

## **E-GOVERNMENT PROCESS: THE ACCESS TO INFORMATION AND ACCOUNTING DISCLOSURE EVIDENCE FROM BRAZILIAN PUBLIC UNIVERSITIES**

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***Abstract:** The aims of this study are to examine the extent of accounting information disclosed by the Brazilian public universities on their websites, and verify which factors determining the observed level of information disclosed. Furthermore, this paper verify the procedures that have been adopted in face of the new law on access to information which revolutionized and expanded the right of citizens to access of public information in Brazil. The results indicate that the level of e-disclosure in Brazilian universities are middling, and aspects related with quality, efficiency, and governance showed to be determining factors for the disclosure of information.*

***Keywords:** e-government, transparency, accounting information, university.*

***Jel Classification:** H83*

### **1. INTRODUCTION**

The social, economic, and political changes in several countries around the world have made governments improve their management systems and increase the transparency of their actions, allowed to citizens' greater access to information and public services. To meet the demands and requirements of citizens, public agencies sought new and innovative management models, in addition to new management tools (Beuren, Moura, & Kloeppel, 2013). These innovations, widely known as e-government, started to be developed in the 1990s and it was being adopted by public bodies over the years (Manoharan, 2013).

E-government could be defined as "the delivery of services and information, electronically, to businesses and residents, 24 hours a day, seven days a week" (Norris, Fletcher, & Holden, 2001, p. 5). Based on this concept, this study aims to verify the

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information disclosed on the internet (e-disclosure) by Brazilian public universities to stakeholders, and furthermore, analyze the factors that can influence the degree of transparency.

First of all, it is important to know who are the main external and internal users of the information provided by the public universities. Among the external users we can mention citizens, but we want to highlight the students, technical staff, and teachers, all with an important role within the university structure because they have the power to decide by voting the leaders who will administer the university. In this sense the agency-theory (Zimmerman, 1977) can explain the reasons why public institutions disseminate information to stakeholders.

On the other hand, it could be considered internal users, not just those who belong to the university, as their own managers or the internal audit, for example, but also those institutions that belong to own public system as the court of auditors and even other public universities. In this sense, the institutional theory (DiMaggio & Powell, 1983), widely used in studies that seek to relate the factors that lead institutions to adopt certain procedures or behaviors, can be applied to this study, since the organizations see themselves influenced by other organizations and, in addition, seek to adopt socially acceptable measures.

It is important to report the regulatory framework that universities are inserted, and we would like to highlight the access to information act (Brasil, 2012) which is revolutionizing the way of public agencies communicate and provide information to citizens via internet. The main innovation of this law lies in the fact that the disclosure of information shall be made available proactively, so that public bodies can promote the dissemination of information based on public interest, regardless of requirements.

Although the innovations provided by the law on access to information, there is much to advance in the field of public transparency. There is still a large amount of public information which depends on the discretion of the public managers to be disclosed over the internet, as accounting information, for example. For this reason, it is important to know what information is being disclosed by the Brazilian public universities through their websites, and what factors can influence this disclosure.

There are few studies that have verified the information disclosed via internet at public universities, and most of them focused on surveys and interviews; nevertheless, almost no previous research was conducted on data published on the internet, which is a mechanism for dissemination of information very powerful and has many advantages (Gallego, García, & Rodríguez, 2009).

This study has three objectives, first is to contribute through empirical evidence on the information disclosed on the websites of Brazilian public universities; second is to create an index which enables systematize the analysis of the websites of public universities; and third is to verify empirically what factors determine a higher or lower level of transparency evidenced by them.

Our study contributes to the literature in many ways. First, it provides a comprehensive evaluation of the current state of information available to the general public on the website of Brazilian public universities. Second, it is attempt to verify procedures that have been adopted by taking into consideration the current regulation on the access to information, and voluntary disclosure. Third, this study systematizes the analysis of the websites of the Brazilian public universities; demonstrates the points where there are still gaps present in digital transparency, and guide public managers to improve the electronic relationship between university and stakeholders.

## 2. LITERATURE REVIEW

In the last few years, accountability and the right of access to public information has become essential for the advancement of a democratic society. These initiatives aimed at supporting citizen participation, increase the confidence of governments, prevent corruption, and support the public decisions and accuracy of government actions (Bertot, Jaeger, & Grimes, 2010).

The current demands of society assume various technological, cultural, and administrative challenges, so that information is revealed in a quick, safe, and widely accessible manner for all stakeholders. In order to overcome these challenges, new information and communication technologies, especially the internet, are essential to provide more information and better quality public services to citizens. Many countries have adopted these new technologies as means to increase government transparency and reduce corruption (Bertot, Jaeger, & Grimes, 2010). Government websites can be an important communication tool in establishing relations with citizens and provide an environment to promote public participation in political processes and decision-making (Moon, 2002).

