Analysing the role of available organisational slack resources in affecting environmental performance. A structural equation modelling approach

Gianluca Vitale, Sebastiano Cupertino and Paolo Taticchi

Abstract

Purpose – *This paper aims to investigate the relationships between business slack resources and environmental performance and considers the possible effects that management commitment, corporate strategy to sustainability and innovation intensity can have on such interactions.*

Design/methodology/approach – *We performed partial least squares path modeling regressions on a sample of 697 non-financial listed companies worldwide, considering a time frame of 13 years.*

Findings – *Operational and financial slack resources are both detrimental to environmental performance in the short term. Nevertheless, financial slack resources are useful to boost innovation that enhances environmental performance. Environmental performance improvement seems to be more a matter of managerial commitment and strategic approach towards sustainability, rather than the availability of slack resources.*

Research limitations/implications – *Due to literature shortcomings on which effects slack resources can have on environmental performance, this paper sheds some light on the topic while also highlighting the role of management commitment, corporate sustainability strategy and innovation.*

Practical implications – *Managers should use financial slack resources in innovation activities to improve environmental performance. In doing so, they need to create retaining earnings to offset any costs using financial slack resources.*

Originality/value – *Adopting a holistic and net of endogeneity analytical perspective, this paper highlights some virtuous and critical interactions between the managerial commitment and strategic approach to sustainability, the availability of slack resources, innovation intensity and environmental performance to understand which aspects may foster or hinder the ecological transition of businesses.*

Keywords *Environmental performances, Ecological transition, Slack resources, Sustainability commitment and strategy, Innovation intensity, PLS-SEM*

Paper type *Research paper*

Gianluca Vitale and Sebastiano Cupertino are both based at the Department of Business and Law, University of Siena, Siena, Italy.
Paolo Taticchi is based at UCL School of Management, University College London, London, UK.

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1. Introduction

Presently, the world is paying great attention to the environmental dimension of sustainability. In this regard, numerous international initiatives (e.g. COP26, Paris Agreement) have been implemented to drive global awareness of climate change and enhance environmental protection. Additionally, at an institutional level, governments are enacting several regulations (e.g. European Union Green Deal) promoting more sustainable lifestyles as well as management practices that are more devoted to environmental issues (Mohd Fuzi *et al.*, 2021). Therefore, companies' activities are increasingly being looked at through the institutional and stakeholders' lens (Budsaratragoon and Jitmaneeroj, 2019). Companies are being asked to rearrange their business practices to minimise their

environmental impacts. Nevertheless, they do not have unlimited assets, and often managers must make investment choices by optimising available resource allocation. Following the recent global socio-economic crises, companies have fewer and fewer resources to invest in sustainable activities. A paradox exists whereby they are being called upon to improve their environmental performance yet have limited resources to do so. Considering this paradox, it appears essential to understand whether, and which, business assets can improve companies' environmental performance.

Scholars have thus developed a debate on the role of firms' slack resources in affecting corporate sustainability, and some studies focused on whether, and which, slack resources can improve companies' environmental performance (Adomako and Nguyen, 2020; Symeou *et al.*, 2019). Although the topic appears still relatively new and of great importance, authors produced little evidence to validate such interaction so far. Furthermore, despite the acclaimed centrality of management in addressing sustainability issues (Vitale *et al.*, 2019), still only a few studies have considered the role of management commitment and corporate strategy in influencing the relationship between slack resources and environmental performance.

Therefore, by combining slack resources and good management theoretical standpoints, we contribute to the current debate by highlighting how slack resources affect companies' environmental performance, as well as what is the role of management commitment, sustainable strategy and innovation intensity in this context. The authors decided to merge these two theoretical perspectives because adopting them singularly can limit the full understanding of possible mutual effects between plural drivers of environmental sustainability. Indeed, since the relationship between financial and non-financial performance is a complex phenomenon, a holistic theoretical perspective is definitively needed (Cupertino *et al.*, 2022).

The paper is structured as follows. Following the Introduction, Section 2 shows the literature background. Section 3 highlights the methodology and the data collection. In Section 4, we present the analysis results. Section 5 contains discussions, conclusions and managerial implications.

2. Literature background

This paper aims to investigate possible interactions between multiple factors that could affect the ecological business transition. Notably, environmental sustainability could be a result of interplays between financial and non-financial corporate value creation determinants. During the last decades, several scholars questioned such relationships so much that flourishing literature developed. In this research field, two main theoretical approaches distinguish the longstanding debate on corporate sustainability and firms' profitability: good management theory and slack resources theory.

The good management theory argues that a firm can maximise financial and non-financial performance due to a strong management commitment to sustainability issues (McWilliams and Siegel, 2000; Vitale *et al.*, 2019). Conversely, according to the slack resources theory, companies can improve their non-financial performance only if they have additional resources to invest in sustainable activities (Xu *et al.*, 2015).

The slack resources theoretical perspective also considers that managers have discretion in using business available resources (Bourgeois, 1981). Managers can invest in sustainable-oriented activities (Robaina and Madaleno, 2020; Xu *et al.*, 2015) or adopt opportunistic behaviours using slack resources for their interests or speculation practices (Lee *et al.*, 2020; Shahzad *et al.*, 2016). Accordingly, organisational slack resources can ambiguously affect corporate sustainability (Bowen, 2002). Notably, recent studies have highlighted that the availability of surplus resources positively affects corporate sustainability performance (Melo, 2012; Wasiuzzaman *et al.*, 2021), especially when a firm reacts to environmental and external pressures (Zhang *et al.*, 2018). Nevertheless, Shahzad *et al.* (2016) pointed out that not all

slack resources can positively affect corporate sustainability performance. They argued that a surplus of financial and innovation resources may increase managerial discretion, favouring opportunistic behaviours.

Considering the conflicting relationship between slack resources and corporate sustainability performance (Bowen, 2002), there is a need to further explore this topic. Indeed, recent studies have called for new insights concerning the factors affecting this relationship (Zhang *et al.*, 2018) and recommended distinguishing the different types of slack resources (Shahzad *et al.*, 2016), since the latter can affect corporate sustainability differently (Bowen, 2002).

Contextually, some scholars emphasised the need to study the link between financial and non-financial issues decomposing corporate sustainability performance in its three main components of environment, social and governance (Cupertino *et al.*, 2021).

Following such prior studies' recommendations, scholars have engaged in a new debate on the relationship between slack resources and environmental performance, building on the recent wave of attention that is being given to corporate environmental issues. Therefore, two distinct research streams investigating such links emerged in literature: the first deepens the effects of environmental performance on financial slack resources, and the second analyses the inverse relationship.

From the first research standpoint, scholars examined whether implementing eco-friendly activities also induces higher financial performance (Alexopoulos *et al.*, 2018; Hang *et al.*, 2019; Manrique and Martí-Ballester, 2017; Muhammad *et al.*, 2015; Russo and Fouts, 1997). Currently, a lack of consensus persists among academics regarding that the notion of that higher environmental performance could foster better financial results (Endrikat *et al.*, 2014). Accordingly, several scholars argued that companies that activate eco-friendly activities and improve their environmental performance can increase their financial performance due to the attraction of customers' preferences and/or the enhancement of production process efficiency (Endrikat *et al.*, 2014; Manrique and Martí-Ballester, 2017; Russo and Fouts, 1997). Conversely, some studies found that improving environmental performance has neutral or negative effects on financial performance (Alexopoulos *et al.*, 2018; Garcia-Blandon *et al.*, 2020). Lastly, other studies found mixed findings (Hoang *et al.*, 2020; Muhammad *et al.*, 2015; Riillo, 2017; Trumpp and Guenther, 2017), highlighting that environmental performance can improve financial results only under certain conditions.

