




Determinants of information disclosure in Latin American universities for good corporate governance

Determinantes de la divulgación de información en las universidades latinoamericanas para un buen gobierno corporativo

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Abstract

In the context that the disclosure of information brings benefits for society, this work answers the questions of what are the causes for different levels of disclosure of information by Latin American universities. The research proposes a theoretical model and four dimensions (and variables) to understand the levels of voluntary dissemination of information. A total of 219 universities from five Latin American countries were considered to answer the research question; these universities are recognized within the 500 best institutions in the Region. Also, a multiple linear regression model was used to test the different hypotheses. The results validate both the theoretical model and its dimensions, which leads to theoretical, empirical and public policy implications.

JEL code: I23, G30, D82

Keywords: Determinants of information disclosure; Latin American universities; corporate governments of universities; Corporate governance theory

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Resumen

En el entendido de que la divulgación de información conlleva una serie de beneficios para la sociedad, este trabajo responde a la pregunta por las causas de que se divulguen distintos niveles de información por parte de universidades latinoamericanas. En la investigación se propone un modelo teórico y cuatro dimensiones (y variables) para comprender los niveles de divulgación voluntaria de la información en dichas instituciones. Se estudiaron 219 universidades de cinco países latinoamericanos, reconocidas dentro de las 500 mejores instituciones de la región, y se utilizó un modelo de regresión lineal múltiple para testear las distintas hipótesis. Los resultados validan tanto el modelo teórico como sus dimensiones, con implicancias teóricas, empíricas y de política pública.

Código JEL: I23, G30, D82

Palabras clave: Determinantes de la divulgación de información; Universidades latinoamericanas; Gobiernos corporativos de las universidades; Teoría de gobiernos corporativos

Introduction

There is constant deliberation in Latin America regarding the quality of its universities, expressed in the training they provide, and the knowledge they generate. The Organization of Ibero-American States for Education, Science, and Culture (Spanish: *Organización de Estados Iberoamericanos*, OEI, 2010), indicates, as part of its educational goals for 2021, that the development of nations now depends more than ever on the quality of the training available in universities, and on the knowledge generated and accumulated in them.

In this context, universities produce different types of goods, such as public goods (Garrity, 2015) and common goods (Frost & Hattke, 2018). Public goods are not competitive or excludable. Common goods, on the other hand, are collective resources that benefit all members of the institution, regardless of their contribution to the creation of said resource (Frost & Hattke, 2018). Public goods require the cooperation of the members of society and university common goods require a collective action for their production, which reaffirms the need for social control—especially if the national or local government and philanthropic bodies are financing the goods, as is the case with public goods and even partially public goods. In these cases, society and the different interest groups exercise social control. It is here that the dissemination of information plays a fundamental role in social control since it has a low level of rivalry in consumption (Frost & Hattke, 2018), and, when distributed, is enriched. Of course, this does not imply that there are no actors within the university who consider that the accumulation of information benefits them or that sharing these resources is not convenient for them.

Information is an essential factor in the decision-making of the organization and the various stakeholders. Its dissemination brings a series of benefits, such as improvements to organizational transparency, which enables greater levels of trust within the various interest groups. Another benefit is the decrease in information asymmetry levels, which impacts on the decrease in agency costs (García-Sánchez & Noguera-Gámez, 2017; Van Buskirk, 2012; Alvez *et al.*, 2015). The dissemination of information is a strategic decision for organizations (Rodríguez *et al.*, 2010; Molio, 2016), which can improve governance (Cormier *et al.*, 2010). Together with transparency, it represents one of the principles of corporate governance (OECD, 2016).

The above raises the following question: what causes different levels of information dissemination? In answer, this work proposes a theoretical model supported by different organizational theories and empirical validation of the explanatory variables.

The variables are classified into four dimensions: (1) characteristics of the university, its history, its size, type of property, etc.; (2) ability to generate information, since there may be a will to disclose it, whether with or without the resources to do so; (3) relevant stakeholders; (4) attributes of the corporate governance of the universities.

This work is in line with the proposals made in Abello and Mancilla (2018), expanding their theoretical base.