Justice *et al.* (2006) argue that improvements in e-government initiatives occur through a continuous process of development by raising awareness of culture change and technological development. The most relevant studies on e-government explain how they developed the dissemination of information through the internet and the way in which these changes have altered the relationship between governments and their citizens, and the way that such initiatives affect citizens at the time of make their decisions, especially when they have to choose those politicians who will manage their cities (Bertot, Jaeger & Grimes, 2010; Moon, 2002; Tolbert & Mossberger, 2006; West 2004, and Wong & Welch, 2004).

Factors that incentivize public organizations to disclose information on the internet was carried out by an extensive review of the literature. West (2004) argues that e-government initiatives can increase citizens' trust in government actions, and denote that digital government has the power to transform service delivery and citizen attitudes. Likewise, Tolbert and Mossberger (2006) explain in their study, that the confidence of citizens in local government can raise through the initiatives of e-government. More recently, Jun *et al.* (2014), studied the relationship between

government website usages, governments capacity for service delivery, and citizens perception of local government transparency in China; their findings indicates that the development of government website has the potential to improve the governments image, and the citizens perceptions of government transparency, however, the e-government in China is still at the information-provision stage, and still not the main platform for service delivery.

Relevant papers on e-government formed the basis for further studies, especially for those on disclosure of financial information, navigability and accessibility of the internet, and studies addressed to the analyze factors related to the disclosure of information, in addition, evaluation of factors that determine the disclosure of budgetary and financial information on the internet (Caba, Rodríguez, & López, 2008; Gandía & Archidona, 2008; Manoharan, 2013; Pina, Torres, & Royo, 2010; Serrano, Rueda, & Portillo, 2009).

However, these previous studies have focused their samples mainly in local and central governments of various countries and continents, especially in North-America and Europe, and it is worth noting that the prior studies have focused their theoretical bases, on the principal-agent theory (Evans & Patton, 1987, and Zimmerman, 1977), and institutional theory (DiMaggio & Powell, 1983).

With respect to universities, not many empirical studies have been published over the last five to ten years related to disclosure of financial information on the internet. In addition, papers published on this topic have not achieved great academic impact (Silva, Ensslin, Ripoll, & Crespo, 2014). Most of the articles that verified the disclosure of financial information by universities are focused on surveys and interviews; nevertheless, almost no previous research was conducted on data published on the internet, which is a mechanism for dissemination of information very powerful and has many advantages (Gallego, García, & Rodríguez 2009).

### **3. HYPOTHESES DEVELOPMENT**

Following a literature review on e-government, we have gathered the main factors leading public institutions to disclose more information on the web through three dimensions (Serrano, Rueda, & Portillo, 2009). The first dimension analyzed was the university characteristic, which corresponds to the following hypotheses: wealth (hypothesis 1), size (hypothesis 2), age (hypothesis 3) and governance (hypothesis 4). The second dimension relates to efficiency aspects, and is linked to cost per student (hypothesis 5), and the relationship between the number of employees and students (hypothesis 6). Finally, the third dimension is related to the quality of university (hypothesis 7). We present, for each case, its corresponding theoretical basis and the results obtained in several empirical studies.

#### **3.1. Wealth**

Lüder (1992) observed in their studies that those municipalities who need more financial resources were those that reported more information, therefore, to meet their needs,

municipalities requires better quality information, and in doing so, are investing resources to develop tools to improve, and increase their reporting. Christiaens (1999) argues that the wealth should be positively associated with increased disclosure because it provides a signal of management quality. Therefore:

*H1 There is a positive association between university wealth and e-disclosure.*

### **3.2. Size**

One of the variables most used by researchers to evaluate the disclosure of information was the organization's size (Gordon, Fischer, Malone & Tower, 2002). The classical theories of financial reporting provide a positive and significant relationship between size and disclosure (Baber & Sen, 1984; Ingran & de Jong, 1987). Torres *et al.* (2005) states that the dissemination of information through the web is an improvement and those larger institutions have more resources to support this innovation.

Considering previous studies, it is argued that there is a positive relationship between the size of the institution and the information disclosed on the internet. Following the methodology used by Gallego *et al.* (2009), the size variable is measured by the number of students. For this study the number of students was divided into two categories: number of undergraduate students and number of graduate students. Therefore:

*H2 There is a positive association between size and e-disclosure.*

### **3.3. Age**

Gallego *et al.* (2009) argue that the age of the university can influence the degree of overall and financial disclosure. Banks *et al.* (1997) demonstrated that older universities have a greater propensity to disclose more information than the younger universities. Murias *et al.* (2008) described similar results for public Spanish universities. Based on empirical evidence, we propose:

*H3 There is a positive association between institution age and e-disclosure.*

### **3.4. Governance**

Several studies demonstrated that the governance aspects, including the size of the governing board were significantly related to the degree of disclosure. Gallego *et al.* (2009), and Gordon *et al.* (2002) argue that bigger boards are consistent with a positive relationship of the level of disclosure information on the web. By considering previous works, we present the following hypothesis:

