Journal of Cleaner Production 375 (2022) 134121

Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

Can a country's environmental sustainability exert influence on its economic and financial situation? The relationship between environmental performance indicators and country risk

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ARTICLE INFO

Handling Editor: Tomas B. Ramos

Keywords:
Environmental performance
Country risk
Fuzzy-set qualitative comparative analysis
Country grouping

ABSTRACT

Due to international events such as the declaration of Sustainable Development Goals, countries have started to develop their national strategies for effective implementation of the 2030 Agenda based on those targets. This study aimed to analyse the existing relationship between the environmental proactiveness and sustainability of countries and their associated Country Risk Scores. For this purpose, two main indicators were considered: (a) the Environmental Performance Index, as a measure of a country's environmental sustainability pro-activeness, and (b) the Country Risk Score, which represents a country's economic, political, and financial situation. Data for 163 countries were used to test whether the Environmental Performance Index is related to the Country Risk Score while controlling for country groupings (memberships and/or alliances). This analysis was complemented by a regression approach using fuzzy-set qualitative comparative analysis to identify the combination of conditions leading to a high or low Country Risk Score. The results showed that the Environmental Performance Index is a good predictor of the Country Risk Score. In particular, the Environmental Health component of the Environmental Performance Index emerged as a better fit. However, the complementary analysis uncovered the important role of Ecosystem Vitality. Furthermore, the analysis confirmed the moderating effect of the country groupings. Overall, the Environmental Performance Index scores correlate with Country Risk Scores. The Environmental Performance Index reflects good governance practices, which are related to those evaluated by the Country Risk Score.

1. Introduction

The recent international awareness about environmental and social degradation has pushed United Nations members to adopt a set of goals to ensure a sustainable planet. Nations have committed to achieve the Sustainable Development Goals (SDGs) through national plans and roadmaps, underlying the important role of governments in the successful implementation and development of any related initiative. Indeed, governmental failure to establish long-term sustainable development plans, financial failure from governments to invest in sustainability, inadequate technology transfer mechanisms, or trade barriers have been reported to be responsible for countries failing to implement the SDGs (Sarvajayakesavalu, 2015; Stafford-Smith et al., 2017). On the other hand, several studies (Lamichhane et al., 2021; Sebestyén and Abonyi, 2021; Biglari et al., 2022) have emphasized the essential role that a country's government plays regarding the policy frameworks and regulations to encourage sustainability (Guo et al., 2020), environmental protection, and the development of sustainable business models (Arbolino et al., 2022). However, these are not stand-alone initiatives but actions involving different agents, namely organizations, companies, stakeholders (Durmaz et al., 2010), and interconnected goals (GA, 2015). For example, to foster environmental protection governments can promote environmental certification, eco-innovation, or the transition from linear to circular models (Geissdoerfer et al., 2017; Aldieri et al., 2019a), all of which require the participation of suppliers, companies, and technological partners, among other stakeholders, to work towards climate action and responsible production.

In addition, governments need indicators to monitor the achievement of these targets. Numerous studies have proposed indicators and methodologies that encompass the three dimensions of sustainability: environmental, economic, and social (Cagno et al., 2019; Sebestyén and

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https://doi.org/10.1016/j.jclepro.2022.134121
Received 5 September 2021; Received in revised form 15 July 2022; Accepted 11 September 2022
Available online 14 September 2022

List of abbreviations/acronyms

SDG	(Sustainable development Goals)
CRS	(Country Risk Score)
CR	(Country Risk)
EPI	(Environmental Performance Index)
EH	(Environmental Health)
EV	(Ecosystem Vitality)
AIR	(Air quality)
H20	(Sanitation and drinking water)
HMT	(Heavy Metals)
WMG	(Water Management)
BDH	(Biodiversity & Habitat)
ECS	(Ecosystem Services)
FSH	(Fisheries)
CCH	(Climate Change)
APE	(Pollution Emissions)
AGR	(Agriculture)
WRS	(Water Resources)
OECD	(Organisation for Economic Co-operation and Development)
GNP	(Gross National Product)
GDP	(Gross Domestic Product)
EU	(European Union)
fsQCA	(Fuzzy-set Qualitative Comparative Analysis)
LDC	(Least developed countries)
Arableague	(The Arab league)
Asean	(Association of Southeast Asian Nations)
Comwealth	(The Commonwealth of Nations)
Eu27	(The 27 countries of the European Union)
G20	(the most powerful industrialised and emerging economies)
Franco	(countries in which French is and official language and/or countries with ties to France)
OEI	(Organization of Ibero-American Countries for Education, Science and Culture)
OIC	(Organization of Islamic cooperation)
OPEC	(Organization of the Petroleum Exporting Countries)
EMMRKT	(Emerging market countries)
SIDS	(Small Island Developing States)
LLDC	(Landlocked Developing Countries)

Abonyi, 2021; Arbolino et al., 2022).

In the economic domain, the Country Risk Score (CRS) was developed to help investors and traders to make better decisions about their international investments and businesses (Erb et al., 1996; Cervelló-Royo et al., 2014). Country risk measures the risk and uncertainty associated with investing in a particular country; it depends on factors outside of a company's control. Indeed, it covers dimensions in the political, economic, and structural spheres, such as political instability, the effectiveness of institutions and government, economic structure, growth prospects, external finances, and fiscal and monetary flexibility (Hoti and McAleer, 2004). Therefore, country risk identifies threats based on the direction of the economic and social output, which, in fact, is highly dependent on the political and economic management of national governments. The failure of governments to create the appropriate conditions for economic development – that is, to promote trade, cooperation or innovation, and technology transfer – causes uncertainty, posing barriers for companies and countries to grow and, therefore, limiting their capability to return their debts. Economic growth as a factor contributing to sustainable development cannot be unintegrated with other efforts towards sustainable development (Collste, 2017), and researchers cannot ignore the interrelations between them – for example, with the environmental impact and climate change (Husted and Sousa-Filho, 2017).

Similarly to the CRS, a country's sustainable indexes are composites that aim to identify and compare its sustainability risks based on the direction of the environmental, economic, and social output (Singh et al., 2012). They are used for policymaking and public communication. According to this approach, a nation's environmentally proactive attitude would provide a safer image, indicate its preference for sustainable business models, and, therefore, imply better political and economic performance (O'Rourke, 2003) associated with less risk and uncertainty (Arbolino et al., 2022). In other words, countries with advanced governments that take care of their societies will manage to achieve good economic performance and political situations (Calcagnini and Perugini, 2019a).

Despite research on carbon footprints, tourism, and country risk (Cervelló-Royo et al., 2016; Lee and Chen, 2021), no previous studies have attempted to investigate the existing relation between a country's environmental proactiveness and sustainability and, therefore, its preference for developing sustainable business models and its associated risk. The literature has been notably reliant on how environmental approaches improve the strategic positioning of firms (González-Benito and González-Benito, 2008; Ferrari et al., 2010; Malesios et al., 2020), whereas not too many researchers have focussed on how a country's environmental management can improve its strategic positioning in the financial markets. A full evaluation of a global measure of environmental sustainability, alongside its components and subcomponents, based on country risk is also missing. Finally, no study has approached the interrelations between the environmental indicators and CR, then failing to determine the combinations of environmental sustainability conditions that lead to high and low country risk.

In an attempt to fill out this research gap, this paper (a) sheds light on the interdependencies between a country's environmental performance and its economic, political, and financial uncertainty; (b) demonstrates how a country's ability to achieve certain environmental policy objectives and indicator values relates to country risk; and (c) investigates the paths to high and low country risk considering a country's geopolitical and economic area.

The paper is structured as follows. Section 2 presents the theoretical background and hypotheses, including a conceptual explanation of the indexes that have shaped the research model. Section 3 offers a description of the methodologies used to test the hypotheses. Subsequently, Section 4 provides a detailed description of the main results derived from the data analysis through regression modelling and qualitative comparative analysis and the discussion. Finally, Section 5 presents the conclusions, implications, and limitations of this study.