Empirically, it adds the contribution by Abello *et al.* (2018) on the variables that reflect the characteristics of the university and advances an explanatory proposal that expands the factors that affect the levels of information dissemination by Latin American universities to the different stakeholders.

In order to address the research question, a meticulous process was necessary to collect background information from 219 universities in five Latin American countries that are placed within the top 500 institutions in the Scimago ranking. The cases studied represent 83% of Latin American universities and 89% of the Latin American total for scientific publications.

Review of the literature and hypothesis

According to Abello and Mancilla (2018), a multi-theoretical model based on organizational theories such as agency, stewardship, stakeholder, institutional, resource dependence, and senior management theory is necessary to establish the determinants of information disclosure in a complex organization as is the case of universities.

Agency theory (Jensen & Meckling, 1976) states that governing bodies are important to monitor performance, which leads to greater information dissemination (Gianiodis & Markman, 1976; Pérez-Calero *et al.*, 2017; Kultys, 2016; Rodrigues *et al.*, 2016).

Stewardship theory (Davis *et al.*, 1997) states that the governance team has an intrinsic motivation capable of maximizing the value of the institution (Deb & Wiklund, 2017; Madison *et al.*, 2016), where board members position themselves as collaborators and exercise an advisory role (Pucheta-Martínez *et al.*, 2016). Therefore, it is not uncommon to voluntarily disseminate information, even in the face of the duality of the leadership structure (John *et al.*, 2016; Pham *et al.*, 2015).

Stakeholder theory (Freeman, 1984) suggests that the company is responsible for serving all stakeholders affected by the decisions and activities of the university (Freeman *et al.*, 2004; Andersen, 2015), which leads to reporting (information dissemination) to wider groups that require greater transparency in order to gain the trust of the influenced groups, and in turn leads to better performance in the long term (Ferrero-Ferrero *et al.*, 2018).

Institutional theory (Dimaggio & Powell, 1983) addresses the influence of external governance mechanisms, which influence senior management for transparency through increased information dissemination in universities, accrediting organizations, organizations that establish public policies on higher education, and stakeholders (Harris, 2013; Fay & Zavattaro, 2016; Fowles *et al.*, 2016; Nurunnabi, 2015).

Resource dependence theory (Pfeffer Salancik, 1978) states that generating access to external resources is a function of the members of the Highest Collegiate Bodies (Spanish: *Máximos Cuerpos Colegiados*, MCC) since no organization can generate everything it needs. Therefore, it is necessary to consider figures such as independent and diverse directors linked to networks that provide access to these external resources, which affects the composition of the MCC and increases dissemination.

Senior management theory (Hambrick & Mason, 1984) contributes from the perspective of the behavior of the members of the MCC, considering that they are people with limited rationality, and their actions are affected by their social and human capital. Therefore, more diverse composition of the MCC makes it possible to fulfill with greater efficiency the advisory role and access to new resources (Krause *et al.*, 2016; Wei *et al.*, 2018; Hoskisson *et al.*, 2017; Plöckinger *et al.*, 2016; Ruiz-Jiménez & Fuentes-Fuentes, 2016; Shi *et al.*, 2017; Kuo *et al.*, 2018; Sun *et al.*, 2019).

Figure 1 is the diagram of the multi-theoretical model that supports the linear relationship between the variables, which, according to this research, explains the levels of information dissemination of Latin American universities. These variables are grouped into four dimensions: a) the attributes of the Highest Collegiate Bodies (MCC); b) variables that characterize the universities; c) relevant stakeholders; d) ability to generate information.

The diagram illustrates the use of the five theories above to create different dimensions. In turn, the different requirements of the stakeholders (surroundings, environment, or society) support these theories. The senior management theory does not have a direct link with the stakeholders since it focuses on the members of the MCC. Finally, these dimensions have an impact on information dissemination, which is the focus of this work, and result in greater transparency and decreased levels of asymmetry.

