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THE IMPACT OF NATIONAL CULTURE ON CORPORATE ENVIRONMENTAL PERFORMANCE: How much does your origin say about how green you are?

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The Impact of National Culture on Corporate Environmental Performance:

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ABSTRACT:
This paper aims to explore the effect of national culture on corporate environmental responsibility. Our study aims to empirically examine the cultural antecedents of environmental performance focusing on the national culture dimensions of the Hofstede model as predictors of commitment. Furthermore, we explore the potential of national environmental commitment as a moderator of the relationship between national culture and corporate environmental performance.
Our findings, deriving from a sample of 591 corporations deriving from the S&P 1200 index, suggest that a firm's environmental performance is influenced by the culture characterizing its country of origin. Among the cultural aspects that function as predictors of corporate environmental commitment, we identify the power distance dimension, as well as masculinity, long-term orientation and indulgence levels.
Our study finds no support for moderation effects originating from national environmental efforts on the examined relationship. Finally, national culture dimensions remain significant in both models of analysis highlighting the strength of the liaison between a firm and its national culture context.

KEYWORDS: *National culture, Hofstede cultural dimensions, environmental performance, institution-based view.*

I. INTRODUCTION

The cultural dimension has long been recognized as one of the most crucial factors for a firm's success in the international arena (Jaeger, 1986; Head, 1991; Alder, 1991; Yaeger, Head and Sorensen, 2006). Managerial skills now require intercultural sensitivity and the consideration of diverse cultural contexts as a necessity. In this context and given the increased importance of environmental concerns for both academics and practitioners, responsible practices cannot be regarded as a reality that can be isolated from the complexities of cultural factors.

Environmental responsibility falling under the umbrella of corporate social responsibility has become a mantra for the 21st century, especially during the past two decades (Campbell, 2007). Nevertheless, definitions and measures applied to both CSR and corporate environmental commitment still find little consensus within existing literature. Firm environmental performance has been studied under a wide range of perspectives with empirical research inves-

tigating its impact on a firm's financial performance, stakeholder management, employee engagement and several related fields. However, only a limited number of studies have focused on its antecedents.

Studies that majorly examined the antecedents of CSR categorize such determinants by firm-level dimensions, such as firm size (Udayasankar, 2007; Chih *et al*., 2010) and a firm's precedent financial performance (López *et al*., 2007), by industry-level dimensions, such as the legal framework regulating an industry (Strike *et al*., 2006), and, finally, by national-level dimensions, such as laws (Spicer *et al*., 2004), NGO density (Chih *et al*., 2010) and societal culture (Waldman *et al*., 2006).

Ioannou and Serafeim (2012) reveal, through an extended empirical study that national-level dimensions account for almost 35% of the variance encountered in CSR commitment. They further suggest that 55% of such variance can be attributed to firm-level dimensions and only 10% to industry effects. In the meantime, a large body of studies exploring the effect of national-level factors on CSR and environmental practices focuses on formal institutions, such as legal frameworks and financial structures. Nonetheless, little academic attention has been granted to informal institutions, such as national culture and norms (Moon, 2004; Campbell, 2007; Chih et al., 2010).

In the present study, we adopt an institution-based view to investigate the relationship between a firm's environmental performance and the cultural framework of its country of origin, in this study specified as the country of the firm's headquarters. Suggesting that national culture is an influential factor that needs to be taken into consideration upon determining a firm's respective corporate strategy and practices, in order to guarantee their effective implementation within an international environment, we aim to extend existing literature and test how cultural differences affect a firm's environmental performance. Our paper aims to empirically study the cultural antecedents of environmental performance focusing on national culture as a predictor of environmental commitment. To this end, we apply the Hofstede model of national culture since it has been the most widely accepted representation of national culture dimensions characterizing societies.

According to the Hofstede framework on national culture, each country's culture is examined under the perspective of six dimensions: power distance, masculinity, individualism, long-term orientation, indulgence and uncertainty avoidance. These cultural dimensions, analysed in detail further down our work, comprise the key elements that define the behavior and expectations of individuals within the respective society. Given that firms are complex constructs of individuals that belong to a certain country's context, we hypothesize that national culture is highly likely to generate a significant effect on the actual behavior of an entire firm. To support this notion of the authors, the same Hofstede gave birth to his model using IBM as the ground on which individual employees were interviewed to then identify patterns of behavior and ideas that ended up outlining robust dimensions of national culture (Hofstede et al., 1990). Finally, the Hofstede model assigns each country with specific values on each cultural dimension that distinguish the unique behaviors and notions of individuals within its society from others. As expected, the aforementioned values may vary even within macro-areas that otherwise present certain similarities, such as Europe.

In our analysis, thus, we consider these national culture dimensions as potential antecedents of firm environmental commitment. Moreover, we assume that the headquarters of a multinational company play a fundamental role in the design and implementation of corporate strategy that locks with it the strategy of all subsidiaries of the mother company on key areas. At this point, it is important to note that this study does not examine corporate culture, but rather its core roots based on national culture.

The notion of an ethical organization is regarded as a pillar of modern international management practices (Bartunek and Wood, 2012). As a consequence, respect for the environment is now viewed as an inherent part of the ethical dimension of firms and their relationships with key stakeholders (Batstone, 2003). Notwithstanding this new notion, little is known with regard to the differences that environmental expectations present in diverse cultural contexts. Despite the consideration of environmental responsibility as a pillar of modern corporate strategies and managerial challenges, we have a limited view of how relative practices vary in terms of importance and engagement when the cultural context of firms alters. The latter becomes even more complicated as a concept when accounting for firms that already operate in an international arena where several cultural backgrounds are involved within regulations, stakeholders and expectations firms are called to meet.

