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Analysing and evaluating environmental information disclosure in universities: The role of corporate governance, stakeholders, and culture

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Abstract

Purpose – The purpose of this paper is to analyse the internal and external factors related to the disclosure of environmental information in universities which reflect the actions carried out in these universities.

Design/methodology/approach – Taking as reference the first 200 universities in the Shanghai ranking, several factors associated with the degree of environmental information disclosure in universities – governance dimension, the relationship and participation of stakeholders, position and prestige as signs of the quality of the institution and cultural concern in the university's country for the environment – are analysed.

Findings – The results obtained show that the size of the leadership team, stakeholder participation, the position of the university in rankings and cultural concern in the university's country for the environment are determining factors in the university's environmental actions and, consequently, in their disclosure. Other factors – such as the size of the university, the level of self-financing and financial autonomy – do not affect the disclosure of environmental information.

Originality/value – Scant research exists on the environmental commitments of universities; this paper aims to fill that gap. Their role as the main channel of research and as instructors of future professionals makes them points of reference in society. Research on university ranking has traditionally focussed on teaching and research results, but environmental issues are becoming increasingly important. This paper enumerates the factors that influence the dissemination of environmental information in the most prestigious universities. This research also provides an original approach by considering not only top-

down but also bottom-up strategies through communication channels and the incidence of cultural factors.

Keywords: sustainability, universities, corporate governance, stakeholders, ranking, environmental information disclosure.

Paper type Research paper

1. Introduction

Universities have long been developing policies and strategies linked to the care and preservation of the environment. These institutions are a benchmark in society as they channel much into the research and training of future professionals (Heleta and Bagus, 2020). Hence, it is relevant to determine their commitments to issues as important as the environment, to the extent that they could be imitated by other organisations. This paper aims to analyse which factors influence the degree of environmental information disclosure, establishing whether it is a decision made by the leadership team as the result of a top-down strategy, whether it is a response to the demands of stakeholders (to the extent that bottomup initiatives are considered) and whether contextual aspects such as cultural concern in the university's country for the environment and the university's level of prestige and position in rankings have influence in this area.

Thus, most universities have introduced volunteer practices aimed at achieving sustainable development (Hensher and King, 2002), where the environmental concern is central (Alonso-Almeida et al., 2015). The environmental information includes the actions developed by the universities to address environmental matters. The information disclosed is not homogeneous. It can be distinguished two levels: universities that report on general topics and those that make a greater distinction on specific aspects (Yarime and Tanaka, 2012; Garde-Sánchez et al., 2013), which means that the volume and scope of information disseminated differ and that a differentiation can be made between these types of universities. Some of them take into account global reporting initiative (GRI) indicators [Global Reporting Initiative (GRI 4), 2013] and others have implemented the Environmental Management System of the ISO 14000 standards (Savely et al., 2007).

Since the 1970s, the university has been recognised as a dynamic agent in society and, as such, plays a decisive role in protecting the environment. Since then, numerous sustainability initiatives have taken place both in the field of institution management and in the setting of strategies (Hammond and Churchman, 2008; Lozano et al., 2013).

Constant concerns about climate change have led more than 7,000 universities on six continents to declare a climate emergency (Dillon, 2019), but although many universities are linked to these declarations and initiatives, which are today closely linked to Agenda 2030, few universities disseminate sustainability, environmental or corporate social responsibility (CSR) reports (Lozano, 2011).

The commitment of universities in sustainable development is important because as instruction organisations, they can encourage individuals (students, professionals and the community) to take an active part in building a more sustainable society (Cheeseman et al., 2019; Finnveden et al., 2020).

Some notable works are related to sustainability and universities' degree of environmental information disclosure and/or social responsibility. Some of them have focussed on examining the factors that explain different degrees of CSR information disclosure on university websites, such as university ownership and/or university positioning (ranking) (Garde-Sanchez et al., 2013). Other papers analyse the inclusion of aspects of sustainable development in university curricula (De Lima et al., 2020; Lozano, 2010; Gomes et al., 2020) or identify key aspects to evaluate the sustainability reports published by universities (corporate governance and organisational structure, context, resources used, design of the plan, degree of implementation and results achieved) (Finnveden et al., 2020). The size of the university, the presence of committees or research institutes related to sustainability and the political orientation of the university are additional factors that have been analysed to explain to what extent universities' strategic plans include environmental initiatives (Larran et al., 2015). This article adds to the literature on CSR disclosure in universities as it analyses factors that affect environmental disclosure that has not been studied, considering, in addition to the impact of government teams, other aspects such as the stakeholders' opinions, the culture of environmental concern in the country of the university or their level of quality. The aim is to analyse what drives these universities to disseminate environmental information in greater volume and detail.

Although several theoretical frameworks are applied to sustainability, the most widely used framework is stakeholder theory, which best suits the objectives of our research. Stakeholder theory argues that organisations try to balance and address the often conflicting interests of their stakeholders (Freeman, 1984). In the university context, this balance is based on communication with the stakeholders through various channels and they can demand the disclosure of information (Chatelain-Ponroy and Morin-Delerm, 2016; Jongbloed et al., 2008). The universities interact with stakeholders that have their perceptions about these higher education institutions and require actions from and information about them (Larran et al., 2012). This approach considers the views, opinions and perceptions of stakeholders in the reporting policies of universities (Brickson, 2005). Stakeholder theory supposes to meet the demands of the stakeholders (Yasser et al., 2017) and the objective of our research is to analyse whether corporate governance bodies take into account the requirements of stakeholders in information disclosure decisions as the theory proposes. Stakeholder theory has been treated through three traditions: descriptive, normative and instrumental (Donaldson and Preston, 1995). The descriptive tradition refers to the way in which the specific characteristics and behaviour of organisations can be explained. Normative validity is used to interpret moral and philosophical guidelines, contributing to the proper functioning of corporations. Finally, instrumental power consists of using data to make sense of and connect stakeholder management to corporate objectives (Donaldson and Preston, 1995). Our study focusses on the last theory of stakeholders.