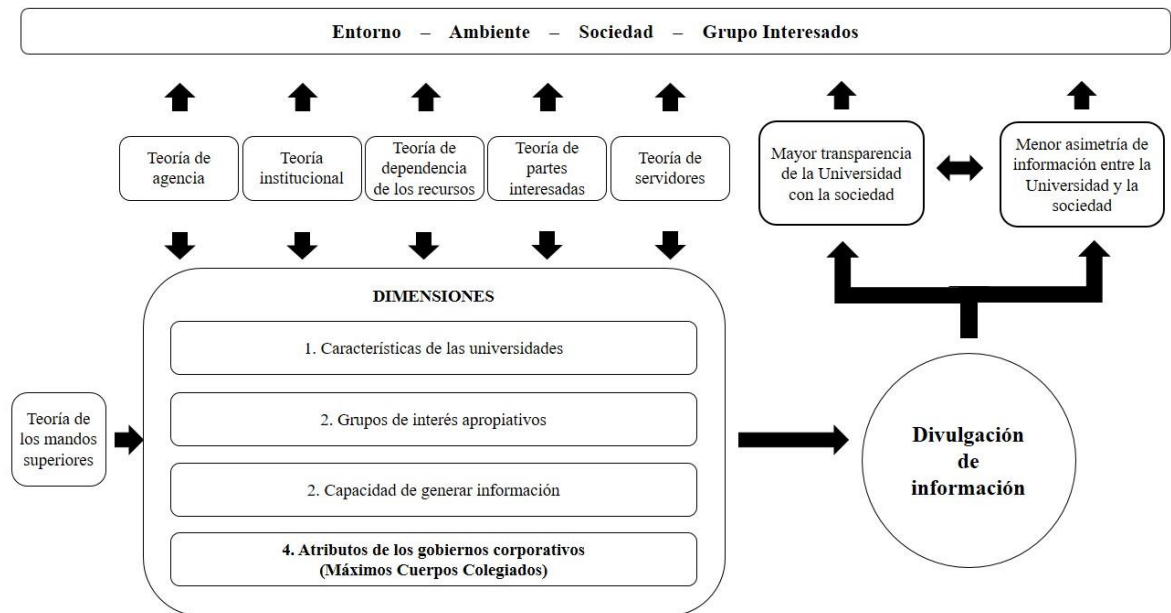


Figure 1. Multi-theoretical diagram of information dissemination

Source: created by the author

Variables that explain information dissemination

The explanatory variables that comprise the model are categorized into four dimensions: (1) characteristics of the university, represented by variables such as size, age, ability to research, and ownership of residual rights (property); (2) relevant stakeholders, such as academics, students, officials, and graduates; (3) ability to generate information on behalf of the universities; (4) attributes of the corporate governance represented by the university board of directors called the Highest Collegiate Bodies (MCC), such as the size of the MCC, independence and diversity of the MCC, and leadership structure of the MCC.

Characteristics of the universities

Latin American universities can be characterized or categorized based on the following variables: property, size, track record, and their ability to do research. This last aspect may be particularly relevant when characterizing Latin American universities, as stated by Abello *et al.* (2018).

Public universities are subject to additional scrutiny, resulting in increased agency costs. Information dissemination is a useful palliative for agency costs (Nagata & Nguyen, 2017; Khlif *et al.*, 2017; Sabbaghi, 2016; Alnabsha *et al.*, 2018). The size of the organization is a characteristic that affects organizations in many areas. In terms of information dissemination, larger universities are more visible to the public, which makes them more subject to criticism and the attention of regulatory agencies. This public exposure, in turn, obliges larger institutions to voluntarily disclose

their activities (Garde-Sánchez *et al.*, 2017; Elshandidy & Shrivs, 2016; Felix *et al.*, 2016; Testera & Cabeza, 2013).

The search for science takes place primarily in universities (Vasbinder, 2017), which entails generating research facilities in these institutions. The need for resources to generate the abilities to carry out research obliges universities, regardless of their status, to disseminate information to the various stakeholders (Arechavala-Vargas & Sanchez-Cervantes, 2017; Mtawa *et al.*, 2016; Harsh *et al.*, 2018; Kohoutek *et al.*, 2017; Powell & Dusdal, 2017; Huenneke *et al.*, 2017; Kotsemir & Shashnov, 2017; Brownson *et al.*, 2017; Rhoads *et al.*, 2017).