From the reverse analytical viewpoint, the effects of the available slack resources on environmental performance have been slightly scrutinised so far (Adomako and Nguyen, 2020; Symeou *et al.*, 2019).

Modi and Cantor (2021) found that firms with higher financial slack tend to be less sensitive to contextual pressures on improving environmental performance. Adomako and Nguyen (2020) found that human slack resources positively affect corporate environmental performance. Symeou *et al.* (2019), distinguishing between absorbed and unabsorbed slack resources, found that the former harmed environmental performance while the latter positively affected environmental performance. Similarly, Alexopoulos *et al.* (2018) and Hang *et al.* (2019) highlighted that having surplus financial resources allows companies to improve their environmental performance. Nevertheless, Hang *et al.* (2019) specified that such a positive effect is limited to the short term (1 year). Table 1 reports the main literature insights on this investigative perspective.

In view of the literature background examined and outlined above, little evidence has been produced to demonstrate whether and how corporate environmental performance depends on the availability/use of slack resources (Adomako and Nguyen, 2020; Symeou *et al.*, 2019), which, in turn, could be influenced by some management aspects (Francoeur, 2021). Specifically, to date, it is still not clear if companies use extra financial resources for eco-friendly purposes. Moreover, the literature has focused on single dimensions of

Table 1 Main literature results

Authors	*The direction of the relationship*	*Type of influence*	*Main findings*
Adomako and Nguyen (2020)	Human slack on environmental performance	Positive	Human slack resources influence environmental performance through the mediating role of sustainable innovation
Alexopoulos *et al.* (2018)	Environmental performance on financial performance	Negative	The avoidance of environmental improving investments is related to better financial performance
Alexopoulos *et al.* (2018)	Financial slack resources on environmental performance	Positive	Having superior financial performance allows companies to achieve better environmental performance
Garcia-Blandon *et al.* (2020)	Environmental performance on financial performance	Negative	Firms with the highest scores of environmental performances are quoted at significantly lower price-to-sales than other firms. The stock market negatively perceives firms' environmental efforts
Hang *et al.* (2019)	Financial slack resources on environmental performance	Mixed	Financial slack resources improve environmental performance only in the short term (1 year) while they have no effects in the long run
Hang *et al.* (2019)	Environmental performance on financial performance	Mixed	Increasing environmental performance has no short-term effect on corporate financial performance, whereas a firm significantly benefits in the long term
Hoang *et al.* (2020)	Environmental performance on financial performance	Mixed	Environmental performance positively influences accounting and stock market performance, but negatively influences the return on capital used
Manrique and Martí-Ballester (2017)	Environmental performance on financial performance	Positive	The adoption of environmental practices significantly and positively affects corporate financial performance in both developed and developing countries
Muhammad *et al.* (2015)	Environmental performance on financial performance	Mixed	The relationship is positive during the pre-financial crisis period while it became absent during the financial crisis
Modi and Cantor (2021)	Financial slack resources on environmental performance	Negative	The more a company has financial slack resources, the more it tends to ignore competitors' pressures to improve environmental performance
Riillo (2017)	Environmental performance on financial performance	U-shaped	Environmental management is associated with higher performance only when it is highly advanced
Russo and Fouts (1997)	Environmental performance on financial performance	Positive	Corporate environmental practices have positive effects on accounting performance (i.e. ROA). This positive effect strengthens with industry growth
Symeou *et al.* (2019)	Absorbed and unabsorbed slack on environmental performance	Mixed	Absorbed slack resources harm environmental performance, while unabsorbed available slack resources improve environmental performance
Trumpp and Guenther (2017)	Environmental performance on financial performance	U-shaped	There is a negative environmental–financial relationship for those companies with low environmental performance and a positive association for high levels of environmental performance

analysis by investigating univocal direction impacts or interplay links between two peculiar business aspects (e.g. slack available resources on environmental performance and/or vice versa). This literature review did find, however, that individual moderating variables have been included in prior studies on this topic. Indeed, a clearer and more comprehensive understanding of how the plural business elements intervene in this relationship is also needed (Endrikat *et al.*, 2014). Lastly, previous studies often adopted limited methodological approaches that allowed scholars to develop analyses focusing on a unidimensional perspective, often with possible endogeneity biases (Zhao and Murrell, 2022). To overcome these limitations, this study adopted a holistic analytical method suitable to minimise endogeneity effects aimed at examining possible key interdependencies between multiple business elements that determine the use of available slack resources and environmental corporate sustainability. Notably, the analysis examined plausible effects on corporate environmental performance using available slack resources considering a managerial commitment to sustainability, a corporate social responsibility (CSR) strategic approach and the firm's innovation intensity.

Moreover, to better understand the above interdependencies under scrutiny, the study focused on different types of slack resources following Bowen (2002) and Shahzad *et al.* (2016) insights. Notably, in line with Azadegan *et al.* (2013) and Bourgeois and Singh (1983), the authors distinguished between operational and financial available slack resources by investigating their effects on different dimensions of environmental performance. To the best of our knowledge, none of the prior studies made such a distinction in analysing the relationship between slack resources and environmental performance. In the following section, the authors present the research hypotheses characterising this study.

2.1 Research hypotheses development

In line with the good management theory, managerial commitment should foster all business activities, starting from strategy definition (Vitale *et al.*, 2019). As pointed out by various authors (Bowen, 2013; Maas *et al.*, 2016; Vitale *et al.*, 2019), a managerial approach strongly committed to non-financial issues should be traditionally placed upstream of a concrete and effective sustainability strategy. Indeed, for firms with a weak managerial commitment towards sustainability, the development of a CSR strategy can be merely symbolic and not likely to be operationalised into daily business operations (Hyatt and Berente, 2017; Vitale *et al.*, 2019).

In place of these assumptions, the authors predict that a sustainability-oriented management commitment fosters the development and subsequent execution of a CSR strategy. The authors thus propose the following hypothesis:

H1. A managerial commitment to sustainability positively affects the execution of CSR strategies.

From the slack resources theoretical framework, corporate sustainability depends on the discretionary allocation of a surplus of both operational and financial firm resources. Notably, investments in sustainability activities occur only when a firm has slack resources that can be allocated to that scope. In the wake of the first hypothesis, the authors merged the assumptions of the good management and slack resources theories to investigate whether developing a sustainability strategy can foster the generation of additional resources prompt to be invested in non-financial activities. In this regard, to date, few studies examined how the sustainability strategy and available slack resources interact. Wasiuzzaman *et al.* (2021) and Fadol *et al.* (2015) highlighted that companies' strategic approach is a key factor affecting the relationship between slack resources and organisational performance. Similarly, Al-Dhaafri and Alosani (2021) emphasised the ability

of companies' strategic approaches to influence organisational excellence. In this view, the authors define the following research hypotheses:

H2a. CSR strategy positively interacts with available operational slack resources;

H2b. CSR strategy positively interacts with available financial slack resources.

