive analysis results, we present Spearman's correlation results in Table 4.

We find the highest positive and statistically significant correlations between the SP variables, in both the dimension and sub-dimension forms, and the FP variables. A noteworthy relationship is the one between EC_SUSTsub1 and EN_SUSTsub2, which is (−0.203) negative and significant. Similarly, there is a negative correlation (−0.243) between SO_SUSTsub1 and SO_SUSTsub4. These results help us corroborate the existing evidence of weak and sometimes opposing inter-linkages between different SP components. No significant correlation has been detected between the ESG parameters and FP. Furthermore, no relevant relationship has been found between the ESG sustainability indicators and our SP indicators. This latter evidence further supports the difference between the two kinds of measure used.

5.2 | Multivariate results

5.2.1 | Sustainability disclosure and financial performance

Table 5 reports the results of Equation (1).

TABLE 5 Regression results with ESG parameters

	(1)	(2)	(3)
Variables	ROA	ROE	TOBINQ
ESG_Environmental	0.0444 (0.547)	0.0642 (0.756)	−0.0129 (0.602)
ESG_Social	−0.0537 (0.305)	−0.0646 (0.560)	0.00516 (0.822)
ESG_Governance	−0.109 (0.314)	−0.00831 (0.979)	−0.0333 (0.245)
SIZE	−4.573*** (0.00978)	−6.405 (0.199)	−1.884** (0.0244)
ENV_SENS	5.152*** (4.64×10^{-7})	13.13*** (1.77×10^{-6})	−0.0244 (0.934)
D/E	0.00962* (0.0701)	−0.0124*** (0.00710)	0.00209* (0.0760)
CAP_INT	−1.899 (0.936)	5.447 (0.939)	−5.173 (0.232)
RD_INT	−95.25* (0.0677)	−210.2** (0.0492)	−6.456 (0.342)
SALES_GROWTH	0.0442* (0.0599)	0.101* (0.0675)	0.00616* (0.0742)
Constant	67.89*** (7.47×10^{-5})	95.11** (0.0453)	26.51*** (0.00541)
Observations	143	143	143
R-squared	0.215	0.107	0.227
Number of ticker	42	42	42
Company FE	yes	yes	yes
Year FE	yes	yes	yes

Robust *p*-value in parentheses.

***$p < 0.01$. **$p < 0.05$. *$p < 0.1$.

Our findings show that no ESG parameter is significantly related to FP. This is valid for both the accounting performance (ROA and ROE) and the market-based performance (TOBINQ). This evidence suggests that the level of a company's commitment to transparency and accountability, as elaborated in the ESG parameters, is not relevant to the FP of that company. As for the control variables, ENV_SENS has a positive and significant relationship with the accounting performance. Similarly, the SALE_GROWTH has a positive linkage, but it seems weak. RD_INT is negatively associated with the accounting performance, but it does not show any relationship with the market-based FP. SIZE is significant for ROA and TOBINQ only, while the ratio D/E is strongly negatively associated with ROE.

5.2.2 | Sustainability performance and financial performance

Tables 6 and 7 report the results of our main regression models (Equations (2) and 3).

Table 6 shows that the impact of the three dimensions of sustainability performance is different depending on the financial performance proxy considered. More precisely, the environmental and social performance measures are significant and have a positive impact on ROA, ROE and Tobin's *Q*. The economic dimension is on the contrary relevant only when we measure the FP by the company Tobin's *Q* ratio. In this case, the economic dimension shows a weak correlation for TOBINQ (p = 0.0562) but the relationship turns out to be negative.

Table 7 reports the results concerning the broken-down SP dimensions. These findings allow us to identify which specific components of SP are related to FP. A number of aspects are worth pointing out. First, the result concerning EC_SUST detected in Table 6 for the TOBINQ variable disappears in this step: no economic-related sub-dimension shows any influence on the financial performances of a company when controlling for other firm-specific factors. Furthermore, not all the sub-components of the environmental pillar have similar associations with FP measures. The sub-dimension EN_SUSTsub1 is positive and significant (at 5%) for ROE (see Column 6), EN_SUSTsub2 is never relevant and EN_SUSTsub3 is positive and significant at 10% for ROA (Column 3) and at 1% for TOBINQ (Column 9). Results show that not all the dimensions are in line with each other for representing the true relationship of environmental performance to FP.