The requirements of stakeholders could be satisfied through the perception that their demands are attended through information disclosure. In this sense, stakeholder participation is a sign of the organisation's concern for the opinions of their stakeholders and information disclosure reduces the asymmetry of information amongst internal and external stakeholders (Lopatta and Jaeschke, 2014). In addition, information disclosure generates legitimacy for corporate governance bodies (Ceulemans et al., 2015). Universities are more accountable and transparent (Sassen and Azizi, 2018), their actions more comparable. This makes it possible to distinguish different levels of environmental performance in universities that can be valued by stakeholders (Larrán et al., 2019).

To achieve the objectives of this work, the study analyses whether factors related to a university's governance structures and composition (top-down strategy), the participation of its stakeholders (bottom-up initiatives), the cultural context or the environment-concerned culture in which it develops its activity and the positioning of the institution could explain its degree of environmental information disclosure. The results contribute to the literature on CSR at universities, which is scarce and show the importance of cultural changes and the sensitivity of stakeholders as dynamic elements of information dissemination, as well as the interest of governance structures in this subject, showing its evolution and the complexity of the aspects to be considered in the preparation of environmental policies and their disclosure. This study considers the top 200 universities in the Shanghai ranking as they are references for many others and, on many occasions, imitated in their policies. In this way, guidelines that can be applied in other universities can be proposed.

The rest of the paper is structured as follows: Section 2 formulates the hypotheses. Section 3 describes the method designed for the empirical analysis. Sections 4 and 5 contain the main results and the discussion. Finally, Section 6 presents the main conclusions.

2. Determinant factors in the disclosure of environmental information by universities: Literature review and hypotheses

Universities are accountable for how they use available resources, meet the demands of their stakeholders, and achieve their institutional objectives (Sułkowski, 2016). Transparency and accountability at universities are measured by their performance and management of resources (Vallespín, 2006). One of the areas to which a university must refer, as an entity with social purposes, is its environmental commitments. Accountability is linked to good governance, which includes the quality and efficiency of resource management, the university degrees, the reputation, the satisfaction of the groups involved, and the degree to which the university's social goals have been achieved, among others (Frølich, 2011). The main channel of accountability is the information disclosed, which should include information on environmental aspects. This information is the means of communication that serves, among other things, to explain resource management, legitimise the university's performance (Ismail and Abu, 2011), and generate trust among the stakeholders (Bice and Coates, 2016). The information disclosed may respond to various factors, be a decision of the leadership team,

be driven by stakeholder demands, or be the result of the influence of an environment-concerned culture (Rodríguez *et al.*, 2013; Nixon, 2002). Universities have been publishing environmental information voluntarily for years (Lozano, 2011). The reports published by universities have served as a basis for some countries to establish regulatory frameworks on environmental information – as is the case in Germany, the UK, the USA, and even the European Union – although neither content nor format are mandatory, with entities being able to opt for the most widely used guides or the ISO 14000 standards (Grindsted and Holm, 2012; Sánchez, 2017).

2.1. The leadership team and environmental information disclosure

Universities have an organisational structure that is generally common among institutions. The university is usually headed by a rector or a president and a governance board (Kretek *et al.*, 2013). In addition, there is usually a leadership team, formed together with the rector by a group of vice-rectors, who are responsible for monitoring the strategic plans of the institution (Shattock, 2012), which are approved by the governance board. The size of the leadership team is usually 10–15 members (Trakman, 2008). The rector and the vice-rectors are required to possess multiple skills and professional qualities that allow them to perform various duties and tasks (Boffo *et al.*, 2008), and their experience is an intangible value that can guarantee the legitimacy of their actions and decisions (Frølich *et al.*, 2019). Considering this framework, concern for the environment and its inclusion among the strategies adopted by universities depend on the leadership team and is normally included within the mission and values of the institution (Alonso-Almeida *et al.*, 2015). The most common sustainability plans at universities refer to the carbon footprint (Gómez *et al.*, 2016; Larsen *et al.*, 2013; Li *et al.*, 2015) and the evaluation of the ecological footprint (Lambrechts and Van Liedekerke, 2014), which are indicators to evaluate performance in relation to sustainable development on university campuses regarding the use of resources such as water and energy (Saadatian *et al.*, 2013), the reduction of waste and emissions (Wright and Wilton, 2012), the publication of sustainability reports (Fonseca *et al.*, 2011), declarations, charters, and/or actions aimed at improving the effectiveness of universities in terms of sustainable development (Lozano *et al.*, 2013) and, at some universities, the creation of a commission for sustainability or a specific vice-rectorate (Vagnoni and Cavicchi, 2015).

The fact that the leadership team is made up of a large number of members makes it possible to divide the functions and manage the various aspects that make up the adopted strategies more efficiently (Christopher, 2015; Trakman, 2008), giving greater prominence to actions on the environment. To the extent that information disclosure and performance are related (Hyun *et al.*, 2016), the following hypothesis is proposed:

H1. The size of the leadership team is positively related to the degree of environmental information disclosure.

2.2. Stakeholder participation and environmental information disclosure

The term ‘stakeholders’ refers to groups that have some legitimate interest in an organisation (Freeman, 1984). At the university level, the main stakeholders would be students, graduates, employers, companies, teaching and research staff, and suppliers. Other institutions – such as other universities, the state, the government, sponsors, professional bodies, and society in general – would also be interested (Oliva, 2009). The management of resources necessary for the development of their social purpose leads them to implement sustainable actions or initiatives and to involve the stakeholders (Castañeda and Quintero, 2015; Velazquez *et al.*, 2006).