Permanence in the system justifies the track record as a characteristic of the universities, and as time goes by, it better explains their mission and performance. Seniority in the business is an appropriate variable in studies on dissemination and its determinants (Dolinsek & Lutar-Skerbinjek, 2018; Garas & Elmassah, 2018; Yasser *et al.*, 2017). The quantity and quality of the information disseminated by a university help increase their credibility and reputation and consolidate their track record. Increased track record and reputation generate greater possibilities for networking and making connections with similar institutions at a national or international level, which entails greater access to new resources and the need to take on board institutional and environmental demands—resulting in the dissemination of more information. Institutional theory, stakeholder theory, and resource dependence theory support this proposition.

H1: The characteristics of Latin American universities such as property, size, ability to do research, and track record affect their levels of information dissemination.

Relevant stakeholders

The nature of the relationships between the company and the stakeholders is a vital issue. Interests often diverge from the company or between the stakeholders. Donaldson and Preston (1995) provide a taxonomy that categorizes those relationships as normative, instrumental, and descriptive. The last two address how the company must relate to its stakeholders. The instrumental ones concern themselves with what happens if the company relates to its stakeholders in a particular way, and the descriptive ones specify how the company relates to its stakeholders (Jones *et al.*, 2007; Schnackenberg & Tomlinson, 2016).

There are university stakeholders who are not willing to promote information dissemination because they believe it is a value that ought to be retained and appropriated by those stakeholders who have a greater affiliation with the institution, such as academics, students, executives, officials, and graduates of the institution.

Against this background, the following hypothesis is proposed:

H2: The relevant university stakeholders negatively relate to the levels of information dissemination of the universities.

Ability to generate information

Information dissemination requires the ability to produce and distribute it efficiently, especially if measuring the dissemination based on the contents generated by an appropriate and effective tool, such as web pages (Midin *et al.*, 2017; Gandia *et al.*, 2016; Nazuk & Shabbir, 2018; Da-Silva *et al.*, 2017; Carrillo *et al.*, 2017).

Svard (2017) indicates that efficient and effective dissemination is not possible without an information management infrastructure to facilitate the creation, management, dissemination, preservation, and reuse of information, which entails resources. Bearfield and Bowman (2017) indicate that the size of organizations affects the achievement of dissemination since smaller organizations have fewer resources to develop outreach capacity in line with their needs; therefore, for their case studies, the municipalities suggest using government resources for the lack of resources.

Against this background, the following hypothesis is proposed:

H3: The autonomous ability of universities to generate information positively relates to the dissemination of information

from Latin American universities to their various stakeholders.

Attributes of corporate governance

There are three attributes of corporate governance, particularly of the board of directors, which are: a) composition; b) leadership structure; c) compensation. Composition considers the size, diversity, independence, and functional specialty. Leadership structure establishes two possibilities: a) separate structure between the dean and the president of the MCC; b) duality (the president and dean are the same person). In this regard, two attributes were observed: composition and leadership, given that they are measurable in universities. In the case of composition, the functional specialty is not considered since there is no information for it.

Given the various variables within the attributes of corporate governance, the following hypothesis is established; however, sub-hypotheses are subsequently derived for different relevant elements within the same dimension: H4: The attributes of the Highest Collegiate Bodies (MCC) influence the dissemination of information of Latin American universities.

Composition of the Highest Collegiate Bodies (MCC)

The composition of the Highest Collegiate Body, characterized mainly by the size, independence, and diversity of the MCC, entails attributes that help explain the behavior of the levels of information dissemination of complex organization such as universities (Mackey, 2011; Kim & Ozdemir, 2014; Cunha & Rodriguez, 2018; Said *et al.*, 2018).

Size of the MCC

Size corresponds to the number of members that comprise the MCC and has an impact on the role of the board (John *et al.*, 2016), in such aspects as monitoring or resource provisioning. In terms of theories, Abello and Mancilla (2018) state that institutional theory and resource dependence theory support the idea that the larger the size, the greater the dissemination of information in universities. Therefore, the following hypothesis is proposed:

H4.1: The size of the Highest Collegiate Body positively relates to the dissemination of information by Latin American universities to their various stakeholders.

