HOW CULTURAL DIMENSIONS, LEGAL SYSTEMS AND INDUSTRY AFFECT ENVIRONMENTAL REPORTING? EMPIRICAL EVIDENCE FROM AN INTERNATIONAL PERSPECTIVE

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Abstract

Past research has paid little attention to the impact of stakeholder engagement, cultural, legal and industrial contexts on environmental disclosure. Thus, the aim of this paper is to explore how these three institutional factors affect the reporting of environmental information by companies in different countries. This research draws on institutional theory: normative isomorphism, coercive isomorphism and mimetic isomorphism. This study uses the generalised method of moments (GMM) procedure. The findings show that the legal system and certain cultural dimensions such as individualism, uncertainty avoidance, long-term orientation and indulgence are determinants of voluntary disclosure of environmental information (individualism and indulgence – negatively; uncertainty avoidance and long-term orientation – positively), particularly when companies belong to industries with high environmental risk.

Key words: environmental disclosure, institutional theory, normative isomorphism, coercive isomorphism, mimetic isomorphism, cultural dimensions, legal systems, industry characteristics

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1. Introduction

In recent years, there has been an increase in research based on environmental issues (Shi, 2004), with especial emphasis on exploring what factors affect environmental disclosure by companies. In this regard, Bewley and Li (2000) provide evidence that companies with more media coverage and political exposure report more environmental information. Liu and Anbumozhi (2009), using a sample of Chinese companies, find that firm size is one of the most important factors influencing environmental reporting. Sun, Salama, Hussainey and Habbash (2010) explore the association between corporate environmental disclosure and earnings management, as well as the impact of corporate governance mechanisms on that association. Employing a sample of UK companies, the findings show no significant association between the different measures of discretionary accrual as a measure of earnings management and environmental disclosure. Other studies have focused on analysing the relationship between environmental disclosure and environmental performance (e.g., Clarkson, Richardson & Vasvari, 2007; Cho, Roberts & Patten, 2010; Iatridis, 2013). Many of these investigations show a positive relationship between performance and corporate environmental disclosure.

In addition to various internal and external aspects, other factors can cause differences in the disclosure of environmental information – e.g., diversity of cultures between countries, different legal systems and different industrial environments. Therefore, in this research, we examine how different cultural, legal and industrial environments impact environmental disclosure by companies in the international arena. Cultural, legal and industrial factors were chosen because they highlight the importance of social and cultural pressures on organisational strategic policies. In this regard, they are able to explain the impacts of different institutional environments on how companies adopt practices and structures, which are considered legitimate. Consistent with this view, Williams and Aguilera (2008) reveal that companies' managers behave differently according to: i) national cultural norms; ii) organisational cultures; and, iii) the profession.

Thus, this research has focused on the following aspects: (a) examining how firms in countries with different cultural systems (normative isomorphism) behave toward the disclosure of environmental information, (b) analysing how legal systems influence environmental reporting (coercive isomorphism), and (c) exploring how companies within a certain economic sector imitate the environmental activities of other organisations or industries in their environment (mimetic isomorphism). This research is based on institutional theory,

since it allows a comparative examination of the effects of culture, legal system and industry on the dissemination of environmental information. This theory assumes that firms are integrated into a nexus of formal and informal institutions that directly influence their activities (McGuinness & Demirbag, 2012). This theoretical perspective helps us understand the effects of institutions on socially responsible behaviours (e.g. Ntim & Soobaroyen, 2013). Moreover, institutional theory focuses on social pressures for conformity in the behaviuor of organisations. According to Oliver (1997, p.698), ‘‘The institutional context refers to rules, norms, and beliefs surrounding economic activity that define or enforce socially acceptable economic behaviour.”

The findings of this research make several contributions. First, by considering 51 items related to three environmental matters – innovation, resource use and emissions – our environmental disclosure proxy was measured using a multidimensional construct with the purpose of collecting all environmental information reported by firms in our sample. Second, the paper focuses on institutional theory, which considers the three isomorphisms proposed by Dimaggio and Powell (1983): normative, coercive and mimetic. This allows us to explain the homogeneous behaviour of organisations in terms of environmental disclosure as a result of the forces and pressures exerted by the institutional environment. Organisations need to interact with the environment in ways that are acceptable to the various constituents to the extent that institutional rules are incorporated within organisations as means to gain legitimacy, resources and stability, as well as to enhance survival prospects. In this context, the outcome of the incorporation of the institutionalized element or institutionalization is sustainability disclosure and reporting (Meyer & Rowan 1977; Amran & Haniffa, 2011). Third, the research explores the effect that cultural, legal and industrial contexts have on environmental disclosure, improving on previous research that only refers to one of them (Kolk & Perego, 2010; Once and Almagtome, 2014; De Villiers & Marques, 2016; Semenova & Hassel, 2016). Fourth, the findings document that environmental reporting is affected by institutional pressures such as those exerted by governments or other companies, as suggested by Aerts, Cormier and Magnan (2006) and Higgins and Larrinaga (2014). This is due to normative, coercive and mimetic isomorphisms. Normative isomorphism refers to values, norms or cultures that distinguish one society from another throughout the world, coercive pressures are typically associated with government and regulatory bodies and mimetic isomorphism refers to when companies can emulate or imitate the behaviour of other more successful organisations. Fifth, our evidence shows, in line with institutional perspective, that the legal system and certain cultural dimensions such as individualism, uncertainty avoidance, long-term orientation and indulgence impact environmental reporting, particularly when companies operate in industries with high

environmental risk. However, our findings report, contrary to our predictions, that power distance and masculinity do not have effect on environmental issues. These last findings compete with the theoretical rationales suggested by institutional theory, which supports a negative effect of power distance and masculinity on environmental disclosure. Thus, this evidence implies a relevant theoretical contribution to institutional theory. Finally, this paper extends prior relevant literature to consider jointly cultural dimensions, legal systems and industry matter in environmental reporting, unlike other investigations that only analyse each of them individually.

The paper is developed as follows. Section 2 provides the theoretical framework. Section 3 shows the hypotheses. Section 4 offers the sample and methodology. Section 5 presents and discusses the results. Section 6 concludes the paper.

2. Theoretical framework

In recent years, interest in environmental issues has increased. Companies have changed their activities with the aim of reducing their environmental impact and improving their image (Barnett, Darnall & Husted, 2015). Authors such as Cerin (2002) and Berthelot, Cormier and Magnan (2003) highlight that stakeholders require organisations to act in an environmentally friendly way. As a result, many companies around the world have increased their level of environmental disclosure. In some instances, they may simply be reacting to institutional pressures, but by doing so, they protect the reputation of the organisation, improve the decisions made by stakeholders, and obtain long-term benefits.

In this context, institutional theory is a solid perspective to support this research. Institutional theory argues that organisations operating in similar environments tend to adopt the same strategic behaviours (Dimaggio & Powel, 1983; Claessens & Fan, 2002). Organisational fields and institutions are the two key aspects of institutional theory (Higgins & Larrinaga, 2014). Institutions are specific practices such as laws and regulations, ideas, ways of understanding reality and cultural frameworks that have achieved a degree of social permanence in a particular context (Higgins & Larrinaga, 2014). North (1990) suggests that institutional theory is based on the notion that institutions operate according to the formal and informal rules of a society or environment and its interactions between institutions and their organisations, with the institutions being the rules and the organisations and entrepreneurs being agents or actors. Furthermore, formal rules comprise laws, regulations, governmental procedures and organised structures to guide human and organizational action (Peng, Mang and Jiang, 2008), while informal rules include ideas, beliefs, attitudes and values – namely, the

culture of a particular society. Informal institutions relate to the normative and cultural-cognitive pressures that guide social behavior (DiMaggio & Powell, 1983; Scott, 2001). Thus, in international business and management research, culture is frequently considered an informal institutional element (e.g., Dikova, Sahib, & van Witteloostuijn, 2010; Redding, 2005) and the legal system a formal institutional factor.

Therefore, through this theory, and taking into account laws, regulations and governmental procedures as formal rules, and ideas, beliefs, attitudes and values as informal rules, organisations respond to the demand of their stakeholders for environmental disclosure by imitating the practices of the leading companies in their industry in order to gain legitimacy (Aerts, Cormier & Magnan, 2006).

DiMaggio and Powell (1983) call this isomorphism, a process by which an organisation acts in a similar way to another organisation by adopting the characteristics of that organisation (Rodrigues & Craig, 2007). Structures of organisations are influenced by their social and institutional environment, and therefore, companies wishing to survive tend to use isomorphism to adapt to their external context (Meyer & Rowan, 1991). Isomorphism can be classified as normative, coercive or mimetic.