Stakeholders promote the sustainability of the institutions themselves (Yarime *et al.*, 2012). This situation leads to universities disclosing more information and relying on platforms such as Web 2.0 (De Aguilera *et al.*, 2010) and social networks, which enable access to information for stakeholders as well as communication and feedback with them (Saraite-Sariene *et al.*, 2019). YouTube and Facebook are communication channels used by universities to communicate with their stakeholders (Yeo, 2014) and to capture their interests, requirements, and demands. These channels for stakeholder participation make it possible to learn about their demands and interests and collect their opinions regarding the measures adopted. Stakeholders’ greater concern and awareness regarding environmental protection can lead to the promotion of environmental initiatives for which they are accountable. This can have an impact on the disclosure of environmental information. In this context, the following hypothesis is proposed:

H2. Stakeholder involvement is positively related to environmental information disclosure.

2.3. Environment-concerned cultures and environmental information disclosure

Countries often have specific cultural characteristics, derived in part from the institutional frameworks in which they operate. In this sense, it can be spoken of country cultures that are reflected in a series of values such as environmental policies, transparency, participation, decentralisation and subsidiarity (Tollefson *et al.*, 2012). The term “country culture” refers to the existence of certain cultural values that characterise the priorities of institutions and organisations in a country, which originate different styles of performance amongst countries or groups of countries (Flórez-Parra *et al.*, 2014; Torres, 2004). A university operates in a specific geographical location and can therefore be influenced by elements of its country’s culture. Some cultures are more prone to environmental issues and others to social issues and even competitiveness indicators.

In the university environment, the Anglo-Saxon organisational culture would be characterised by managerial management, focussed on management effectiveness and efficiency (the USA, the UK, Australia, Canada and New Zealand) (Flórez-Parra *et al.*, 2014); in the area of environmental policies, actions

are focussed on establishing codes and reporting. Continental Europe (Belgium, France, Germany, Greece, Portugal, Spain and Switzerland), on the other hand, is identified by its focus on stakeholders, their participation in governance bodies and greater institutional autonomy. In the environmental field, strategies are structured around the concept of sustainable development, although there are differences amongst the various countries of Continental Europe in this respect (Capano et al., 2019; Ull et al., 2010). The Netherlands and the Scandinavian countries (Denmark, Finland, Sweden and The Netherlands) are characterised by a mixed organisational or institutional culture (taking aspects from Anglo-Saxon and European cultures). It is characterised by a greater concern about knowing and solving the needs of the citizens and their environment. Several universities in these countries are at the top of sustainability rankings. At the same time, they are concerned with ensuring efficiency and effectiveness in the use of resources and usually follow a managerial style of management (Capano, 2011; Pérez et al., 2010).

The organisational or institutional culture of Asian countries (China, South Korea, Japan and Singapore) is characterised by the importance of traditions, relationships of trust and ties established on the basis of word and honour and by a strong bureaucracy given the strong centralisation of public management, whether for religious reasons or because of the dominant political regime (Berman et al., 2013; Flórez-Parra et al., 2014). Finally, the culture of Latin America (Brazil and Mexico), in many respects, follows the heritage of a bureaucratised and hierarchical public administration, whose origin is in the culture of Continental Europe (Torres, 2004). These less-developed countries take the Anglo-Saxon and European models as their point of reference and in this regard, some of the policies adopted to follow the patterns of these other cultures. Along these lines, if countries are immersed in a globalisation process, culture could have no influence and university performance could be unified, also in relation to the environment, according to some objective indicators established by academic rankings. Despite the strength of globalisation, differences have been derived based on the environment-concerned culture in which each university develops its own activity so that each geographical area can emphasise different issues. In this sense, at the European level, greater concern exists for environmental issues and their disclosure. In the environmental field, some Anglo-Saxon countries such as the USA and Canada did not ratify international agreements and protocols, while Europe signed these agreements and established binding objectives. Other countries, such as those of the East and Latin America, have only signed the protocols but have not set binding targets (Leis and Viola, 2003; United Nations Climate Change, 2012). In this context, the following hypothesis is put forward:

H3. The environment-concerned culture where universities operate is positively associated with the level of environmental information disclosure.

2.4. The positioning of universities and environmental information disclosure

Academic rankings date from the 1870s and became widespread in the early 1980s when a classification of American universities was published (Dobrota et al., 2016). Universities' positions in rankings are understood to reflect the efficiency of their management in the aspects measured (Flórez-Parra et al., 2014). This position can serve as a means to attract financial resources for the institutions, fundamentally in the area of research (Jabnoun, 2015). Rankings help universities to create and maintain their reputation (Jarocka, 2015). They can serve different purposes: universities can use them to define performance targets and as a mechanism to attract researchers and students, academics can use them to support their own reputations, students can use them to choose universities and research locations and funders (donors, sponsors, companies and foundations) can use them to make their decisions on fund allocation (European Commission, 2010). In this sense, these rankings usually value aspects of research and teaching prestige, so the universities that lead these rankings could focus more on issues aimed at improving their competitiveness and in this case, the environmental issue might not be a priority.

Controversies exist regarding these rankings, mainly those based on objective indicators coming from transferable products – research articles and/or patents (Lynch, 2015). They are seen as consumer products and not as quality indicators of universities (Amsler and Bolsmann, 2012; Gonzales and Núñez, 2014; Saunders and Blanco Ramirez, 2017); in general, the countries that generate good results in the rankings are those with the best economic capacity (Marginson, 2007). This perception means that many universities worldwide, especially those belonging to the European Union, introduce other performance indicators related mainly to the environment (Dabija et al., 2017). Green Metrics is a new ranking system that evaluates universities with regard to environmental indicators. These indicators refer to the following: the characteristics of the campus infrastructure for the use of energy resources; the impact of climate change on resource consumption; the recycling of campus waste, water availability and access to water resources; and transportation or educational offerings (academic programs) in sustainability, amongst others (UI Green Metric Ranking Team, 2019). In this sense, it could be thought that the best-positioned universities must integrate all these aspects, including being a reference in environmental issues.

Thus, universities should not be kept out of environmental concerns as greater sensitivity to this issue exists at the general level and should include environmental issues in their policies. Universities that are well-positioned in the rankings cannot remain on the side-lines of society's demands, also for reasons of the legitimacy of their actions and image. The following hypothesis is then put forward:

H4. The position in the Shanghai ranking has a positive impact on environmental information disclosure.