2. Theoretical background and hypotheses

There is an abundance of studies on environmental performance indicators, specifically regarding the performance of environmental firms and industries (e.g., González-Benito and González-Benito, 2008; Ferrari et al., 2010; Malesios et al., 2020). Indeed, resource efficiency and environmentally friendly and sustainable practices make a direct and positive contribution to a firm's value (Aragon-Correa et al., 2008; Galdeano-Gomez et al., 2008). Furthermore, the more environmentally friendly the firm's performance, the better its management (Zeng et al., 2010; Cabello-Eras et al., 2013). Thus, it is imperative that firms consider incorporating environmentally friendly practices and sustainable approaches into their long-term strategy and not only consider them in the short term (Porter and Kramer, 2006; Cambra-Fierro and Ruiz-Benítez, 2011).

From this point of view, it seems that it falls to the private sector to look ahead and to make plans to ensure sustainability and to protect the environment for its own self-interest (Boiral, 2006; Larrán-Jorge et al., 2015). However, according to a country approach, a government is still essential to regulate and encourage the development of appropriate policy frameworks for creating sustainable business models (Steger, 2000). There have been continuous efforts to work with government and society to encourage companies to become more vigorously involved in environmentally friendly practices, particularly in less developed countries. In fact, the governments of many countries have developed policies to preserve natural resources, to restrict emissions of greenhouse gases, and to decrease air pollution for their residents (Kronenberg, 2007), while relevant studies have focussed on the implementation of a more ecological way of life for individuals (Marchand and Walker, 2008), firms (Rosner, 1995; Kürzinger, 2004), and learning organizations (Zsoka et al., 2013; Ramos et al., 2015; Sammalisto et al., 2015).

Stakeholders form a key player in this environment. Several authors have investigated the relations between environmental management and stakeholder pressures in companies (e.g., Henriques and Sadorsky, 1996, 1999; Epstein and Roy, 1998; Delmas, 2001; Sharma and Henriques, 2005) and institutions (Cummins, 2006; Gulbrandsen, 2009; Dentoni and Bitzer, 2015). The prior literature has addressed environmental and sustainability issues affecting stakeholders' interests (Calcagnini and Perugini, 2019a, 2019b). This has been shown through sustainability models, corporate social responsibility, and environmental management (Krucken and Meroni, 2006; Onkila, 2009) resulting from the influences of stakeholders on firms. Similarly, a country's regulation and protection of nature and the environment (King, 2007) addresses the increasing public demand for sustainability and environmental protection that has been occurring in North America, Western Europe, and many of the most prosperous countries in Asia and Latin America. In this vein and as a reverse effect, a country's environmental policy can also exert a strong influence on external stakeholders (Freeman, 1984; Martí-Ballester, 2015; Dafermos et al., 2018). Environmentally proactive countries are associated with less uncertainty and risk and therefore would also show good economic and financial performance and social progress (Calcagnini and Perugini, 2019b; Ferrer, 2019). Thus, worldwide movement towards more effective and efficient sustainable and environmental management will deeply affect the policies of a country and, therefore, its international image as a foreign investment destination.

2.1. Environmental Performance Index (EPI)

Evaluation of the environmental sustainability performance of a nation is very complex (Olafsson et al., 2014). Environmental indices have displayed a trend of showing generic sustainability and environmental performance qualities. In particular, the EPI can act as a measure of the environmental proactiveness and sustainability of a country, which reflects the preference of a country for sustainable business models. The EPI is not a perfect index, but it can be considered the most comprehensive (Olafsson et al., 2014). The main problem is that it mainly focusses on sustainability and the environment with little interest in the link between these dimensions and the economy. This study aimed to explore this connection. An environmentally proactive attitude would provide a safer image and a sign of an advanced society, demonstrate the preference for sustainable business models, and, therefore, offer increasing international appeal.

The EPI measures how well a country is performing on sustainability and environmental standards in two main areas: the protection of human health from environmental hazards – the Environmental Health [EH] goal, which represents 40% of the weighting – and protection of natural resources including ecosystems – the Ecosystem Vitality [EV] goal, which represents 60% of the weighting. The EPI scores the performance of countries in the nine main areas of issues within these two main policy objectives (see Table 1).

Table 1
The table lists the policy objectives and issue areas that are included in the Environmental Performance Index.

Policy objective	Indicator	Description
Environmental Health (EH)	AIR	Air Quality
	H2O	Sanitation & Drinking Water
	HMT	Heavy Metals
	WMG	Waste Management
Ecosystem Vitality (EV)	BDH	Biodiversity & Habitat
	ECS	Ecosystem Services
	FSH	Fisheries
	CCH	Climate Change
	APE	Pollution Emissions
	AGR	Agriculture
	WRS	Water Resources

Source: epi.yale.edu data

These nine areas contain a total of 20 indicators. Each individual indicator is connected to either a long-term public health or ecosystem objective. Indicators are evaluated in terms of their 'proximity-to-target value' for each country. Thus, indicators in the EPI measure how close the country is to reaching agreed targets for the international community or, if there are no established targets, how well it is performing compared with the best performing countries. For all countries, these targets are identical and are obtained from known information, such as (a) agreements or other globally established objectives, (b) standards agreed upon by global institutions and/or organizations, (c) state government requirements, and (d) the verdict of recognized experts based on scientific consensus.

The collection of elements in the EPI also includes some of the main Organisation for Economic Co-operation and Development (OECD) criteria, which measure sustainability and environmental proactiveness (OECD, 2001). Because the EPI quantifies not only environmental and sustainability outcomes during an isolated year, but also evolution over longer periods, it is a good measure for evaluating environmental and sustainable conditions and trends. Moreover, the political dimension inherent in the EPI makes it a useful comparative tool to benchmark a country's sustainability and environmental performance and policies. The extent to which the EPI really determines the circumstances under which use of resources is sustainable depends on how well the policy targets and indicators are applied (Mori and Christodoulou, 2012). Indeed, according to Hsu et al. (2014), the EPI provides information on relevant environmental and sustainability data, structured in a way that is suitable for policymakers and for spearheading competitiveness.

2.2. Country Risk Score (CRS)

From an international investor's point of view, country risk ratings are good indicators for ranking the present condition of a nation with respect to the political, economic, and financial risk status quo. Throughout the past two decades, these country risk ratings have become an issue of great interest for the global finance community. This work has examined the CRS developed by the Euromoney Agency (2020), which encompasses metrics on qualitative and quantitative factors grouped into six different categories (Table 2).

Thus, the CRS represents a complete composite indicator of a country's current situation regarding political, economic, and financial risks. A high CRS means low risk, whereas a low CRS means high risk. Political risk (35% of the weight) and economic performance (35% of the weight) are the qualitative categories that exert greater influence on the CRS. Aspects like corruption, information and transparency, and the regulatory and policy environment are strongly linked to sustainability and the preference for sustainable models, whereas aspects like economic gross domestic product (GDP), employment, and government finances provide a proper measure of the good health and sustainability of a national economy. The rest of the indicators provide measures of the demographics and investment in infrastructure components (structural

Table 2
The table lists the categories and indicators included in the Country Risk Score.

C1: Political risk	C2: Economic performance	C3: Debt indicators	C4: Structural assessment	C5: Access to bank finance/capital markets	C6: Credit ratings
Corruption	Bank stability/risk	Total debt stocks to GNP	Demographics	Country's accessibility to international markets	Nominal values assigned to sovereign ratings by Moody's, S&P and Fitch IBCA
Government non-payments/non-repatriation	Economic GNP	Debt service to exports and current account balance to GNP	Hard infrastructure		
Government stability	Employment/unemployment		Labour market/industrial relations		
Information/transparency	Monetary policy/currency stability		Soft infrastructure		
Institutional risk	Government finances				
Regulatory and policy environment					

GNP: gross national product.
Source: Euromoney Agency data

assessment) along with the country's finances and total level of debt (quantitative values).