II. LITERATURE REVIEW & HYPOTHESES

Our paper aims to empirically study the cultural antecedents of environmental performance focusing on the national culture dimension as a predictor of commitment. As a consequence, we review relevant existing literature that has already investigated the fields of CSR and green attitude drivers (Campbell, 2007; Chih et al., 2010), the relationship between national culture and green practices (Ho et al., 2011; Ringov and Zollo, 2007) and the evolution of national culture over time (Hofstede, 1980). We dedicate major attention to the field of CSR given that environmental commitment is regarded as an undeniable and inherent attribute of CSR strategies.

A significant amount of studies that explored CSR antecedents stress the effect of formal institutions, such as the legal frameworks that bind firms, as previously mentioned (Campbell, 2007; Chih et al., 2010; Moon, 2004). In the present study we follow the aforementioned line of work on a secondary level inserting variable reflecting institutional aspects as a control mechanism while placing our key focus on the informal aspects of national-level factors affecting CSR, such as culture (Ringov and Zollo, 2007; Waldman et al., 2006). To this effect, even less academic works appear to be inclusive of all cultural dimensions (power distance, individualism, masculinity, uncertainty avoidance, long-term orientation and indulgence), as presented in the Hofstede model (Ho et al., 2011; Ringov and Zollo, 2007). The predominant stream of studies focus on single dimensions of national culture or a subset of them, with power distance and individualism being at the center of analysis (Ioannou and Serafeim, 2012; Waldman et al., 2006). Nevertheless, existing literature in the field is met with inconsistent findings regarding the relationship between national culture and CSR commitment. Among findings, support for the predicting power of cultural dimensions, such as institutional collectivism and power distance, on CSR commitment within the top management of a firm is found (Waldman et al., 2006). Researchers argue that culture has an effective impact on a firm's CSR and environmental commitment. In this direction, Maignan and Ralston (2002), based on French and German consumers compared to US consumers, found indications that consumers press firms to act ethically. Hofstede's national culture model is also employed by Ho et al. (2011) and Ringov and Zollo (2007) who further investigate the impact of national culture on firm's CSR and environmental engagement.

We are basing our paper on the classic studies of national culture by Hofstede, developing our hypotheses around the dimensions of national culture recognized within the adopted framework.

Power Distance Index (PD)

Power distance values represent the degree to which the members of a society believe that power should be concentrated in the hands of leaders, and these people should be obeyed without question

(Hofstede, 1980; Ho et al., 2011; Ringov and Zollo, 2007; Waldman et al., 2006; Hofstede, 2011; Peng et al., 2012). Upon this notion of power distance, we can expect that higher power distance values are linked to decreased dialogue between management and employees and decreased consumer pressure on the respective firms with regard to their environmental and otherwise performance.

The power distance index (PDI) refers to the degree to which less powerful members of a society accept and expect that power is distributed unequally. Individuals in high power distance societies tend to accept a hierarchical order and inequality without further justification. On the other hand, low power distance societies make an effort to even power gaps out.

In other words, societies that demonstrate higher power distance values may be expected to be comprised by citizens and, more specifically, consumers that are ready to accept externalities generated by firms in their larger scale function within the respective country. Since individuals are accustomed to hierarchical distinctions deriving from social positions and roles, less pressure is put on companies to be egalitarian versus the social nexus of their environment. As a consequence, we may expect that firms operating in countries characterized by high power distance exhibit lower environmental commitment and effort.

H1: Power distance is negatively related to a firm's environmental performance.

Individualism (IND)

Individualistic cultures are comprised of individuals that prioritize interests of their own and of their direct families rather than collective objectives (Hofstede, 1980; Hofstede, 2011). In highly individualistic societies personal and societal relationships appear to be loose. On the contrary, collectivistic societies function more towards the interests and the welfare of the group.

Existing studies demonstrate that there is a negative relationship between individualism (IDV) and CSR performance (Ringov and Zollo, 2007; Ho et al., 2012; Akaah, 1990). Data also suggest that employees within individualistic contexts, compared to those working for collectivistic firms or nations, present less ethically oriented behaviors. Therefore, we can expect that firms operating in countries with highly individualistic cultures place less attention on their impact on the environment and the collective, connected to a lower degree of environmental commitment.

H2: Individualism is negatively related to a firm's environmental performance.

Masculinity (MASC)

Masculine societies revolve around individuals that value more competitiveness, achievement, assertiveness, power, and material reward for success (Hofstede, 1980; Hofstede, 2011). Opposite to masculine societies, societies with lower masculinity values, alternatively characterized as feminine societies, tend to appreciate more relationships, cooperation, caring, modesty and quality of life (Hofstede, 1980; Hofstede, 2011). Masculine societies exhibit less cooperative and helping behaviors (Steensma et al., 2000; Tice and Baumeister, 2004), while they present a major tendency toward unethical behaviors and the pursuing of personal gains (Vitell and Festervand, 1987). With this regard, companies with a divulged masculine culture are less likely to take active care of their environmental context or be receptive to public opinion and social concerns.

Previous studies indicate a negative relationship between masculinity (MAS) and CSR commitment (Ringov and Zollo, 2007; Peng et al., 2012). In light of the latter, we can expect firms operating in a context with higher masculinity values to adopt lower levels of environmental commitment.

H3: Masculinity is negatively related to a firm's environmental performance.

Uncertainty Avoidance Index (UNCA)

This index (UAI) refers to the degree to which uncertainty and ambiguity are shared and accepted within a society. Societies with high values of uncertainty avoidance disapprove of uncertain and ambiguous situations. Strict and explicit codes of conduct, laws and regulations are normally put in place in order to minimize the uncertainty in societies characterized by a high degree of uncertainty avoidance. Opposite to the latter, societies with low uncertainty avoidance values tend to adopt flexible attitudes and behaviors and are more likely to take on risky conducts or endeavors (Hofstede,1980; Hofstede, 2011). Researchers (Rallapalli et al., 1994) reveal that riskier conducts are linked to more unethical backgrounds. Additionally, data from current literature support the notion of a positive relationship between uncertainty avoidance and environmental engagement (Ringov and Zollo, 2007; Ho et al., 2012; Peng et al., 2012). Therefore, we can expect that firms operating in an uncertainty avoiding ambient, where rigid laws and regulations are in place, will demonstrate higher environmental commitment.