Following the above line of reasoning, it is worth investigating if and how management commitment towards sustainability issues produces higher available slack resources. In this regard, the literature is enriched with contrasting results (Hirunyawipada and Xiong, 2018). According to Hirunyawipada and Xiong (2018), scholars are divided among those who advocate a positive relationship between management commitment and the creation of operational and financial slack resources (Clarkson *et al.*, 2011; Dowell *et al.*, 2000; Russo and Fouts, 1997; Zhu and Sarkis, 2004), those who find mixed or neutral effects (Gilley *et al.*, 2000; Leonidou *et al.*, 2013) and those who underline the negative effects that sustainability management commitment has on the generation of additional financial and operational resources (Cordeiro and Sarkis, 1997; López *et al.*, 2007). The scholars standing for a positive effect of sustainable management commitment on the development of surplus operational and financial slack resources trace this result back to the ability of sustainability-committed companies to:

- effectively meet stakeholders' expectations;
- minimise reputationally and operating risks;
- improve management efficiency and the allocation of firms' resources;
- effortlessly enable innovation processes net of criticalities;
- attract new capitals and talents; and
- achieve competitive advantages (Wood, 2010).

Conversely, scholars who found a neutral relationship between sustainability management commitment and the creation of slack resources assumed that the availability of financial and organisational extra inputs is more influenced by other business aspects (such as product innovation or marketing initiatives) (Gilley *et al.*, 2000; Leonidou *et al.*, 2013). Finally, the authors suppose that a managerial commitment towards sustainability penalises the creation of slack resources. Notably, they underline that sustainability requires long-term investments that can produce no financial returns and thus it can be detrimental to the generation of slack resources (Brammer and Millington, 2008).

In the context of this controversial background, the authors embrace the first research stream (Clarkson *et al.*, 2011; Dowell *et al.*, 2000; Russo and Fouts, 1997; Zhu and Sarkis, 2004), assuming a positive relationship between the managerial commitment to non-financial issues and the generation of operational and financial available slack resources. Through this lens, the following research hypotheses are presented:

H3a. The commitment of management towards environmental, social and governance (ESG) issues produces positive effects on available operational slack resources;

H3b. The commitment of management towards ESG issues produces positive effects on available financial slack resources.

Following the slack resources theory assumptions, one of the main roles of slack resources is to influence business innovation (Damanpour, 1987; Weinzimmer, 2000). In this regard, available slack resources can protect firms from the uncertainty associated with experimentation plans (Bourgeois, 1981; Zhor, 2018) and allow them to easily explore and exploit new business opportunities (Weinzimmer, 2000), making them more ready to manage innovation risks and minimise any related possible failures (Lee and Wu, 2016; Zhor, 2018). Conversely, some scholars argued that the availability of slack resources can

penalise corporate innovation (Lee and Wu, 2016). According to Nohria and Gulati (1996), having an excess of slack resources that compensate for any innovation risks and losses can lead managers to underestimate hazardous innovation activities thus investing in potentially unsuccessful projects. Given the above assumptions, there is no univocal consensus on the effect of available slack resources in fostering companies' innovation activities. Considering the above debate, the authors assume that available slack resources can positively affect corporate innovation in line with Bourgeois (1981), Weinzimmer (2000) and Zhor (2018). Accordingly, the authors develop the following research hypotheses:

H4a. The availability and exploitation of operational slack resources positively interact with the firm's innovation;

H4b. The availability and exploitation of financial slack resources positively interact with the firm's innovation.

From a good management theory perspective, innovation can also be fostered by responsible managerial behaviours and practices (Bocquet *et al.*, 2013). Based on this perspective, several studies underlined that CSR strategy and managerial commitment towards sustainability are enabling factors for corporate innovation (Bocquet *et al.*, 2013; Tsai and Liao, 2017). Supporting this view, Russo and Fouts (1997) argued that the most sustainability-committed companies are better able to seize innovation opportunities. Similarly, Porter and Kramer (2006) argued that the adoption of sustainable strategies leads firms to develop innovative processes and products useful to acquire important competitive advantages. Analogously, Sharma and Vredenburg (1998) found that firms with a strong managerial commitment and strategic approach to ESG issues develop better innovative capabilities, while Bocquet *et al.* (2013) and Tsai and Liao (2017) highlighted that the most proactive firms in defining a sustainability strategy are more likely to innovate both products and processes.

In line with the above insights, literature seems to converge on the key role that CSR strategy and managerial commitment to sustainability have in fostering corporate innovation. Nevertheless, such relationships need to be further studied and empirically reinforced (Kraus *et al.*, 2020). Therefore, the authors elaborate on the following research hypotheses:

H5 CSR strategy fosters the firm's innovation;

H6. The managerial commitment to sustainability fosters the firm's innovation.

After having formulated the hypotheses related to how the different financial and non-financial business aspects can be interrelated, in the second part of the research design the authors focused on the effects that these aspects can have on corporate environmental performance.

The first business element of which the authors consider the effects on environmental performance is innovation. Many studies (Brower and Mahajan, 2013; Shahzad *et al.*, 2016; Ruggiero and Cupertino, 2018) highlighted that innovation can be considered a critical influencing factor of non-financial and financial business performance. Moreover, the literature focused extensively on the role that green innovation can have on environmental performance (Long *et al.*, 2017; Kraus *et al.*, 2020; Rehman *et al.*, 2021; Singh *et al.*, 2020). In this context, scholars mostly found that activating eco-innovation processes allows companies to significantly improve their environmental performance (Singh *et al.*, 2020). Nevertheless, most of the literature focuses on innovations dedicated to the environment and their ability to concretely improve the environmental impact of companies. However, despite many studies that have questioned this topic, the role of innovation in affecting environmental performance needs to be further investigated (Ruggiero and Cupertino, 2018).

In line with the above reasoning, the authors develop the following hypothesis:

H7. A firm's innovation positively is correlated with corporate environmental performance.

According to the slack resources theory, available slack resources can have a key role in financial and non-financial performance interactions. In this research field, however, scholars did not find univocal evidence about whether and how the availability of slack resources impacts non-financial performance (Cupertino *et al.*, 2022). Notably, some authors argued that the exploitation of available slack resources is more a matter of profit maximisation or a managerial practice for managers' self-interest satisfaction (Friedman, 2007; Preston and O'Bannon, 1997; Shahzad *et al.*, 2016). Offering a different perspective, other studies highlighted that the availability of slack resources is a crucial requirement for those firms that aim to implement ESG activities considering sustainability a key strategic factor for business success and the stakeholders' engagement (Freeman, 1984; Robaina and Madaleno, 2020). Following this last research stream, the authors assume that having operational and financial slack resources can allow companies to achieve better environmental performance. Accordingly, the authors propose the following hypotheses:

H8a. Available operational slack resources positively affect corporate environmental performance;

H8b. Available financial slack resources positively affect corporate environmental performance.