3. Methodology

3.1. Study sample

Our study includes the top 200 universities according to the Shanghai ranking of 2018, of which 20 universities are part of the Green Metrics ranking. This ranking is an index by which the quality and excellence of the universities are measured by objective indicators (Leydesdorff and Shin, 2011). The sample comprises 168 universities that belong to the public sector and 32 to the private sector, which operate in 25 countries with diverse environment-concerned cultures (Appendix 1).

To obtain information about the governance variable and the perception of the stakeholders from the universities, the content of their Web pages has been analysed. In addition, it was reviewed the sustainability and environmental reports, when available and their annual reports, where information on the environmental aspects of each university has been extracted.

The sustainability and annual reports of the universities are elements of dissemination that serve to render accounts and legitimise the management to the stakeholders (AlonsoAlmeida et al., 2015; Barakat et al., 2014; Ceulemans et al., 2015; Dixon and Coy, 2007; Fonseca et al., 2011; Hahn and Kühnen, 2013; Lock and Seele, 2016; Lozano, 2006–2011; Madeira et al., 2011; Richardson and Kachler, 2017).

3.2. Method

3.2.1 Index of environmental information

To analyse the volume and scope of the universities' environmental information, an index of environmental information was drawn up, covering both general and specific aspects that the universities disclosed on their websites (Table 1). The recommendations of the GRI (GRI 4, 2013) relating to specific environmental aspects and the guidelines of the integrated report, which provides a general approach to environmental aspects [IIRC (International Integrated Reporting Committee), 2013], were considered. Previous research on sustainability (AASHE, 2010; Lozano, 2006), as well as contributions made in the literature on environmental and social responsibility assessments at the university level, were also taken into account (Garde-Sánchez et al., 2013; Rodríguez Bolívar et al., 2013).

In relation to the assessment assigned to each of the aspects proposed in our model to measure the universities' degree of environmental information disclosure and taking into account previous studies (Caba et al., 2005), a binary dichotomous assessment was selected (0/1), which allows us to score the absence or presence of information on each item disclosed on websites and/or reports presented by the universities (Ho et al., 2008; Jones et al., 1998).

Table 1. Volume EIDU on their websites and reports

EIDU		$EI = \sum_{i=1}^m g_i$
Concept	Items	Score
1. General information on environmental aspects GEI	a) The main environmental commitments are disclosed. b) The website or sustainability report includes a statement from the leadership team on environmental issues. c) The certifications corresponding to the environmental management systems are disclosed (awards and honors). d) Environmental indicators are disclosed.	0/0.25 based on the absence/presence of each item
2. Specific information on environmental management SIEM	a) Energy b) Water c) Purchase management d) Waste management and recycling e) Transportation f) Security and risk management	0/0.16 based on the absence/presence of each item

The proposed rate for measuring the dependent variable, environmental information disclosed by universities (EIDU), would be general environmental information (GEI) and specific information on environmental management (SIEM).

$$EIDU = \sum_{i=1}^n \frac{GEI}{4} + \sum_{m=1}^l \frac{SIEM}{6} \quad (1)$$

3.2.2. Regression analysis

Once the dependent variable was obtained in our study, the following model for EIDU was proposed:

$$EIDU = \alpha_0 + \beta_1 \text{ Leadership Team} + \beta_2 \text{ Stakeholders} + \beta_3 \text{ Environment-concerned Culture} + \beta_4 \text{ Quality} + \beta_5 \text{ Size} + \beta_6 \text{ Financial Autonomy} + \epsilon_i \quad (2)$$

A multiple-regression model was applied to test the hypotheses. The statistical package was SPSS version 21.0.

The measurement of the variables is shown in Table 2. The information for the leadership team and stakeholder participation variables was obtained from the universities' websites (Flórez-Parra et al., 2019; Garde-Sánchez et al., 2013). Specifically, the stakeholder participation variable was measured by the sum of

a set of elements (characteristics of interactivity, forums/chat, Web 2.0 technology, online surveys and newsletters), where 0 means the absence of information and 1 means its presence (Table 3).

Table 2. Variables and measurement

Variable	Definition	Measurement
EIDU	Environmental information index.	According to the items listed in Table 1.
Leadership team	Number of vice-rectors who, together with the rector, form the university's governance team.	Total number of leadership team members.
Stakeholder participation	Measured through the communication channels that the university provides for these: interactivity features, forums/chat, web 2.0 technology, online surveys and newsletter.	According to the items listed in Table 2.
Environment concerned culture	Measured according to the geographical location of the country.	(1) Anglo-Saxon countries, (2) Continental European countries, (3) Scandinavian countries and Netherlands, (4) Asian countries, (5) Latin American countries. (see Annex 1).
Quality	Ranking of universities. Source: Shanghai Ranking 2018.	Position of the university in the ranking (AMWU).
Size	Number of students at the university.	Logarithm of total number of students.
Financial autonomy	Total private income (tuition and donations) over total income.	Percentage of non-state income over total income.

Internal consistency and reliability had a satisfactory level reflected in Cronbach's α and each factor presented a value above 0.8, reflecting good internal consistency (environmental information: $\alpha = 0.892$; stakeholder participation: $\alpha = 0.841$). The environment-concerned culture variable was measured according to the geographical areas where the universities operate. The distribution of universities in the sample is as follows: 67% from Anglo-Saxon countries (the USA, the UK, Canada, Australia, New Zealand and Ireland), 23.5% from European countries (Germany, Austria, Switzerland, The Netherlands, Finland, Belgium, Sweden, Denmark, Norway, France, Italy, Spain and Portugal), 8.5% from Eastern countries (China, South Korea, Japan and Singapore) and 1% from Latin American countries (Brazil and Mexico).