Normative isomorphism refers to values, norms or cultures. According to Scott (2008), it is important to determine how culture affects corporate decisions regarding environmental disclosure issues. For Vitell, Paolillo and Thomas (2003), culture can be defined as a collective programme of the mind that affects the basic values of citizens and, at the same time, corporate values. In the same sense, Parboteeah and Cullen (2003, p.138) see culture as representing the historically determined set of implicit and explicit abstract notions and beliefs (that is, what is good, right and desirable) shared by a group of individuals who have experienced a common historical experience. These cultural values, norms, beliefs and assumptions are symbolically reinforced and transmitted through socialisation and training from generation to generation. For other authors such as Su (2006) and Tsakumis (2007), national culture has an important impact on the ethics of decision-making processes and is expected to influence business performance and the behaviour of managers (Richardson & Boyd, 2005), as well as helping to determine the level of transparency that companies will adopt in relation to their sustainable and environmental actions.

Institutional theory suggests that companies also face formal and coercive pressures to comply with socially established standards. These coercive forces are strongly related to large regulatory agencies that have the power to impose sanctions on companies (for example, legal mechanisms). For Campbell (2006), coercive pressure is strongly related to the main regulatory

instruments that can impose sanctions on companies, such as legal and enforcement mechanisms. Larrinaga (2007) see this type of coercive isomorphism as including regulations that enforce disclosure of ecological information, ensure mandatory compliance or carry threats of future regulations. Coercive pressures are typically associated with government and regulatory bodies.

Institutional theory also suggests that companies can emulate or imitate the behaviour of other more successful organisations. In this regard, Rodrigues and Craig (2007) argue that mimetic isomorphism can influence the corporate disclosure of environmental issues. Bansal (2005), using a sample of Canadian companies, concludes that the motivation of organisations to promote environmental disclosure and contribute to sustainable development is better understood through mimetic isomorphism than through Canadian regulations. The practices carried out by the most successful companies in each sector are imitated by companies in similar industries because they are confronted with similar environmental challenges (Dimaggio & Powell, 1991).

Therefore, this research draws on institutional theory to examine how companies' environmental disclosure responds to different cultural systems, legal systems and industry pressures.

3. Research hypotheses

3.1. Normative isomorphism: the influence of cultural systems

According to the institutional approach, organisations are influenced by cultural aspects (normative isomorphism) that reflect the way in which people conform to the norms, values and cultures that distinguish one society from another throughout the world (Tsakumis, 2007). Hence, culture guides the behaviour of the members of society by providing a dominant logic (Roy & Goll, 2014). Various investigations have analysed the impact that the cultural context has on environmental disclosure.

Buhr and Freedman (2001) examined companies in Canada and the United States to explore the role of cultural factors in environmental disclosure. They show that Canadian culture is more helpful than US culture to companies disclosing environmental aspects. This is because Canadian society has a collectivist nature that encourages companies in this country to disclose this type of information.

Roy and Goll (2014) examine the influence of national culture on various facets of a country's sustainability indicators – namely, environmental aspects, which refer to the protection of the natural environment. The analyses used data from 57 countries. The study takes into account countries from all continents, with various forms of government and all

population sizes: Africa (seven countries), Asia (14 countries), Australasia (two countries), North America (six countries), South America (six countries), and Europe (21 countries). Their evidence supports the view that cultural practices influence environmental behaviours.

The impact of the cultural context is usually analysed using the dimensions proposed by Hofstede (1980, 2001), Hofstede and Hofstede (2005) and Hofstede, Hofstede and Minkov (2010). Initially, four cultural dimensions were considered (power distance, individualism, masculinity and uncertainty avoidance), with two additional cultural dimensions introduced later (long-term orientation and indulgence). Thus, there are currently six cultural dimensions. These dimensions provide an important framework, not only for analysing national culture, but also for considering the effects of cultural differences on management and organisation. According to Hoecklin (1996), this theoretical framework is especially useful for understanding people's conception of what an organisation is, for considering the most appropriate mechanisms in order to control and coordinate the activities within an organisation and for analysing the roles and relationships of its members.

3.1.1. Power distance

The dimension of power distance refers to the hierarchical level in a society. This dimension examines the degree of equality and inequality among people in a society (Peng & Lin, 2019, p. 206). According to Carl, Gupta and Jadivan (2004, p. 513), power distance reflects "the extent to which a community accepts and endorses authority, power differences, and status privileges".

Therefore, a large distance of power means that positions of power are stratified vertically, creating different levels of power status. Miska, Szöcs and Schiffinger (2018) suggest that in cultures with a high power distance, people tend to differentiate themselves into classes according to different criteria. The bases of power tend to be stable, and power is considered as ensuring social order, relational harmony and stability. In such cultures, only a few people have access to resources, skills and abilities. As a result, high power distance is negatively correlated with economic prosperity, competitiveness and human development. Regarding social and environmental disclosure by organisations, Veser (2004) finds that when power distance is high, stakeholders consider it less likely that information will be made available to them regarding social and environmental practices. In contrast, when there is less power distance, organisations need to disclose more information about these practices to ensure the support of stakeholders. Similarly, Gray (1988) considers that the greater the power distance, the less information is disclosed.

Regarding to previous studies on power distance and corporate social and environmental disclosure, Orij (2010) and Peng, Dashdeleg and Chih (2014) find a negative relationship between power distance and corporate environmental practices. These results are in line with those indicated by Vachon (2010), who considers that companies in countries with less power distance will be less concerned about relations with shareholders, and will feel more responsible for the welfare of the community at large and for publicising their environmental practices. To analyse this relationship, the following hypothesis is proposed:

H1: *Environmental disclosure is negatively affected by power distance*

3.1.2. Individualism

Another dimension addressed by Hofstede (2001) within the framework of institutional theory is individualism. Individualism refers to the importance of the individuals in the society and personal rights tend to have much influence. The individualism dimension reflects the prevalence of individual values versus collective ones. Hence, in individualistic societies there is a greater development of individual rights. On the contrary, in collective societies citizens think more about their performance as members of a group than in their individual behavior, showing a strong commitment to society. According to Peng and Lin (2009), collectivist societies would exhibit close ties between individuals, extended families, and collectives, where everyone takes responsibility for fellow members of their group.

In an individualist society, people feel comfortable that they have the authority to make their own decisions based on what they think is best, and the freedom and independence of the individual is considered of great importance, with priority being given to personal interests over those of the social group. Furthermore, in these types of societies, systems of personal protection rights are highly developed, and stakeholders in individualist societies are less receptive to achieving objectives that are not their own. Accordingly, companies in a cultural environment of this individualist type will be less willing to disclose social and environmental matters (Ho, Wang & Vitell, 2012). Therefore, based on above arguments, we propose the following hypothesis:

H2: *Environmental disclosure is negatively affected by individualism*

3.1.3. Masculinity

The masculinity dimension refers to gender and the role of women in society. Societies that consider themselves masculine describe men as assertive, aggressive, ambitious, competitive and materialistic. In this type of society, co-operative behaviour is less appreciated. Additionally, in these societies, values of success prevail and obtain greater economic benefits. Santema, Hoekert, Van de Rijt and Van Oijen (2005) consider that in cultures with a high degree

of masculinity, people prioritise masculine value such as their career development and business success, and companies' stakeholders mainly demand economic and financial reporting.

In general, organisations with a female culture are not as competitive as those with a male culture, since the former gives greater priority to concern for others and is considered more supportive of societies (Hofstede, 2001). Feminine societies tend to be more open, especially in the disclosure of socially related information, because they are more caring societies (Gray, 1988). These countries' typologies present a higher sensibility to other business behavior perspectives, and a higher capacity to detect their society's needs and the opportunities to satisfy them.

Previous studies show a negative relationship between masculinity and environmental reporting (Orij, 2010). Other researchers also show a negative relationship between masculinity and environmental sustainability, noting that the greater the degree of femininity of a given culture, the greater the degree of sustainability, environmental management and commitment to sustainable development (Peng & Lin, 2009; Roy & Goll, 2014). Based on previous arguments, the following hypothesis is proposed:

H3: *Environmental disclosure is negatively affected by masculinity*

3.1.4. Uncertainty avoidance

According to Sully de Luque and Javidan (2004, p. 602), uncertainty avoidance is "the extent to which ambiguous situations are threatening to individuals, to which rules and order are preferred, and to which uncertainty is tolerated in a society". Cultures higher in uncertainty avoidance tend to formalise their interactions with others (Miska, Szőcs & Schiffinger, 2018). Greater uncertainty avoidance practices tend to be correlated with quality of life, human development, and general satisfaction (Sully de Luque & Javidan, 2004).

According to Miska, Szőcs & Schiffinger (2018), a positive relationship between uncertainty avoidance and companies' economic, social, and environmental sustainability practices is conceivable. In this regard, Vachon (2010) supports the notion that high uncertainty avoidance results in companies' engagement in sustainability practices. For Scholtens and Dam (2007), uncertainty avoidance has been related to ethical policies in the case of human rights and community development, and these associations support the notion that in cultures characterised by greater uncertainty avoidance practices, companies are likely to show higher degrees of social sustainability practices. In the same way, Peng, Dashdeleg and Chih (2014) suggest that engagement in sustainability practices can help reduce environmental uncertainties facing companies. Therefore, companies in cultures with greater uncertainty avoidance practices are more likely to engage in environmental sustainability practices.