Following the good management theory assumptions, management commitment to sustainability and CSR strategy can be assumed as transversal drivers that produce effects on financial and non-financial performances (Cupertino *et al.*, 2022). With reference to environmental performance, prior studies argued that a sustainable-oriented strategy, together with an adequate managerial commitment, fosters the adoption of accounting and measurement practices that, in turn, prompt a continuous improvement of environmental performance (Latan *et al.*, 2018). Indeed, with a corporate sustainability strategy, key indicators are usually identified to be used in the accounting models to monitor sustainability performance (Maas *et al.*, 2016; Vitale *et al.*, 2019). Accounting and control tools, therefore, aid managers in understanding how the company is performing from an environmental standpoint as well as in deciding the initiatives to be implemented to enhance the eco-friendly of business (Latan *et al.*, 2018). In the wake of these considerations, previous studies (Journeault, 2016; Dixon-Fowler *et al.*, 2017; Latan *et al.*, 2018) emphasised the positive effects produced by sustainable strategy and management commitment on the companies' environmental performance. Accordingly, following the above literature stream, the authors derive the following research hypotheses:

H9. CSR strategy fosters corporate environmental performance;

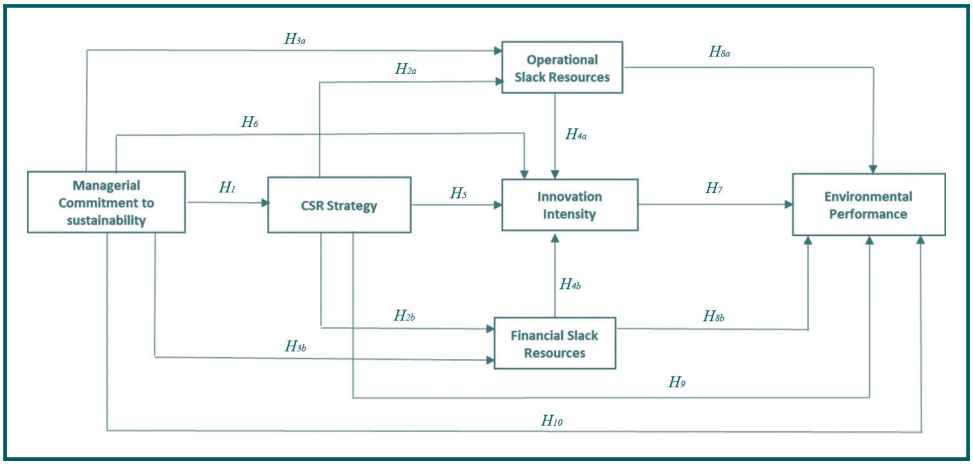
H10. The managerial commitment to sustainability fosters corporate environmental performance.

Figure 1 below summarises the present study's theoretical framework.

3. Data and method

The analysis scrutinised annual financial and non-financial information of listed global manufacturing and non-manufacturing companies for a time frame of 13 years (i.e. 2008–2020) that includes some lags between the examined variables. The study focused on non-financial transnational corporations due to their key role at the production level worldwide and their ability to effectively determine business cycles (Orhangazi, 2008). Moreover, manufacturing and non-manufacturing companies notoriously distinguish from activities that can affect the (un)sustainability of the socioeconomic systems (Gunasekaran and Spalanzani, 2012). Furthermore, the analysis carried out examined relationships between environmental, social and governance performance (ESGP) and corporate financial performance (CFP) in an evolutionary context that ranges from the post-Great

Figure 1 Framework of the hypothesis tested in the study



Recession to the early implementation stages of both Agenda 2030 and the COP-21 Agreement. Indeed, the time span of the study focuses on a mid-term perspective where the institutional parties and stakeholders increasingly pushed companies to rethink their managerial activities in eco-friendly modes and, in turn, enhance their environmental performances. Notably, annual data of Refinitiv Eikon environmental sustainability scores highlighted an improving yearly average rate trend of roughly 3.65% for the examined companies during the analysed period (see Figure 2).

The data collection was conducted using the Datastream Refinitiv Eikon platform, a well-known source that enables analysts to access appropriate databases containing reliable financial and non-financial corporate data (Djoutsa Wamba *et al.*, 2020). To begin, the sampling process started to consider the Refinitiv ESG universe that provides non-financial data, namely, corporate sustainability scores, for 9,894 firms. Secondly, firms' accounting data were downloaded from the Worldscope dataset. The final sample composition concluded by defining a panel data strongly balanced with 697 firms and 7,667 observations net of corporate financial and non-financial missing annual values (see Table 2). The following Tables 3 and 4 show the industry and geographical sample distribution, respectively.

Figure 2 Annual trend of corporate environmental performances in 2008–2018 period for the scrutinised companies

Time	ENVScore
2008	43.00108
2009	47.05387
2010	50.7378
2011	51.75845
2012	52.9031
2013	53.2834
2014	53.73745
2015	55.57106
2016	57.36773
2017	58.59549
2018	61.3407

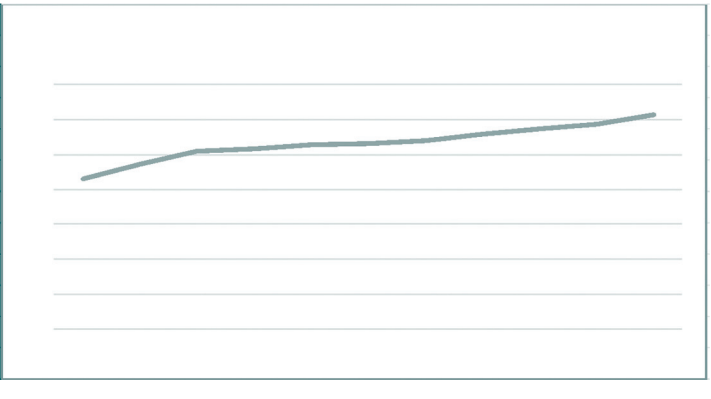


Table 2 Sample definition

Samplig process	*NFCs*
ESG Refinitiv Universe	*9,894*
Companies with missing CFP and ESGP values	*−9,197*
Sample of the study:	*697*

Table 3 Sample distribution per industry

Sector	*Companies*	*%*	*Cum.*
Basic materials	93	13.76	13.76
Consumer discretion	94	13.91	27.66
Consumer staples	54	7.99	35.65
Energy	29	4.29	39.94
Health care	75	11.09	51.04
Industrials	177	26.18	77.22
Technology	108	15.98	93.2
Telecommunications	26	3.85	97.04
Utilities	20	2.96	100
NFCs	*697*		