*H4 There is a positive association between number of members on the governing board and e-disclosure.*

### **3.5. Cost per student**

In studies related to local governments, public administrators have incentives to reduce the cost of municipal debt, because in turn could reduce property taxes (Gore, 2004). Thus, in this study, we propose a variable that measures the cost per student. We try

to measure the degree of efficiency of universities by evaluating the average, maximum, and minimum values of the cost per student among them. By following the line that quality of the administration, and its efficiency in the application of resources will be related to a greater incentive to disclosure of information, we set up the following hypothesis:

*H5 There is a negative relationship between cost per student and e-disclosure*

### **3.6. Relationship between students and employees**

Following the previous studies, as Católico (2012) we investigate the relationship between the number of students and employees. Greater relationship between students and employees may demonstrate greater efficiency in academic procedures and teaching process;

*H6 Universities with higher ratio students/employees disclose more information on the web.*

### **3.7. Quality of university**

One of the factors that the literature describes as a decisive aspect for the dissemination of information on the internet is the level of quality of universities (Gallego, García, & Rodríguez, 2009). To measure the quality of the university we use the 2013 “*University Ranking Folha*” (RUF), published by “*Folha de São Paulo*” (Brazil).

Another important factor is the qualifying standard of the teaching staff. Therefore, we also use as a quality parameter, the level of qualification of teachers. We propose the following hypothesis:

*H7 There is a positive association between quality and e-disclosure.*

## **4. RESEARCH DESIGN AND METHODOLOGY**

This section describes the methodology used to test the hypotheses of the study. First, the population and sample selection procedures are detailed. Then, the process to create the University Disclosure Index (**UDI**) is discussed. Next, is described the methods by which information about the universities was gathered. Finally, the last section specifies the model and statistical methods used to test the hypotheses.

### **4.1. Population and sample**

The population is defined by the 193 universities in Brazil in 2013 with a total population of 3,822,998 students (INEP, 2012). Of the 193 universities, 97 are public and the remaining 96 are private. In Brazil, public universities can be administered by central government (federal), state government or local government, depending on their legal constitution and who supports it financially.

In this paper we used as sample the public universities, but only the federal universities. To achieve the objective proposed, it has carried out an analysis of the websites of all 59 federal Brazilian universities.

We have chosen this type of institution because of their importance for Brazilian society, importance to higher education, and their existence as public body. The numbers of students in the federal universities represent a little more than one million, and their annual budget represents about 0.6% of the Brazilian gross domestic product. Federal universities have specific characteristics and its administrative composition, economic, and financial structure corresponds to a public body. In most universities, the President is elected by the academic community, the financial resources are transferred by the central government, and the university has full administrative and financial autonomy.

#### 4.2. Research design

From a methodological point of view, we have developed a score table (Table 1) to capture the main disclosure information by the universities with respect to accessibility and accounting information. The definition for accounting disclosure is subject to various interpretations “perhaps ranging from the information provided in audited notes and financial statements to any information set that might be employed by a

**Table 1**  
**University Disclosure Index (UDI)**

<i>Item</i>	<i>Interpretation</i>	<i>Score</i>
A) IAI	Index of Access to Information	27
<b>A1) Accessibility</b>		10
1 Banner	Have link to enter “Access to Information” of the institution	1
2 Toolbar - Federal Government	Has the identity toolbar the federal government - Portal Brazil	1
3 Service letter	Own institution’s service letter	1
4 Map of the web	Own map about the content available on the university web	1
5 Redirection	Information that does not appear on the site are redirected to another government site	1
6 FAQ	Frequently asked questions	1
7 Access form for solicitation	Has a link with form to request access to information	1
8 Classified information	Disclose if there are confidential information	1
9 Allows to record data in several formats	Enables recording of reports in various electronic formats (doc, pdf, xls)	1
10 Accessibility for disabled	Ensures the accessibility of content for people with disability	1
<b>A2) 11 Ombudsman office</b>	Contact for the monitoring authority or ombudsman office	1
<b>A3) 12 Rector agenda</b>	Presents on its website the schedule manager	1
<b>A4) Institutional</b>		9
13 Organizational Structure	Organizational structure, responsibilities, main office and its occupants	1
14 Information to contact	Contact, address and telephone number to the public	1
15 Organization Chart	Presents the university organization chart	1
16 Statute	Displays the statute on the website	1