H4: Uncertainty avoidance is positively related to a firm's environmental performance.

Long-term Orientation (LTO)

Higher values upon this cultural dimension correspond to increased perseverance, thrift, ordering relationships by status, and having a sense of shame. Opposite, short-term oriented cultures present respect for tradition, protection of personal reputation, steadiness and reciprocal social commitments (Hofstede and Bond, 1988; Hofstede, 2011). A longer-term orientation is frequently associated to countries that are open to adapt to improvements suggested by practices adopted by other cultures. What is more, long-term orientation characterizes societies with a higher probability of increased savings that grant funds for investments. As a result of the previous considerations, we expect firms that originate from long-term oriented countries to be more considerate versus the environment.

H5: Long-term orientation is positively related to a firm's environmental performance.

Indulgence (INDU)

Higher levels of the indulgence dimension indicate cultures that allow relatively free gratification of basic and natural human desires connected to enjoying life and having fun (Hofstede, 2011). Although this cultural dimension has been found to be correlated to the Long-term Orientation dimension of national culture, it is considered to represent attributes that are not comprehensively reflected by the other five dimensions. Countries that lean towards the indulgence pole consists of individuals that greatly value their personal freedom and leisure, as well as the unconditional pursuit of happiness, focusing less on norms and order within their society. Restrained societies, instead, are characterized by increased norms and formal control. Consequently, we posit that firms operating in a more indulgent cultural context will adopt less strict environmental commitment.

H6: Indulgence is negatively related to a firm's environmental performance.

III. DATA

In order to test our hypotheses, we collect firm-level and industry-level data from multiple databases. Primarily we originate data from the Dow Jones Sustainability Index (DJSI) and the Compustat Global Vantage database, specifically the S&P Global 1200 index[1]. Data concerning environmental performance measures are drawn from the Asset4 Thomson Reuters database. Furthermore, we draw our country-level data from the CIA World Factbook web page, the World Bank databases, the human development program of United Nations and the PRS group, while cultural scores for each country originate from Geert Hofstede's online database (https://geert- hofstede.com/national-culture.html). Finally, financial data at a firm-level are drawn from Datastream.

Our sample frame consists of firms included in the S&P 1200 index and cover a time window from 2003 until 2013. We are confident that the sample employed is big enough to be considered free from a non-normal distribution bias, according to the central limit theorem and the law of large numbers (Stock and Watson, 2005). Additionally, the time span of this study's sample grants our analysis with a longitudinal character.

Elaborating our data, we initially downsize the sample to account for firms that lack relevant data. After adjusting the sample for this first criterion and in order to obtain a balanced panel dataset, a total of 689 firms' data are available. The sample has been further filtered down, in order to remove outliers (Stock and Watson, 2005). Furthermore, despite the universal nature of analysis we adopt by including all industries, we opt for the exclusion of two sectors (telecommunications and financials) in order to guarantee major logic in our findings. The rationale behind the latter decision has been the marginal relevance of environmental concerns in the two eliminated sectors that would insert a bias in the resulting conclusions. The final sample is comprised of 591 firms that generate a total of 6,056 observations.

Following, Tables 1 and 2 summarize the main descriptive characteristics of this study's sample, in terms of geographic cluster and industrial sector. North America appears to be the most representative geographic cluster consisting of 50% of the firms in the sample. It is followed by Europe with 28% and Asia with 19% of the firms studied. In the meantime, Australian and South American firms only account for 2% and 1% of the sample respectively. More specifically, the North America sample includes USA and Canada, while the South America one consists of Chile, Brazil and Mexico. On the other hand, the European sample is composed by firms from Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Norway, Spain, Sweden, Switzerland, and U.K., while the Asian sample is made up by China, Hong-Kong, Japan, the Republic of Korea, Singapore and Taiwan. With regard to the sample's composition by industry, the industrials represent 22% of the sample's firms, followed by consumer goods and consumer services with 18% and 15% respectively. Basic materials have an 11% presence in the sample, while technological companies account for 10% of the data. Healthcare and oil and gas represent 9% of firms in the sample each and, finally, utilities include 6% of firms examined.

IV. VARIABLES

[1]*The S&P Global 1200 provides efficient exposure to the global equity market. Capturing approximately 70% of global market capitalization, it is constructed as a composite of 7 headline indices, many of which are accepted leaders in their regions. These include the S&P 500® (US), S&P Europe 350, S&P TOPIX 150 (Japan), S&P/TSX 60 (Canada), S&P/ASX All Australian 50, S&P Asia 50 and S&P Latin America 40. (Source: http:// us.spindices.com/indices/equity/sp-global-1200).*

GEOGRAPHIC AREA	NUMBER OF FIRMS	PERCENTAGE IN SAMPLE
North America	135	50%
Europe	104	28%
Asia	83	19%
South America	64	1%
Australia	60	2%
TOTAL	**591**	**100%**

Table 1: Sample composition by geographic area.
Source: *Authors' elaboration*

GEOGRAPHIC AREA	NUMBER OF FIRMS	PERCENTAGE IN SAMPLE
Industrials	135	22%
Consumer Goods	104	18%
Consumer Services	83	15%
Basic Materials	64	11%
Technology	60	10%
Healthcare	56	9%
Oil & Gas	55	9%
Utilities	37	6%
TOTAL	**591**	**100%**

Table 2: Sample composition by geographic area.
Source: *Authors' elaboration*

The aim of this paper is to measure the impact of national culture on a firm's environmental aptitude. In order for us to move forward with our study we employ a set of variables that operationalize the concepts we wish to explore.