Regarding the social sub-dimensions, SO_SUSTsub1 has a positive effect on TOBINQ, while SO_SUSTsub2 and SO_SUSTsub4 affect positively the accounting measures only. In Table 6 we note that social performance is weakly linked to TOBINQ. However, further in-depth analyses show that some aspects of the same measures are positively linked to market-based FP. For both Equations (2) and 3 we run the variance inflation factor test to check for the multicollinearity issue. The results did not raise any concerns.

Summarizing, our empirical evidence showed that the transparency of a company's sustainability commitment, as measured by the ESG parameters, is not related to the company's FP. However, SP is significantly linked to accounting as well as market-based measures of FP. Furthermore, we find a negative, although weak, relationship between the economic sustainability performance of reporting companies and their market value. This shows weak and contrasting links between various pillars of SP.

Analysis of the sub-dimensions enabled us to better investigate the most relevant results regarding components in each SP dimension. More specifically, concerning the environmental pillar, the Inputs and the Compliance dimensions (Sub-dimensions 1 and 3, respectively) showed a positive and significant relationship with both accounting and market-based FP. With regard to the social dimension, the sustainability performance on Human Rights and Product Responsibility (Sub-dimensions 2 and 4, respectively) shows a link with the accounting performance only, while the reported sustainability performance on Labour Practices & Decent Work (Sub-dimension 1) may increase the company market value only.

6 | DISCUSSION OF THE RESULTS

Our analysis aimed at exploring the relationship between SP and FP. Our findings provide a new lens for obtaining a more profound insight into the divergence in existing findings (see for comparison Brammer, Brooks, & Pavelin, 2006; Mishra & Suar, 2010; Fujii, Iwata, Kaneko, & Managi, 2013; Flammer, 2015; Trumpp & Guenther, 2015; Hoepner et al., 2016). Our starting model (1), reported in Table 5, replicates previous analyses (e.g. Nollet, Filis, & Mitrokostas, 2016) but uses a special dataset of US companies. This specific sample selection allows us to show that the ESG indicators, standard measures capturing the voluntary disclosure of companies, are not related to FP, from either an accounting or a market perspective. Although these results are not in line with our expectations, they help us understand the reasons for the prevailing fragmentation in the existing results. We believe that the ESG indicators are not appropriate tools to analyse firms' behaviour as they lack specific performance measurement criteria.

Existing literature has so far neglected the multifaceted nature of sustainability measurement (Trumpp et al., 2015). This creates a huge knowledge gap, which we fill by providing fact-based findings. We elaborate a set of innovative indicators that are better adapted to capture the essence of companies' efforts towards sustainability: the SP measures included in Tables 6 and 7. As predicted, these models suggest that findings support our intuition. The SP pillars, measured in terms of performance and not just disclosure, may affect significantly the FP. Specifically, we find that the inclusion of our variables significantly improved the overall explanatory power of the regression models and that the coefficients differ considerably according to the specific sustainability dimension.

One of the most important results of our analyses is the negative relationship between economic SP and market-based measures of financial performance. We measure SP in various dimensions and sub-dimensions and show that there is a need to seek better and more aligned dimensions for sustainability reporting and SP measurement. This is also evident from the negative correlations found in various social, economic and environmental sub-dimensions. Our findings are supported by the fact that the GRI had already revised the G3 guidelines in 2012 and the new guidelines (G4) have modified 78% of the items under the economic indicator. The environmental and social dimensions are restructured by 57% and 37% respectively.