*contd. table 1*

<i>Item</i>	<i>Interpretation</i>	<i>Score</i>
17 Internal regulations	Presents the Internal Regulation on the website	1
18 Academic Calendar	Publishes the academic calendar	1
19 Opening hours	Reports the opening hours and customer service	1
20 IDP	Institutional Development Plan	1
21 ITDP	Information Technology Development Plan	1
<b>A5) Employees</b>		<b>2</b>
22 Public tender	Public announcements and the results of public tenders held	1
23 Payment of employees	Publishes the remuneration and allowances received by office occupants, or has link to provide information	1
<b>A6) Contracts</b>		<b>4</b>
24 Bidding	Bidding made, publication of auctions, attachments and results, signed agreements and commitment notes	1
25 Contracts	Discloses the contracts made	1
26 Partnerships	Discloses list of partnerships	1
27 Outsourced companies	Discloses list of outsourced workers and company names to which they belong	1
B) ADI	Accounting Disclosure Index	20
<b>B1) Accounting statements</b>	Accounting statements applied to the public sector - Accounting Manual Applied to Public Sector - V (Finance Ministry)	<b>8</b>
28 Statement by accountant	Statement by accountant of the conformity of reports submitted	1
29 Budget balance sheet	Budget Execution and financial detailed and transfer of financial resources	1
30 Financial Statement	Revenues (Budgetary Revenues and Receipts Extra Budgetary) and expenditures (Budget Expenditure and extra budgetary Payments)	1
31 Balance sheet		1
32 Statements of equity variations	Will evidence the changes in the equity	1
33 Statement of cash flows		1
34 Explanatory notes		1
35 Access to previous financial statements	May inspect the financial statements of two or more years old	1
<b>B2) 36 Expenditures</b>	Presents expense report	<b>1</b>
<b>B3) Auditing</b>		<b>4</b>
37 Internal audit	The institution has permanently constituted internal audit	1
38 Report of internal audit	Presents the internal audit reports	1
39 Audit Court report	Presents the audit court reports	1
40 Measures adopted	Presents the information of the measures adopted of the inspections of the audit court and internal audit	1
<b>B4) Management</b>		<b>7</b>
41 Management Report	Management Report of the Rector	1
42 Performance indicators		1
43 Manag. control systems	Presents a cost management control system	1
44 Departments	Presents results by department	1
45 Teaching	Presents results by teaching activity	1
46 Research	Presents results by research activity	1
47 Extension	Presents results by extension activity	1
<b>UDI</b>	<b>University Disclosure Index</b>	<b>47</b>



user in arriving at some decision about economic entity at hand" (Gordon, Fischer, Malone & Tower, 2002, p. 252). In our study, the disclosure of accounting information is examined in a more comprehensive way. We verified information from a strictly financial aspect, such that financial statements, equity, budget, and explanatory notes were taken into consideration as well as aspects of information like expenditures, audits, and management procedures.

Our methodology for data collection involves the identification and evaluation of the outstanding features observed in the websites of universities in regard to the precepts of the current regulation on the access to information, the previous studies on public financial accountability, and the instructions and guides regarding to accounting information provided by the Court of Audit, and the Ministry of Finance.

The following methodological steps were performed for the construction of the university disclosure index (**UDI**). For this, it is essential to use a specific questionnaire that covers all relevant aspects for a complete analysis of the level of disclosure of universities. The verification of the degree of transparency in each university was performed by measuring the proposed questionnaire.

Such index (Table 1) is composed of 47 items divided into ten subsections which in turn are divided into two major sections, namely, index of access to information (**IAI**), and accounting disclosure index (**ADI**). The questionnaire was performed during the months of September and October 2014.

The development of the questionnaire items whose full structure can be seen in Table 1, took into consideration the following criteria:

- 1) Access to information (IAI). This section is related to verification of adherence to aspects related to active transparency and the access to information required by current legislation. With respect to IAI, it is the duty of the public organizations, independent of the request, to promote the dissemination of information of general interest in their websites. In this section twenty-seven items were observed, representing 57% of the UDI.
- 2) Accounting disclosure (ADI). The accounting index was performed by evaluating the disclosure of financial reports, expenditures, information about internal and external audits, and information related to management. In this section twenty items of voluntary disclosure were observed, representing 43% of the UDI.

By completing the questionnaire, were checked all items in each of the surveyed universities, and when this item was filled, was designated note "one"; otherwise the score was "zero". We made the choice in this study to designate a distinct weight to the two sections studied here. After reviewing the 47 questionnaire items for each university, the next step was to calculate the degree of information revealed on the websites. The disclosure index was calculated, for each university taking into consideration the items identified in Table 1. Taking into account that the disclosure

index is divided into two sections, it first calculates each partial index, which is weighted to calculate the total index. By definition, both, the total and the partial index can have values ranging between “zero” and “ten”. The partial and total index was calculated as demonstrated (Gandía & Archidona, 2008):

$$I_i^P \frac{\text{Score obtained in the subgroup}}{\text{Maximum total score obtainable}} \times 10$$

After obtaining the partial index, the calculation for verification of total index for each university was conducted. The calculation was performed as follows:

$$I^T = \sum_{i=1}^n I_i^P \times P_i^T$$

Where:

$I^T$  = Total index score;

$I_i^P$  = Score of the partial index based on the total index subgroups; and

$P_i^T$  = Proportion of overall total index score represented by the partial index “i”.