2.3. EPI and CRS

The relationship between sustainability, risk management, and performance has been widely studied in recent years (Gil-Bazo et al., 2010). As Martí-Ballester (2015) has stated, ethical fund managers known for integrating sustainability and environmental issues (among others) into their main investment strategies could therefore obtain better yields than traditional and/or other managers of pension funds (Statman, 2000; Ferruz et al., 2010). Along this line of thought and according to a country approach, an environmentally proactive attitude would provide a safer image, indicate the preference for sustainable business models, and, therefore, imply less uncertainty and risk (O'Rourke, 2003) associated with political and economic performance and structural assessments. It would lead to better economic performance and an improved political situation, and thus the country would be less risky and more attractive from an international standpoint. Hence, environmental performance indicators exert an influence on country risk.

H1. Environmental performance indicators, as measures of sustainability and an advanced society with a preference for sustainable business models, significantly impact the CRS, increasing the appeal of a country.

Intergovernmental organizations, such as the European Union (EU), the Arab League, and the Commonwealth of Nations, include political and economic alliances, business market areas, and trading partnerships that represent areas that share a similar level of development or a similar legal or economic framework among the members (Wahab, 2004; Clapp, 2006; Alonso et al., 2015). The euro crisis showed that because of the heavy interrelation between zone economies, country risk in one European country can be affected by other countries located in the same economic area. Moreover, the political stability in the area can affect country risk. Therefore, this study controlled for country groupings and location in a geopolitical and economic area and it can be stated that country risk is also affected by the country grouping and/or geographic location of each country.

H2. Environmental performance indicators, as measures of sustainability and an advanced society with a preference for sustainable business models, significantly impact the CRS, increasing the appeal of a country, but are conditioned by the country grouping in which the country is located.

3. Methodology and data

The data used were sourced from the components of the 2020 Environmental Performance Index (EPI) for 163 countries. The Country Risk Score (CRS) data were obtained from the Euromoney Agency.

The EPI measures performance within the scope of environmental friendliness and sustainability. This study focussed on and retrieved data for the two main policy objectives present in the database: Environmental Health (EH) and Ecosystem Vitality (EV). EH is an indicator that aggregates information on how environmental aspects impact the health of humans through indicators such as water quality, child morbidity, and/or air pollution, whereas EV accounts for indicators such as protected areas, environmental pressure by agricultural activities, or overfishing.

The CRS is a combination of different categories related to debt; access to credit; and political, economic, and structural assessments. The CRS were obtained for all 163 countries that are present in the EPI. This study used 161 countries for the analysis, as Botswana and Lebanon were excluded because they were clear outliers in the initial calculations.

The CRS and EPI are evaluated with a set of indicators that can overlap. Therefore, this study assessed the indicators used to measure the CRS that could overlap with the EPI indicators, particularly hard and soft infrastructure. For example, hard infrastructure, which is among the indicators for the CRS, may include elements that are also measured by indicators for the EPI, like waste management. However, the definition of hard infrastructure is broader and represents a measure of the adequacy of a country's physical infrastructure. Similarly, soft infrastructure may also include elements like sanitation and drinking water and/or pollution emissions (EPI), but the concept of soft infrastructure is wider and represents a measure of the health of the economic, medical, and cultural/social institutions of a country. In addition, hard and soft infrastructure represent only 5% of the CRS weighting scheme, preventing any residual overlap.

Because the main objective of this study was to determine the relation between environmental and sustainability aspects and country risk indicators, a regression analysis was performed to evaluate a model of the relation between the EPI and the CRS. As the EPI indicator is an aggregate of other indicators, the analysis followed a step-by-step approach and created different regression models going from the higher to the lower level of aggregation.

The regression models for country risk were built considering the CRS as dependent on the environmental and sustainability indicators as follows:

$$Country\ Risk = C + b_0 EPI + E \quad (1)$$

$$Country\ Risk = C + b_1 EnvHealth + E \quad (2)$$

$$Country\ Risk = C + b_2 EnvVitality + E \quad (3)$$

$$Country\ Risk = C + b_1 EnvHealth +_2 EnvVitality + E \quad (4)$$

$$Country\ Risk = C + b_1 EnvHealth + b_2 EnvVitality + b_3 EnvHealthxEnvVitality + E \quad (5)$$

Regression coefficients b_0, b_1, and b_2 helped to determine how much the CRS increases or decreases when the EPI, EH, and EV of the country change. Moreover, it allowed evaluating whether they are good predictors of country risk. The significance of the relations was tested using the coefficient of multiple determination (R^2), which shows the percentage change in the dependent variable. This percentage change can be explained by the independent variables. When sig. (F) < 0.05, the model can be considered more significant than expected and therefore the null hypothesis, which states that there are no linear relationships between these variables and the independent variables, can be rejected.

In the multiple regression model (model 4), the *b* coefficient indicates an increase/decrease in the CRS when independent variable I (EH) increases by one unit while the other factor (EV) remains constant. The results of the regression model suggested a disaggregation of the EH and EV policy objectives into their indicators, which might provide some insights into which specific factors contribute the most to predict country risk. This approach also allowed exploring whether detailed indicators could significantly impact the prediction model and whether that improvement had an important trade-off in terms of model complexity (model 6).

$$Country\ Risk = C + b_{2,1} AIR + b_{2,2} H2O + \ldots. + b_{2,10} WRS + E \quad (6)$$

To confirm the second hypothesis, for the dummy variables, b_i measures the relative predictive power of the specific levels of each variable. b_i indicates how much the dependent variable rises or falls (if negative) with respect to the omitted category when a country belongs to the corresponding country grouping.

$$Country\ Risk = C + b_{1,1} EnvHealth + b_{1,2} EnvVitality + b_{1,3} A_1 + \ldots + b_{1,16} A_{14} + E \quad (7)$$

Dummy variables should be assessed by evaluating the change in R^2. This study assessed the set of country groupings by using a forward stepwise regression procedure, which introduces variables into the model by evaluating the change in the F-value (F-change). Thus, this method only introduced variables into the model that produce a significant change in R^2, that is, variables that result in a significant increase in the prediction.

Finally, this study evaluated the effects when EH and EV were crossed with the dummy variables representing the country groupings to evaluate whether there was any moderating effect of the country groupings on the indicators.

$$Country\ Risk = C + b_{1,1} EnvHealth + b_{1,2} EnvVitality + b_{1,3} A_1 + \ldots + b_{1,16} A_{14} + \beta_{1,16} EnvHealth\ x\ A_1 + \ldots + \beta_{1,44} EnvVitality\ x\ A_{14} + E \quad (8)$$

These linear regression–based models show the degree of the relationship that each independent variable has with the dependent variable. However, these relationships can change depending on the other independent variables included in the model. The relationship between the dependent and independent variables is assumed to be linear and symmetric, and the interactions between the different variables is difficult to interpret.

With configurational comparative methods like fuzzy-set qualitative comparative analysis (fsQCA), one can study different combinations of conditions resulting in an outcome (Rihoux and Ragin, 2008). While independent variables in a regression compete to explain the variance in the dependent variable, in fsQCA they cooperate to create the outcome (Fiss, 2007), and either a high or low value of the outcome, which is the dependent variable. Indeed, the combination of conditions that produce a high value of the dependent variable can be different than the conditions resulting in a low value. fsQCA can examine whether these conditions act differently depending on the context (Rihoux, 2006), that is, the symmetry of the relationship. Thus, fsQCA deals with some of the limitations of regression-based models, such as symmetry or the lack of proficiency at handling multifaceted interdependencies between variables (Woodside, 2013). It represents an ideal complement to the regression (Liu et al., 2017).