Hence, taking nto account the above arguments, we propose the following hypothesis:

H4: *Environmental disclosure is positively affected by uncertainty avoidance*

3.1.5. Long-term orientation

The dimension of long-term orientation places great importance on the events that will happen in the future. Hofstede (2011, p. 15) considers that long-term orientation captures the following elements: adaptation of tradition to the modern context, high savings ratio driven by thrift, patience and perseverance towards slow results, concern with respecting the demand of virtue, fast economic growth of countries up till a level of prosperity, and large savings quote funds available for investment. For short-term orientation most important events in life occurred in the past or take place now, there are universal guidelines about what is good and evil, service to others is an important goal.

In addition, individuals belonging to this type of society believe that the truth depends a lot on the situation, context and time, and they have a strong propensity to save and invest, being known for their cunning and perseverance (Hofstede & Minkov, 2010). According to Cheng, Ioannou and Serafeim (2014), stakeholders in this type of society afford more importance to reports on social and environmental aspects than to traditional financial reports, as they will provide information about the future. Stakeholders give greater importance to all information useful for deciding about the future. Previous research has documented that certain environmental activities such as investments made to prevent pollution are carried out by organisations operating in this type of culture (Hackert, Krymwiede, Tokle & Vokurka, 2012), so there seems to be a direct relationship between this type of culture and environmental disclosure. Thus, according to above arguments, we posit the following hypothesis:

H5: *Environmental disclosure is positively affected by long-term orientation*

3.1.6. Indulgence

Indulgence is the latest addition to Hofstede's cultural framework (Hofstede, Hofstede & Minkov 2010). Cultures classified as indulgent tend to satisfy the immediate needs and personal desires of their members. At the same time, they tend to enjoy life and have fun. The members of these societies have a positive attitude and have a tendency towards optimism. Some of the most important characteristics of this type of society are a perception of control of personal life and great importance afforded to leisure and freedom of expression, while the maintenance of order is not given high priority.

Hofstede (2011, p.16) considers that indulgence captures the following elements: higher percentage of people declaring themselves very happy, more likely to remember positive emotions, higher importance of leisure, freedom of speech seen as important, a perception of personal life control; on the contrary, restraint stands for a society that controls gratification of needs and regulates it by means of strict social norms.

Past evidence finds a negative relationship between environmental disclosure and indulgence (Gallego-Álvarez & Ortas, 2017), suggesting that in restrictive cultures, organisations will be more likely to report environmental information. Hence, taking into account the above arguments, we propose the following hypothesis:

H6: *Environmental disclosure is negatively affected by indulgence*

3.2. Coercive isomorphism: the influence of legal systems

According to institutional theory, besides cultural aspects (normative isomorphism), there are also coercive pressures. These are strongly related to the main regulatory instruments that can impose sanctions on companies, such as legal and enforcement mechanisms. Campbell (2006) supports the idea that firms behave in a more responsible way by performing their activities in institutional environments, where there is a great coercive pressure and where the legal system is orientated towards protecting the interests of stakeholders. Within legal systems, regulatory institutions promote certain types of behaviours and, at the same time, restrict others through the existing laws, regulations and rules in each country.

Legal system considers the protection of persons and their rightfully acquired property, which is a central element of economic freedom and a civil society. The key ingredients of a legal system consistent with economic freedom are rule of law, security of property rights, an independent and unbiased judiciary, and impartial and effective enforcement of the law. According to La Porta, Lopez-de-Silanes, Shleifer & Vishny (1998), in a more rights-based legal, investors often enjoy greater protection of their interests and a company is considered as an instrument to create and maximise shareholder value.

This strong legal protection towards investors implies that firms have a greater dependence on external capital markets (Aerts, Cormier & Magnan, 2006) and, therefore, they will be subject to a greater coercive pressure by this external dependence on resources and will strive to maintain its access to external capital markets. In this regard, firms will adopt practices that are perceived as appropriate and will disclose social and environmental information (Aerts, Cormier & Magnan, 2006) to improve their legitimacy, their resources and their ability to survive (Scott, 2001). Thus, companies located in countries with a stronger legal system, where

the financing has been obtained primarily from very numerous agents or not related to the company, have had to face a greater pressure to disclose more information with a higher level of detail and content.

Therefore, based on the above arguments, we propose the following hypothesis:

H7: *Environmental disclosure is positively affected by a stronger legal system*

3.3. Mimetic isomorphism: the influence of industry characteristics

In addition to normative and coercive isomorphism, this research also considers mimetic isomorphism within the framework of institutional theory. Aerts, Cormier and Magnan (2006) state that mimetic isomorphism can have a great influence on the corporate disclosure of environmental issues, especially considering that the idiosyncratic characteristics of industries can also play a notable role in companies' environmental reporting. This is mainly because companies within the same economic sector imitate the environmental activities of reference of other organisations or industries in their environment. This is of special relevance, since if the development of quality environmental practices in a specific industry shapes the social expectations, all companies that operate in that same industry will be forced to behave in the same way as a consequence of mimetic isomorphism. This effect appears because companies that do not comply with the demands of their stakeholders and standardised institutional practices can be perceived as businesses at risk (Deegan, 2009).

Earlier research has provided examples of mimetic isomorphism. In this regard, Tagesson, Blank, Broberg and Collin (2009) point out that companies operating in industries with possible negative impacts on the environment participate more in environmental disclosure than companies in other economic sectors. For example, companies operating with raw materials focus more on reporting environmental issues, whereas companies within the consumer goods sector place more emphasis on business ethics. For voluntary carbon disclosure, authors such as Jaggi, Allini, Macchioni and Zagaria (2018) propose a similar reasoning and hypothesis regarding companies that operate in industries that are more affected by carbon emissions. Therefore, based on these arguments, we propose the following hypothesis:

H8: *Environmental disclosure is positively affected by high impact industries*

4. Methodology, sample and variables

4.1. Sample

Our initial sample consisted of 13,178 international firm-year observations from 2004 to 2015. Financial entities were excluded because these companies comply with different rules from non-financial firms and, therefore, financial statements of these two types of firms are not comparable. From this initial sample, 419 firms were also removed because the data of some of the variables was missing. Thus, the final panel data sample is unbalanced and consists of 12,759 firm-year observations pertaining to 28 countries, which are provided in Table 1. As can be seen, the country with the highest representation is the United States with 28.41%, followed by Japan with 14.02% and the United Kingdom with 9.48%. In contrast to these figures, Portugal represents 0.23%, and Greece is the country with the lowest percentage, at 0.08%. All information was collected from the Thomson Reuters database.

Insert Table 1

The international companies of the final sample operate within the nine industries shown in Table 2. The sectorial classification used in this research is based on the TRBC economic sector classification by Thomson Reuters. The sectors most represented are industrial, consumer cyclical and basic metals with 21.91%, 19.23% and 13.74%, respectively. Telecommunications services accounts for 3.61%, the lowest representation.

Insert Table 2

4.2. Variables

4.2.1. Dependent variable

The dependent variable, environmental disclosure, is labelled ENVIR_DISCL. Our environmental disclosure proxy, in line with scholars such as Lee, Kim, Lee and Li (2012) and Rupp and Mallory (2015), was measured using a multidimensional construct with the purpose of collecting all environmental information reported by the firms in our sample. Thus, our environmental reporting index is measured by the unweighted aggregation of 51 items relating to environmental matters, as presented in Table 3 (e.g., Gallego-Álvarez & Ortas, 2017), which will take the value 1 if the company reports the item analysed, and 0 otherwise. The data for constructing the environmental disclosure proxy was colled from the Thomson Reuter database. In line with Radu and Francoeur (2017) and Wu, Liu, Chin and Zhu (2018), among others, three areas were explored to construct the environmental reporting index: innovation, resource use and emissions. Thus, our environmental reporting index attempts to respond to a variety of questions: (a) renewable energy use: do firms make use of renewable energy? (b) environmental supply chain management: do companies use environmental criteria (ISO 14000 or energy consumption, among others) in the selection process of their suppliers or sourcing partners? (c) emission reduction policy: do firms have a policy to reduce emissions? (d) waste reduction

total: do companies report on initiatives to recycle, reduce, reuse, substitute, treat or phase out total waste, hazardous waste or wastewater? (e) environmental products: do firms report on at least one product line or service that is designed to have positive effects on the environment or which is environmentally labelled and marketed? (f) water technologies: do companies develop products or technologies that are used for water treatment, purification or that improve water use efficiency? To ensure the validity and internal consistence of the index of environmental disclosure practices, we have measured its reliability by using the Cronbach alpha, which shows a value of 0.932. Then, this value can be considered acceptable, given that it is higher than 0.8 (Sijtsma, 2009). Further, we have proceeded to perform a factorial analysis in order to explain the relationships among a set of observed variables. Based on correlations as input information, it attempts to summarise and reflect the information through a reduced number of hypothetical variables (factors). The information about the validation of the factorial analysis is provided by Kaiser-Meyer-Olkin (KMO) test and Bartlett's sphericity test. According to Hair, Anderson, Tatham and Black (1998), KMO values should be higher than 0.8 in order to confirm that the variables analysed refer to the same homogeneous set of variables. In this research, the value obtained for KMO is 0.8263 and Bartlett's test evidences a statistical significance of 0.000. These statistics allow us to deduce and validate that all the items used in the index of environmental disclosure practices refer to a unique construct, which will be the dependent variable in the model.