It is important to note that the overall index is obtained not by simple arithmetic average of the different partial indexes, but the assessment of the relative weight of each item. Following the creation of the university disclosure index we contrast the hypotheses raised in order to verify which factors may determine the degree of e-disclosure among federal Brazilian universities.

### 4.3. Data analysis

We investigated the institutional factors that can influence the degree of transparency using a multivariate approach. To carry out the multivariate analysis, we proposed three multiple linear regression models to verify the hypotheses proposed on third section. Was used as the dependent variable for each model, the different proposed disclosure index; whereas the independent variables were related to the hypotheses listed anteriorly. Table 2 describes how all the explanatory variables were calculated.

For this study, we have chosen to analyze some independent variables that have been extensively used in previous research, such as size (Baber & Sen, 1984, and Ingran & de Jong, 1987), wealth (Christiaens, 1999), age, quality, and governance (Católico, 2012; Gallego, García, & Rodríguez, 2009, and Gordon Fischer, Malone & Tower, 2002). To complete our study, we have also focused on features related to efficiency. Beyond the independent variables already contrasted by previous studies, we consider two variables related to efficiency, namely cost per student, and relationship between students and employees.

**Table 2**  
**Variable Description**

	<i>Definition</i>	<i>Source</i>
University Wealth	Annual income	MEC website
Equivalent cost (COSTEQ)	$\frac{\text{Current costs}}{\text{Equivalent student}}$	University annual report
Size of the university (SIZEag)	Number of undergraduate students	University annual report
Size of the university (SIZEapg)	Number of graduate students	University annual report
Relationship student/employees (ALUMSERV)	$\frac{\text{Total ungraduate student}}{\text{Professors + adm.staff}}$	University annual report
University age (AGE)	Number of years since its foundation	University website
University quality (QUALITY inst)	Quality Index (RUF) published in 2013	Newspaper website of "Folha de São Paulo"
Teachers specialization (QUALITY prof)	Degree of specialization of teachers staff	University annual report
Governance	Number of members on the governing board	University website

Furthermore, the size variable was divided into two groups: one, measured by the number of undergraduates, and the other measured by the number of graduate students. Lastly, we utilized two proxies for the variable quality: one related to the general quality of the university, and other related to the degree of the specialization of the teacher staff. All together we analyzed a total of nine independent variables.

## 5. RESULTS AND DISCUSSION

### 5.1. Descriptive results

Analyzing the statistical data of university disclosure index (UDI), we obtained an average value of 5.77 points (Table 3). That means that universities disclose, on average, slightly more than 50 percent of the information available, taking into consideration only the aspects related to this study. The results can be analyzed in a positive way if we take as a measure isolated result for the average values of the index of access to information (IAI) which showed an average of 7.12 points (Table 3). In other words, for this indicator, more than 70 percent of the maximum possible value was disclosed.

Diametrically opposite direction data on disclosure of accounting information had a very poor outcome. The average for the ADI index was only 3.95 points (Table 3). In this case, it can be noticed that the majority of the universities disclosed less than 40 percent of their accounting information. These results make it clear that universities are not taking full advantage of their websites to increase transparency; in addition, they are limiting themselves just to comply with legislation. This result is consistent

with data presented by Pina *et al.* (2010) who detected in European cities the same limitation, and Gandía and Archidona (2008) who presented similar results for Spanish cities.

The results also revealed that the ADI disclosure was not that high, with a maximum reported result of 7.5 points (Table 3), and the situation gets even worse if we take into consideration that some universities did not present any accounting information. According to these results, the federal Brazilian universities websites focus their efforts on legal requirements, consequently the accounting information are less widespread. The Table 3 demonstrates the descriptive results obtained.

**Table 3**  
Descriptive statistics of the disclosures indexes and independent variables

Sample: 59 Universities

<i>Variable</i>	<i>Nº Obs.</i>	<i>Dev.</i>	<i>Mean</i>	<i>Minimum</i>	<i>Maximum</i>
Dependent					
UDI	59	1.11578	5.772542	3.19	8.51
IAI	59	1.310472	7.121017	3.7	9.26
ADI	59	1.702655	3.957627	0	7.5
Independent					
Wealth	59	.8758	19.8220	17.9337	21.59035
Costeq	52	5156.896	15477.09	8237.03	35317.84
Size (ag)	50	9922.191	14875.34	1008	40731
Size (apg)	50	2559.996	2199.29	0	11209
Alumserv	49	.5264	.1911	.1063	.3134
Age	59	30.8110	51.4745	3	105
Quality (inst)	54	20.4842	64.5681	12.46	95.64
Quality (prof)	52	.3789	4.1301	3.28	5
Governance	58	5.2582	6.7068	0	17

A possible recommendation for these institutions would be to establish more ambitious communication strategies, centered on the improvement of digital informative transparency and improve the interactivity between the institution and the stakeholders (Gandía & Archidona, 2008). Also, implement a more proactive strategy in the website administration, based on the law of access to information and even based on successes experienced by other universities that provide satisfactory amounts of financial and general information.