In the present study, fsQCA made it possible to identify the combination of conditions (paths) leading to a high or low CRS. Moreover, it allowed identifying the synergies among conditions leading to the desired outcome, examining asymmetric and non-linear relations between conditions and the outcome (Fiss, 2007), and identifying the sufficient and necessary conditions or combination of conditions leading to the outcome.

fsQCA requires the outcome and the predictor conditions to be on a fuzzy scale from 0 to 1. The scale indicates the level of membership of a set, with 1 indicating full membership, 0 indicating full non-membership, and 0.5 representing the cross-over point, separating cases that are more in or more out of the set (Ragin, 2008). The process of transforming the original scales to the fuzzy values is called calibration, which requires setting up thresholds for the three anchor points determining the level of membership. In this case, all the indicators were scaled from 0 to 100, an approach that simplified the procedure. This study considered the EPI as a calibrated measure of the level of a country's accomplishment of the different objectives regarding the environmental issues. Therefore, the original scores were directly transformed to the calibrated scores, by dividing them by 100. Thus, full membership was established for a score of 95 (fuzzy score = 0.95), full non-membership was a score of 5 (fuzzy score = 0.05), and the cross-over point was 50 (fuzzy score = 0.5).

Additionally, the country groupings were introduced as conditions in the present study (Table 3). In this case, they were modelled as crisp sets with a value of 1 if they belonged to the country grouping or 0 if they did not. The fsQCA algorithm produces a truth table with 2k rows, where k represents the number of conditions predicting the desired outcome.

As the number of dummy conditions representing the areas was quite large, directly introducing all the conditions into the study would create

Table 3
The table presents country groupings, which have been elaborated based on the authors' observations.

Area (Abbreviation)	Description
A1 (ldc)	Groups together the least developed countries according to the United Nations (UN)
A2 (arableague)	The Arab League: countries of the Middle East and Africa/ Maghreb
A3 (asean)	Association of Southeast Asian Nations (AESAN): groups 10 countries of Southeast Asia
A4 (Comwealth)	The Commonwealth of Nations is a voluntary association of 54 independent and equal countries. It includes both advanced economies and developing countries, primarily former territories of the British Empire
A5 (eu27)	The 27 countries of the European Union (EU)
A6 (g20)	The most powerful industrialised and emerging economies, representing 85% of the global economy
A7 (franco)	Countries in which French is an official language and/or countries with ties to France
A8 (oecd)	Countries that belong to the Organisation for Economic Co-operation and Development (OECD)
A9 (oei)	Organización de estados iberoamericanos para la educación la ciencia y la cultura (Organization of Ibero-American Countries for Education, Science and Culture)
A10 (oic)	Organization of Islamic cooperation
A11 (opec)	Organization of the Petroleum Exporting Countries
A12 (emmrkt)	Emerging market countries
A13 (sids)	Small Island Developing States
A14 (lldc)	Landlocked Developing Countries

a big truth table that would be difficult to interpret and would be of little value to this study. Therefore, each country grouping was pretested individually with the EPI objectives to evaluate which areas by themselves were suitable conditions to be included in the paths to the desired outcome.

Once the areas had been evaluated, the calibrated policy objectives (EH and EV) and the areas showing viable paths to high and low levels of CRS were introduced as conditions in the analysis. The model ended up with five conditions, which generated a truth table of 2^5 (32) possible combinations. The truth table (Ragin, 2008) was refined based on the minimum number of observations (frequency) and the degree to which cases corresponded to a set of the desired outcomes (consistency). The frequency was set to 3, considering the relatively high number of cases in the sample (Ferrari et al., 2010), and the consistency was set to 0.8, above the suggested threshold of 0.75 (Ragin, 2006). Then, solutions that were not within the suggested cut-off levels were not used for further analysis.

The fsQCA algorithm minimizes the truth table (logical minimization), producing three solution schemes: the complex, the parsimonious, and the intermediate solutions, according to how logical remainders are considered; that is, none are considered, all are considered, or just the ones that make sense are considered, respectively. Intermediate solutions to high and low CRS are shown in Table 5, as these solutions have been reported to be superior to the other (Ragin, 2008). Following Ragin (2008), black dots (●) indicate the presence of a condition and circles with a cross (⊗) indicate its absence. Blank spaces in the table indicate the 'does not matter' condition – that is, the condition is not relevant for the outcome. Table 5 also includes the consistency and coverage of the solutions. Consistency refers to the proportion of cases that are consistent subsets of and sufficient for the outcome, and coverage is the proportion of the desired outcome that is explained by the model. Consistency is analogous to significance (Schneider and Wagemann, 2010) and coverage is analogous to the variance explained (Ragin, 2006) in regression-based models.

4. Results

The first step of the analysis was to evaluate a model of the relation between the Environmental Performance Indicator (EPI) and the Country Risk Score (CRS) (Tables 4 and 5). Based on the estimation of the regression models, the EPI was positively and significantly correlated (model 1) with the CRS ($b_0 = 0.808$, $R^2 = 0.614$, $p < 0.001$), confirming H1. The CRS is an evaluation of the political, economic, and financial situation of a nation, which reflects the quality of the country's governance. Governments acting on sustainability-related aspects reflect the country's awareness of higher-level objectives beyond mere economic or financial performance. Thus, quality governance results in better environmental performance and, subsequently, less uncertainty and less risk are indicated (O'Rourke, 2003), which is reflected in the CRS. Nations working on improving sustainability and environmental aspects would provide a more predictable, riskless, and ethical environment for investors.

Table 4
The table presents the results of the regression analysis.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
(Constant)	10.91	23.71	11.509	21.08	31.129	26.51	23.46	22.9
EPI score	0.808 (0.043)***							
Environmental Health (EH)		0.546 (0.031)***		0.516 (0.042)***	0.307 (0.15)***		0.480 (0.044)	0.490 (0.044)
Ecosystem Vitality (EV)			0.789 (0.084)***	0.083 (0.083) n.s.	−0.125 (0.166) n.s.			
EHxEV					0.004 (0.0027) n.s.			
AIR						0.057 (0.072) n.s.		
H2O						0.129 (0.061)*		
HMT						0.191 (0.058)**		
WMG						0.064 (0.033) n.s.		
BDH						- 0.025 (0.038) n.s.		
ECS						0.012 (0.033) n.s.		
CCH						−0.065 (0.068) n.s.		
APE						0.041 (0.04) n.s.		
AGR						0.004 (0.044) n.s.		
WRS						0.116 (0.038)**		
COMMONWEALTH							5.087(1.61)	4.744 (1.586)
g20							−6.211 (2.468)	
OECD							6.96 (2.62)	
EMMAKT							7.27 (2.04)	18.453 (5.721)
EH*g20								−0.11 (0.033)
EH*emmrkt								−0.236 (0.109)
EV*OECD								0.135 (0.040)
ANOVA F	253.27	318.17	88.52	159.57	108	38.74	76.91	69.64
R2	0.614***	0.667***	0.358***	0.669**	0.673***	0.721***	0.713***	0.731***
R2 change							0.046***	0.018***

Note. The numbers represent the b coefficients, with the p values in parentheses. Statistical significance is denoted with asterisks: ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; n.s, not significant.
Source: Authors' own elaboration

Table 5
The table presents the results of the fuzzy-set qualitative comparative analysis.

	Positive outcome		(high CRS)	Negative outcome		(low CRS)
Configuration	1	2	3	4	5	6
EH	●		●	⊗	⊗	
EV		●	●		⊗	⊗
Asean	⊗	⊗	⊗	⊗		⊗
Opec	⊗	⊗	⊗			
lldc + ldc						⊗
eu27	⊗	⊗				
Consistency	0.915	0.9	0.972	0.864	0.946	0.853
Raw Coverage	0.539	0.574	0.704	0.847	0.842	0.547
Unique Coverage	0.044	0.079	0.209	0.06	0.056	0.066
Overall Solution consistency	0.89			0.83		
Overall solution coverage	0.827			0.968		

Note: Black circles (●) indicate the presence of a condition, and circles with "x" (⊗) indicate its absence. The blank cells represent conditions that did not matter.