Insert Table 3

4.2.2. Independent variables

Cultural issues were measured following the national cultural dimension model created by Hofstede (1980, 2001), which was enhanced later by Hofstede et al. (2010). Authors such as Vachon (2010), Peng, Dashdeleg and Chih (2014), Gallego-Álvarez and Ortas (2017), Miska et al. (2018) and Guptal et al. (2018) support the national culture dimension model as the most suitable construction for measuring the different cultures among countries. Hofstede's model takes into account six cultural dimensions to capture the cultural differences of several countries: (1) power distance, defined as POW_DIST, (2) individualism versus collectivism, defined as INDIV, (3) masculinity versus femininity, labelled as MASCUL, (4) uncertainty avoidance, labelled as UNC_AVOID, (5) long-term orientation, based on Confucian thinking, defined as LONG_ORIENTATION, and (6) indulgence versus restraint, labelled as INDULG. The six cultural dimensions range from 0 to 100, with 50 being the halfway point. Countries with a score under 50 show a low culture score, while 50 or above is considered a high culture score. For instance, for the culture dimension of individualism versus collectivism, a score

under 50 is categorised as collectivist, and above 50 as individualist. Therefore, a country with a score of 30 would be collectivist, but less collectivist than another country with a score of 10, because this figure is nearer 0. All the values associated with each culture dimension are publicly available through the website of Geert Hofstede[1]. In Table 4, we show the score for each cultural dimension by country.

Insert Table 4

The legal system is labelled as LEG_SYSTEM and considers the protection of persons and their rightfully acquired property, which is a central element of economic freedom and a civil society. The key ingredients of a legal system consistent with economic freedom are rule of law, security of property rights, an independent and unbiased judiciary, and impartial and effective enforcement of the law. This variable is measured as the ratio between the addition of 9 components, which range from 0 to 10, and the total number of components (9): (a) judicial independence, (b) impartial courts, (c) protection of property rights, (d) military interference in rule of law and politics, (e) integrity of the legal system, (f) legal enforcement of contracts, (g) regulatory costs of the sale of real property, (h) reliability of police and (i) business costs of crime. Theses indicators show how effectively the protective functions of government are performed. The nine components for measuring this variable are provided by the webpage of the Fraser Institue[2]. A country with a score near 10 will have a legal system with a higher protection of persons and property rights, while a score near 0 will have a lower protection.

Finally, to explore the effect of those industries with high or low impact on stakeholders, we categorise industries into critical industries – that is, industries with direct and strong effects on stakeholders – and less critical industries – namely, industries with less impact on stakeholders. This variable is denoted as HIGH_IMPACT_INDUS and is calculated as a dummy variable that will take the value 1 if firms operate in high-impact industries and 0, otherwise. We refer to Young and Marais (2012), the FTSE4 Good Indexes (2015), Semenova and Hassel (2016) and Jaggi, Allini, Macchioni and Zagaria (2018) to classify industries according to their low and high impact on stakeholders. While previous research mainly focused on analysing the impact of countries legal system and enforcement on environmental practices due to the existence of coercive and normative isomorphisms (Kolk & Perego, 2010; García-Sánchez et al., 2013), this paper also considers the influence of industry characteristics on environmental reporting. This is of special relevance when considering that industry characteristics also influence the adoption of environmental practices, because companies in the same organizational field mimic the environmental practices of their peers (Jackson & Apostolakou, 2010).

4.2.3. Control variables

Drawing on past evidence, we take into account several factors that may potentially affect the environmental disclosure index. Firm size is the first control variable considered, defined as SIZE and measured as the logarithm of total assets of companies. It is expected, in line with Jaggi et al. (2018), that big companies will be more likely to disclose environmental information, given that they are more exposed to public scrutiny and the impact of their activities on the environment will be more visible. Return on assets (ROA) is also controlled for and was calculated as the operating income before interests and taxes over total assets. In line with past research (e.g., Kim, Park & Wier, 2012), a firm with good corporate performance will be more likely to disclose environmental information because it may reduce investors' fears about the company's risk. Leverage, labelled as LEVERAGE, has also been considered as a control variable. It is measured as debt over total assets. Companies with high levels of leverage will be more likely to report environmental information, since it may allow creditors to assess any risk regarding firm performance (Clarkson, Li & Richardson, 2004; Jaggi et al., 2018).

Board size has also been taken into account as a control variable. It is defined as B_SIZE and is measured as the number of board members. It is expected that, consistent with Husted and Milton de Sousa-Filho (2018), the higher the number of directors on the board, the higher the disclosure of environmental information, because bigger boards will be more likely to provide wider perspectives and opinions in the decision-making process, involving more negotiation and debate. Board independence (B_INDEP) is also controlled for, and it is measured as the ratio between the total number of independent directors on the board and the total number of members on the board. We predict a positive association between board independence and environmental reporting (e.g., Husted & Milton de Sousa-Filho, 2018). Independent directors are non-executive directors, and they defend shareholders' interests, particularly those of stakeholders and minority shareholders. Thus, they will support the reporting of environmental matters.

The presence of a CSR committee is also considered as a control variable – labelled as CSR_COMMITTEE – and is measured as a dummy variable that takes the value 1 if the firm has a CSR committee, and 0 otherwise. A positive effect of CSR committees on environmental disclosure is expected (Konadu, 2017). Companies that set up CSR committees are signalling their interest in stakeholders' societal demands; hence, firms with these committees will promote firm transparency through the disclosure of CSR information such as that referring to

environmental matters. Liquidity is also considerd as a control variable. This variable is labelled as LIQUIDITY and is measured as the ratio between the current assets and the current liabilities. Companies with a high liquidity show that the firm's financial position is strength. Thus, these firms, in order to preserve and safeguard their reputation and credibility, will be more likely to report environmental information (Rahajeng, 2010; Yasmin & Zuraida, 2017). Other factors controlled in this research are relative to country-specific characteristics. The first one is the governance of the country, labelled as GOVERN, and it is calculated as the ratio between the addition of 4 components, which range from 0 to 10, and the total number of components (4): (a) government consumption, (b) transfers and subsidies, (c) government enterprises and investment and (d) top marginal tax rate. Governance indicates the extent to which countries rely on the political process to allocate resources and goods and services. A country with a score near 10 will have a better governance, while a score near 0 will have a worse. Adinehzadeh, Jaffar, Shukor and Rahman (2018) show a positive association between the good governance of a firm and environmental disclosure. This evidence can be extended to the governance of a country. In this regard, a firm which operates in a country with a better governance will be more likelty to report environmental issues. The population, labelled as POPULATION, and the gross domestic product, labelled as GDP, are also considered. The population is measured as the log of the total number of people in a country and the gross domestic product as the log of the gross domestic product. Both variables can be found at the webpage of the world bank. More population and more growth in a country may imply more impact on the environment by increasing the pollution and more impact on the change climate. In this regard, firms will tend to disclose more environmental information in order to mitigate the negative effect of a higher pollution (Sherbinin, Carr, Cassels, & Jiang, 2007). Finally, year fixed effects ($\mho_t$) are also controlled. In Table 5, we offer a summary of all the variables employed in this research.

Insert Table 5

4.3. Methodology

To test our hypotheses, we run the following model:

$$ENVIR\_DISCL_{it} = \beta_0 + \beta_1 POW\_DIST_{it} + \beta_2 INDIV_{it} + \beta_3 MASCUL_{it} + \beta_4 UNC\_AVOID_{it} + \beta_5 LONG\_ORIENTATION_{it} + \beta_6 INDULG_{it} + \beta_7 LEG\_SYSTEM_{it} + \beta_8 HIGH\_IMPACT\_INDUS_{it} + \beta_9 SIZE_{it} + \beta_{10} ROA_{it} + \beta_{11} LEVERAGE_{it} + \beta_{12} B\_SIZE_{it} + \beta_{13} B\_INDEP_{it} + \beta_{14} CSR\_COMMITTEE_{it} + \beta_{15} GOVERN_{it} + \beta_{16} POPULATION_{it} + \beta_{17} GDP_{it} + \beta_{18} LIQUIDITY_{it} + \sum \beta_k \mho_t + \chi_i + \alpha_{it}$$

where χ_i represents firm fixed effects or firm-specific effects (the unobservable heterogeneity), which are controlled because they may affect the disclosure of environmental information. Firm

fixed effects capture unobservable characteristics of firms, which are invariant over time and variable among individuals, and α_{it} represents the error term.