TABLE 6 Regression models with the sustainability performance variables (main dimensions)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	ROA	ROA	ROA	ROE	ROE	ROE	TOBINQ	TOBINQ	TOBINQ
EC_SUST	−0.989 (0.515)		−1.375 (0.353)	−1.568 (0.694)		−4.985 (0.252)	−1.293* (0.0668)		−1.128* (0.0562)
EN_SUST	7.197*** (0.00570)		5.691*** (0.00875)	10.80** (0.0142)		10.69** (0.0180)	1.644** (0.0284)		1.217* (0.0635)
SO_SUST	7.781** (0.0140)		8.709*** (0.000993)	19.90** (0.0154)		22.05*** (0.00471)	1.947* (0.0912)		1.782* (0.0911)
SIZE		−4.967*** (0.000154)	−3.906*** (0.000343)		−6.065* (0.0646)	−3.578** (0.0456)		−2.088*** (0.00748)	−1.824*** (0.00331)
ENV_SENS		4.986*** (8.14×10^{-10})	5.052*** (0)		12.46*** (4.38×10^{-9})	12.77*** (1.24×10^{-10})		0.168** (0.0191)	0.232*** (0.00397)
D/E		0.00853 (0.111)	0.00693 (0.140)		−0.0116** (0.0199)	−0.0153*** (0.00495)		0.00179 (0.117)	0.00117 (0.249)
CAP_INT		−2.824 (0.896)	−4.330 (0.814)		3.374 (0.959)	0.0617 (0.999)		−3.851 (0.315)	−4.642 (0.194)
RD_INT		−94.25* (0.0962)	−109.0** (0.0373)		−206.8* (0.0540)	−244.6*** (0.00808)		−6.505 (0.333)	−10.54 (0.155)
SALES_GROWTH		0.0449* (0.0547)	0.0476** (0.0146)		0.101* (0.0639)	0.109** (0.0173)		0.00589* (0.0775)	0.00696** (0.0456)
Constant	0.843 (0.447)	64.96*** (2.35e − 05)	47.32*** (0.000457)	5.050 (0.111)	91.17** (0.0111)	51.05** (0.0151)	1.743*** (0.000379)	26.44*** (0.00324)	22.63*** (0.00192)
Observations	151	150	150	151	150	150	151	150	150
R-squared	0.203	0.196	0.382	0.137	0.107	0.259	0.147	0.203	0.302
Number of ticker	43	43	43	43	43	43	43	43	43
Company FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes

Robust *p*-value in parentheses.

***$p < 0.01$. **$p < 0.05$. *$p < 0.1$.

TABLE 7 Regression models with the sustainability performance variables (sub-dimensions)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	ROA	ROA	ROA	ROE	ROE	ROE	TOBINQ	TOBINQ	TOBINQ
EC_SUSTsub1	1.774 (0.126)		1.888 (0.115)	3.358 (0.310)		0.819 (0.789)	−0.571* (0.0931)		−0.398 (0.169)
EC_SUSTsub2	−1.689 (0.391)		−2.662 (0.173)	−4.236 (0.378)		−6.078 (0.246)	−0.146 (0.767)		−0.267 (0.537)
EC_SUSTsub3	−1.077 (0.507)		0.0132 (0.992)	−0.0812 (0.982)		−0.140 (0.963)	−0.794 (0.233)		−0.603 (0.344)
EN_SUSTsub1	2.137 (0.235)		2.385 (0.106)	6.942 (0.169)		9.895** (0.0358)	0.460 (0.358)		0.265 (0.599)
EN_SUSTsub2	0.977 (0.419)		0.397 (0.654)	2.764 (0.325)		3.350 (0.177)	0.383 (0.228)		0.0480 (0.899)
EN_SUSTsub3	3.334* (0.0600)		2.864* (0.0504)	2.620 (0.481)		1.732 (0.545)	0.741*(0.0535)		0.812*** (0.00898)
SO_SUSTsub1	2.719 (0.125)		2.287 (0.154)	2.179 (0.639)		0.761 (0.851)	1.992** (0.0123)		1.697** (0.0187)
SO_SUSTsub2	2.809** (0.0260)		2.602** (0.0212)	7.111* (0.0516)		6.874** (0.0394)	0.259 (0.374)		0.184 (0.454)
SO_SUSTsub3	0.217 (0.878)		0.882 (0.419)	2.155 (0.525)		3.435 (0.255)	0.360 (0.207)		0.467 (0.120)
SO_SUSTsub4	1.624*** (0.004 27)		1.902*** (0.000 454)	4.233** (0.0133)		4.995*** (0.000 698)	0.0360 (0.914)		0.0777 (0.792)
SIZE		−4.967*** (0.000154)	−4.636*** (2.66×10^{-6})		−6.065* (0.0646)	−5.076** (0.0406)		−2.088*** (0.00748)	−1.623*** (0.000618)
ENV_SENS		4.986*** (8.14×10^{-10})	3.907*** (1.99×10^{-6})		12.46*** (4.38×10^{-9})	9.667*** (1.04×10^{-5})		0.168** (0.0191)	0.352** (0.0395)
D/E		0.008 53 (0.111)	0.008 02** (0.0449)		−0.0116** (0.0199)	−0.0152** (0.0126)		0.001 79 (0.117)	0.001 30* (0.0638)
CAP_INT		−2.824 (0.896)	−5.217 (0.818)		3.374 (0.959)	−3.084 (0.961)		−3.851 (0.315)	−4.522 (0.195)
RD_INT		−94.25* (0.0962)	−106.6** (0.0367)		−206.8* (0.0540)	−265.7*** (0.001 40)		−6.505 (0.333)	−7.486 (0.279)
SALES_GROWTH		0.0449* (0.0547)	0.0486*** (0.004 17)		0.101* (0.0639)	0.129*** (0.002 03)		0.005 89* (0.0775)	0.005 53 (0.193)
Constant	0.768 (0.551)	64.96*** (2.35×10^{-5})	55.57*** (5.80×10^{-6})	4.761 (0.182)	91.17** (0.0111)	69.46** (0.0137)	1.277** (0.0474)	26.44*** (0.003 24)	19.82*** (0.000 482)
Observations	151	150	150	151	150	150	151	150	150
R-squared	0.253	0.196	0.432	0.163	0.107	0.296	0.285	0.203	0.394
Number of ticker	43	43	43	43	43	43	43	43	43
Company FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes

Robust *p*-value in parentheses.

***$p < 0.01$. **$p < 0.05$. *$p < 0.1$.

More specifically, the GRI has entirely eliminated EC_SUSTsub3. Moreover, 85% of the input dimension of the environmental indicator has been updated. Similarly, 50% of the society (SO_SUSTsub3) and 33% of the product responsibility (SO_SUSTsub4) dimension has been updated (GRI, 2012). In the light of observed results, we argue that there is a need for continuous improvement in the reporting frameworks. Alternatively, our empirical evidence can be interpreted as support for the choice of integrated reporting, as argued by Dong (2017) in his recent experiments. An integrated reporting framework provides a holistic view of a firm's financial and non-financial performance avenues. Building inter-linkages between economic and non-economic performance will provide better performance analysis prospects (Antolin-Lopez et al., 2016; Bradford et al., 2016; Lozano & Huisingh, 2011; Schons & Steinmeier, 2016). Furthermore, the choice of integrated reporting can increase the usefulness and value relevance of information provided by the company about its sustainability initiatives. The integrated reporting choice can ensure that the necessary information reaches relevant market participants (Frias-Aceituno, Rodríguez-Ariza, & Garcia-Sánchez, 2014).

7 | CONCLUSION, IMPLICATIONS AND FUTURE RESEARCH DIRECTIONS

The objective of this research is to gain a deeper insight into the relationship between SP and FP by utilizing unique measures of SP based on globally accepted SP reporting framework. The review of the existing literature shows that there is a huge divergence in the existing evidence (Endrikat et al., 2014; Horváthová, 2010; Wang et al., 2016). These reviews motivated the present study to link SP and SD with FP. We find that SP measurement matters and can provide better and conclusive results about the direction of the relationship between sustainability engagement and firms' performance. Our research also provides important insights concerning the compartmentalization of SP dimensions by showing that these dimensions need to be revisited and realigned.

Our results reveal that, no matter how great is the disclosure, the real impact of this costly initiative of standalone reporting can only be achieved by considerable commitment to sustainable development goals. These results are clearly in line with stakeholder theory. Results provide further support for the Porter hypothesis by showing that genuine commitment towards corporate sustainability generates positive outcomes. In line with the findings of Pätäri, Jantunen, Kyläheiko, and Sandström (2012) and Gómez-Bezares, Przychodzen, and Przychodzen (2017), we argue that firms should include sustainability in their strategic planning and invest more in social and environmental performance to achieve manifold performance objectives. We also conclude that firms that invest more in sustainability, particularly if characterized by an outstanding visibility, perform better. Our results provide some important policy implications for the standard setter in terms of providing new evidence about the need for more aligned parameters for overall sustainability reporting standards. Based on our findings of the relationships between various dimensions and sub-dimensions of SP, we would invite future research into the global context and further investigation in other less developed or developing economies. We consider that deploying a sub-dimensional analysis of SP can provide better insight into outcomes for managers as well as policy makers.

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