In addition to simple regression results, some insights were obtained by disaggregating the EPI into its different policy objectives and components. This study estimated the focal policies of Environmental Health (EH) and Ecosystem Vitality (EV) separately to show the importance of accounting for individual effects. EH and EV policy objectives taken in isolation were also good predictors of the CRS ($b_1 = 0.546$, $R^2 = 0.667$, $p < 0.001$; $b_2 = 0.5789$, $R^2 = 0.358$, $p < 0.001$). The EH policies are more closely correlated to the CRS. This might be explained by the different nature of the two policy objectives. On the one hand, EH concerns human well-being and is built on infrastructure that allows reducing health hazards. Human well-being is of interest as a good governance indicator, which is also related to most of the indicators included in the CRS. On the other hand, EV results from the stress that the development of the economy puts on the environment. Rapid growth of industries and urban areas puts a lot of pressure on the environment, and this is more evident in developing countries, where other socio-political aspects are still in a fragile state, and this affects CRS indicators.

Although EH and EV had significant predictive power when acting together ($R^2 = 0.669$, $p < 0.001$), the small and insignificant increase in R^2 in model 2 compared with model 4 and the absence of significance for the EV and of its interaction with EH suggested that further model development was required. First, level 2 EPI indicators were evaluated to determine which of them might be significant for determination of the CRS. Second, other factors might moderate the relation of the policy objectives to the CRS, such as a country's location or its interrelation with other countries (country grouping).

Model 6 explored the correlation between EPI level 2 and the CRS. The results indicated that only three indicators, two from the EH objective, Sanitation & Drinking Water (H2O) and Heavy Metals (HMT), and one from the EV, Water Resources (WRS), are significant in the CRS prediction. This might be caused by the fact that, particularly in EH, the two indicators that are not significant in the model, Air Quality (AIR) and Waste Management (WMG), have not been sufficiently developed by the countries. Indeed, the average scores for H2O and WMG in the sample were 38.7% and 17.8%, respectively, significantly lower than those for H2O and HMT (61.6% and 57%, respectively). The insufficient overall development of some level 2 indicators in countries that are strongly committed to environmental protection indicated that there is still room for improvement and that these indicators are not a good reflection of the quality of the nation's governance. In relation to EV, as one of its indicators was significant in the model, EV was kept for subsequent analysis to evaluate its possible moderating effect on the country grouping.

Model 7 confirmed a significant improvement in R^2, indicating that some of the country groupings showed significantly higher CRS (i.e., being in the Commonwealth, OECD and emerging markets increases the CRS by around 5–7 points on average) or lower CRS (i.e., being in the G20 reduces the CRS by around 6 points on average) when the other independent variables remain constant. Additionally, model 7 confirmed the moderating effect of the country grouping on the relation of the environmental policy objectives to the CRS. For example, belonging to the OECD group increases the relation of the EV to the CRS, thus confirming H2. Then, some country groupings rise above their peers in the evaluation of the CRS. In other words, for the same environmental performance, some countries have a better risk evaluation result. There are several potential reasons for this phenomenon. For example, Commonwealth countries have, on average, a better CRS than non-Commonwealth countries. This could be explained by the economic and financial links among the countries in this group, which date back to the colonial era. On the other hand, the fast economic growth of emerging markets might not be accompanied by similar commitments regarding climate change mitigation, which would cause these markets to outperform their environmentally friendly peers.

However, as indicated previously, the regression analysis had some shortcomings that could be addressed using a complementary approach, namely fsQCA. Fig. 1 shows the calibrated fsQCA values for the countries and Table 5 shows the results of the fsQCA analysis for achieving CRS. The logical minimization process produced three solutions leading to a high CRS, that is, three combinations of conditions with consistency >0.8. These three solutions represent different combinations of conditions sufficient to achieve a high CRS. Specifically, solutions 1 and 2 apply to countries that have high EH or EV scores and do not belong to the European Union, OPEC, or ASEAN (e.g., Switzerland, Norway, Iceland, Japan, Australia, or the United Kingdom). Solution 3 illustrates that a high CRS could be achieved in countries with high EPI policy objectives that do not belong to ASEAN or OPEC (e.g., Switzerland, Denmark, Luxemburg, Austria, or the United Kingdom). Note that some countries could be included in several solutions, as could also be derived from coverage values. Raw coverage accounts for the proportion of CRS that each of the configurations explains (i.e., solution 3 covers 70.4% of

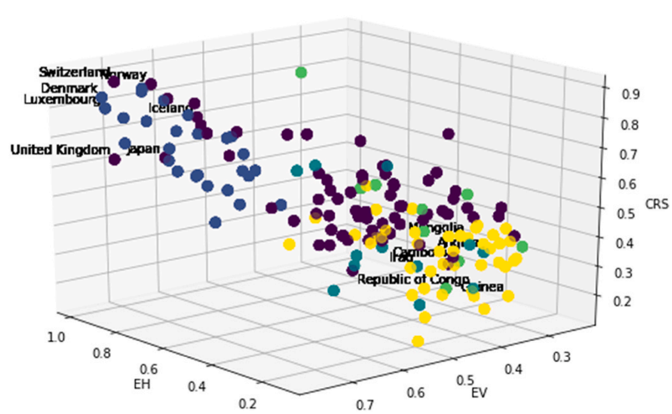

Fig. 1. The figure presents the calibrated fsQCA values for the countries.
Note. Colours are used to represent different country groupings in the analysis (Blue = UE27, Purple = Others, Yellow = lldc + ldc, Green = Asean, Turquoise = Opec).

the cases with a high CRS). Unique coverage accounts for the proportion of CRS that was solely explained by each configuration (i.e., solution 3 covers 20.9% of the cases with a high CRS that no other solution explained).

In addition, a separate analysis to determine the configurations or combinations of conditions leading to a low CRS was performed (solutions 4, 5, and 6). Solution 4 indicated that low EH and not being a part of ASEAN are sufficient to achieve a low CRS, that is, to have a high country risk (i.e., the Republic of Congo, Mali, and Guinea). Similarly, failure to meet the two EPI policy objectives is a sufficient condition for a low CRS (e.g., Cambodia, Angola, or Afghanistan). Finally, solution 6 suggested that a low EV in countries that are not classified as less developed and that do not belong to ASEAN can also lead to a low CRS (e.g., Republic of Congo and Iraq).

A necessary condition needs to be present to obtain the desired outcome. It should then be present in all the configurations that lead to the desired outcome. Additionally, Ragin (2006, 2008) suggested a consistency of 0.9 for necessary conditions. The necessity analysis test revealed that no condition by itself or combined with another condition was necessary to produce a high or low CRS.

The results corroborate the essential, strong correlation between EH and country risk. Two of the three configurations in both analyses included EH in the combination of conditions for the desired outcome and most of the cases (see raw and unique coverage), leading to high and low CRS being covered by these configurations. However, the analysis uncovered the relevant role of EV in delivering a high or low CRS. Indeed, the regression models showed no influence of EV in the presence of EH and no significant interaction between the two policy objectives. Although a country's overall EV performance does not make a significant contribution to improve its CRS, the presence (high level) or absence (low level) of EV by itself or interacting, respectively, with high or low EH is a sufficient condition in a wide spectrum of country groupings to achieve an extreme CRS. These results are reinforced by the high raw coverage values in the solutions included in Table 5. For example, 70.4% of the countries with a high CRS (solution 3) are not in ASEAN or OPEC and show high EV and EH.

5. Discussion

This study tests the relation between EPI and CRS by means of the regression analysis and fsQCA, it offers a complementary view of the relationship between environmental performance and financial risk that previous studies fail to provide. This research fills a gap in the literature by examining aspects that *a priori* may be considered very different but are actually profoundly connected. Unlike other studies that have focused on investigating the financial impact of Environmental, Social, and Governance (ESG) indicators on companies (Aggarwal, 2013; Xie et al., 2019), this study shows that environmental indicators can also bring greater transparency to country risk levels.