Independence of the members of the MCC

There are reasons to indicate that a higher percentage of independent board members relates to the quantity of information disseminated to the various stakeholders (Busuony, Mohamed, & Samaha, 2018; Abello & Mancilla, 2018; Said *et al.*, 2018). The expectation is for there to be incentives that promote greater transparency, and thus greater information dissemination.

H4.2: The independence of the members of the Highest Collegiate Body positively relates to the levels of information dissemination of Latin American universities to their various stakeholders.

Additionally, considering the preponderance of endogamous MCCs, that is, those comprised only of internal members, the following hypothesis is proposed:

H4.3: The existence of only internal members within the Highest Collegiate Body negatively relates to the levels of information dissemination by Latin American universities to their various stakeholders.

Diversity of the Highest Collegiate Bodies (MCC)

Abello and Mancilla (2018) state that there are different ways to represent diversity, whether analyzed according to the difference of opinion (separation), types or categories (variety), or concentration of resource and status. In the case of MCCs comprised of different stakeholders, there are three types of differences.

This study tests two types of differences: Those related to the types or categories of the stakeholders, and the concentration of members within the stakeholders. The latter is important to verify since various groups can comprise the MCC. However, one group can bring together a large number of members, which makes it difficult to demonstrate the differences.

There is support for the relationship between diversity and information dissemination, since it expands the cognitive and behavioral range of the councils, improving the quality of the debates and increasing monitoring capacity (Ferrero-Ferrero *et al.*, 2015; Briano-Turrent & Saavedra-García, 2015).

H4.4: The diversity of the stakeholders who comprise the Highest Collegiate Body positively relates to the dissemination of information by Latin American universities.

The leadership structure of the Highest Collegiate Body (MCC)

The literature demonstrates that duality increases information retention and decreases the quality of voluntary corporate information dissemination (Acar & Ozkan, 2017; Alfraih & Almutawa, 2017). Although the empirical results are not conclusive (Jizi *et al.*, 2014; Giannarakis *et al.*, 2014; Torchia & Calabro, 2016), the negative relationship between the duality of the chairman of the board and the top executive (manager) and the voluntary dissemination of information has more theoretical solidity (De Maere *et al.*, 2014), with no clarity on who represents the cause or the effect. On the other hand, the lack of a controlled market, and the duality can generate a complicated situation for the organization (John *et al.*, 2016). There is full agreement, however, on the fact that the duality could further restrict the dissemination of information to other members of the board and the various stakeholders (Haan & Vlahu, 2016). Considering the context above, the following hypothesis is proposed:

H4.5: Duality in the leadership structure of the Highest Collegiate Body negatively relates to the levels of information dissemination by Latin American universities.

Methodology

This section presents the methodology used in this work, detailing the background information collected, and the data processing and analysis applied to it.

This study included 219 Latin American universities listed in the Scimago Institutions Rankings (SIR) of Ibero-America, ranking within the top 500 institutions. The selected universities had to be consistently in the ranking between 2012 and 2015 and came from 5 countries: Argentina (31 universities), Brazil (98 universities), Chile (28 universities), Colombia (28 universities), and Mexico (34 universities). The countries studied represent 83% of Latin American universities and 89% of the total scientific publications of the region.

The previously mentioned theories form the basis for the model studied, which will be estimated using Ordinary Least Squares (OLS). This model consists of the information dissemination index (IDI) based on four dimensions that, in turn, include different explanatory variables: characteristics of the universities, relevant stakeholders, ability to generate information, and attributes of the highest collegiate bodies (MCC), plus a stochastic error term (Equation 1). Nevertheless, within each of the four dimensions, there is a series of variables that help operationalize the dimensions and the concepts behind them.

Equation 2 illustrates the complete model with the variables used in this work. Note that the estimated coefficient has a sub-index with two numbers, the first of which identifies the dimension that affects the dissemination of information. The second number indicates the variable used in this work.