The Figures 1 and 2 below show the group of items evaluated in each university for each of the proposed indexes, and their respective results. The results demonstrated on Figure 1 reveal that almost 96 per cent of the information related to ombudsman office was revealed by the universities, and almost 93 per cent of the information related to their employees was provided; however only 44 per cent of the information related to Rector's agenda was disclosed.

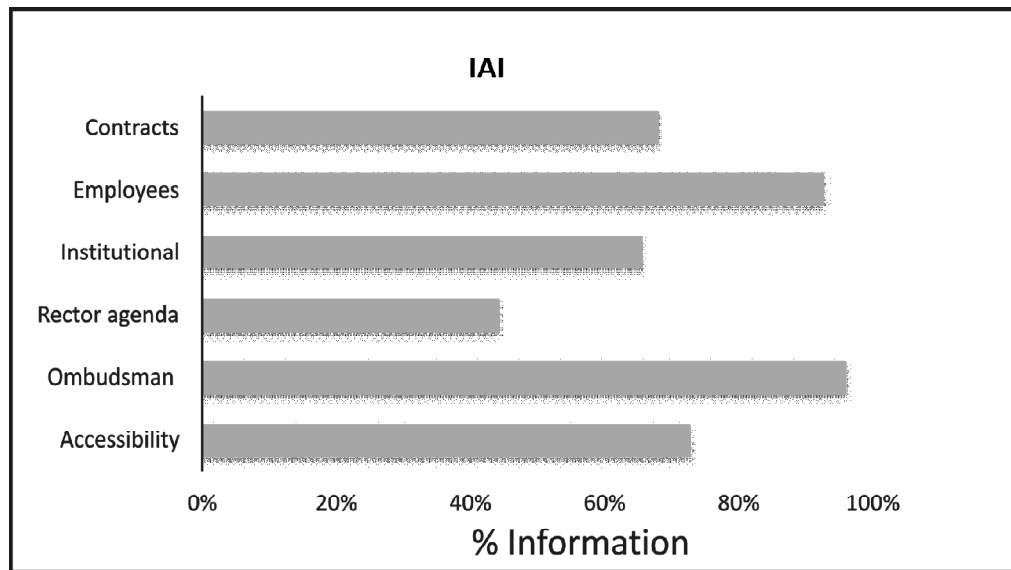


Figure 1: Content of public information disclosed by Brazilian universities

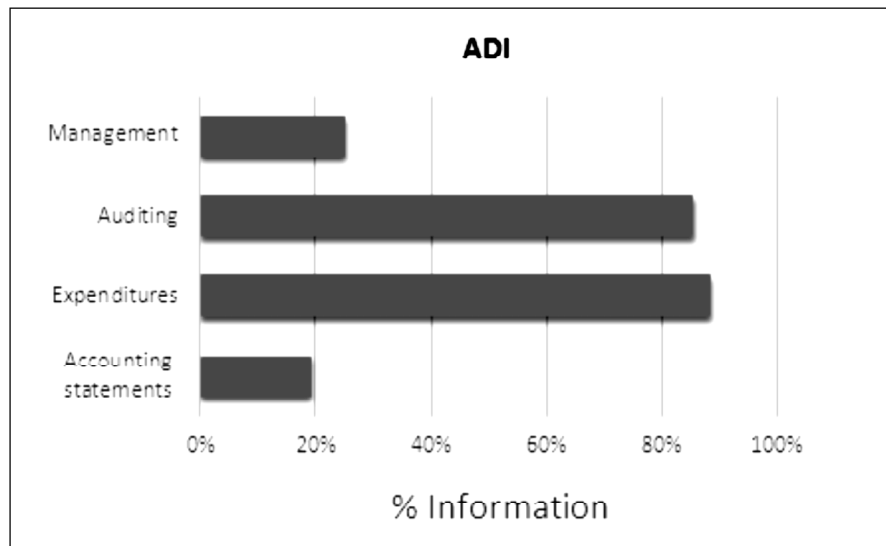


Figure 2: Content of accounting information disclosed by Brazilian universities

With respect to ADI index (Figure 2), more than 80 per cent of the information regarding to auditing and expenditures were disclosed by the universities, nevertheless just 24 per cent of information related to management accounting was disseminated, and the least published information was linked to accounting statements. Less than

20 per cent of the information related to accounting statements was published on universities' website (Figure 2). The result that has been found in the Brazilian context is similar to that found by Galego *et al.* (2009), whereby the Spanish universities disclose a low volume of accounting information on their websites.