1. Dependent Variable

Our dependent variable that represents the core of this paper measures the environmental performance of firms considered in the sample. To this end, we employ categorical data to measure environmental performance that is represented by the environmental score variable (ENVSC). The environmental score measures a company's impact on living and non-living natural systems, including air, land and water, as well as complete ecosystems that surround it. It reflects how well a company uses management practices to mitigate environmental risks and capitalize on environmental opportunities in order to generate long term shareholder value. The dependent variable is measured by a scale from 0 to 100, with higher scores reflecting firms that demonstrate a superior environmental commitment and performance. Our data concerning the environmental score of firms in the sample derive from the Asset4 Thomson Reuters database.

2. Independent Variables

Our focus of investigation is the relationship between the national culture dimensions, as represented within the Hofstede framework, and the environmental performance of firms. Therefore, we employ six independent variables to measure the six individual cultural aspects at a national level: power distance, individualism, masculinity, uncertainty avoidance, long-term orientation and indulgence (Hofstede, 1980; Hofstede, 2011). We adopt categorical data for the independent variables that reflect the cultural scores for each nation present in the sample (Hofstede, 2001). Each firm is assigned with an individual environmental score, which reflects its environmental performance, and an individual score upon each national culture dimension characterizing the country where its headquarters are based. More in detail, each of the 15 countries comprising the European sample has been assigned with its separate scores on each cultural dimension reflecting the country's idiosyncrasies. The same approach has been applied on the American (North and South) and Asian samples. As a result, we are confident that our analysis takes into account each national peculiarity following Hofstede's (1980) intuition. All cultural data on cultural values have been collected from Hofstede's official website.

As previously mentioned, multinational firms included in our sample assume the cultural dimension values of the country in which they were founded. Our rationale is that, according to Hofstede (2001), even corporate culture dimensions are deeply-rooted in national habits and patterns of behavior. A firm operating in different countries still has national cultural values strongly linked with the values of the nation in which it was founded.

Power distance (PD): This variable expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. The fundamental issue here is how a society handles inequalities among people. People in societies exhibiting a large degree of Power Distance accept a hierarchical order in which everybody has a place, and which needs no further justification. In societies with low Power Distance, people strive to equalise the distribution of power and demand justification for inequalities of power.

Individualism (IND): The high side of this variable represents a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. Its opposite, collectivism, represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty. A society's position on this dimension is reflected in whether people's self-image is defined in terms of "I" or "we."

Masculinity (MASC): The Masculinity pole of this variable represents a preference in society for achievement, heroism, assertiveness and material rewards for success. Society at large is more competitive. Its opposite, femininity (represented by low scores), stands for a preference for cooperation, modesty, caring for the weak and quality of life. Society at large is more consensus-oriented. In the business context Masculinity versus Femininity is sometimes also related to as "tough versus tender" cultures.

Uncertainty Avoidance (UNCA): The Uncertainty Avoidance variable expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? Countries exhibiting strong UAI maintain rigid codes of belief and behaviour and are intolerant of unorthodox behaviour and ideas. Weak UAI societies maintain a more relaxed attitude in which practice counts more than principles.

Long-term Orientation (LTO): Every society has to maintain some links with its own past while dealing with the challenges of the present and the future. Societies prioritize these two existential goals differently. Societies who score low on this dimension, for example, prefer to maintain time-honoured traditions and norms while viewing societal change with suspicion. Those with a culture which scores high, on the other hand, take a more pragmatic approach: they encourage thrift and efforts in modern education as a way to prepare for the future. In the business context this dimension is related to as "(short term) normative versus (long term) pragmatic" (PRA). In the academic environment the terminology Monumentalism versus Flexhumility is sometimes also used.

Indulgence (INDU): The variable stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. Restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms.
All data regarding national culture dimensions and comprising the study's independent variables have been collected from Geert Hofstede's online database and are measured on a scale from 0 to 100.

3. Control Variables

In accordance with current literature in the field (Ho et al., 2011; Ringov and Zollo, 2007), this study aims to control for all three levels considered: firm level effects (firm size and precedent financial performance), industry level effects and national level effects.

3.1 Firm-Level Effects

Firm size (FS): Firm Size is measured by the variable FS, calculated as the natural logarithm of the company's total assets.
Precedent financial performance (EBITDA): This variable represents the EBITDA margin, a measure of the firm's previous profitability, and is calculated dividing the firm's EBITDA by its net sales. Financial data regarding firms in our sample are gathered from the Datastream database.

3.2 Industry-Level Effects

Given that literature suggests that industry effects, such as industry characteristics, stakeholders and context of operations (Decker, 2004; Donleavy et al., 2008; Tan and Chow, 2009; Cruz and Boehe, 2010; Ho et al., 2012) can lead to an unsystematic variation of environmental practices, we employ industry-specific dummy variables for each corporation and control for the relative effects.

3.3 Ntional-Level Effects

In order to isolate the net effect of culture on CSR and environmental performance, we follow former academic works that locate four main influential factors within a specific country: the level of economic development, standard of living, laws and regulation and knowledge capital. We add to previous research and the controls that were put to use to study the relationship of interest one more variable that may be a potential predictor of environmental performance at the national-level. To control for the potential effects of the latter we insert in our analysis part the following variables used as proxies:

Economic development (GDPCG): GDP per capita is calculated as the gross domestic product divided by midyear population for each country of the sample. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are originated from the World Bank database.