Table 1 details the explanatory variables together with the mean and standard deviation values. The following tests are applied to the model: error normality test, global model F-test, individual tests for the coefficients (t-test, multicollinearity test, variance inflation factor), and heteroscedasticity test.

$$IDI_i = \beta_0 + \beta_1 \text{ University Characteristics}_i + \beta_2 \text{ Stakeholders}_i + \beta_3 \text{ Ability to generate information}_i + \beta_4 \text{ Attributes}_i + \varepsilon_i \quad (1)$$

$$IDI_i = \beta_0 + \beta_{11} \text{ University Property}_i + \beta_{12} \text{ University Size}_i + \beta_{13} \text{ Ability to do research}_i + \beta_{14} \text{ Track Record}_i + \beta_{21} \text{ Officials}_i + \beta_{22} \text{ Graduates}_i + \beta_{31} \text{ Ability to generate information}_i + \beta_{41} \text{ MCC Size}_i + \beta_{42} \text{ Independence}_i + \beta_{43} \text{ Endogamous}_i + \beta_{54} \text{ MCC diversity with regard to the stakeholders}_i + \beta_{45} \text{ Stakeholder diversity}_i + \beta_{46} \text{ Duality of the leadership structure of the MCC}_i + \varepsilon_i$$

(2)

Table 1
Description of the explanatory variables of the model

Dimensions/ Independent variables		Description	Mean	Standard Deviation
University Characteristics	Property	A dichotomous variable where Public = 1 and Private = 0	0,79	0,40
	University Size	Considers the number of students standardized by country	0,16	0,19
	Ability to do research	Doctoral degree academics/total academics	0,29	0,25
	Track record	Age of the university	59,43	48,58
Stakeholders	Officials	Corresponds to the number of officials who are members with the right to speak and vote in the Highest Collegiate Body.	2,55	3,17
	Graduates	Corresponds to the number of graduates who are members with the right to speak and vote in the Highest Collegiate Body.	0,51	1,27
Ability to generate information	Main web domain ability	Webometrics ranking of the presence variable, which represents the total number of web pages in the main web domain (including all subdomains and directories) of the university, obtained from the most significant commercial search engine (Google).	22.943	2.969
Attributes of the MCC	Size of MCC	Number of members with the right to vote	44,84	49,32
	Independence of MCC	Percentage of external members of the total number of members of the MCC	0,19	0,26
	Endogamous	Dichotomous variable where the MCC with only internal members = 1 and MCC with external members = 0	0,22	0,42
	Diversity of the MCC	The number of stakeholders who are part of the MCC, divided by the theoretical number of stakeholders (11 stakeholders)	0,43	0,14
	Stakeholder diversity	Corresponds to the diversity of the stakeholders, determined (1-HHN). HHN is the Standardized Hirschman Herfindhal index (Liz-Gutiérrez, 2013).	0,824	0,16
	Duality	Dichotomous variable where deans with double roles = 1 and universities with separated roles = 0	0,81	0,39
Number of observations			219	

Source: created by the author

Although the variables Diversity of the MCC and Stakeholder Diversity use the same information for the corresponding calculation, they provide different information. On the one hand, the Diversity of the MCC only identifies the ratio of the various stakeholders (of all potential stakeholders) that exist within the corporate government, independent of the relative weight they may have within it. For its part, Stakeholder Diversity, as explained in Table 1, is an indicator obtained by calculating $1 - \text{Standardized Hirschman Herfindhal index (1-HHN)}$. Thus, an indicator close to 0 indicates that in existing groups, the relative weight in terms of members is concentrated in a few stakeholders (even considering the maximum number of stakeholders possible). On the other hand, values far from 0 and closer to 1 indicate not only that there are several stakeholders, but also that the number of stakeholders is more equitably distributed.

In order to verify that these and all other variables of the model do not cause a problem of assumptions in the estimation by OLS, it was necessary to calculate the variance inflation factor (VIF) for each of them. A VIF value above 10 indicates a possible problem of multicollinearity. The results indicated that no variable was above this threshold, with the highest value being 5.141. In the case of the variable Diversity of the MCC, it obtained a VIF value of 1.542, and Stakeholder Diversity had a value of 1.402.