The generalised method of moments (GMM) procedure has been employed for estimating the model (Arellano & Bond, 1991, 1998). This estimator introduces the temporal dependency by lagging the dependent variable. In contrast to other procedures, the GMM estimator takes into account the unobservable heteroge

neity (χ_i), making this estimator more efficient and consistent than others. The GMM addresses the unobservable heterogeneity by considering it as an individual factor, and with the first differences of the variables, this heterogeneity will be eliminated. The GMM estimator also addresses endogeneity and mitigates the estimation bias.

The following tests are provided by the GMM estimator: the Wald χ^2 test, the Arellano–Bond tests AR(1) and AR(2), and the Hansen test. The Wald χ^2 statistic lets us know the model fitness. The Arellano-Bond statistic AR(2) shows us the existence of a second-order serial correlation in the first difference residuals. There will be no second-order serial correlation if the null hypothesis of "no serial correlation" is rejected. Finally, the Hansen test of over-identifying restrictions supports the appropriateness of the instruments employed in the model when rejecting the null hypothesis of non-correlation between the instruments and the disturbance term.

5. Analysis of results

5.1. Descriptive statistics

In Table 6, we provide the most important statistics of all the variables used in this research study. Our dependent variable, environmental disclosure index (ENVIR_DISCL), shows a value of, on average, 12.81. Thus, the international firms in our sample report information on nearly 25.11% of the 51 environmental items considered in our research to construct the environmental disclosure index. This figure shows the firms in our sample should give a further step in disclosing environmental issues because the environmental reporting score is not as high as it would have to be expected. Focusing on the six cultural dimensions, out of a score of 100, power distance (POW_DIST) is 45.17, individualism (INDIV) is 72.36, masculinity (MASCUL) is 61.46, uncertainty avoidance (UNC_AVOID) is 56.63, long-term orientation (LONG_ORIENTATION) is 48.11, and indulgence (INDULG) is 59.55. On average, firms in our sample operate in societies near middle power distance, showing that these cultures are associated with peaceful conflict resolution, political systems changed by evolution or less income inequality. Further, companies in our sample also operate in more individualist and masculine societies. Societies with human rights more respected, more press freedom or

fater pace of life prevail in indivualist cultures and societies with salary preferred over leisure, more people living in powerty, with women who are food shoppers or more functional illiterates prevail in masculine cultures. Societies in wich companies in our sample are located tend to show a middle uncertainty avoidance and long-term orientation. In this regard, greater interest on honesty, self-discipline, learning, adaptiveness and accountability of its members are intermidate (uncertaintiny avoidance= 56.63) and the tendency to be prudent and humble, to be persistent in the achievement of their goals and the discouragement to be self-assertive are also intermediate (long-term orientation=48.11). Firms in our sample also operate in indulgent societies, which means that these cultures allow relatively free gratification of basic, and natural human drives related to enjoying life and having fun. Furthermore, firms of our sample operate in countries with a strong legal system since this variable shows, on average, a value of 7.45 out of 10. Among the firms in the sample, 61.25% operate in high-impact industries. Firm size is 9.64 (log of total assets, expressed in euros), return on assets (ROA) is 6.38%, leverage, on average, is 13.11%, number of board members is 10.89, 50.79% of the board members are independent, and 59.08% of the firms have a CSR committee. The governance of the countries in which firms are located is, on average, 6.05 out of 10, the population of all countries, on average, is 7.92 (log of total number of persons), the gross domestic product is 12.52 and liquidity is 1.74.

Insert Table 6

In addition, multicollinearity concerns have been checked by calculating the correlation matrix provided in Table 7. According to the values in Table 6, none of the coefficients is higher than 0.8 (e.g., Pucheta-Martínez et al., 2018). Therefore, multicollinearity is not a problem in our analysis.

Insert Table 7

5.2. Multivariate analysis and discussion

In Table 8, we present the findings of the nine models built for testing our hypotheses. In Model 1, we explore the association between the cultural dimension of power distance (POW_DIST) and environmental disclosure. The variable of power distance provides a positive sign, contrary to our expectations, and is not statistically significant. Thus, our first hypothesis is not supported, and this finding suggests that power distance does not have an effect on the reporting of environmental information. Our evidence shows that the level of hierarchy in a society is not a determinant factor affecting the disclosure of environmental matters. In other words, a higher or lower power distance in the national culture of each country does not influence the decision-making process of firms regarding corporate environmental reporting.

This evidence is in contrast to that provided by Waldman et al. (2006) and Peng, Dashdeleg and Chih (2014), who find that managers operating in firms located in countries with a stronger power distance will tend to disclose less environmental information, because this cultural dimension induces them to show less commitment to stakeholders' needs. It also contradicts the research by Ho, Wang and Vitell (2012) and Ioannou and Serafeim (2012), who support the thesis that a stronger power distance is positively associated with environmental reporting.

Insert Table 8

Models 2 and 6 examine the effect of individualism (INDIV) and indulgence (INDULG), respectively, on environmental disclosure. Both variables provide a negative sign, as predicted, and are statistically significant. Therefore, hypotheses 2 and 6 cannot be rejected. These results confirm that the cultural dimensions of individualism and indulgence negatively affect the reporting of environmental information. According to Ho et al. (2012), communities in which individualism prevails place greater importance on independence and freedom, and consequently, this encourages people to prioritise individual needs and interests over collective demands. This may explain why firms operating in individualist cultures will be less likely to report environmental information, because the sensitivity of the firms' managers to stakeholders' needs will be lower. Co-operation, integration, cohesion and agreement, among others, are not predominant values among company managers. Furthermore, indulgent cultures also tend to report less environmental information because these communities have a greater tendency than restraint cultures to support desires such as enjoying life or entertainment (Ismail & Lu, 2014). This undermines the disclosure of environmental information because members of indulgent communities will not be willing to sacrifice their desire to enjoy life in order to engage with environmental issues.

In Models 3, we analyse the impact of masculinity (MASCUL) on environmental disclosure. The coefficient of the variable is positive, in contrast to our predictions, with the variable of masculinity being insignificant from a statistical point of view. According to these findings, hypotheses 3 cannot be supported.

In Model 4, we explore the association between uncertainty avoidance (UNC_AVOID) and environmental disclosure. The variable exhibits the expected sign – positive – and is statistically significant (the hypothesis 4 is supported by this result). Thus, strong uncertainty avoidance cultures have a positive impact on the reporting of environmental information. It seems that the strict codes of behaviour and beliefs predominant in uncertainty avoidance communities, as well as the major presence of norms and rules imposed on individuals, encourage managers to disclose environmental information.

In Model 5, we explore the relationship between the long-term orientation culture dimension (LONG_ORIENTATION) and the reporting of environmental information. The variable exhibits the expected sign – positive – and is statistically significant. Thus, the hypothesis 5 is supported by this result. Communities that show a long-term orientation tend to disclose more environmental issues. This might be due to sustainability and environmental issues showing their benefits in the long term and, accordingly, their long-term orientation will imply a greater engagement with environmental matters (Cheng et al., 2014).

In Models 7, we examine the effect of the legal system (LEG_SYSTEM) on the reporting of environmental information. The coefficient presents a positive sign, as expected, and it is statistically significant. Therefore, our findings support the hypothesis 7. Our evidence suggests that companies operating in countries with a strong legal system are positively associated with environmental reporting. The orientation of countries with stronger legal systems is mainly towards shareholders and, as a result, firms operating in these countries will disclose more environmental information, allowing shareholders to assess firms' commitment to environmental issues. In this way, companies have a higher probability of receiving the external resources necessary for survival.

Finally, in Model 8, we explore the association between industries with a strong impact on the environment (HIGH_IMPACT_INDUS) and environmental disclosure. The variable exhibits a positive coefficient and is statistically significant. Hence, our evidence supports hypothesis 9, and it can be concluded that companies operating in high-impact industries tend to report more environmental information. Firms that have a greater impact on the environment will be perceived negatively by society and stakeholders. Thus, disclosing more information on environmental issues will compensate for this negative perception. If firms do not report environmental information, stakeholders may assume that these companies have poor environmental performance. In Table 9, we provide a summary of the expected and obtained signs for each of the hypotheses.

Insert Table 9

5.3. Robustness analysis

An analysis of robustness was conducted to corroborate our results. In this regard, we used as a dependent variable the mean of our environmental disclosure index (ED_SCORE). This new dependent variable is measured as the ratio between the aggregation of the 51 items of environmental issues considered and the total number of items (51). This variable ranges from 0 to 1. So as not to extend the paper more than necessary, the results of the regressions are not shown here, but they confirm the evidence shown in our baseline models. Therefore, the

impacts of cultural dimensions, the legal system and high-impact industries on environmental disclosure are independent of the way of measuring the dependent variable.