To find evidence for the research hypotheses presented above, the authors developed a panel data analysis performing PLS-SEM regressions using STATA software. The adopted statistical methodology also considered cultural aspects or differences in business practices among companies, or variables that change over time but not across firms. The PLS-SEM approach allowed authors to evaluate direct and indirect effects between the scrutinised variables, minimising possible endogeneity problems in each performed regression (Hair *et al.*, 2014). Accordingly, the analysis distinguished between exogenous and endogenous variables. In turn, the authors assumed the managerial commitment to sustainability, firm's profitability, financial leverage, corporate size and industry affiliation as exogenous variables. Notably, the implementation of business practices may be modulated through a managerial commitment aimed to achieve ESG objectives and to introduce governance mechanisms operationalising sustainability principles (Vitale *et al.*, 2019). Accordingly, the analysis included $ManagementScore_t$ which is a Refinitiv ESG category score assessing companies' effectiveness and commitment to following sustainability postulates and best practices for corporate governance principle adoption. Furthermore, according to slack resources theory's assumptions, corporate profitability could generate financial resources that are also useful to invest in ESG initiatives. Therefore, the analysis considered the *Return on Assets* (ROA_t) as a control exogenous variable. The study also assumed that the firm's size may interact with the relationship between ESGP and CFP considering the findings of prior studies (Margolis and Walsh, 2003). Notably, the firm's size may determine the acquisition and exploitation of slack resources as well as the capability to innovate the business. At the same time, the stakeholders' pressure for the achievement of higher both financial and non-financial performances could be stronger for larger companies. Hence, following such assumptions, the authors included the exogenous control variable *Total Assets* computed in its logarithmic form as a firm size estimation (i.e. $lnTA_t$). Finally, the analysis used dichotomous exogenous control variables (i.e. *Industry*) to check for sectors' unobservable possible effects that may affect the main interactions under investigation, in line with insights from previous studies (Andersen and Dejoy, 2011).

Regarding the endogenous variables side, the study focused on the following business issues:

Table 4 Geographical distribution of the sample

Country	*Companies*	*%*	*Cum.*
Australia	8	1.15	1.15
Austria	4	0.57	1.72
Belgium	7	1	2.73
Brazil	1	0.14	2.87
Canada	8	1.15	4.02
China	7	1	5.02
Denmark	11	1.58	6.6
Finland	12	1.72	8.32
France	30	4.3	12.63
Germany	39	5.6	18.22
Greece	1	0.14	18.36
Hong Kong	8	1.15	19.51
India	9	1.29	20.8
Ireland	1	0.14	20.95
Israel	2	0.29	21.23
Italy	4	0.57	21.81
Japan	229	32.86	54.66
Luxembourg	1	0.14	54.81
Netherlands	9	1.29	56.1
New Zealand	1	0.14	56.24
Norway	4	0.57	56.81
Russia	1	0.14	56.96
Saudi Arabia	1	0.14	57.1
Singapore	3	0.43	57.53
South Africa	2	0.29	57.82
South Korea	13	1.87	59.68
Spain	4	0.57	60.26
Sweden	14	2.01	62.27
Switzerland	20	2.87	65.14
Taiwan	12	1.72	66.86
Turkey	3	0.43	67.29
United Kingdom	46	6.6	73.89
United States	182	26.11	100
NFCs	*697*		

- the strategic approach towards sustainability;
- the exploitation of available slack resources;
- the corporate effectiveness in enabling innovation activities;
- the eco-friendly use of resources in production processes and the sustainable management of supply chain; and
- the attitude to reduce corporate greenhouse gases (GHGs) emissions

Therefore, in line with Vitale *et al.* (2019), the authors supposed that managerial commitment may foster the integration of ESG issues into decision-making processes and corporate strategy. Managers may opt to maximise financial performance and pursue self-interests (Shahzad *et al.*, 2016), instead of focusing on non-financial business aspects. Conversely, they may find a trade-off between economic and ESG goals by implementing suitable strategies that enhance sustainability performances (Bowen, 2013) not compromising the achievement of acceptable CFP. In this regard, the authors considered findings of recent literature (Wasiuzzaman *et al.*, 2021; Fadol *et al.*, 2015) that emphasised the crucial role of a firm's strategy in fostering sustainability affecting both financial and non-financial performances. The analysis included thus the endogenous variable $CSRStrategyScore_t$ which is the Refinitiv ESG score designed to evaluate the corporate

capability in executing CSR strategies for the sustainable development of business. Moreover, the analysis assumed that optimal balances and synergies between ESGP–CFP are fostered through the strategic exploitation of available slack resources supporting both core business and sustainability activities (Orlitzky *et al.*, 2003). In line with this hypothesis, the study used two proxies of corporate unabsorbed resources identified in prior studies (Azadegan *et al.*, 2013; Bourgeois and Singh, 1983) as endogenous variables to assess respectively operational and financial available slack resources. To this end, the analysis used the following accounting short-term liquidity ratios:

- net sales to fixed assets (i.e., $FATRatio_t$)
- near-cash assets to current liabilities (i.e., $QuickRatio_t$)

Furthermore, the authors supposed that innovation is a result of a strategy operationalising sustainability through the use of resources to enhance ESGP and foster the firm's profitability at the same time (Ruggiero and Cupertino, 2018). Hence, the analysis used $Innovation_{t+1}$ as an endogenous variable that estimates how intensely a firm implements innovation at the level of production processes and product design. This variable was set with a one-year lag compared to the other ones to better appreciate the effects of the sustainability strategy execution that fosters the exploitation of financial slack resources as an enabling factor of innovation activities. Finally, the study assumed that interdependencies between management commitment towards sustainability, the corporate strategic approach to pursuing ESG objectives, the exploitation of slack resources, and innovation may affect subsequent firms' environmental performances. Notably, the analysis included two alternative endogenous variables, namely $ResourceUseScore_{t+2}$ and $GHGsEmissionsScore_{t+2}$, that are environmental sustainability sub-scores defined by Refinitiv Eikon and recognised by prior scholars as valuable proxies of environmental performance (Wiedemann *et al.*, 2017; Giannarakis *et al.*, 2017). The former assesses the firm's efforts in rationalising resources in production processes and in implementing sustainable procurement practices, while the latter estimates the corporate commitment to minimising climate change impacts. These variables were set considering two-year lags to fully examine the possible direct and indirect impacts of the scrutinised financial and non-financial corporate performances on the corporate ecological footprint.

Table 5 summarises the variables' definitions, while Table 6 shows the analytical models on which PLS-SEM regressions were performed step-by-step.

4. Results

Table 7 highlights the descriptive statistics, while Table 8 shows the Pearson correlation test. From this first analysis, the authors ascertained the existence of linear dependencies between the examined variables, supporting the research hypotheses. In the covariance test and regressions carried out, the authors considered three levels of statistical significance (i.e. <0.01; <0.05; <0.10).

Since the collinearity analysis showed an average variance inflation factor lower than 2 (i.e. 1.76), the authors can exclude significant multicollinearity effects in line with Allison (1999) notions.

The following Table 9 presents the main PLS-SEM results, while Figure 3 graphically shows the highlighted interdependences between the examined variables.