The analysis for the dissemination of information of universities used the information dissemination index (IDI) proposed by Abello (2018) and used in Abello *et al.* (2018). This index includes five dimensions with the same relative weight (1/5 each). Each dimension, in turn, has various components (40 in total). These components have a value of 1 (one) if they are present, and a value of 0 (zero) if they are absent. The data used to calculate the index were obtained from the university websites in the sample for six months. The result is then averaged for each dimension, followed by the weighted sum, as shown in Equation 3. Thus, with an IDI closer to one, a university disseminates more information, and the closer to 0, the less it disseminates.

$$IDI = \left(\sum_{K=1}^{K=6} \frac{DII}{6} \right) * 0,2 + \left(\sum_{K=1}^{K=8} \frac{DIF}{8} \right) * 0,2 + \left(\sum_{K=1}^{K=7} \frac{DITL}{7} \right) * 0,2 + \left(\sum_{K=1}^{K=5} \frac{DIEO}{5} \right) * 0,2 + \left(\sum_{K=1}^{K=14} \frac{DICI}{14} \right) * 0,2 \quad (3)$$

Where:

- DII = Institutional Information Dimension
- DIF = Financial Information Dimension
- DITL = Leadership and Transparency Information Dimension
- DIEO = Structure and Organization Information Dimension
- DICI = Intellectual Capital Information
- K = component number

Source: Abello (2018), Abello *et al.* (2018)

For the index, the Cronbach alpha is calculated to verify the reliability of the IDI. In this regard, a value above 0.6 indicates adequate internal consistency (De Castro *et al.*, 2016; Borges & Mafra, 2014). The results for the calculated IDI provided a Cronbach alpha of 0.69 for an equal-weighted index, and of 0.72 based on standardized elements.

It is of note that the information gathering was developed based on secondary information. This is how the variables related to the attributes of the Highest Collegiate Body were obtained from the analysis of each of the statutes of the universities and the analysis of their websites. The variables related to the size, age, and type of property were obtained from the public databases of each of the five countries established in the sample. In the case of the data to build the information dissemination index, they were collected through a six-month information collection processes from the websites of the selected universities.

Results

Table 2 presents the results obtained from estimating the model using OLS, which explains the levels of dissemination of the universities. A first observation is that the global significance test (F-test) is highly significant, and that, except for the constant, the dimensions and variables considered to explain the levels of information dissemination are all significant.

Table 2
Results from the estimation of the model

Dimensions\Variables		Coefficient	value (t)	p-value	Significance
Characteristic	Constant	-0.3968	(-3.925)	0.000	***
	Property	0.1245	(5.720)	0.000	***
	Size of the university	0.1397	(2.767)	0.006	***
	Ability to do research	0.1719	(4.102)	0.000	***
	Track record	0.0270	(1.918)	0.057	**
Stakeholders (H2)	Officials	-0.0053	(-1.732)	0.085	*
	Graduates	-0.0326	(-4.665)	0.000	***
Ability to generate information (H3)	Presence	0.00001	(4.756)	0.000	***
MCC attributes (H4)	Size of the MCC (H4.1)	0.0005	(2.620)	0.009	***
	Independence (H4.2)	0.1698	(2.538)	0.012	***
	Endogamous (H4.3)	0.0683	(2.644)	0.009	***
	Diversity (H4.4)	0.2299	(3.515)	0.001	***
	HH Diversity (H4.4)	0.1097	(2.009)	0.046	**
	Duality (H4.5)	-0.1337	(-0.366)	0.715	
	R2 adjusted	0.5114			
	F-test	18.5496		0.0000	****
Schwarz Criteria		-279.7788			
Number of observations		219			

***, **, * Indicate, respectively, the level of significance at 1%, 5%, and 10%

Source: created by the author

These results validate the theoretical model proposed in this study, illustrated in Figure 1, since the four dimensions proposed based on the different theories help explain the dissemination of information. The F-value of 18.54 with $p = 0.000$ indicates that F is significant with an $\alpha = 0.001$; therefore, the null hypothesis is rejected, since there is at least one significant prognosticator of the levels of dissemination of information. Furthermore, the null hypothesis on the existence of heteroscedasticity (with a $p\text{-value} = P(\text{chi-square}(99) > 108.088) = 0.205102$) is accepted. A standardization contrast of the residues was also carried out, thus accepting the null hypothesis with $\text{chi-square}(2) = 2.04165$ with a $p\text{-value} = 0.360298$.