As the control variable, size was included, which is frequently used to explain the possible differences amongst the universities to reveal information (Alba-Hidalgo et al., 2018). The size variable has been used in various empirical studies that analyse the degree of disclosure of information on social responsibility (Castelo and Lima, 2008; Garde-Sánchez et al., 2013). Larger organisations generally disclose a greater volume of information (Da Silva Monteiro and Aibar Guzmán, 2010; Gordon et al., 2002), finding a positive relationship between size and the information disclosed (Da Silva Monteiro and Aibar Guzmán, 2010; Gallego Álvarez et al., 2011). The data for the size variable has been extracted from the

2018 annual report, measured by the number of students each university had, as well as the variable of financial autonomy (Gallego Álvarez et al., 2011).

Table 3. Description stakeholders' participation variable.

STAKEHOLDER PARTICIPATION		STAKEH= $\sum_{i=1}^m g_i$
Concept	Items	Score
1. Characteristics of interactivity	a) A different email address is provided to the webmaster to request information or explanations. b) Personal contact details for the persons at the university responsible for the information provided are provided on the website. c) The website has a mailing list to update information for.	0/0.33 based on absence/presence of each item
2. Forums/chat	a) General content forums b) CSR-related forums	0.5 if the online forum/chat used allows the discussion of general topics 1 in case there is a specific forum/chat used for the discussion of CSR issues
3. Web 2.0 technology	a) A different email address is provided to the webmaster to request information or explanations. b) Personal contacts with the persons responsible at the university for the information provided are provided on the website c) The website has a mailing list to update information to users of the information that apply this service	0/0.33 based on absence/presence of each item
4. Online surveys	a) General content forums b) CSR-related forums	0.5 if the online forum/chat used allows for the discussion of general topics and 1 if there is a specific forum/chat used for the discussion of CSR topics
5. Newsletter	a) General content forums b) CSR-related forums	0.5 if the online forum/chat used allows for the discussion of general topics and 1 if there is a specific forum/chat used for the discussion of CSR topics

Source: based on Fang (2002); Holzer and Manoharan (2007); Garde-Sánchez *et al.* (2013).

The second aspect that needs to be monitored concerns financial autonomy. Financial autonomy can lead to the entity being free to set its strategies. Universities are funded either through the state budget or through other alternative sources of funding, such as tuition, fees, contributions from companies, private donations, legacies and other forms of income such as the provision of complementary services, contracts and research projects related to public and private bodies (Azra, 2008; Eckel, 2008; Gordon et al., 2002; Ngolovoi, 2008). Universities with more funding present better results in international

academic rankings – Shanghai, Times or Quacquarelli symonds (Michavila and Martinez, 2018). There may be a relationship between the policies adopted and the financial autonomy enjoyed by the institutions. The greater the autonomy, the greater the freedom to distribute resources; this can affect the environmental policies and, consequently, environmental information disclosure (Leal Filho et al., 2018).

4. Results

The data in Table 4 are referred to as correlations amongst the variables included in the model.

The results show that the disclosure of environmental information is significantly associated with the size of the leadership team (Christopher, 2015), the participation of stakeholders (Yarime et al., 2012), the environment-concerned culture where the university carries out its activities (Capano et al., 2019) and its quality according to its position in the Shanghai ranking (Dabija et al., 2017). The last two variables are inversely related. Size and financial autonomy are not significantly related to the disclosure of environmental information. These results coincide with those obtained in the regression (Table 5).

The size of the leadership team is significantly associated with stakeholder participation, management culture and quality. Universities with larger leadership teams have also established more channels of communication and greater participation with stakeholders (Saraite-Sariene et al., 2019). In addition, the correlations show that the size of the leadership team is related to Western countries that present more environment-concerned cultures.

Table 4. Descriptive statistics and correlations.

	Mínimum	Máximo	Mean	Standard deviation	Correlations						
					1	2	3	4	5	6	7
1. EIDU	0.00	2.00	1.00	0.74	1						
2. Leadership team	0.00	24.00	9.36	4.64	.401**	1					
3. Stakeholders' participation	0.00	1.00	0.83	0.19	.436**	.252**	1				
4. Environment-concerned culture	1.00	5.00	1.80	1.34	-.576**	-.357**	-.464**	1			
5. Quality	1.00	200.00	100.50	57.88	-.391**	-.437**	-.239**	-.356**	1		
6. Size	3.35	5.53	4.47	0.27	-.076	.014	-.073	.154*	.005	1	
7. Financial autonomy	10.00	92.47	45.79	19.67	-.082	-.038	-.153	.030	.014	-.042	1

Notes: **. significant at 0.01; * significant at 0.05.

Finally, the size of the leadership team is related to universities that occupy the top positions in the Shanghai ranking, showing that the most prestigious universities have large governance teams, which makes it possible to divide tasks.

Similarly, stakeholder participation and communication channels are associated with more environment-concerned cultures, which could indicate that in these cultures, stakeholder involvement is greater. The results show that the best-positioned universities have the best levels of communication with their stakeholders (De Aguilera Moyano et al., 2010) and that these tools are being used (Yeo, 2014).

Table 5 shows the results obtained by the proposed model. The results indicate that the size of the leadership team, stakeholder participation, environment-concerned culture and quality according to ranking have a significant impact on the disclosure of environmental information. In the case of the size of the leadership team, the relationship is positive, confirming H1. These results coincide with those obtained in previous works (Francoeur et al., 2019; Hyun et al., 2016).

The model shows that the variable of stakeholder participation is significantly and positively related to the disclosure of environmental information. According to the results obtained, H2 is confirmed.

On the other hand, the environment-concerned culture is significantly but negatively related to the disclosure of environmental information, which indicates that universities in Western countries are more likely to disclose environmental information. These results allow us to confirm H3. The quality of the university is significantly associated with the disclosure of environmental information. These results lead us to confirm H4.

Finally, size and financial autonomy do not relate to the disclosure of environmental information. The sizes of the sample universities may be very similar and the variable may not serve to distinguish different performances. In terms of financial autonomy, the sample includes both public and private universities, with different levels of resources. The entities may respond to other factors (culture, stakeholder demand or the decisions of governance bodies) and the environmental practices and their disclosure may not depend on the volume of resources available.