Life Expectancy at Birth (LEX): This variable represents age-specific mortality rates. More specifically, life expectancy at birth is a basic indicator of health and social development within a country. It is closely related to human health, environmental, and economic conditions. These three elements are considered an integral part of sustainable development and primary environmental care. It captures the ability to access public health-care and primary health-care services, as well as the health effects of environmental degradation and exposure to hazardous substances in the workplace. Calculation of life expectancy at birth is based on age-specific mortality rates for a particular calendar period. Technically, higher values indicate the higher quality of life of individuals in the specific country. This type of data is drawn from The CIA World Factbook for all countries represented in our sample.

Political Risk Rating (PRS): This variable represents various risks associated with the political and business environment with which firms are faced in a country of operations. We employ the political risk rating of countries as a proxy for laws and regulations within a national context, since law application and effectiveness, corruption and bureaucracy are among the major weight factors composing the index. In order to collect data on the variable of interest, we employ the International Country Risk Guide that includes a Political Risk Index, which in turn consists of 12 components. We use data from December reports of each year provided by the PRS Group.

Human Development Index (HDI): The specific variable refers to a country's potential of human development and wellbeing. A composite of the HDI index consists of life expectancy, educational attainment and income indicators, in terms of length and health of life, years and expected years of schooling, as well as a standard of living. The scores for the three HDI dimension indices are aggregated into a composite index. Higher scores indicate improved human development. Our data is originated from the United Nations Development Program (UNDP).

CO2 National Emissions Reduction (NER): Carbon dioxide emissions are those stemming from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide produced during consumption of solid, liquid, and gas fuels and gas flaring. This specific variable represents emissions reduction at a yearly national level and is employed as a proxy for national environmental performance. Data regarding CO2 emissions reduction for each country of the sample are drawn from the World Bank database.

Before proceeding with the analysis part of our study, Table 3 provides the descriptive statistics and matrix correlation concerning the dependent, independent and control variables employed. As can be noted, no significant correlation exists with our dependent variable. Opposite we have identified high correlations among cultural dimensions, which, however, can be easily explained by the fact they all work together interlinked to construct the context of national culture as a whole. Correlations between control variables and independent ones do not cause negative effects on our analysis.

V. ANALYSIS

The Ordinary Least Squares (OLS) regression is the model employed in this study to test our hypotheses. On our attempt to explore how national culture affects a firm's environmental performance. Our regression model will be shaped as follows:

ENVSCi = f (Culture k, X)

where i=firm ENVSCi = β1Culture i,k + βχX + ε1.

The subscript k denotes each individual dimension of culture indicated by the Hofstede framework including power distance (PD), individualism (IND), masculinity (MASC), uncertainty avoidance (UNCA), long-term orientation (LTO) and indulgence (INDU). The variable X denotes the control variables considered in this study: national-level control variables that include political risk rating, life expectancy at birth, economic development, human development index, and national environmental performance, as well as firm- specific variables that include firm size and precedent financial performance. Moving forward, in order to control for industry effects, as suggested earlier, we create sector dummy variables to indicate the industrial sector of each firm in the sample.

Elaborating the model, we conduct the Hausman test to select between a fixed or random effects analysis to render our model more robust. "Because firms may differ in ways that we do not capture with our independent variables, we include dummy variables that allow each firm to have a dif-

		MEAN	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	**ENVSC**	65.87	30.46	**1.00**													
2	**PD**	43.43	10.14	**0.10**	**1.00**												
3	**IN**	76.42	19.02	**-0.17**	**-0.63**	**1.00**											
4	**MASC**	63.36	19.61	**-0.2**	**0.32**	**-0.36**	**1.00**										
5	**UNCA**	57.42	20.44	**0.14**	**0.77**	**-0.79**	**0.53**	**1.00**									
6	**LTO**	47.47	25.33	**0.21**	**0.52**	**-0.85**	**0.43**	**0.78**	1.00								
7	**INDU**	60.48	12.64	**-0.14**	**-0.63**	**0.79**	**-0.49**	**-0.81**	-0.83	**1.00**							
8	**NER**	0.01	0.04	0.01	**-0.14**	**0.21**	**-0.11**	**-0.15**	-0.16	**0.17**	1.00						
9	**FS**	17.11	2.30	**0.24**	**0.48**	**-0.75**	**0.48**	**0.68**	0.69	**-0.66**	-0.14	**1.00**					
10	**EBITDA**	0.89	0.28	0.02	0.00	-0.01	0.00	0.01	0.01	-0.01	0.00	0.01	**1.00**				
11	**HDI**	0.89	0.28	0.01	**-0.59**	**0.55**	**-0.12**	**-0.38**	-0.35	**0.37**	0.17	**-0.23**	0.00	**1.00**			
12	**PRS**	0.85	0.50	-0.01	**-0.67**	**0.29**	**-0.26**	**-0.32**	-0.14	**0.34**	0.06	**-0.21**	0.00	**0.47**	**1.00**		
13	**LEX**	81.23	2.02	**0.17**	**0.36**	**-0.68**	**0.51**	**0.73**	0.78	**-0.67**	-0.10	**0.69**	0.01	-0.01	**0.14**	**1.00**	
14	**GDPCG**	0.42	0.72	-0.05	**-0.01**	**-0.04**	**-0.16**	-0.03	0.00	-0.02	-0.24	-0.11	0.00	**-0.24**	**-0.05**	**-0.05**	**1.00**

Table 3: Matrix correlation
Source: *Authors' elaboration*
Note: *In bold significan tcorrelations are highlighted*

ferent constant value. This is a fixed effects analysis because it reduces the possibility that a firm's fixed attributes confound the analysis" (King and Lenox, 2001). This kind of regression requires that changes in the independent variables be associated with changes in dependent variables. The test results suggest that we may apply the random effects model for our sample. In sum, we use a panel multiple OLS model with random effects controlled for industry dummy variables.