Reviewing the results (Table 2) by dimension demonstrates that all of the dimensions contribute to explain the variance of the IDI. The dimension that reflects the characteristics of Latin American universities is coherent with that which is proposed in theory and reaffirms the statements by Abello *et al.* (2018). The variables of property, size, ability to

carry out research, and track record have a high significance, and their signs are in line with the proposals. The dimension that reflects the relevant stakeholders confirms the existence of stakeholders who are not willing to promote the dissemination of information, assuming that its retention will generate value for the stakeholders most strongly associated with the institution. Officials and graduates are significant and have the projected sign.

The ability of the universities to generate information is a significant dimension. The results obtained from testing various proxies indicate that the variable that reflects the total number of webpages within the main domain (including all subdomains and directories) of the university is what is known as presence. The attributes of the Highest Collegiate Bodies (MCC) comprise a dimension that contributes to explaining the behavior of the dissemination of information by Latin American universities, as indicated by the results of this study.

Of note is the behavior of the variables Size of the MCC (H4.1) and Independence (H4.2), both being significant at a level of $p < 0.0$. H4.3 is significant, but its sign is contradictory and departs from the proposal, which can be due to various reasons. One, based on stewardship theory, states that even if all the members of the MCC are internal, this does not disqualify the dissemination of information, since they will always favor the institution and, together with the executive team, will encourage dissemination whenever it is suitable for the institution. The university is more important than personal interests.

On the other hand, the governing team can be better attuned to those MCCs with only internal members who have power within the organization and retaining power will encourage the dissemination of information. The Diversity variable was quantified in two ways: a) according to the Standardized Hirschman and Herfindhal index, and b) according to the number of stakeholder types in the MCC divided by the total possible number of stakeholders. In this operationalization, the variables were complementary.

Concerning the dual nature of the leadership structure of the MCC (H4.5), the sources consulted admit that duality has a negative relationship with the levels of information dissemination of universities. The results of this study, although they confirm the proposed sign, did not find it to be significant. This is a result of the low variability of the data for the Latin American case, and in general, the MCCs have dual leadership.

Conclusions

The findings of this work demonstrate that it generates theoretical, empirical, and methodological contributions, as well as having some public policy implications.

From the theoretical point of view, the results obtained validate the constructed model, which demonstrates that the theories that form the foundation of this work contribute to the understanding of the problem. In other words, a multi-theoretical focus is necessary to explain the levels of information dissemination of universities. Likewise, the proposed model establishes four dimensions that help understand the dissemination of information, these being the attributes of corporate governance, the characteristics of the universities, the relevant stakeholders, and the ability to generate information.

From the empirical point of view, each dimension of the theoretical model had variables defined and identified to help operationalize the measurement of said dimensions. These variables, together with statistical significance, presented the expected impacts according to the theories, which helped validate the model. The Duality variable, among the attributes of corporate governance, is of note since it is the only variable with no statistical significance; therefore, it has no influence on the dissemination of information by the universities.

The methodology adopted is noteworthy for the high number of observations, that is, 219 universities from different countries. Additionally, these universities are part of the Scimago Institutions Rankings (SIR) of Ibero-America and are among the top 500 institutions.

For public policy implications, these results propose that at least these four dimensions should be considered to increase the levels of dissemination, and, consequently, decrease information asymmetry. On the other hand, more concrete measures can be focused, if only as an example, within the characteristics of the universities, such as their size. Where the results indicated that the larger the size, the greater the dissemination, public policies should facilitate, encourage, or support smaller universities.

Regarding the attributes of the MCCs, public policy should tend to regulate or encourage, for example, an increase in diversity and independence of the MCCs through changes in composition (increasing the number of independent directors and decreasing the number of those linked to the executive), as well as through the inclusion of other stakeholders.

Future lines of research should consider aspects such as longitudinal monitoring of the levels of dissemination of these universities, as well as open discussion as to the quality and value of the information disseminated (and its measurement).

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