## 5.2. Multivariate regression analysis

In order to calculate the degree of linear relationship between the variables, Table 4 show the Pearson correlation between all independent variables that are part of the analysis. The correlation matrix allows us to verify that the variables related to size, and wealth were highly correlated.

**Table 4**  
Pearson's correlation matrix of independent variables

	Wealth	Costeq	Alumserv	Size (ag)	Size (apg)	Age	Quality (inst)	Quality (prof)	Governance
Wealth	1.0000								
Costeq	-0.2407	1.0000							
Alumserv	-0.2103	0.3449***	1.0000						
Size (ag)	0.8970**	-0.2386*	-0.3589	1.0000					
Size (apg)	0.8002	-0.0995***	-0.0442***	0.7929	1.0000				
Age	0.4159***	-0.4205**	0.0393**	0.2957	0.3528***	1.0000			
Quality (inst)	0.8244	-0.0823***	0.0245***	0.7034	0.7571***	0.3736***	1.0000		
Quality (prof)	0.0974	0.3885***	0.4354***	-0.0569	0.3183***	0.0184**	0.5334***	1.0000	
Governance	0.1288	0.0662	0.0663	0.1131	0.0034	0.0489	0.1018	0.1063	1.0000
VIF	8.66	1.54	1.61	9.59	5.27	1.53	5.58	3.01	1.21

\*\*\*Significant to 1%; \*\* Significant to 5%; \* Significant to 10%

With the view to verify a problem of multi-collinearity between the variables, we used the "variance inflation factor" statistic, or VIF. According to Table 4, the values for statistical VIF is between 1 and 9, below the tolerable limit (Wooldridge, 2006), except for the size (ag) variable with a value of 9.59. However, we performed other tests that led us to believe that the model was not compromised. In addition to statistical VIF, we tested adding or deleting variables to the model to verify exaggerated alterations in the model, but, the signs did not change, and values of the estimated parameters have not changed significantly, which shows that the model is stable (Edwin, 2008). Furthermore, the "t" tests applied to the coefficients were statistically significant. For these reasons, it can be argued that in this model, the assumption of multi-collinearity has not affected the results.

The postulate of homoscedasticity was also verified. In the tests performed, we have not encountered problems of heteroskedasticity for UDI and IAI, however, for estimates of ADI the test rejected the null hypothesis of homoscedasticity, indicating the presence of heteroskedasticity. To solve the problem, the estimators have been corrected according to the White (1980) method.

The regression results are presented in Table 5, which presents the statistical of the three regression models obtained for the dependent variables (UDI, IAI and ADI), including estimated coefficients, statistics “t” and the coefficients of determination adjusted ( $R^2$  adjusted). Table 5 also shows the sign of the expected relationships between the dependent and independent variables. The “+” sign indicates a positive relationship, the sign “-” indicates a negative relationship. The following is a summary of the results:

**Table 5**  
**Estimation results**

<i>Variable Independent</i>	<i>Estimation “UDI”</i>	<i>Estimation “IAI”</i>	<i>Estimation “ADI” (robust)</i>	<i>Expected Signs</i>
Wealth	-0.8749116 (-1.59)	-0.9735284 (-1.51)	-0.2695604 (-0.51)	+
Costeq	-0.0000719** (-2.49)	-0.0001167** (-2.67)	-0.0000114 (-0.36)	-
Size (ag)	-0.0000525 (-1.33)	-0.0000305 (-0.53)	-0.0000821 (-1.65)	+
Size (apg)	0.0002706** (2.57)	0.0002126 (1.33)	0.0003487** (2.67)	+
Alumserv	-3.771764 (-1.27)	-5.873249 (-1.30)	-0.92873 (-0.22)	+
Age	-0.139632** (-2.68)	-0.0205356** (-2.59)	-0.0051067 (-0.80)	+
Quality (inst)	0.308287** (2.29)	0.0304813 (1.46)	0.0311631** (2.19)	+
Quality (prof)	0.3695621 (0.64)	0.8551523 (0.97)	-0.2815094 (-0.71)	+
Governance	0.0666736** (2.50)	0.1041501** (2.57)	0.0158777 (0.49)	+
Observations	45	45	45	
Within $R^2$	0.4774	0.3838	0.3906	
Durbin-Watson test	1.577	1.607	1.251	
<b>(F statistic)</b>	3.55 (0.0032)	2.42 (0.0295)	1.94 (0.0788)	

\*\*\*Significant at 1%; \*\* Significant at 5%; \*Significant at 10%

To test the seven hypotheses established earlier, the proposed models for disclosure extension by federal Brazilian universities were examined for significance. The regression models explained only part of the variance of disclosures. For all models, the observed sign and significance of the *t*-statistic for the regression coefficients were examined to determine whether the research hypotheses associated with each variable was supported.