6. Conclusions

Drawing on institutional theory, which argues that firms operating in the same institutional context will tend to behave in a similar way, this study aimed to explore how the institutional context in which firms operate affects their environmental disclosure practices. As proxies of the institutional context, we use Hofstede's cultural dimensions, the legal system and industries with a high impact on the environment. In this regard, Hofstede's six cultural dimensions (normative isomorphism) are: (1) power distance, (2) individualism, (3) masculinity, (4) uncertainty avoidance, (5) long-term orientation, and (6) indulgence. In this paper, we considered the legal system (coercive isomorphism) in terms of a stronger legal system, where investors often enjoy a greater protection of their interests and a company is considered as an instrument to create and maximise shareholder value. The proxy of industries with a high impact (mimetic isomorphism) refers to firms operating in an industry with an impact on the environment.

The findings show that three of Hofstede's six cultural dimensions—individualism, uncertainty avoidance, long-term orientation and indulgence—do indeed have an impact on environmental disclosure, while power distance and masculinity are not significant, contrary to our predictions. Individualism and indulgence have a negative effect on environmental information, and uncertainty avoidance and long-term orientation has a positive effect. Furthermore, the legal system also positively affects environmental reporting. Companies operating in industries with a high impact on the environment will be more likely to report environmental information.

Several implications can be derived from this analysis. First, our evidence confirms the three perspectives of institutional theory on the reporting of environmental information: normative isomorphism, coercive isomorphism and mimetic isomorphism. Normative ismorphism is based on the cultural development of the country, where the company operates and contains the prescriptive, evaluative and obligatory dimensions of social life (Scott, 2008). The moral values that culture imposes on the business world (Su, 2006) may influence the organisational strategies, among which is sustainability reporting. Regarding coercive isomorphism might include regulations for issuing ecological information, mandatory compliance or threats of future regulation (Larrinaga, 2007). In the same way, Sarkis, Gonzalez-Torre and Adenso-Diaz (2010) indicate that coercive pressures are typically associated with government and regulatory bodies. Mimetic isomorphism "concerns the ways in which

organizations emulate the actions of similar organizations that are perceived to be more legitimate or successful in the institutional environment" (Rodrigues & Craig, 2007, p. 743). Jennings and Zandbergen (1995) show that organizations in the same trade association might also follow the set example, since they are sharing the same vision or mission and belief. Further research could seek to shed some light on the impact of these three aspects of the institutional approach on other business aspects, such as CSR disclosure or firm performance. This evidence may reinforce the theoretical foundations that suggest which factors incentivise firms to disclose environmental issues. Our evidence shows, contrary to our predictions, that power distance and masculinity do not have effect on environmental reporting. These findings contribute to current theoretical perspectives on the reporting of environmental issues and culture because it counters to what theory and past evidence show. On the other hand, the positive impact of long-term orientation cultures on environmental disclosure is consistent with what prior research on manager's temporal orientation would say. Second, our findings provide a solid understanding of which institutional contexts provide greater encouragement for the reporting of environmental information, which may be useful for regulatory bodies. Countries with individualist and indulgent cultures are not the most suitable contexts for disclosing environmental issues, whereas long-term orientation and uncertainty avoidance cultures are, as well as strong legal systems and countries where industries have a high impact on the environment. Thus, international policymakers might take into account this evidence and recommend or enforce certain aspects over which they may have some influence, such as the legal system, certain cultural dimensions or industries in which firms operate. At the same time, our evidence can also be very useful for bringing about the regulatory homogenisation of environmental disclosure practices with a view to harmonisation by the European Union or the United Nations. Third, managers of companies will consider our findings of great interest, and they should pay attention to the disclosure practices on environmental issues in relation to the demands of stakeholders. In this regard, managers who are committed with stakeholders' needs and interest should manage firms located in cultural context with long-term orientation and with uncertainty avoidance and in countries with strong legal systems. Additionally, these managers might also manage companies operating in an industry with strong and direct environmental impact because they will be more likely to disclosre environmental information. On the contrary, managers who show indifference regarding environmental issues and stakolder's needs may manage firms located in cultures with high scores of power distance and masculinity, while managers who are reluctant to report environmental matters should manage firms in cultures with high scores of individualism and indulgency. From an environmental disclosure

perspective, uncertainity avoidance and long-term orientation cultural contexts as well as countries with strong legal systems and firms operating in industries with a higher impact on the environment show a higher orientation toward stakeholders. In contrast to this, power distance, invidiualist, masculinity and indulgent cultural contexts show a lower or no orientation toward stakeholders. Last, the results of this research may be also relevant for stakeholders, given that they will have more knowledge regarding within which institutional contexts environmental information is more likely to be reported.

Some caveats can be derived from this study. Firstly, we have attempted to address as many factors as theory and past empirical findings suggest impacting environmental disclosure, but it is likely that some of them have omitted. Secondly, we have considered in our sample as many countries as it has been possible. However, some countries have not been included. Thus, we encourage other researcher to extend our analysis with more countries in order to find out if our evidence is confirmed.

Some future lines of research can be derived from our investigation. We encourage other scholars to extend our research to a sample of companies within both developed and developing countries. It would also be interesting to explore the effects of Hofstede's cultural dimensions and the legal system on environmental disclosure, or other voluntary disclosures, using a sample of financial entities.

Notes

[1] The cultural insights website of Geert Hofstede can be accessed at: https://www.geert-hofstede.com/

2 The mission of the Fraser Institute is to improve the quality of life for Canadians, their families, and future generations by studying, measuring, and broadly communicating the effects of government policies, entrepreneurship, and choice on their well-being. The webpage of Fraser Institute: https://www.fraserinstitute.org/economic-freedom/approach

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Table 1
Number of observations by country

Country	Observations	Percentage	Cum.
Australia	817	6.40%	6.40%
Austria	41	0.32%	6.72%
Belgium	97	0.76%	7.48%
Brazil	257	2.01%	9.50%
Canada	1,155	9.05%	18.55%
Chile	110	0.86%	19.41%
China	342	2.68%	22.09%
Denmark	115	0.90%	23.00%
Finland	142	1.11%	24.11%
France	578	4.53%	28.64%
Germany	407	3.19%	31.83%
Greece	10	0.08%	31.91%
Hong Kong	128	1.00%	32.91%
India	171	1.34%	34.25%
Ireland	175	1.37%	35.62%
Italy	133	1.04%	36.66%
Japan	1,789	14.02%	50.69%
Mexico	124	0.97%	51.66%
Netherlands	220	1.72%	53.38%
New Zealand	53	0.42%	53.80%
Norway	70	0.55%	54.35%
Portugal	29	0.23%	54.57%
Spain	211	1.65%	56.23%
Sweden	261	2.05%	58.27%
Switzerland	393	3.08%	61.35%
Thailand	97	0.76%	62.11%
United Kingdom	1,209	9.48%	71.59%
United States	3,625	28.41%	100%
Total	**12,759**	**100%**	

Table 2
Number of observations by activity sector

TRBC economic sector name	Number of observations	Percentage	Cum.
Basic Materials	1,753	13.74%	13.74%
Consumer Cyclicals	2,454	19.23%	32.97%
Consumer Non-Cyclicals	1,279	10.02%	43.00%
Energy	1,193	9.35%	52.35%
Healthcare	1,012	7.93%	60.28%
Industrials	2,795	21.91%	82.19%
Technology	1,017	7.97%	90.16%
Telecommunications Services	460	3.61%	93.76%
Utilities	796	6.24%	100%
Total	**12,759**	**100%**	

Table 3
Environmental disclosure items

Resource use	Emissions	Innovation
Resource reduction policy	Policy emissions	Environmental products
Policy water efficiency	Targets emissions	Eco-design products
Policy energy efficiency	Biodiversity impact reduction	Noise reduction
Policy sustainable packaging	Emissions trading	Hybrid vehicles
Policy environment supply chain	Climate change commercial risks opportunities	Environmental assets under MGT
Resource reduction targets	Nox and Sox emissions reduction	Equator principles or environmental projects
Environment management team	Voc or particulate matter emissions	Environmental project financing
Environment management training	Voc emissions reduction	Labeled wood
Environmental materials sourcing	Particulate matter emission reduction	Organic products initiatives
Toxic chemicals reduction	Waste reduction total	Product impact minimization
Renewable energy use	e-Waste reduction	Take-back and recycling initiatives
Green buildings	Environmental restoration initiatives	Product environmental responsible use
Environmental supply chain management	Staff transportation impact reduction	GMO products
Environmental supply chain monitoring	Environmental expenditures investment	Agrochemical products
Env supply chain partnership termination		Agrochemical 5% revenue
Land environmental impact reduction		Animal testing in the last 12fy
		Animal testing cosmetics
		Animal testing reduction
		Renewable clean energy products
		Water technologies
		Sustainable building products