As expected, sustainable management commitment positively and strongly fosters the adoption of a CSR strategy ($\beta_1 = 0.21$, $\rho > |z| = 0.00$) as assumed in H_1. In line with H_6 and H_{10}, it produces positive effects on both corporate innovation ($\lambda_4 = 1.17$, $\rho > |z| = 0.01$) and environmental performance ($\gamma_5 = 0.02$, $\rho > |z| = 0.05$; $\omega_5 = 0.02$, $\rho > |z| = 0.05$). Conversely, management commitment is negatively and significantly correlated with *QuickRatio* ($\theta_2 = -0.002$, $\rho > |z| = 0.00$), while it shows a significant positive statistic association with

Table 5 Overview of the main variables under investigation

Variables (and timing lags)	*Description*
$ResourceUseScore_{t+2}$	It is the Refinitiv ESG category score that evaluates in percentage terms (i.e. 0–100%) corporate environmental performance regarding the use of materials, energy and water in the production activities, as well as the firm's attitude useful to enhance sustainability in supply chain processes (Refinitiv, 2022).
$GHGsEmissionsScore_{t+2}$	It is the Refinitiv ESG category score that estimates the corporate effectiveness in decarbonising production and operational processes (Refinitiv, 2022).
$Innovation_{t+1}$	It is a proxy of corporate innovation intensity defined as a ratio between R&D expenses and net sales suitable to measure the firm's capacity to exploit operational slack resources to innovate production processes and products.
$FATRatio_t$	It is an efficiency index computed as net sales to fixed assets. This ratio estimates the firm's ability to generate operational slack resources derived from net sales using its fixed-asset investments (i.e. property, plant and equipment).
$QuickRatio_t$	It is an indicator of corporate liquidity computed as the sum between cash and equivalents, marketable securities and accounts receivable scaled on current liabilities. This ratio indicates the firm's capacity in exploiting its near-cash assets to meet its short-term obligations. Moreover, it can be used as a measure of available unabsorbed financial resources suitable to develop future business activities (Bourgeois and Singh, 1983).
$CSRStrategyScore_t$	It is a corporate sustainability sub-category percentage score (i.e. 0–100%) retrieved from the Refinitiv ESG database that assesses the company's attitude to define and execute sustainability strategies (Refinitiv, 2022).
$ManagementScore_t$	It is a corporate sustainability sub-category percentage score (i.e. 0–100%) retrieved from the Refinitiv ESG database that estimates the managerial commitment to achieve non-financial goals and to use mechanisms able to integrate environmental and social issues at the governance level (Refinitiv, 2022).
ROA_t	It is an accounting profitability index that measures the corporate efficiency in using assets to make a profit.
$lnTA_t$	The amount of total assets commonly expresses how big a company is. Notably, this financial data is computed as the sum of the company's economic and financial resources that can be used to develop production activities. The present study used this variable in its logarithmic form to normalise data.

Table 6 PLS-SEM Models of the study

	Model	*Hypotheses*
1	$CSRStrategyScore_{(i,t)} = \beta_0 + \beta_1(ManagementScore)_{(i,t)} + \beta_2(ROA)_{(i,t)} + \beta_3(lnTA)_{(i,t)} + \beta_4\left(\sum_{K=1}^{9} Industry\right)_{(i,t)} + \varepsilon_{(i,t)}$	H_1
2	$FATRatio_{(i,t-1)} = \delta_0 + \delta_1(CSRStrategyScore)_{(i,t-1)} + \delta_2(ManagementScore)_{(i,t-1)} + \delta_3(lnTA)_{(i,t)} + \delta_4\left(\sum_{K=1}^{9} Industry\right)_{(i,t)} + \varepsilon_{(i,t)}$	H_{2a}; H_{3a}
3	$QuickRatio_{i,t} = \vartheta_0 + \vartheta_1(CSRStrategyScore)_{(i,t)} + \vartheta_2(ManagementScore)_{(i,t)} + \vartheta_3(ROA)_{(i,t)} + \vartheta_4(lnTA)_{(i,t)} + \vartheta_5\left(\sum_{K=1}^{9} Industry\right)_{(i,t)} + \varepsilon_{(i,t)}$	H_{2b}; H_{3ba}
4	$Innovation_{(i,t+1)} = \lambda_0 + \lambda_1(FATRatio)_{(i,t)} + \lambda_2(QuickRatio)_{(i,t)} + \lambda_3(CSRStrategyScore)_{(i,t)} + \lambda_4(ManagementScore)_{(i,t)} + \lambda_5(ROA)_{(i,t)} + \lambda_6(lnTA)_{(i,t)} + \lambda_7\left(\sum_{K=1}^{9} Industry\right)_{(i,t)} + \varepsilon_{(i,t)}$	$H_{4a/b}$; H_5; H_6
5a	$ResourceUseScore_{(i,t+2)} = \gamma_0 + \gamma_1(Innovation)_{(i,t+1)} + \gamma_2(FATRatio)_{(i,t)} + \gamma_3(QuickRatio)_{(i,t)} + \gamma_4(CSRStrategyScore)_{(i,t)} + \gamma_5(ManagementScore)_{(i,t)} + \gamma_6(ROA)_{(i,t)} + \gamma_7(lnTA)_{(i,t)} + \gamma_8\left(\sum_{K=1}^{9} Industry\right)_{(i,t)} + \varepsilon_{(i,t)}$	H_7; $H_{8a/b}$; H_9; H_{10}
5b	$GHGsEmissionsScore_{i,t+2} = \omega_0 + \omega_1(Innovation)_{(i,t+1)} + \omega_2(FATRatio)_{(i,t)} + \omega_3(QuickRatio)_{(i,t)} + \omega_4(CSRStrategyScore)_{(i,t)} + \omega_5(ManagementScore)_{(i,t)} + \omega_6(ROA)_{(i,t)} + \omega_7(lnTA)_{(i,t)} + \omega_8\left(\sum_{K=1}^{9} Industry\right)_{(i,t)} + \varepsilon_{i,t}$	H_7; $H_{8a/b}$; H_9; H_{10}

FATRatio (δ_2 = 0.008, $\rho > |z|$ = 0.00). These findings partially confirm $H_{3a/b}$. This evidence means that the more managerial commitment towards sustainability increases, the more financial slack resources are consumed and slack from core business activities are generated. In contrast to what has been supposed in H_5, the CSR strategy has no significant effects on innovation (λ_3=0.003, $\rho > |z|$ = 0.486), while it positively affects environmental performance (γ_3 = 0.48, $\rho > |z|$ = 0.00; ω_4 = 0.49, $\rho > |z|$ = 0.00) as

Table 7 Descriptive statistics

Variable	Mean	Median	SD	Variance	Min	Max
$ResourceUseScore_{t+2}$	61.22136	67.5	29.51207	870.962	0	99.86
$GHGsEmissionsScore_{t+2}$	61.03667	68.49	30.18259	910.9887	0	99.87
$Innovation_{t+1}$	5.033249	2.42	10.98175	120.5987	0	540.07
$FATRatio_t$	2.475627	1.62	3.572441	12.76234	0.1	66.21
$QuickRatio_t$	1.256858	0.95	1.426229	2.034129	0.03	55.58
$CSRStrategyScore_t$	45.58915	48.16	33.57958	1127.588	0	99.84
$ManagementScore_t$	55.42468	57.55	28.22037	796.3891	0.05	99.98
ROA_t	6.379727	5.61	9.610305	92.35795	−178.66	269.11
$lnTA_t$	15.65446	15.57816	1.344622	1.808007	10.53829	20.16796