The analysis of the relationship of EPI and CRS has provided evidence about the importance of a country's environmental policies and performance as a proxy for economic and financial confidence, confirming the relation between environmental indicators related to tourism and country risk reported in previous studies (Cervelló-Royo et al., 2016; Lee and Chen, 2021) and the positive correlation between economic growth and environmental indicators found in a study on the sustainable development performance of OECD countries (Lamichhane et al., 2021). However, unlike other studies relating economic and environmental aspects, the results don't show U shape like environment Kuznets curve (Chenand Lee, 2020; Sarkodie and Ozturk, 2020).

The strong interrelation found between environmental and social aspects and the economic aspects reinforces the belief that countries addressing them will be in the right path to ensure healthy economic growth. This relation was recently reported for SDGs (Căutişanu et al., 2018). The similar results can be explained by the fact that SDGs cover a set of goals from these social, environmental, and economic dimensions and they are enbibed in the subdimensions of the indexes of the study. For example, EH clean water and sanitation (goal 6: Clean Water and Sanitation), EV climate change (goal 13: Climate Action), EV Fisheries (goal 14: Life Below Water), EV Biodiversity and habitat (goal 15: Life on Land) or CRS subdimensions, employment, labour market, and Economic GNP (goal 8: Decent Work and Economic Growth). Our study of the paths leading to high and low values of CRS also confirms that, as SDGs, they cannot be isolated or treated independently (Collste, 2017) because there are multiple interdependencies among them (GA, 2015).

Thus, countries must undertake profound, thoughtful, and long-term fundamental changes in the economic, social, and environmental spheres to succeed (Sachs et al., 2019). Government action – that is, a national setting favourable to sustainable development is essential. It is critical for governments to create a proper ecosystem that reduces environmental impacts and promotes environmental innovation and collaboration among stakeholders to transition from a linear to a circular economy. In this context, for the purpose of monitoring and policy analysis (Zhou et al., 2021; El Gibari et al., 2019), there has been an increase in the number of assessment tools, indexes, and indicators covering the different dimensions of sustainability: environmental, economic, and social (Haque and Ntim, 2018; Cagno et al., 2019; Ioppolo et al., 2019). However, in many cases these indexes are treated in isolation, ignoring the interrelations between the factors that are used to evaluate them. Our results call into question the effectiveness of measurements used in country risk evaluation methods that do not consider any environmental dimension among their indicators. Although country risk methods have been improved to meet the challenges brought about by globalization, the new challenges related to sustainability remain off the country risk radar. Consequently, the results imply that CR assessment should contemplate the environmental dimension to offer an analysis which more closely resembles the new reality.

In the study, the top CRS performers have strong results in most of the issues related to environmental protection, allowing them to achieve high scores on either one of the two policy objectives collected by the EPI. This finding is aligned with the relation found between CRS related indicators and the environment: democracy and financial (You et al., 2015), pace of globalization (Lv and Xu, 2018), poverty (Masron and Subramaniam, 2019), home consumption, capital investment, and export growth (Guan et al., 2008) among others. It indicates that countries with a high CRS score have a leading role in the commitment to climate change mitigation, which is the result of governmental policies and programmes to preserve the environment and the well-being of their population. The strong effort of countries to achieve the Sustainable Development Goals to mainstream the 2030 Agenda into national plans (Biglari et al., 2022) is associated with strong governance and provides associated benefits for the country, such as better image and predictability and, consequently, lower risk. Similarly, CRS laggards consistently score low on the EPI indicators, indicating the lack of governmental commitment or ability to enforce environmental regulations or the presence of other social issues that prevent them from focussing efforts on environmental issues, which eventually affects country risk. Indeed, climate change, biodiversity loss, and other social factors, such as the level of equality or social inclusion, are now considered risk factors (Guo et al., 2022), and their importance will grow in foreseeable future. Geopolitical and economic areas have different agendas that can impact in the acceleration of the aforementioned governmental policies. Previous studies indicated that, in countries located in areas with high stakeholder orientation and more developed regulatory frameworks, the mobilization of resources to sustainable projects is easier (Husted and de Sousa-Filho, 2019). The results considering the geopolitical and economic areas in the study, with a high concentration of countries that have equivalent geopolitical and economic frameworks around the similar values in the indexes, reinforces the idea that institutional context matters (Ioannou and Serafeim, 2012).

6. Conclusions

The main objective of this research was to determine the relation of environmental sustainability aspects to the Country Risk Score (CRS). With this aim, this study included a regression analysis to test whether the CRS is influenced by the environmental sustainability performance of the country. Furthermore, it was complemented with fsQCA, which made it possible to identify the combinations of conditions (paths) leading to a high or low CRS. The results showed that the Environmental Performance Index (EPI) is a good predictor for the CRS; in particular, the Environmental Health (EH) component of the EPI emerges as a better fit. However, the complementary analysis uncovered the important role of the Ecosystem Vitality (EV) component. Additionally, this study revealed the small but significant influence of certain country groupings on the relationship, confirming its moderating effect.

This analysis has produced important policy implications. For policymakers, this study provides insights into the impact of a nation's commitment to climate change on the CRS. First, EPI can be used as a proxy for the financial risk of a country. The EPI reflects good governance practices, which are related to the practices evaluated by the CRS. Second, countries do not need to focus on sustainability at the expense of economic or financial performance. Although the relationship between sustainability measures and economic performance is rather complex, the present results revealed a pronounced positive relationship; therefore, they can include greater involvement and mobilization of key stakeholders to protect natural resources and human well-being, which would produce a more stable and less risky civil environment that would also favour economic growth. Finally, some country groupings moderate the impact of the relationship. Policymakers can motivate the organizations or groups to which a country belongs to drive faster adaptation of the targets related to climate change.

This study had some limitations that could be explored in future work. For example, the analysis is based on the EPI scores, which have gaps in the collection of data related to some of the detailed indicators and only account for environmental impacts within the country, being unable to capture transboundary impacts. In addition, the EPI variables used in this study were limited and other omitted factors influence the CRS. Finally, both the EPI and the CRS have been calculated for an extensive period of time, and therefore analysing their evolution over time would be a worthwhile direction for future research.

CRediT authorship contribution statement

Ángel Peiró-Signes: Conceptualization, Methodology, Software, Formal analysis, Visualization, Validation, Investigation, Writing – review & editing. **Roberto Cervelló-Royo:** Data curation, Writing – original draft, Formal analysis, Visualization, Investigation, Writing – review & editing. **Marival Segarra-Oña:** Supervision, Software, Validation, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

Acknowledgments

This publication is part of the Program for Assessing and Resources sets R+D+i VLC/CAMPUS and has been funded by the Ministry of Education, Culture and Sports as part of the Campus of International Excellence Program. The authors would like to thank the Universitat Politècnica de València (UPV) for the support through the grant number: PAID-06-14 to the project SP20140647 'Identification of moderating factors in the eco-innovative orientation of society. A social innovation approach'.