Table 4
The score on each of the cultural dimensions by country

Country	POW_DIST	INDIV	MASCUL	UNC_AVOID	LONG_ORIENTATION	INDULG
Australia	38	90	61	51	21	71
Austria	11	55	79	70	60	63
Belgium	65	75	54	94	82	57
Brazil	69	38	49	76	44	59
Canada	39	80	52	48	36	68
Chile	63	23	28	86	31	68
China	80	20	66	30	87	24
Denmark	18	74	16	23	35	70
Finland	33	63	26	59	38	57
France	68	71	43	86	63	48
Germany	35	67	66	65	83	40
Greece	60	35	57	112	45	50
Hong Kong	68	25	57	29	61	17
India	77	48	56	40	51	26
Ireland	28	70	68	35	24	65
Italy	50	76	70	75	61	30
Japan	54	46	95	92	88	42
Mexico	81	30	69	82	24	97
Netherlands	38	80	14	53	67	68
New Zealand	22	79	58	49	33	75
Norway	31	69	8	50	35	55
Portugal	63	27	31	104	28	33
Spain	57	51	42	86	48	44
Sweden	31	71	5	29	53	78
Switzerland	34	68	70	58	74	66
Thailand	64	20	34	64	32	45
United Kingdom	35	89	66	35	51	69
United States	40	91	62	46	26	68

Table 5
Variables description

Variables	Description
ENVIR_DISCL	The aggregation of 51 items focused on environmental issues. If the company discloses information concerning each item, it will take the value 1 and 0, otherwise
POW_DIST	Power distance is one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100
INDIV	Individualism is one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100
MASCUL	Masculinity is one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100
UNC_AVOID	Uncertainity avoidance is one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100
LONG_ORIENTATION	Long-term orientation is one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100
INDULG	Indulgence is one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100
LEG_SYSTEM	Legal system of the country is the ratio between the addition of 9 components, which range from 0 to 10, and the total number of components (9). The nine components are (a) judicial independence, (b) impartial courts, (c) protection of property rights, (d) military interference in rule of law and politics, (e) integrity of the legal system, (f) legal enforcement of contracts, (g) regulatory costs of the sale of real property, (h) reliability of police and (i) business costs of crime. Theses indicators indicate how effectively the protective functions of government are performed
HIGH_IMPACT_INDUS	Dummy variable that takes the value 1 if the company operates in an industry with strong and direct environmental impact and 0, otherwise
SIZE	The log of total assets
ROA	Operate income before interests and taxes over total assets
LEVERAGE	Debt over total assets
B_SIZE	Number of directors on board
B_INDEP	Proportion of independent directors on boards= Total number of independent on boards/ Total number of directors on boards
CSR_COMMITTEE	Dummy variable that takes the value 1 if the company has a CSR committee and 0, otherwise
GOVERN	Governance of the country is the ratio between the addition of 4 components, which range from 0 to 10, and the total number of components (4). The four components are (a) government consumption, (b) transfers and subsidies, (c) government enterprises and investment and (d) top marginal tax rate. Governance indicates the extent to which countries rely on the political process to allocate resources and goods and services.
POPULATION	The log of total number of people in a country
GDP	The log of gross domestic product of a country
LIQUIDITY	Ratio between total current assets and total current liabilities

Table 6
Descriptive analysis

Variable	Obs	Mean	Standard Deviation
ENVIR_DISCL	12,759	12.81	9.28
POW_DIST	12,759	45.17	13.32
INDIV	12,759	72.36	21.29
MASCUL	12,759	61.46	19.24
UNC_AVOID	12,759	56.63	20.58
LONG_ORIENTATION	12,759	48.11	24.07
INDULG	12,759	59.55	14.80
LEG_SYSTEM	12,759	7.448	0.840
HIGH_IMPACT_INDUS	12,759	61.25	48.72
SIZE	12,759	9.64	1.48
ROA	12,759	6.38	8.45
LEVERAGE	12,759	13.11	22.06
B_SIZE	12,759	10.89	3.58
B_INDEP	12,759	50.79	34.84
CSR_COMMITTEE	12,759	59.08	49.17
GOVERN	12,759	6.05	1.02
POPULATION	12,759	7.92	0.59
GDP	12,759	12.52	0.55
LIQUIDITY	12,759	1.74	3.83

Mean and standard deviation. ENVIR_DISCL is the aggregation of 51 items focused on environmental issues. If the company discloses information concerning each item, it will take the value 1 and 0, otherwise; POW_DIST represents the power distance, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; INDIV represents the individualism, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; MASCUL represents the masculinity, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; UNC_AVOID represents the uncertainity avoidance, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; LONG_ORIENTATION represents the long-term orientation, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; INDULG represents the indulgence, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; LEG_SYSTEM is the ratio between the addition of 9 components, which range from 0 to 10, and the total number of components (9). The nine components are (a) judicial independence, (b) impartial courts, (c) protection of property rights, (d) military interference in rule of law and politics, (e) integrity of the legal system, (f) legal enforcement of contracts, (g) regulatory costs of the sale of real property, (h) reliability of police and (i) business costs of crime. Theses indicators indicate how effectively the protective functions of government are performed; HIGH_IMPACT_INDUS is a dummy variable that takes the value 1 if the company operates in an industry with strong and direct environmental impact and 0, otherwise; SIZE is the log of total assets; ROA is the operate income before interests and taxes over total assets; LEVERAGE is the debt over total assets; B_SIZE is the number of directors on board; B_INDEP is the proportion of independent directors on boards= Total number of independent on boards/ Total number of directors on boards; CSR_COMMITTEE is adummy variable that takes the value 1 if the company has a CSR committee and 0, otherwise, GOVERN is the ratio between the addition of 4 components, which range from 0 to 10, and the total number of components (4). The four components are (a) government consumption, (b) transfers and subsidies, (c) government enterprises and investment and (d) top marginal tax rate. Governance indicates the extent to which countries rely on the political process to allocate resources and goods and services; POPULATION is the log of total population of the country; GDP is the log of gross domestic product of the country and LIQUIDITY is the ratio between total current assets and total current liabilities.

Table 7
Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
ENVIR_DISCL (1)	1.000																	
POW_DIST (2)	0.056***	1.000																
INDIV (3)	-0.152***	-0.349***	1.000															
MASCUL (4)	0.091***	0.064***	-0.176***	1.000														
UNC_AVOID (5)	0.149***	0.391***	-0.509***	0.136***	1.000													
LONG_ORIENTATION (6)	0.231***	0.235***	-0.744***	0.401***	0.428***	1.000												
INDULG (7)	-0.175***	-0.622***	0.573***	-0.354***	-0.459***	0.589***	1.000											
LEG_SYSTEM (8)	-0.115***	-0.756***	-0.034***	-0.059***	-0.033***	0.112***	0.389***	1.000										
HIGH_IMPACT_INDUS (9)	0.069***	0.039***	-0.124***	-0.044***	0.054***	0.051***	-0.011	0.023***	1.000									
SIZE (10)	0.507***	0.224***	-0.063***	0.118***	0.069***	0.161***	-0.291***	-0.240***	0.097***	1.000								
ROA (11)	-0.129***	-0.099***	0.172***	-0.105***	-0.266***	-0.215***	0.147***	-0.013***	0.126***	-0.204***	1.000							
LEVERAGE (12)	0.140***	0.075***	-0.059***	0.025***	0.066***	0.079***	-0.082***	-0.097***	0.163***	0.293***	-0.375***	1.000						
B_SIZE (13)	0.313***	0.238***	-0.112***	0.068***	0.063***	0.146***	-0.284***	-0.218***	0.073***	0.507***	-0.089***	0.179***	1.000					
B_INDEP (14)	-0.076***	-0.231***	0.627***	-0.272***	-0.371***	-0.564***	0.387***	-0.003***	-0.026***	-0.012***	0.148***	-0.042***	-0.125***	1.000				
CSR_COMMITTEE (15)	0.621***	0.000	-0.069***	0.035***	0.066***	0.116***	-0.008	-0.048***	0.106***	0.302***	-0.128***	0.099***	0.190***	-0.013***	1.000			
GOVERN (16)	-0.256***	-0.018**	0.433***	-0.003	-0.218***	-0.573***	0.184***	-0.098***	-0.047***	-0.091***	0.207***	-0.104***	-0.067***	0.317***	-0.178***	1.000		
POPULATION (17)	0.027***	0.530***	0.318***	0.293***	-0.183***	-0.129***	-0.312***	-0.732***	-0.085***	0.229***	0.037***	0.037***	0.179***	0.146***	-0.010	0.217***	1.000	
GDP (18)	0.037***	0.327***	0.506***	0.372***	-0.159***	-0.156***	-0.185***	-0.551***	-0.116***	0.213***	-0.009	0.039***	0.123***	0.225***	0.005	0.189***	0.785***	1.000
LIQUIDITY (19)	-0.054***	-0.007	0.037***	0.043***	0.017*	-0.064***	0.002	-0.027***	-0.140***	-0.281***	0.234***	-0.486***	-0.179***	0.019**	-0.055***	0.096***	0.063***	0.059***