5. Discussion

The results show that the leadership teams manage their universities' strategies and when the teams are big, they are prone to environmental information disclosure (Fonseca et al., 2011). In management, managers meet stakeholder demands by disclosing more and more specific information, in accordance with the propositions of stakeholder theory.

In addition, the results indicate that the demands and requirements of stakeholders and the establishment of communication channels help universities to acquire greater commitment to disclose information about environmental issues (De Aguilera Moyano et al., 2010; Yarime et al., 2012). According to stakeholder theory, it is desirable for the organisation to establish means to determine their stakeholders' demands so as to meet them (Brickson, 2005). In this sense, the results of the correlations show that the perception of the stakeholders is associated with the management (governance team) and that it affects the disclosure of environmental information (Larrán et al., 2012; Lopatta and Jaeschke, 2014). The results highlight that both variables, the leadership team and the participation of the stakeholders, are related and that the environmental strategies set by universities take into account the demands of stakeholders.

Likewise, sustainable information disclosure is linked to stakeholder theory (Larrán et al., 2019). The reason is that environmental information generates trust from the stakeholders (Arco-Castro et al., 2020; Lopatta and Jaeschke, 2014) because universities are more accountable and transparent (Jongbloed et al., 2008; Sassen and Azizi, 2018). The reason for disclosing a growing volume of information (Flórez-Parra et al., 2014) could be because of greater social and institutional demand (Capano, 2011; Pérez et al., 2010), but such an action could also be thought of as an initiative of the leadership teams. The results show that when it is possible to diversify tasks in the leadership team, the dissemination of environmental information improves (Boffo et al., 2008; Fonseca et al., 2011).

The results obtained show that the cultures most concerned about the environment (and with more traditions in this area) are more likely to disseminate environmental information, which indicates that when assessing the degree of disclosure, it is necessary to consider the culture in which the organisation carries out its activity (Capano, 2011; Flórez-Parra et al., 2014).

The environment-concerned culture is positively related to environmental information disclosure. Several factors could be considered. Anglo-Saxon countries have had extensive experience in the disclosure of CSR reports as the publication of the Cadbury Report (1992; 2000). The countries of Continental Europe are highly involved in environmental issues to the extent that their management is largely oriented towards their stakeholders. These countries have made a greater commitment to reducing greenhouse gas emissions, as outlined in the binding targets of the Kyoto Protocol. This concern and interest also exist in the university sphere and universities in these countries lead in the ranking that measures university sustainability (UI Green Metric Ranking Team, 2019). The universities in the Eastern and Latin American countries could be said, as a consequence of globalisation, to follow the guidelines of Western countries, but they still have not developed their procedures; nor is their commitment to environmental objectives as strong. These cultures have signed the Kyoto Protocol but have not assumed binding objectives as they are characterised by excessive deforestation, as in the specific case of Brazil (Leis and Viola, 2003). This context explains the results obtained in the research.

Table 5. Results of the multiple regression of the determinants of the environmental disclosure in universities.

Variables	Beta	t
EIDU	0.766	2.799
Leadership team	.165	2.587***
Stakeholders' participation	.183	2.947***
Environment- concerned culture	-.388	-5.910***
Quality	-.013	-2.396***
Size	-.050	-.841
Financial autonomy	-.039	.486
R	0.65	
R ² adjusted	0.42	
F-statistics	28.260***	
Probability	0	
Significant at 0.1; ** Significant at 0.05; ***Significant at 0.01		

Related to the objective standards set in academic rankings, it could be said that they determine factors and priorities in the allocation of resources and the establishment of priorities at universities (Flórez-Parra et al., 2014). The highest-ranking universities show greater interest in disclosing a greater volume of environmental information than the universities that occupy less prominent positions. The entities that are better positioned in the ranking may have a greater volume of resources or are in countries where environmental issues have gained importance (Dabija et al., 2017). This is relevant insofar as they are, in themselves, references and examples to be followed by other universities. The fact that they dutifully adopt environmental measures can serve as an incentive for universities around the world to follow their example.

6. Conclusions

The importance that has been given in recent years to environmental actions and information by universities requires an analysis of which factors are associated with such environmental information (Alonso-Almeida et al., 2015). In this sense, the paper analyses whether it is a decision made by governance structures (top-down strategy) or a response to stakeholders' initiatives (bottom-up demands) and whether it is associated with cultural elements or can be linked to the positioning of universities in rankings (Flórez-Parra et al., 2014). The choice of these explanatory factors may be relevant to explain the development of environmental concern in business environments and in society in general. Universities can be considered as benchmarks in this sense, to a greater extent when they rank highly, both for other universities and for creating states of opinion amongst their stakeholders. In fact, some universities have supported environmental emergency declarations, which imply that they are pioneers in assuming a greater commitment to the environment and society (Finnveden et al., 2020).

This paper contributes to the theory of stakeholders in the area of universities as the results show, on the one hand, greater commitment on the part of universities to interact with their stakeholders and, on the other, that governance structures take into account the opinions of their stakeholders. The information disclosed can be understood as accountability to society for the use of resources (Ceulemans et al., 2015; Lock and Seele, 2016; Richardson and Kachler, 2017). This can also be considered as a response to stakeholders' demands (Freeman, 1984).

The findings of this research demonstrate that environmental information disclosure depends on bottom-up initiatives coming from stakeholders (Brinkhurst et al., 2011). The opinions of stakeholders must also be considered (Castañeda and Quintero, 2015). Universities have become more active in publishing information and interacting with their stakeholders on social networks (Saraite-Sariene et al., 2019; Yeo, 2014) and research shows that the data obtained are taken into account while setting university strategies. In this sense, a contribution of the work is to highlight the participation of stakeholders in the university's policies.