References

Aggarwal, P., 2013. Impact of sustainability performance of company on its financial performance: a study of listed Indian companies. Glob. J. Manag. Bus. Res. 13 (11), 61–70.
Aldieri, L., Ioppolo, G., Vinci, C.P., Yigitcanlar, T., 2019. Waste recycling patents and environmental innovations: an economic analysis of policy instruments in the USA, Japan and Europe. Waste Manag. 95, 612–619.
Alonso, J.A., Cortez, A.L., Klasen, S., 2015. LDC and other country groupings: how useful are current approaches to classify countries in a more heterogeneous developing world? Global Governance and Rules for the Post-2015 Era: Addressing Emerging Issues in the Global Environment, 424.
Aragon-Correa, J.A., Hurtado-Torres, N., Sharman, S., Garcia-Morales, V.J., 2008. Environmental strategy and performance in small firms: a resource-based perspective. J. Environ. Manag. 86 (1), 88–103.
Arbolino, R., Boffardi, R., Ioppolo, G., Lantz, T.L., Rosa, P., 2022. Evaluating industrial sustainability in OECD countries: a cross-country comparison. J. Clean. Prod. 331, 129773.
Biglari, S., Beiglary, S., Arthanari, T., 2022. Achieving sustainable development goals: fact or fiction? J. Clean. Prod. 332, 130032.
Boiral, O., 2006. Global warming: should companies adopt a proactive strategy? Long Range. Plann 39 (3), 315–330.
Cabello Eras, J.J., Sagastume Gutierrez, A., Hernandez Capote, D., Hens, L., Vandecasteele, C., 2013. Improving the environmental performance of an earthwork project using cleaner production strategies. J. Clean. Prod. 47, 368–376.
Cagno, E., Neri, A., Howard, M., Brenna, G., Trianni, A., 2019. Industrial sustainability performance measurement systems: a novel framework. J. Clean. Prod. 230, 1354–1375.
Calcagnini, G., Perugini, F., 2019a. Social capital and well-being in the Italian provinces. Socio-Econ. Plant Sci. (Limerick, Irel.) 68, 100668.
Calcagnini, G., Perugini, F., 2019b. A well-being indicator for the Italian provinces. Soc. Indicat. Res. 142 (1), 149–177.
Cambra-Fierro, J., Ruiz-Benítez, R., 2011. Sustainable business practices in Spain: a two-case study. Eur. Bus. Rev. 23 (4), 401–412.
Căutișanu, C., Asandului, L., Borza, M., Turturean, C., 2018. Quantitative approach to circular economy in the OECD countries. Amfiteatru Economic 20 (48), 262–277.
Cervelló-Royo, R., Peiró-Signes, A., Segarra-Oña, M., 2016. How do country risk ratings affect tourism activity? An indirect measure of the environmental awareness of countries. Environ. Eng. Manag. J. 15 (7).
Cervelló-Royo, R., Cortés, J.C., Sánchez-Sánchez, A., Santonja, F.J., Shoucri, R., Villanueva, R.J., 2014. Probabilistic european country risk score forecasting using a diffusion model. In: Computational Models of Complex Systems. Springer, Cham, pp. 45–58.
Clapp, J., 2006. WTO agriculture negotiations: implications for the Global South. Third World Q. 27 (4), 563–577.
Collste, D., Pedercini, M., Cornell, S.E., 2017. Policy coherence to achieve the SDGs: using integrated simulation models to assess effective policies. Sustain. Sci. 12 (6), 921–931.
Cummins, A., 2006. The marine stewardship council: a multi-stakeholder approach to sustainable fishing. Corp. Soc. Responsib. Environ. Manag. 11 (2), 85–94.
Dafermos, Y., Nikolaidi, M., Galanis, G., 2018. Climate change, financial stability and monetary policy. Ecol. Econ. 152, 219–234.
Delmas, M., 2001. Stakeholders and competitive advantage: the case of ISO 14001. Prod. Oper. Manag. 10 (3), 343–358.
Dentoni, D., Bitzer, V., 2015. The role (s) of universities in dealing with global wicked problems through multi-stakeholder initiatives. J. Clean. Prod. 106, 68–78.
Durmaz, B., Platt, S., Yigitcanlar, T., 2010. Creativity, culture tourism and place-making: istanbul and London film industries. Int. J. Cult. Tourism Hospit. Res. 4 (3), 198–213.
El Gibari, S., Gómez, T., Ruiz, F., 2019. Building composite indicators using multicriteria methods: a review. J. Bus. Econ. 89 (1), 1–24.
Epstein, M., Roy, M.J., 1998. Managing corporate environmental performance: a multinational perspective. Eur. Manag. J. 16 (3), 284–296.
Erb, C.B., Harvey, C.R., Viskanta, T.E., 1996. Political risk, economic risk, and financial risk. Financ. Anal. J. 52 (6), 29–46.
Euromoney Agency, 2020. Cited 15 December 2020. http://www.euromoney.com/poll/10683/PollsAndAwards Country-Risk.html.
Ferrari, G., Mondéjar-Jiménez, J., Vargas-Vargas, M., 2010. Environmental sustainable management of small rural tourist enterprises. Int. J. Environ. Res. 4 (3), 407–414.
Ferrer, R., 2019. Cambio Climático, Transición Verde Y Sector Financiero. CaixaBank Research.
Ferruz, L., Muñoz, F., Vargas, M., 2010. Stock picking, market timing and style differences between socially responsible and conventional pension funds: evidence from the United Kingdom. J. Bus. Ethics 19 (4), 408–422.
Fiss, P.C., 2007. A set-theoretic approach to organizational configurations. Acad. Manag. Rev. 32, 1180–1198.
Freeman, R.E., 1984. Strategic Management. A Stakeholder Approach. Pitman Publishing Inc., Boston.