ENVIR_DISCL is the aggregation of 51 items focused on environmental issues. If the company discloses information concerning each item, it will take the value 1 and 0, otherwise; POW_DIST represents the power distance, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; INDIV represents the individualism, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; MASCUL represents the masculinity, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; UNC_AVOID represents the uncertainity avoidance, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; LONG_ORIENTATION represents the long-term orientation, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; INDULG represents the indulgence, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; LEG_SYSTEM is the ratio between the addition of 9 components, which range from 0 to 10, and the total number of components (9). The nine components are (a) judicial independence, (b) impartial courts, (c) protection of property rights, (d) military interference in rule of law and politics, (e) integrity of the legal system, (f) legal enforcement of contracts, (g) regulatory costs of the sale of real property, (h) reliability of police and (i) business costs of crime. Theses indicators indicate how effectively the protective functions of government are performed; HIGH_IMPACT_INDUS is a dummy variable that takes the value 1 if the company operates in an industry with strong and direct environmental impact and 0, otherwise; SIZE is the log of total assets; ROA is the operate income before interests and taxes over total assets; LEVERAGE is the debt over total assets; B_SIZE is the number of directors on board; B_INDEP is the proportion of independent directors on boards= Total number of independent on boards/ Total number of directors on boards; CSR_COMMITTEE is adummy variable that takes the value 1 if the company has a CSR committee and 0, otherwise, GOVERN is the ratio between the addition of 4 components, which range from 0 to 10, and the total number of components (4). The four components are (a) government consumption, (b) transfers and subsidies, (c) government enterprises and investment and (d) top marginal tax rate. Governance indicates the extent to which countries rely on the political process to allocate resources and goods and services; POPULATION is the log of total population of the country; GDP is the log of gross domestic product of the country and LIQUIDITY is the ratio between total current assets and total current liabilities. *p-value<0.1 **p-value<0.05 ***p-value<0.01.

Table 8
Multivariate analysis results of the Generalized Method of Moments

	MODEL 1 Coef. P>|t|	MODEL 2 Coef. P>|t|	MODE 3 Coef. P>|t|	MODEL 4 Coef. P>|t|	MODEL 5 Coef. P>|t|	MODEL 6 Coef. P>|t|	MODEL 7 Coef. P>|t|	MODEL 8 Coef. P>|t|
ENVIR_DISCL(t-1)	0.536*** (0.001)	0.517*** (0.000)	0.417** (0.032)	0.422** (0.014)	0.440** (0.030)	0.543*** (0.000)	0.645*** (0.000)	0.800*** (0.000)
POW_DIST	0.009 (0.163)							
INDIV		-0.005*** (0.008)						
MASCUL			0.002 (0.323)					
UNC_AVOID				0.007*** (0.006)				
LONG_ORIENTATION					0.007*** (0.006)			
INDULG						-0.009** (0.028)		
LEG_SYSTEM							0.024* (0.096)	
HIGH_IMPACT_INDUS								0.119* (0.098)
SIZE	0.001 (0.999)	-0.028 (0.790)	0.045 (0.723)	0.011 (0.940)	0.099 (0.183)	-0.125 (0.293)	0.015* (0.092)	-0.038 (0.134)
ROA	0.002 (0.250)	0.001* (0.076)	0.002 (0.121)	0.003 (0.137)	0.003** (0.038)	0.001* (0.052)	-0.003* (0.086)	-0.005* (0.060)
LEVERAGE	0.003 (0.446)	0.000 (0.902)	0.000 (0.666)	0.002 (0.694)	0.002 (0.418)	0.001 (0.497)	0.000 (0.259)	-0.001 (0.781)
B_SIZE	0.032 (0.170)	0.017 (0.114)	0.037 (0.234)	0.044** (0.037)	0.033 (0.178)	0.036*** (0.006)	0.008** (0.017)	0.032*** (0.006)
B_INDEP	0.002 (0.304)	0.001** (0.032)	-0.000 (0.878)	0.001* (0.085)	0.004* (0.085)	0.001* (0.079)	0.000 (0.714)	0.000 (0.690)
CSR_COMMITTEE	0.159* (0.098)	0.220*** (0.001)	0.208** (0.042)	0.159** (0.024)	0.143 (0.128)	0.187** (0.016)	0.130*** (0.000)	-0.012 (0.873)
GOVERN	-0.024 (0.555)	-0.041* (0.097)	0.003 (0.862)	0.049 (0.208)	0.086* (0.066)	-0.025 (0.345)	-0.017** (0.015)	0.012 (0.562)
POPULATION	-0.263 (0.418)	-0.253 (0.143)	0.079 (0.734)	-0.066 (0.787)	0.206 (0.383)	-0.143 (0.312)	0.104** (0.010)	-0.070 (0.509)
GDP	0.255 (0.472)	0.100 (0.577)	-0.212 (0.265)	-0.044 (0.789)	-0.086 (0.611)	0.215 (0.292)	-0.089** (0.013)	0.074 (0.398)
LIQUIDITY	0.019 (0.552)	0.012 (0.700)	0.000 (0.977)	0.004 (0.730)	-0.002 (0.844)	0.009 (0.503)	0.000** (0.034)	0.000 (0.198)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald χ^2 test	5526.33***	7471.70***	4671.11***	3677.82***	2881.96***	7339.25***	13299.63***	4962.17***
Arellano-Bond test AR(1) (z, p>|z|)	-0.95(0.343)	-2.10 (0.035)	-0.59 (0.552)	-0.49 (0.624)	-1.33 (0.182)	-1.25 (0.213)	-8.27 (0.000)	-1.19 (0.234)

Arellano-Bond test AR(2) (z, p>|z|)	-0.66(0.510)	-0.66 (0.512)	-0.81 (0.416)	-0.21 (0.834)	-0.46 (0.647)	0.17 (0.868)	0.57 (0.570)	1.40 (0.160)
Hansen test (Chi-square, p>|Chi^2|)	7.65 (0.365)	2.01 (0.570)	16.24 (0.908)	9.03 (0.340)	1.83 (0.969)	1.95 (0.983)	11.90 (0.104)	19.66 (0.765)

ENVIR_DISCL is the aggregation of 51 items focused on environmental issues. If the company discloses information concerning each item, it will take the value 1 and 0, otherwise; POW_DIST represents the power distance, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; INDIV represents the individualism, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; MASCUL represents the masculinity, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; UNC_AVOID represents the uncertainity avoidance, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; LONG_ORIENTATION represents the long-term orientation, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; INDULG represents the indulgence, one of the six culture dimensions addressed by Hostfede (2010) and ranges from 0 to 100; LEG_SYSTEM is the ratio between the addition of 9 components, which range from 0 to 10, and the total number of components (9). The nine components are (a) judicial independence, (b) impartial courts, (c) protection of property rights, (d) military interference in rule of law and politics, (e) integrity of the legal system, (f) legal enforcement of contracts, (g) regulatory costs of the sale of real property, (h) reliability of police and (i) business costs of crime. Theses indicators indicate how effectively the protective functions of government are performed; HIGH_IMPACT_INDUS is a dummy variable that takes the value 1 if the company operates in an industry with strong and direct environmental impact and 0, otherwise; SIZE is the log of total assets; ROA is the operate income before interests and taxes over total assets; LEVERAGE is the debt over total assets; B_SIZE is the number of directors on board; B_INDEP is the proportion of independent directors on boards= Total number of independent on boards/ Total number of directors on boards; CSR_COMMITTEE is adummy variable that takes the value 1 if the company has a CSR committee and 0, otherwise, GOVERN is the ratio between the addition of 4 components, which range from 0 to 10, and the total number of components (4). The four components are (a) government consumption, (b) transfers and subsidies, (c) government enterprises and investment and (d) top marginal tax rate. Governance indicates the extent to which countries rely on the political process to allocate resources and goods and services; POPULATION is the log of total population of the country; GDP is the log of gross domestic product of the country and LIQUIDITY is the ratio between total current assets and total current liabilities. *p-value<0.1 **p-value<0.05 ***p-value<0.01.

Table 9
Expected and obtained signs for each one of the hypotheses

Cultural, legal and industrial variables	Hypotheses	Expected sings	Obtained signs
POW_DIST	H1	Negative	Not significant
INDIV	H2	Negative	Negative
MASCUL	H3	Negative	Not significant
UNC_AVOID	H4	Positive	Positive
LONG_ORIENTATION	H5	Positive	Positive
INDULG	H6	Negative	Negative
LEG_SYSTEM	H7	Positive	Positive
HIGH_IMPACT_INDUS	H8	Positive	Positive