An initial analysis of the results obtained by the three models reveals that there are two hypotheses that were not confirmed by any of the analyzed disclosure levels. The hypothesis related with wealth (H1) of the institution and the relation between employees and students (H6) were not statistically significant in any of the three regression models. Other studies (Caba, Rodríguez, & López, 2008, and Gallego, García,

& Rodríguez, 2009) have obtained similar results to ours. Furthermore, the size and quality variables that had as proxy the number of undergraduate students and the degree of specialization of the teachers, respectively, showed no significant results for all of the regressions.

On the other hand, there are five hypotheses that have been confirmed at least in two of the three models presented: efficiency (was measured by cost per student), size (number of graduate student), the age of the institution; quality (quality of the institution), and governance.

The hypothesis that argue that there is a negative relationship between cost per student (H5) and disclosure information was confirmed with a significant result, demonstrating that efficient universities disclose more information. This result is consistent with a study conducted by Católico (2012), which argue that the highest quality in public administration presupposes access to information requirements and greater transparency.

Similar to the present paper, previous studies like Carbara and Garcia (2010), and Gandía and Archidona (2008) found a positive and significant relationship between the institution size (H2), and information dissemination on the internet.

The results shown in Table 5 suggest that university age (H3) has a negative and significant relationship in relation to the disclosure of information on the internet. This variable had an unexpected negative sign, taking into account we expected that the oldest universities would disclose more information as demonstrated in previous studies. This result also suggests that we should analyze this variable with caution, because the statistical information reveals that the federal Brazilian universities are relatively young with 75 percent of the sample having less than 67 years old. Statistical tests were performed using *dummy* variables in sections of age, and revealed that older universities, over 67 years old, has a greater influence on the results presented, because these institutions affect negatively and significantly the variable age. Nevertheless, the results demonstrate that the universities with less than 67 years old reported more information on their websites, especially those under 11 years old.

The result of our study in relation to the university quality (H7), also came out as expected, in other words, universities that had better quality released more information than those of lower quality.

The results confirm the hypothesis that the governance (H4) is related to disclosure of information, and the result shows a positive relationship, as predicted. This result is in agreement with the one proposed by Gallego *et al.* (2009), and Gordon *et al.* (2002), although these studies did not obtain a significant result for the governance variable in their samples.

Finally, the results obtained by each regression showed that the aspects related to quality, efficiency, governance, size, and age provided to be determining factors to disclosure of information on internet of the universities analyzed.



## 6. CONCLUSIONS

The results of this study revealed important findings, and contribute to the literature through detailed analysis of the issues related to the actual regulation on access to information, accounting disclosure, and the identification of different motivational factors for voluntary disclosure among Brazilian public universities.

The empirical evidence suggest that the aspects related to quality, efficiency and governance showed to be determining factors for the dissemination of information with statistically significant results. Another interesting aspect verified in the Brazilian context was that the younger universities showed better results in relation to the proposed indexes. Perhaps this result was related to the fact that younger universities have to disclose more information to capture more students, especially those universities that have approximately one decade of existence, as demonstrated in the statistical analysis.

It must be emphasized that the level of e-disclosure in federal Brazilian universities are middling, however, considering the partial indexes, the general information dissemination level is medium-high, although the level of accounting information disclosed demonstrated to be quite small.

The present study shows that the index to access to information, which is regulated by the access to information law, afforded a much higher result than the accounting disclosure index, of voluntary disclosure. This result demonstrates that the regulation of access to information has brought benefits to citizens, to the extent that the institutions analyzed in our study increased their transparency.

Several limitations to the study must be addressed. First, regards the composition of the sample. The study was conducted with federal Brazilian universities, however, there are other higher education institutions, with different forms of registered composition that were left out of this study. Therefore, the present results cannot be generalized to all higher education institutions in Brazil, but only for the sample of this study. A second limitation in our study is related to the extent of information disclosed, once the quality of information has not been evaluated. A single sentence description of compliance received the same score as a detailed report of several pages. The subjective nature of classification based on the quality prevents this approach. Third limitation to our study is the possible problem with multi-collinearity between variables. The use of highly correlated variables that could measure the same attribute, such as wealth and size of university, may be a limitation, even though the variance inflation factor (VIF) did not exceed the level suggested by Wooldridge (2006, p. 99). In spite of these limitations, our work provides significant results about the determinants of e-disclosure.

This study brings empirical evidence and knowledge to the academic literature on transparency and e-disclosure, especially with regard to the context of Brazilian public universities. With the implementation of the law on access to information in

many countries, allied to the need to improve and expand the dissemination of information and services via internet, it is expected that more academic studies will be interested in this field.

Future studies aiming to check the aspects and necessities to improve and expand the disclosure of information on the internet from the perspective of public administrators might help on the development of the e-government.

### *Acknowledgements*

The author Rodrigo Valverde da Silva is thankful for the financial support from CAPES - Proc. n° 1071122.

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