supposed in H_9. It has strong negative effects on both operational ($\delta_1 = -0.007$, $\rho > |z| = 0.00$) and financial ($\theta_1 = -0.003$, $\rho > |z| = 0.00$) available slack resources contrary to what has been assumed in $H_{2a/b}$. Consequently, having a sustainability strategy leads to the consumption of both types of available slack resources. Operational and financial available slack resources have different effects on innovation and environmental performance. Opposite to what has been assumed in H_{8a}, available operational slack resources have a negative statistically significant association with environmental performance ($\gamma_2 = -0.19$, $\rho > |z| = 0.00$; $\omega_3 = -0.58$, $\rho > |z| = 0.00$). They are also strongly and negatively correlated with innovation ($\lambda_1 = -0.1$, $\rho > |z| = 0.00$), in contrast with H_{4a}. Accordingly, the results suggest that companies do not use available operational slack resources to innovate their business processes or improve their environmental performance. Available financial slack resources have negative and statistically significant association with environmental performance ($\gamma_3 = -1.68$, p> $|z| = 0.00$; $\omega_2 = -1.09$, $\rho > |z| = 0.00$) in contrast with H_{8b}. Nevertheless, they positively and strongly affect innovation ($\lambda_2 = 1.17$, $\rho > |z| = 0.000$) as supposed in H_{4b}. Finally, innovation strongly and positively affects environmental performance ($\gamma_1 = 0.09$, $\rho > |z| = 0.00$; $\omega_1 = 0.05$, p > $|z| = 0.05$) in line with H_7. These latest results show that available financial slack resources indirectly support environmental performance improvement. Available financial slack resources are useful to boost innovation processes with one year lag. Prior innovation activities, in turn, foster subsequent environmental performance in terms of both resources' sustainable use in production activities and GHG emissions reduction for carbon neutrality. Nevertheless, available financial slack resources have a direct negative effect on two-year-lag environmental performance, thus downsizing their positive indirect effects.

5. Discussion and conclusion

The results of this study are mixed and mostly against the literature trend. In contrast with Symeou *et al.* (2019), the authors found that both types of unabsorbed slack resources (operational and financial ones) have a direct negative effect on environmental performance. Nevertheless, the availability and use of financial slack resources foster innovation that, in turn, improves environmental performance. Available operational slack resources have negative and statistically significant associations with both innovation and environmental performance. These findings allow the authors to argue that managers prefer to use available operational slack resources to develop core business activities rather than addressing innovation and/or environmental sustainability purposes.

Combining good management and slack resources theories (Melo, 2012), the authors argue that managers mainly use available financial slack resources to enable innovation processes aimed at improving corporate environmental performance. However, having available slack resources does not automatically lead to an improvement in environmental performance. They need to be properly addressed (e.g. in innovation activities) to indirectly

Table 8 Covariance matrix of the main scrutinised variables

Variables	$ResourceUseScore_{t+2}$	$GHGsEmissionsScore_{t+2}$	$Innovation_{t+1}$	$FATRatio_t$	$QuickRatio_t$	$CSRStrategyScore_t$	$ManagementScore_t$	ROA_t	$lnTA_t$
$ResourceUseScore_{t+2}$	1								
$GHGsEmissionsScore_{t+2}$	0.771***	1							
$Innovation_{t+1}$	−0.044***	−0.064***	1						
$FATRatio_t$	−0.084***	−0.139***	0.015	1					
$QuickRatio_t$	−0.198***	−0.186***	0.206***	0.01	1				
$CSRStrategyScore_t$	0.663***	0.659***	−0.091***	−0.103***	−0.192***	1			
$ManagementScore_t$	0.231***	0.216***	0.034***	0.049***	−0.067***	0.283***	1		
ROA_t	0.054***	0.003	−0.115***	0.067***	0.151***	0.034***	0.044***	1	
$lnTA_t$	0.489***	0.484***	−0.124***	−0.107***	−0.239***	0.519***	0.227***	−0.065***	1

Notes: *** <0.01; ** <0.05; * <0.1

Table 9 PLS-SEM regressions results

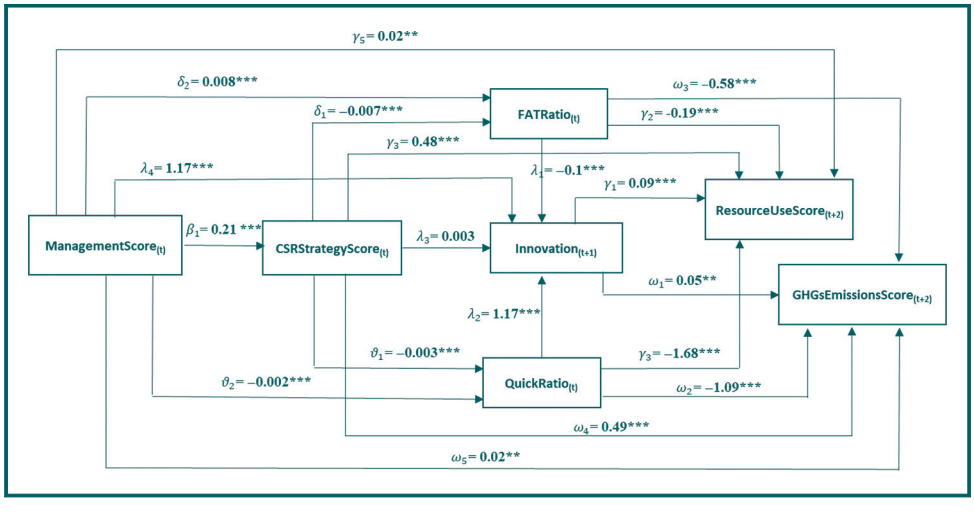
Models	DVs	IVs & CVs	Coef.	Robust Std. Err.	ρ>z
1	$CSRStrategyScore_t$ <–	$ManagementScore_t$	0.2080074	0.0118207	0.000
		ROA_t	0.2704915	0.0421175	0.000
		$lnTA_t$	11.85663	0.2529225	0.000
		Basic Materials	11.05249	2.057544	0.000
		Consumer Discretion	0.0420624	2.049456	0.984
		Consumer Staples	5.474128	2.189153	0.012
		Energy	3.027927	2.412119	0.209
		Health Care	2.149072	2.11913	0.311
		Industrials	1.199052	1.971651	0.543
		Technology	1.621871	2.052773	0.429
		Telecommunications	1.234406	2.477635	0.618
		Utilities	Omitted because of collinearity		
2	$FATRatio_t$ <–	$CSRStrategyScore_t$	0.0069337	0.0014505	0.000
		$ManagementScore_t$	0.0081302	0.001509	0.000
		ROA_t	0.0217664	0.0052827	0.000
		$lnTA_t$	0.1409286	0.0360084	0.000
		Basic Materials	0.4130814	0.2578591	0.109
		Consumer Discretion	2.176138	0.2563487	0.000
		Consumer Staples	2.337767	0.2739371	0.000
		Energy	0.6528675	0.3017429	0.030
		Health Care	1.747022	0.2650818	0.000
		Industrials	1.857356	0.2466227	0.000
		Technology	2.967859	0.2567743	0.000
		Telecommunications	1.324772	0.309911	0.000
		Utilities	Omitted because of collinearity		
3	$QuickRatio_t$ <–	$CSRStrategyScore_t$	0.003331	0.0005237	0.000
		$ManagementScore_t$	0.0016069	0.0005507	0.004
		ROA_t	0.0231779	0.0019287	0.000
		$lnTA_t$	0.160862	0.0131139	0.000
		Basic Materials	0.2076174	0.094143	0.027
		Consumer Discretion	0.3979192	0.0935955	0.000
		Consumer Staples	0.0226518	0.1000163	0.821
		Energy	0.5555933	0.1101691	0.000
		Health Care	0.6267223	0.0967839	0.000
		Industrials	0.2132458	0.0900444	0.018
		Technology	0.9847543	0.0937508	0.000
		Telecommunications	0.4295228	0.1131516	0.000
		Utilities	Omitted because of collinearity		
4	$Innovation_{t+1}$ <–	$FATRatio_t$	0.1003799	0.0337317	0.003
		$QuickRatio_t$	1.165187	0.0923877	0.000
		$CSRStrategyScore_t$	0.0029462	0.0042299	0.486
		$ManagementScore_t$	1.165187	0.0923877	0.000
		ROA_t	0.0120439	0.0043915	0.006
		$lnTA_t$	0.2674434	0.0155092	0.000
		Basic Materials	0.6478168	0.105739	0.000
		Consumer Discretion	1.215997	0.7490131	0.104
		Consumer Staples	3.216527	0.7489676	0.000
		Energy	1.375052	0.7991832	0.085
		Health Care	0.212549	0.8778774	0.809
		Industrials	12.74252	0.7742788	0.000
		Technology	1.781013	0.7191063	0.013
		Telecommunications	8.921066	0.7583834	0.000
		Utilities	Omitted because of collinearity		
5a	$ResourceUseScore_{t+2}$ <–	$Innovation_{t+1}$	0.0804393	0.0246553	0.001
		$FATRatio_t$	0.194624	0.0717589	0.007
		$QuickRatio_t$	1.678868	0.1985133	0.000
		$CSRStrategyScore_t$	0.4840898	0.0089934	0.000