A practical implication of the research is that the policies of the best-positioned entities will serve as benchmarks for other universities and for institutions to create regulatory frameworks. They can also serve as reference points for other organisations and institutions. Increasingly, when setting their strategies, organisations have to consider the interests of their stakeholders. International academic rankings are of public interest because they are seen as standards of excellence and quality (Jarocka, 2015) and, in fact, are points of reference for other universities and institutions in general. The fact that the universities well-positioned in the rankings show interest in disclosing environmental information can generate a multiplier effect on other institutions that follow their guidelines to the extent that they constitute references in their field. With regard to the dissemination of environmental information, the best-positioned universities disclose the greatest volume of information (Lock and Seele, 2016; Lozano, 2011; Madeira et al., 2011). Their pre-eminent position and their desire to maintain the legitimacy of their actions and respond to the requirements of their stakeholders may lead them to prioritise environmental issues as part of their strategies. These results are relevant to the extent that they serve to counteract the criticism of rankings (Lynch, 2015). In addition to the elements related to teaching and research, these entities attempt to be pioneers in other issues that are also relevant to society in general. If environmental commitment is an objective, the objective indicators with which the universities position themselves must be adapted to incorporate new parameters that measure more aspects, taking environmental commitments into account, which will mean that the universities will be more efficient in terms of achieving their objectives in all areas.

The importance given to the disclosure of environmental information, either by the promotion of various protocols and summits or by the emergence of academic rankings that measure sustainability at universities, may be changing the elements that are considered in the management of educational institutions, encouraging the incorporation of environmental policies, in which Western

universities are the pioneers. The next step could be to develop common standards and have a specific framework applicable to universities. This could facilitate the management, the proposal of proactive policies and the assurance and audit of the information disclosed.

With regard to limitations, it can point out that the work is focussed on a specific ranking of universities where the participation of universities from the Anglo-Saxon area has a high weight. Likewise, the results refer to the analysis of a single year. Finally, in terms of future research directions, it was proposed that future researchers study the evolution of this trend in a longer time series and introduce other variables that can influence and determine environmental concern, such as the gender of the leadership team members.

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Appendix 1. Sample description.

Countries	Total Universities	%	Environment-concerned culture	Kyoto Protocol 2013–2020
USA	92	46.0	Anglo-Saxon (67%)	Signed, but ratification rejected.
UK	18	9.0%		Signed, ratified and binding targets.
Canada	15	7.5%		Abandoned Kyoto protocol.
Australia	8	4.0%		Signed, ratified and binding targets.
New Zealand	1	0.5%		No binding targets in the second period.
Germany	14	7.0%	Mainland Europe (14%)	Signed, ratified and binding targets.
Switzerland	5	2.5%		
Italy	5	2.5%		
Spain	1	0.5%		
France	1	0.5%		
Portugal	1	0.5%		
Austria	1	0.5%		
The Netherlands	6	3.0%	Scandinavian countries and the Netherlands (9.5%)	Signed, ratified and binding objectives.
Sweden	4	2.0%		
Norway	3	1.5%		
Denmark	3	1.5%		
Belgium	2	1.0%		
Finland	1	0.5%		
China	7	3.5%	Asian countries (8.5%)	Signed, but no binding targets.
Japan	3	1.5%		No binding targets in the second period.
South Korea	3	1.5%		Signed, but no binding targets.
Singapore	2	1.0%		Signed, but no binding targets.
Israel	2	1.0%		Signed, but no binding targets.
Brazil	1	0.5%	Latin American countries (1.0%)	Signed, but no binding targets.
Mexico	1	0.5%		

Appendix 2. Universities reports.