VI. THE MODERATING EFFECT OF NATIONAL ENVIRONMENTAL PERFORMANCE

As mentioned earlier in this study, we make a consideration that goes beyond the control factors commonly employed throughout existing literature on the relationship between national culture and firm environmental performance. Apart from the main focus on the national culture dimensions and their strength as predictors of environmental performance for corporations, we also explore the potentially moderating role upon the relationship of interest generated by the environmental aptitude of the country of origin. We have previously presented the variable measuring national CO2 emissions reduction used here as a proxy for a country's environmental commitment and performance. In order to delve deeper into the moderation effect that such factor can generate, we create six additional variables that result after the multiplication of the cultural dimension variables with the national environmental performance variable (Sharma et al., 1981) (Appendix A).

We run a second OLS model introducing the six new variables. The second model of our analysis controls for industry effects and is checked for robustness by applying a random effects analysis, according to our Hausman test indication. Our objective in the case of this further analysis is to examine the possibility of a stronger or weaker link between national culture and firm environmental performance depending on the actual tendency of the country of origin towards environmental responsibility. Considering the impact that we assume in our initial hypotheses national culture has on a firm's environmental efforts, it comes natural assuming that a factor strengthening such relationship can easily be the stance of the country towards the environment. We expect firms that operate in a context where protection of the environment is a strong feature of the country's agenda to have additional stimuli towards a stronger environmental performance. Furthermore, we expect that cultural dimensions will function as stronger or weaker predictors depending on the national environmental performance. Thus, we posit the following two hypotheses:

H7: National CO2 emissions reduction is positively related to a firm's environmental performance.

H8: National CO2 emissions reduction will positively affect the relationship between cultural predictors and a firm's environmental performance.

VII. FINDINGS

The key findings of this study are presented and analyzed in this section. Our results are robust to the effect of multicollinearity, outliers and non-linearity. We run a Variance Inflation Factor test (VIF) to make sure that multicollinearity does not affect the panel and the resulted VIF values in our regression models are considerably within the limit, as none of VIF approached the critical value of 10 (Stock and Watson, 2005). Additionally, we run a White test to rule heteroscedasticity out as a bias within the panel. The test results allow us to consider heteroscedasticity a null issue. Finally, the results of the models that test our hypotheses are demonstrated in Table 4.

Proceeding with the actual results (Table 4), our primary assumption is confirmed, as national culture appears a significant predictor of a firm's environmental performance. In particular, hypothesis 1, exploring power distance as an antecedent of environmental performance, hypothesis 3, exploring masculinity and hypothesis 5, exploring long-term orientation, are confirmed by our analysis at a 1% significance level. Moreover, hypothesis 6, exploring indulgence, is also confirmed at a 10% significance level. As a result, we find support for the position that national culture affects a company's environmental profile as four out of six cultural dimensions as presented within the Hofstede model appear to be significant predictors of the dependent variable. Our results appear to be in line with major works in the field so far (Ho et al., 2011; Ringo and Zollo, 2007; Waldman et al., 2006) that suggest a strong relationship between CSR and national cultural context.

However, we do come across discrepancies between our findings and those of relevant academic works in the specifics. More precisely, Ioannou and Serafeim (2012) and Waldman et al. (2006) have highlighted the significance of the power distance and uncertainty avoidance dimensions. To this point, our analysis only agrees partially, since a highly significant relationship between power distance scores and firm environmental scores has been found, which was not the case for the uncertainty avoidance dimension, with hypothesis 4 that examines uncertainty avoidance lacking support in findings. Another hypothesis to lack support from our data was the one suggesting a relationship between environmental performance and individualism values.

In addition to the previous findings, we find strong support for the positive relationship between a country's environmental performance and that of firms operating in it. Among control variables, on the other hand, we observe a significant relationship between our environmental performance and the human development index, firm size and life expectancy at birth.

Concluding with our quantitative analysis part, we find no support for our eighth hypothesis regarding the moderating role of national environmental performance on the relationship between national culture and firm environmental performance. Nevertheless, some interesting highlights have risen through the analysis of this extended model. Despite the lack of support for the national environmental performance variable as a moderator, we do observe some interesting dynamics. Cultural dimensions and the way they result in our basic model remain almost unaffected by the alterations, further supporting Hypotheses 1, 3, 5, 6 and 7 (power distance, masculinity, long-term orientation, indulgence and national CO2 emissions reduction), with some slender positive movement in their coefficients. Firm size, the human development index and life expectancy at birth remain significant and almost invariant too.

VIII. DISCUSSION

In this paper we make an attempt to explore the relationship between the national culture underlying a firm and its environmental performance. This association has been explored thoroughly under the CSR umbrella by Ho et al. (2011) and Ringo and Zollo (2007) that are our key literature references. However, findings throughout literature appear inconsistent. The variance that is present across studies can be attributed to the different methodologies applied. Samples among papers vary and more often than not multinationals are not directly comparable.

As suggested within existing research on culture, national cultures outline a nation's value system, which has an influence on shaping individuals' attitudes that move forward to determine notions on CSR, as well as the respective adopted practices (Sirmon and Lane, 2004).