Ga, U.N., 2015. Transforming Our World: the 2030 Agenda for Sustainable Development. Div. Sustain. Dev. Goals, New York, NY, USA. Retrieved from. https://www.unfpa.org/resources/transforming-our-world-2030-agenda-sustainable-development.
Galdeano-Gomez, E., Cespedes-Lorente, J., Martínez-del-Río, J., 2008. Environmental performance and spillover effects on productivity: evidence from horticultural firms. J. For. Environ. 88 (4), 1552–1561.
Geissdoerfer, M., Savaget, P., Bocken, N.M., Hultink, E.J., 2017. The Circular Economy–A new sustainability paradigm? J. Clean. Prod. 143, 757–768.
Gil-Bazo, J., Ruiz-Verdú, P., Santos, A.A., 2010. The performance of socially responsible mutual funds: the role of fees and management companies. J. Bus. Ethics 94 (2), 243–263.
González-Benito, O., González-Benito, J., 2008. Implications of market orientation on the environmental transformation of industrial firms. Ecol. Econ. 64 (4), 752–762.
Guan, D., Hubacek, K., Weber, C.L., Peters, G.P., Reiner, D.M., 2008. The drivers of Chinese CO2 emissions from 1980 to 2030. Global Environ. Change 18 (4), 626–634.
Gulbrandsen, L.H., 2009. The emergence and effectiveness of the Marine stewardship council. Mar. Pol. 33 (4), 654–660.
Guo, Y., You, W., Lee, C.C., 2020. CO2 emissions, income inequality, and country risk: some international evidence. Environ. Sci. Pollut. Res. 29, 12756–12776. https://doi.org/10.1007/s11356-020-09501-w.
Haque, F., Ntim, C.G., 2018. Environmental policy, sustainable development, governance mechanisms and environmental performance. Bus. Strat. Environ. 27 (3), 415–435.
Henriques, I., Sadorsky, P., 1996. The determinants of an environmentally responsive firm: an empirical approach. J. Environ. Econ. Manag. 30 (3), 381–395.
Henriques, I., Sadorsky, P., 1999. The relationship between environmental commitment and managerial perceptions of stakeholder importance. Acad. Manag. J. 42 (1), 87–99.
Hoti, S., McAleer, M., 2004. An empirical assessment of country risk rating and associated models. J. Econ. Surv. 18 (4), 540–588.
Hsu, A., Emerson, J., Levy, M., de Sherbinin, A., Johnson, L., Malik, O., Schwartz, J., Jaiteh, M., 2014. The 2014 Environmental Performance Index. Yale Center for Environmental Law & Policy, New Haven.
Husted, B.W., de Sousa-Filho, J.M., 2017. The impact of sustainability governance, country stakeholder orientation, and country risk on environmental, social, and governance performance. J. Clean. Prod. 155, 93–102.
Husted, B.W., de Sousa-Filho, J.M., 2019. Board structure and environmental, social, and governance disclosure in Latin America. J. Bus. Res. 102, 220–227.
Ioannou, I., Serafeim, G., 2012. What drives corporate social performance? The role of nation-level institutions. J. Int. Bus. Stud. 43 (9), 834–864.
Ioppolo, G., Cucurachi, S., Salomone, R., Shi, L., Yigitcanlar, T., 2019. Integrating strategic environmental assessment and material flow accounting: a novel approach for moving towards sustainable urban futures. Int. J. Life Cycle Assess. 24 (7), 1269–1284.
King, A., 2007. Cooperation between corporations and environmental groups: a transaction cost perspective. Acad. Manag. Rev. 32 (3), 889–900.
Kronenberg, J., 2007. Making consumption "reasonable". J. Clean. Prod. 15 (6), 557–566.
Krucken, L., Meroni, A., 2006. Building stakeholder networks to develop and deliver product-service-systems: practical experiences on elaborating pro-active materials for communication. J. Clean. Prod. 14 (17), 1502–1508.
Kürzinger, E., 2004. Capacity building for profitable environmental management. J. Clean. Prod. 12 (3), 237–248.
Lamichhane, S., Eğilmez, G., Gedik, R., Bhutta, M.K.S., Erenay, B., 2021. Benchmarking OECD countries' sustainable development performance: a goal-specific principal component analysis approach. J. Clean. Prod. 287, 125040.
Larrán-Jorge, M., Herrera-Madueño, J., Martínez-Martínez, D., Lechuga-Sancho, M.P., 2015. Competitiveness and environmental performance in Spanish small and medium enterprises: is there a direct link? J. Clean. Prod. 101, 26–37.
Lee, C.C., Chen, M.P., 2021. Ecological footprint, tourism development, and country risk: international evidence. J. Clean. Prod. 279, 123671.
Liu, Y., Mezei, J., Kostakos, V., Li, H., 2017. Applying configurational analysis to IS behavioural research: a methodological alternative for modelling combinatorial complexities. Inf. Syst. J. 27, 59–89.
Lv, Z., Xu, T., 2018. Is economic globalization good or bad for the environmental quality? New evidence from dynamic heterogeneous panel models. Technol. Forecast. Soc. Change 137, 340–343.
Malesios, C., De, D., Moursellas, A., Dey, P.K., Evangelinos, K., 2020. Sustainability performance analysis of small and medium sized enterprises: criteria, methods and framework. Soc. Econ. Plann. Sci. 75, 100993.
Masron, T.A., Subramaniam, Y., 2019. Does poverty cause environmental degradation? Evidence from developing countries. J. Poverty 23 (1), 44–64.
Marchand, A., Walker, S., 2008. Product development and responsible consumption: designing alternatives for sustainable lifestyles. J. Clean. Prod. 16 (11), 1163–1169.
Martí-Ballester, C.P., 2015. Can socially responsible investment for cleaner production improve the financial performance of Spanish pension plans? J. Clean. Prod. 106, 466–467.
Mori, K., Christodoulou, A., 2012. Review of sustainability indices and indicators: towards a new City Sustainability Index (CSI). Environ. Impact Assess. Rev. 32 (1), 94–106.
OECD, 2001. OECD Environmental Strategy for the First Decade of the 21st Century. OECD, Paris.
Olafsson, S., Cook, D., Davidsdottir, B., Johannsdottir, L., 2014. Measuring countries' environmental sustainability performance–a review and case study of Iceland. Sust. Energ. Rev. 39, 934–948.
Onkila, T.J., 2009. Corporate argumentation for acceptability: reflections of environmental values and stakeholder relations in corporate environmental statements. J. Bus. Ethics 87, 285–289.
O'Rourke, A., 2003. The message and methods of ethical investment. J. Clean. Prod. 11 (6), 683–693.
Porter, M.E., Kramer, M.R., 2006. Strategy and society: the link between competitive advantage and corporate social responsibility. Harv. Bus. Rev. 84, 78–92.
Ragin, C.C., 2006. Set relations in social research: evaluating their consistency and coverage. Polit. Anal. 14 (3), 291–310. https://doi.org/10.1093/pan/mpj019.
Ragin, C.C., 2008. Redesigning Social Inquiry: Fuzzy Sets and beyond. University of Chicago Press, pp. 190–212. https://doi.org/10.7208/chicago/9780226702797.001.0001.
Ramos, T.B., Caeiro, S., van Hoof, B., Lozano, R., Huisingh, D., Ceulemans, K., 2015. Experiences from the implementation of sustainable development in higher education institutions: environmental Management for Sustainable Universities. J. Clean. Prod. 106, 3–10.
Rihoux, B., 2006. Qualitative comparative analysis (QCA) and related systematic comparative methods: recent advances and remaining challenges for social science Research. Int. Sociol. 21, 679–706.
Rihoux, B., Ragin, C.C., 2008. Configurational Comparative Methods: Qualitative Comparative Analysis (QCA) and Related Techniques. Sage Publications, Los Angeles.
Rosner, W.J., 1995. Mental models for sustainability. J. Clean. Prod. 3 (1–2), 107–121.
Sachs, J.D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N., Rockström, J., 2019. Six transformations to achieve the sustainable development goals. Nat. Sustain. 2 (9), 805–814.
Sammalisto, K., Sundström, A., Holm, T., 2015. Implementation of sustainability in universities as perceived by faculty and staff – a model from a Swedish university. J. Clean. Prod. 106, 45–54.
Sarkodie, S.A., Ozturk, I., 2020. Investigating the environmental Kuznets curve hypothesis in Kenya: a multivariate analysis. Renew. Sustain. Energy Rev. 117, 109481.
Sarvajayakesavalu, S., 2015. Addressing challenges of developing countries in implementing five priorities for sustainable development goals. Ecosys. Health Sustain. 1 (7), 1–4.
Schneider, C.Q., Wagemann, C., 2010. Standards of good practice in qualitative comparative analysis (QCA) and fuzzy-sets. Comp. Sociol. 9 (3), 397–418. https://doi.org/10.1163/156913210X12493538729793.
Sebestyén, V., Abonyi, J., 2021. Data-driven comparative analysis of national adaptation pathways for Sustainable Development Goals. J. Clean. Prod. 319, 128657.
Sharma, S., Henriques, I., 2005. Stakeholder influences on sustainability practices in the Canadian forest products industry. Strat. Manag. J. 26 (2), 159–180.
Singh, R.K., Murty, H.R., Gupta, S.K., Dikshit, A.K., 2012. An overview of sustainability assessment methodologies. Ecol. Indicat. 15, 281–299.
Stafford-Smith, M., Griggs, D., Gaffney, O., Ullah, F., Reyers, B., Kanie, N., et al., 2017. Integration: the key to implementing the sustainable development goals. Sustain. Sci. 12 (6), 911–919.
Statman, M., 2000. Socially responsible mutual funds. Financ. Anal. J. 56 (3), 30–39.
Steger, U., 2000. Environmental management systems: empirical evidence and further perspectives. Eur. Manag. J. (1), 23–37.
Wahab, M., 2004. Economic growth and government expenditure: evidence from a new test specification. Appl. Econ. 36 (19), 2125–2135.
Woodside, A.G., 2013. Moving beyond multiple regression analysis to algorithms: calling for adoption of a paradigm shift from symmetric to asymmetric thinking in data analysis and crafting theory. J. Bus. Res. 66 (4), 463–472.
Xie, J., Nozawa, W., Yagi, M., Fujii, H., Managi, S., 2019. Do environmental, social, and governance activities improve corporate financial performance? Bus. Strat. Environ. 28 (2), 286–300.
You, W.H., Zhu, H.M., Yu, K., Peng, C., 2015. Democracy, financial openness, and global carbon dioxide emissions: heterogeneity across existing emission levels. World Dev. 66, 189–207.
Zeng, S.X., Meng, X.H., Yin, H.T., Tam, C.M., Sun, L., 2010. Impact of cleaner production on business performance. J. Clean. Prod. 18 (10), 975–983.
Zhou, Luo, J., Cheng, F., Yüksel, S., Dinçer, H., 2021. Analysis of risk priorities for renewable energy investment projects using a hybrid IT2 hesitant fuzzy decision[1] making approach with alpha cuts. Energy 224, 120184.
Zsoka, A., Szerenyi, Z.M., Szechy, A., Kocsis, T., 2013. Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian high school and university students. J. Clean. Prod. 48, 126–138.