Universities	Annual Report / websites	Sustainability Report	Universities	Annual Report / websites	Sustainability Report
1. Harvard University	1	0	101. Technische Universität München	1	0
2. Stanford University	1	1	102. Delft University of Technology TU Delft	1	1
3. Massachusetts Institute of Technology	1	1	103. University of California Riverside	1	1
4. University of California Berkeley	1	1	104. University of Illinois Chicago	1	1
5. University of Michigan	1	0	105. University of Delaware	1	0
6. University of Washington	1	1	106. Uppsala University / Uppsala Universitet	1	0
7. Cornell University	1	1	107. Colorado State University	1	1
8. University of Oxford	1	1	108. Lund University / Lunds Universitet	1	1
9. Columbia University New York	1	1	109. Ghent University / Universiteit Gent	1	1
10. Johns Hopkins University	1	1	110. University of Kentucky	1	1
11. University of California Los Angeles UCLA	1	1	111. McMaster University	1	1
12. University of Pennsylvania	1	1	112. University of Warwick	1	1
13. University of Cambridge	1	1	113. University of California Santa Cruz	1	1
14. Yale University	1	1	114. Oregon State University	1	1
15. University of Wisconsin Madison	1	1	115. University of Tennessee Knoxville	1	1
16. University of California San Diego	1	1	116. Aarhus University / Aarhus Universitet	1	1
17. University of Texas Austin	1	0	117. Università di Bologna (Università degli Studi di Bologna)	1	1
18. University of Toronto	1	1	118. University of Notre Dame	1	1
19. Duke University	1	1	119. Universität Zürich	1	1
20. University College London	1	1	120. Universidad Nacional Autónoma de México	1	1
21. University of Illinois Urbana Champaign	1	1	121. Korea Advanced Institute of Science & Technology KAIST	1	0
22. Princeton University	1	0	122. Dartmouth College	1	0
23. University of Chicago	1	1	123. University of Connecticut	1	1
24. Pennsylvania State University	1	1	124. Universität Wien	1	0
25. New York University	1	0	125. VU University of Amsterdam / Vrije Universiteit Amsterdam	1	0
26. University of North Carolina Chapel Hill	1	1	126. University of Miami	1	1
27. University of British Columbia	1	1	127. Università degli Studi di Roma La Sapienza	1	1
28. California Institute of Technology Caltech	1	1	128. City University of New York	1	1
29. University of Maryland College Park	1	0	129. University of Nottingham	1	1
30. Eidgenössische Technische Hochschule ETH Zürich	1	1	130. Chinese University of Hong Kong	1	0
31. University of California Davis	1	1	131. University of South Florida	1	0
32. University of Florida	1	0	132. Nanyang Technological University	1	1
33. University of Southern California	1	1	133. University of Missouri Columbia	1	1
34. Michigan State University	1	0	134. Georgetown University	1	0
35. Ohio State University	1	1	135. Washington State University Pullman	1	0
36. Northwestern University	1	1	136. Université de Montréal	1	0
37. Carnegie Mellon University	1	0	137. Rheinisch Westfälische Technische Hochschule Aachen	1	0
38. Purdue University	1	1	138. University of Western Australia	1	1
39. University of California Irvine	1	1	139. George Washington University	1	1
40. Georgia Institute of Technology	1	1	140. Universität Hamburg	1	1
41. Washington University Saint Louis	1	1	141. Universitat de Barcelona	1	1
42. University of Pittsburgh	1	1	142. University of Oregon	1	1
43. University of Edinburgh	1	0	143. University of Kansas	1	0
44. University of Virginia	1	1	144. University of Adelaide	1	1
45. Rutgers The State University of New Jersey	1	0	145. Case Western Reserve University	1	0
46. Boston University	1	1	146. University of Cincinnati	1	0
47. University of Arizona	1	1	147. University of New Mexico	1	1
48. University of Tokyo	1	0	148. Queen Mary University of London	1	1
49. University of California San Francisco	1	1	149. Karlsruhe Institute of Technology (Universität Karlsruhe)	1	0
50. Vanderbilt University	1	1	150. Universität Freiburg	1	0
51. Arizona State University	1	1	151. Rheinische Friedrich Wilhelms Universität Bonn	1	0
52. University of Colorado Boulder	1	1	152. Bristol University	1	1
53. Texas A&M University	1	1	153. Monash University	1	1
54. McGill University	1	1	154. Université de Geneve	1	0
55. University of Utah	1	1	155. Newcastle University Newcastle upon Tyne	1	0
56. University of California Santa Barbara	1	1	156. National Chiao Tung University	1	0
57. National University of Singapore	1	1	157. University of Auckland	1	1
58. Indiana University Bloomington	1	1	158. Royal Institute of Technology / Kungliga Tekniska Högskolan	1	0
59. University of Alberta	1	1	159. Tel Aviv University	1	1
60. Imperial College London	1	0	160. University of Victoria British Columbia	1	0
61. University of Melbourne	1	1	161. Université d'Ottawa / University of Ottawa	1	1
62. University of Queensland	1	1	162. Freie Universität Berlin	1	1
63. Universidade de São Paulo USP	1	1	163. University of Southampton	1	1
64. Virginia Polytechnic Institute and State University	1	1	164. Temple University	1	1
65. North Carolina State University	1	1	165. Osaka University / 大阪大学	1	1
66. University of New South Wales	1	1	166. University of Houston	1	0
67. Brown University	1	1	167. University of Western Ontario	1	0
68. National Taiwan University	1	1	168. Wayne State University	1	0
69. Utrecht University / Universiteit Utrecht	1	1	169. Queen's University Kingston	1	0
70. Tufts University	1	1	170. Technische Universität Dresden	1	1
71. Catholic University of Leuven	1	1	171. Yonsei University / 연세대학교	1	0
72. University of Manchester	1	0	172. George Mason University	1	0
73. École Polytechnique Fédérale de Lausanne	1	0	173. Karolinska Institute / Karolinska Institutet	1	0
74. Emory University	1	0	174. University of South Carolina	1	1
75. University of Iowa	1	0	175. Università degli Studi di Padova	1	1
76. Rice University	1	1	176. Université Paris 6 Pierre and Marie Curie	1	0
77. Seoul National University / 서울대학교	1	0	177. Universität Tübingen	1	0
78. Australian National University	1	0	178. Universität Bern	1	1
79. University of Amsterdam / Universiteit van Amsterdam	1	1	179. Hebrew University of Jerusalem	1	0
80. University of Waterloo	1	1	180. Indiana University/Purdue University Indianapolis	1	0
81. University of Rochester	1	1	181. Universidade do Porto	1	0
82. Kyoto University / 京都大学	1	1	182. University of Exeter	1	1
83. University of Oslo / Universitetet i Oslo	1	1	183. York University	1	1
84. University of Copenhagen / Københavns Universitet	1	1	184. Hong Kong University of Science & Technology	1	1
85. King's College London	1	1	185. University of Oklahoma	1	0
86. Ruprecht Karls Universität Heidelberg	1	1	186. Hong Kong Polytechnic University	1	0
87. Iowa State University	1	1	187. Università degli Studi di Milano	1	1
88. University of Glasgow	1	1	188. National Cheng Kung University	1	0
89. University of Helsinki / Helsingin yliopisto	1	1	189. Università di Pisa (Università degli Studi di Pisa)	1	0
90. University of Sydney	1	1	190. Norwegian University of Science & Technology	1	0
91. Ludwig Maximilians Universität München	1	0	191. University of Bergen / Universitetet i Bergen	1	1
92. University of Massachusetts Amherst	1	1	192. Universität zu Köln	1	0
93. University of Leeds	1	1	193. Trinity College Dublin	1	1
94. University of Georgia	1	1	194. Louisiana State University	1	0
95. Simon Fraser University	1	1	195. Technical University of Denmark	1	0
96. University of Calgary	1	1	196. Johann Wolfgang Goethe Universität Frankfurt am Main	1	0
97. University of Hong Kong	1	1	197. Eindhoven University of Technology	1	0
98. University of Groningen / Rijksuniversiteit Groningen	1	1	198. Durham University	1	0
99. University at Buffalo	1	0	199. Dalhousie University	1	0
100. University of Nebraska Lincoln	1	1	200. Humboldt Universität zu Berlin	1	0
Total	100	79	Total	100	51

Source: Based on the pages webs of the universities

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