Having specified the analytical features of

	BASIC MODEL	EXTENDED MODEL
Constant	-31.84 (78.13)	-38.94 (78.14)
PD	0.66*** (0.20)	0.62*** (0.20)
IND	0.01 (0.13)	-0.02 (0.13)
MASC	0.26*** (0.07)	0.27*** (0.07)
UNCA	-0.15 (0.14)	-0.15 (0.14)
LTO	0.49*** (0.10)	0.50*** (0.10)
INDU	0.32* (0.17)	0.33* (0.17)
NER	23.59*** (5.33)	16.68*** (5.86)
FS	5.73*** (0.52)	5.63*** (0.52)
EBITDA	-0.02 (0.02)	-0.02 (0.02)
HDI	35.59*** (20.39)	35.91*** (20.42)
PRS	7.93 (11.20)	0.06 (11.40)
LEX	-4.48 *** (1.00)	-4.32 (1.00)
GDPCG	-4.56 (3.25)	-1.86 (3.41)
NERXPD	-	0.10 (0.08)
NERXIND	-	0.04 (0.04)
NERXMASC	-	-0.01 (0.03)
NERXUNCA	-	-0.00 (0.06)
NERXLTO	-	-0.05 (0.03)
NERXINDU	-	-0.04 (0.06)
Random Effects	*Yes*	*Yes*
Industry Dummies	*Yes*	*Yes*
R^2 Adjusted	0.15	0.15
Number of firms	588	588
Number of observations	6,056	6,056

Table 4: Impact of National Culture and National Environmental Performance on Environmental Score (2003-2013).

each cultural dimension, as well as its links to CSR commitment and environmental engagement within current academic works, our findings connect improved environmental performance to cultures characterized by higher power distance scores, masculinity, long-term orientation and indulgence. Our results contradict the vast stream of academic insights in the field that associate responsible behaviors with lower power distance values, combined with lower masculinity and lower indulgence.

One possible interpretation of our findings associating improved environmental performance with higher power distance and masculinity values can be sought in the school of thought that connects CSR and environmental practices and commitment to a strong management with clear vision and dominant presence in companies and among employees. At the same time, our findings suggesting that long-term orientation within a culture boosts environmentally responsible practices are in line with works on national culture and CSP, although the uncertainty avoidance dimension does not appear to be a significant predictor of environmental engagement. The long-term orientation of more environmentally friendly cultures and firms can be attributed to their belief systems that place major importance in the future, setting goals and acting with prudence, which constitute factors enhancing the studied relationship.

In addition to findings concerning the individual cultural dimensions that compose national cultures, we find great support for our hypothesis suggesting that an additional potent predictor of environmental performance is the actual national performance in the field. In other words, companies that originate in countries with greener behavior tend to be more environmentally responsible.

Moreover, certain control variables appear to be strongly related to environmental performance of corporations around the world. A firm's size, for instance, is positively associated to its environmental commitment, a result potentially explained by the major funds available for investment in firms of bigger size in terms of assets and revenue. Moving towards country-level effects, we find a positive relationship between the human development index values, as well as the environmental performance of the country. Such findings can be interpreted through the increased environmental awareness within a country that may result in more rigid regulations and expectations regarding the environmental behavior of firms. Finally, we discern a negative relationship between life expectancy at birth and firm environmental performance. Although conclusions cannot be direct and binding in this case, we may find rationale behind such dynamics by digging into the more eminent health issues and standard of living in countries that present lower life expectancy values and call for urgent measures to improve impact on the environment.

Our study aims to fill theoretical gaps in the field of interest by exploring the informal institution effects on firms' CSP moving further than the widely shared focus on the formal institutions underlying national cultures.

IX. CONCLUSIONS & LIMITATIONS

This paper examines and finds support for the relationship between national culture and the environmental behavior of firms. As a matter of fact, the country of origin, here represented by the country where corporate headquarters are based, appears to be a strong antecedent of a firm's environmental responsibility.

Through the lenses of the Hofstede framework that examines national culture under six individual cultural dimensions, we have identified four significant and more detailed predictors of environmental commitment. More precisely, power distance, long-term orientation, masculinity and indulgence have a strong impact on the way corpo-

rations choose to act upon their environment. Our study's outcomes suggest that the more masculine, indulgent, long-term oriented and characterized by power distance the national culture of origin is, the more environmentally committed the firm results.

In the meantime, countries which more actively protect the environment tend to generate companies that favor environmental protection as well. In addition to the core antecedents of environmental commitment that this study examines, life conditions within the country of origin, as well as a firm's financial well-being seem to also influence how green a company ends up being.

The present study gives birth to several implications both for academics and managers, especially practitioners that act in an international environment. CSR and environmental strategies can now take into account the specifics of a market's cultural context in order to customize practices and adopt the ones that are the most appreciated in each background. Moreover, policy makers that affect corporate actions or are responsible for foreign investments can apply new insights on their decisions regarding how to attract capital and how to better market their countries gaining a competitive advantage by evaluating potential investors' sensitivity and the host country's dynamics.

Concluding, the major contribution of this study lies in the strength that findings grant to the impact of national culture on green practices and relative performance of firms. Capitalizing on the knowledge that national culture has a robust and long-term influence on the real performance of firms can generate a complete strategic shift in managerial approaches. Finally, the connection between a country's environmental performance and that of firms operating within its borders gives precious insight to environmental engagement as a reality that needs to be considered under a holistic prism that incorporates firms, communities, consumers and the state per se in order to bear fruit.

At this stage, we cannot help but also recognize the limitations that bind our work but at the same time give rise to opportunities for further future exploration of the topic of interest. For instance, the effect that national culture has on the levels of environmental commitment may deviate, according to firm characteristics that include the level of multinationality. Additionally, the operationalization methods adopted by each study can have a toll on the final findings. In the current study, environmental performance is measured by a categorical variable, while other research works employ a continuous measure for CSR and environmental practices. In a similar manner, the six cultural dimensions that are here viewed under the Hofstede model are not an exclusive mode of consideration for culture. Different combinations of cultural dimensions can be taken into account, as well as different models depicting the underlying dimensions.

Furthermore, future potential can rise from other limitations faced within this investigation. What other researchers may also investigate is the interaction between institutions and CSR practices and commitment, which might account for some explanatory role in the relationship. An extra point of interest can also appear in the study of the dynamics within regions when studies extend their view beyond a cross-regional analysis or limit it down to a regionally specific frame. Lastly, inserting firm financial performance can specify the aspects of expanded CSR practices that go beyond environmental efforts and are linked to given cultural contexts generate the highest returns on investments realized.