(*continued*)

Table 9

Models	DVs	IVs & CVs	Coef.	Robust Std. Err.	$\rho>z$
		$ManagementScore_t$	0.0198584	0.0093414	0.034
		ROA_t	0.2270089	0.0336266	0.000
		$lnTA_t$	4.428109	0.2253761	0.000
		Basic Materials	3.055766	1.592743	0.055
		Consumer Discretion	4.209605	1.594338	0.008
		Consumer Staples	0.7478849	1.699465	0.660
		Energy	0.4530471	1.866444	0.808
		Health Care	5.560488	1.675889	0.001
		Industrials	3.659256	1.529507	0.017
		Technology	7.969347	1.627316	0.000
		Telecommunications	1.083979	1.922584	0.573
		Utilities	*Omitted because of collinearity*		
5b	$GHGsEmissionsScore_{t+2}$ <–	$Innovation_{t+1}$	0.0530555	0.0254934	0.037
		$FATRatio_t$	0.5775015	0.0741983	0.000
		$QuickRatio_t$	1.085684	0.2052615	0.000
		$CSRStrategyScore_t$	0.4903044	0.0092991	0.000
		$ManagementScore_t$	0.0200268	0.009659	0.038
		ROA_t	0.0482716	0.0347697	0.165
		$lnTA_t$	4.250812	0.2330374	0.000
		Basic Materials	7.14251	1.646887	0.000
		Consumer Discretion	6.591482	1.648535	0.000
		Consumer Staples	3.789279	1.757236	0.031
		Energy	6.022679	1.929891	0.002
		Health Care	2.576784	1.732859	0.137
		Industrials	4.201749	1.581501	0.008
		Technology	7.490795	1.682635	0.000
		Telecommunications	2.063551	1.987939	0.299
		Utilities	*Omitted because of collinearity*		

Figure 3 The main results of PLS-SEM regressions



produce positive eco-friendly effects. Nevertheless, managers need to be cautious since the examined available financial slack resources involve borrowed capital. Therefore, they can expose the risk of damaging future liquidity and profitability. Additionally, this could penalise the achievement of higher future environmental performance. In the short term, managers should thus create liquidity cushions that offset the costs of financial slack

resource management, ensuring an efficient ecological transition and carbon neutrality of core business activities.

Regarding the role of sustainability strategy, the analysis results enrich prior studies' findings (Al-Dhaafri and Alosani, 2021; Demartini and Taticchi, 2021; Fadol *et al.*, 2015). In line with Wasiuzzaman *et al.* (2021), the present paper highlighted that sustainability strategy is a key driver to achieving higher future environmental performance.

Ultimately, the study findings allow the authors to assume that the improvement of corporate environmental performance is more a matter of the managerial commitment and strategic approach towards sustainability, rather than the availability of slack resources (Wasiuzzaman *et al.*, 2021).

This study provides multiple contributions to the current literature on the relationship between available slack resources and environmental performance. Firstly, it produces original and innovative pieces of evidence that fuel the scant debate on how available slack resources affect environmental performance. Secondly, this paper differs from the existing literature by examining the specific and key role of both unabsorbed operational and financial slack resources. Thirdly, it combines good management and slack resources theories in adopting a holistic and more rigorous methodological approach (i.e. PLS-SEM) to examining financial and non-financial business determinants of corporate environmental sustainability that also mitigates possible endogeneity effects between the scrutinised variables. Moreover, the analysis identified critical drivers that may enable available slack resources to boost the ecological transition of companies. Lastly, this paper contrasts with most of the prior studies investigating this topic. Indeed, the authors argue that the availability of both operational and financial slack resources is not a sufficient requirement for corporate environmental sustainability. Accordingly, managers should strategically activate proper innovation processes to transmute unabsorbed slack resources in higher subsequent environmental performances, fostering business ecological transition.

From a managerial standpoint, the paper emphasises the key role of management commitment in properly addressing available financial slack resources towards environmental performance improvement. Furthermore, this study encourages managers when using unabsorbed financial slack resources to boost environmental sustainability activities. Notably, managing financial slack resources can foster innovation for environmental improvements. However, this business practice may critically affect future financial and non-financial performance. In this regard, the authors suggest that managers should create appropriate retained earnings to offset any future liquidity shortages or costs of debt due to the use of available financial slack resources for the businesses' environmental sustainability. Alternatively, managers should strategically invest the financial surplus in eco-friendly product innovations generating new business opportunities that lead the firm to be the first mover in emerging market segments, fostering the achievement of competitive advantages and higher profits (Porter and Kramer, 2019). This managerial attitude may compensate for any costs incurred to finance innovations enabling the ecological transition of production activities without compromising the achievement of optimal financial results. Moreover, managers could also mitigate the cost of debt by drawing on sustainable finance, leveraging the new institutional pressures on banks and investors for ESG investments (e.g. in Europe, the new green asset ratio will encourage banks to lend to companies effectively involved in sustainable activities).

This study has some limitations. The analysis considers only two proxies of available slack resources, distinguishing them into operational and financial ones. Moreover, the analysis is short-term oriented. Accordingly, several research opportunities arise. Future studies should focus on a wider range of unabsorbed slack resources to better appreciate how they affect corporate environmental performance. In this context, more research that integrates good management and slack resources theories is needed. Further studies can also

investigate how available slack resources can be leveraged to enable investment projects aimed at fostering environmental performance in the middle-long term. Future analysis can also investigate other external and internal business factors that can play a critical role in affecting the relationship between unabsorbed slack resources and environmental performance.

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Corresponding author

Sebastiano Cupertino can be contacted at: cupertino@unisi.it

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