I. APPENDIX

Appendix A: Variables description

NAME	CODE	DEFINITION	MEASURE	SOURCE
DEPENDENT VARIABLES				
Environmental Score	ENVSC	The environmental score measures a company's impact on living and nonliving natural systems, including air, land and water, as well as complete ecosystems. It reflects how well a company uses best management practices to avoid environmental risks and capitalize on environmental opportunities in order to generate long term shareholder value.	Scale: 0-100	Asset4 Thomson Reuters
INDEPENDENT VARIABLES				
Power Distance	PD	This dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. The fundamental issue here is how a society handles inequalities among people. People in societies exhibiting a large degree of Power Distance accept a hierarchical order in which everybody has a place and which needs no further justification. In societies with low Power Distance, people strive to equalise the distribution of power and demand justification for inequalities of power.	Scale: 0-100	Official Geert Hofstede Online Database
Individualism	IND	The high side of this dimension, called individualism, can be defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. Its opposite, collectivism, represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty. A society's position on this dimension is reflected in whether people's self-image is defined in terms of "I" or "we".	Scale: 0-100	Official Geert Hofstede Online Database

Masculinity	MASC	The Masculinity side of this dimension represents a preference in society for achievement, heroism, assertiveness and material rewards for success. Society at large is more competitive. Its opposite, femininity, stands for a preference for cooperation, modesty, caring for the weak and quality of life. Society at large is more consensus-oriented. In the business context Masculinity versus Femininity is sometimes also related to as "tough versus tender" cultures.	Scale: 0-100	Official Geert Hofstede Online Database
Uncertainity Avoidance	UNCA	The Uncertainity Avoidance dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? Countries exhibiting strong UAI maintain rigid codes of belief and behaviour and are intolerant of unorthodox behaviour and ideas. Weak UAI societies maintain a more relaxed attitude in which practice counts more than principles.	Scale: 0-100	Official Geert Hofstede Online Database
Long-term Orientation	LTO	Every society has to maintain some links with its own past while dealing with the challenges of the present and the future. Societies prioritize these two existential goals differently. Societies who score low on this dimension, for example, prefer to maintain ime-honoured traditions and norms while viewing societal change with suspicion. Those with a culture which scores high, on the other hand, take a more pragmatic approach: they encourage thrift and efforts in modern education as a way to prepare for the future. In the business context this dimension is related to as "(short term) normative versus (long term) pragmatic" (PRA). In the academic environment the terminology Monumentalism versus Flexhumility is sometimes also used.	Scale: 0-100	Official Geert Hofstede Online Database

Indulgence	INDU	Indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. Restraint stands for a society bthat suppresses gratification of needs and regulates it by means of strict social norms.	Scale: 0-100	Official Geert Hofstede Online Database
CO2 National Emission Reduction	NER	Carbon dioxide emissions are those stemming from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide produced during consumption of solid, liquid, and gas fuels and gas flaring.	Annual % change of gross CO2 emission per capita (metric tons).	World Bank
CONTROL VARIABLES				
Firm Size	FS	Firm Size represents the firm size calculated as the natural logarithm of the company's total assets.	Log of Total Assets	Datastream
EBITDA Margin	EBITDA	EBITDA Margin represents the firm's EBITDA margin, a measure of the firm's profitability.	EBITDA/Net sales or Revenues	Datastream
Human Development Index	HDI	The Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living. The HDI is the geometric mean of normalized indices for each of the three dimensions.	Scale: 0-100	Human Development Reports, United Nations Development Programme
Country Political Risk	PRS	The International Country Risk Guide includes a Political Risk Index, which in turn consists of 12 components measuring various dimensions of the political and business environment facing firms operating in a country. We use data from December reports of each year.	Scale: 0-100	Political Risk Services International Country Risk Guide (PRS)

Life Expectancy at Birth	LEX	This variable represents the average number of years to be lived by a group of people born in the same year, if mortality at each age remains constant in the future. Life expectancy at birth is also a measure of overall quality of life in a country and summarizes the mortality at all ages. It can also be thought of as indicating the potential return on investment in human capital and is necessary for the calculation of various actuarial measures.	Scale: 0-100	Official Geert Hofstede Online Database
GDP per Capita Growth	GDPCG	GDP per capita is gross domestic product divide d by mid-year population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollar.	Annual % change of GDP per capita in US dollars.	World Bank
CO2 National Emission Reduction	LTO	Every society has to maintain	Scale: 0-100	Official Geert

MODERATING VARIBALES				
CO2 National Emission Reduction X Power Distance	NERXPD	Product of the CO2 National Emission Reduction variable and the Power Distance variable.	-	Authors elaboration
CO2 National Emission Reduction X Individualism	NERXIND	Product of the CO2 National Emission Reduction variable and the Individualism variable.	-	Authors elaboration
CO2 National Emission Reduction X Masculinity	NERXMASC	Product of the CO2 National Emission Reduction variable and the Masculinity variable.	-	Authors elaboration
CO2 National Emission Reduction X Uncertainty Avoidance	NERXUNCA	Product of the CO2 National Emission Reduction variable and the Uncertainty Avoidance variable.	-	Authors elaboration
CO2 National Emission Reduction X Long-term Orientation	NERXLTO	Product of the CO2 National Emission Reduction variable and the Long-term Orientation variable.	-	Authors elaboration
CO2 National Emission Reduction X Indulgence	NERXINDU	Product of the CO2 National Emission Reduction variable and the Indulgence variable.	-	Authors elaboration

Appenix B: Variance Inflation Factor (VIF) Test

VARIABLES	VIF
PD	6.52
IND	8.47
MASC	2.16
UNCA	8.00
LTO	6.30
INDU	4.66
NER	1.13
FS	2.99
EBITDA	1.00
HDI	3.71
PRS	3.81
LEX	7.02
GDPCG	1.22
MEAN VIF	**4.38**

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