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Research paper

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Abstract

IT Governance (ITG) institutionalization might reduce the negative impact of political issues on IT results especially through the behavioral pillar. This research used the Organizational Citizenship Behavior (OCB) concept to understand this phenomenon. OCB describes a person's voluntary commitment to an organization that is not part of his/her contractual tasks. The goal of this study is confirming that ITG institutionalization effects *civil servants' behavior. The set of hypotheses of the theoretical-empirical model are based on the presumption that ITG institutionalization exerts a positive effect on each variable of OCB. A descriptive-confirmative ex post facto research was operationalized through a survey research with 173 civil servants in the Executive and Judiciary Branch of a Brazilian state. A questionnaire was developed and validated through Factor exploratory Analysis. Partial least squares structural equation modeling was used for data analysis. All hypotheses were confirmed, showing the effect of ITG institutionalization on the behavior of individuals. The theoretical contribution is the development of an ITG institutionalization construct and the demonstration of a positive and significant relationship between this and the OCB construct. The practical contribution highlights the possibility of IT managers performing their IT tasks through behavior change of individuals encouraged by the ITG institutionalization.*

Keywords: IT Governance Institutionalization, Organizational Citizenship Behavior, Public Organizations, Partial Least Squares (PLS-SEM).

1 Introduction

A very particular challenge in public organizations is making the initiatives perennial and related more to the state rather than the government, avoiding the constant changes every term. The same occurs with Information Technology (IT) initiatives, which should be applied from a long-term perspective in order to better address the demands of the population (Meijer and Bolivar, 2015). IT objectives and principles that are not changed in every administration are more consistent, and their implementation is more likely to be consistent over the years within an IT Governance process (Luciano et al., 2016).

Long-term decisions and initiatives in public organizations have been focusing on tools that support citizen participation rather than tools that only improve public services (Yildiz, 2007), allowing a more open and transparent interaction with all stakeholders (Luna- Reyes et al, 2012). The connections between government and citizens are changing (Cunha and Miranda, 2013), and this whole process generates new demands for data, information, and fast and reliable services whose operationalization de-

pends on, evolves with, or is enhanced by IT solutions. Additionally, government service delivery nowadays involves a complex mix of political, organizational, technical, and cultural concerns (Nfuka and Rusu, 2011), which can be more adequately dealt with by a governance structure.

Considering this scenario, managing IT is no longer enough; it is necessary to go one step further into a governance process. Van Grembergem and De Haes (2009) indicate that the differences between management and governance are related to time and orientation: management involves short term and internal aspects, while governance deals with long term and external aspects. Governing IT, consequently, can assist an organization in meticulous IT decision making, so increasing or maintaining the alignment between IT and stakeholders' expectations. For a public organization, to consider long-term and external aspects is mandatory, given that they are part of a complex network of actors working together for the concretization of a service. IT governance is a part of the good governance of public organizations (Juiz, Guerrero and Lera, 2014).

IT Governance (ITG) is a set of organizational arrangements and patterns of authority for strategic IT activities (Sambamurthy and Zmud, 1999). These arrangements are compounded by a set of structures, processes, and relationship mechanisms (Weill and Ross, 2004), which are the practical operationalization of ITG high-level definitions (Luciano et al., 2016). Mainly, ITG is the decision-making structure, the decision rights and the decision responsibilities for encouraging desirable behavior related to IT (Weill and Ross, 2004), and the strategic use of IT in an organization. Good governance provides transparency and clear decision making, authority, and responsibility when dealing with the public sector assets (Juiz, Guerrero and Lera, 2014), and amplifies organizational IT agility when aligned with the IT units' and line functions' peripheral knowledge (Tiwana and Kim, 2015). IT Governance is also important for understanding the nature of public administration work at its operative level, where public policies are executed and the everyday tasks of public governance are carried out (Goldkuhl, 2016).

Studies on IT Governance, like as Juiz and Toomey (2015) and ISO/IEC 38500 (2008), suggest the existence of two main pillars of action in the ITG mechanisms' adoption. The first and most common one focuses on the legal and regulatory aspect and involves, according to Peterson (2004) and Van Grembergen and De Haes (2004), the specification of the key IT decisions, and every actor's IT decision rights. The second pillar centers on the behavioral aspect inherent to individuals dealing with IT. According to Weill and Ross (2004), Huang, Zmud and Price (2010), and Bradley et al. (2012), the IT Governance mechanisms should be able to encourage individuals' desired behavior regarding IT issues.

The encouragement of desirable behavior complements the normative side of IT Governance, and goes beyond regulatory compliance and also contributes to a more consistent and aligned relationship between business and IT (Juiz and Toomey, 2015). This behavioral expression of IT Governance is the focus of this research. The Organizational Citizenship Behavior (OCB) concept was used to understand individuals' behavior. According to Smith, Organ and Near (1983), OCB describes a person's voluntary commitment to an organization or company that is not part of his or her contractual tasks. OCB is characterized by the existence of employees' protective actions that aim to safeguard an organization and whatever belongs to it, contributing to a favorable environment. Our premise is that IT Governance acts on the antecedents of the organizational citizenship behavior, such as job satisfaction and rewards perception. Thereby, citizenship behavior might improve because of the ITG process, a relation that this study aims at understanding.

The proposed relationship between IT Governance and OCB is based on the potential effect that the ITG mechanisms adoption can exert on the OCB constructs in the public sector domain, which to the best of our knowledge has not been studied so far. This effect can be potentialized when ITG mechanisms are institutionalized in the organization. Institutionalization process connects the stages of ITG practices institutionalization, the needs of the organization with the adoption of the practices, and the institutional mechanisms that operate in the decision-making process (Pereira et al., 2013). ITG can be better understood by analyzing the organization's responses to institutional pressures, whether formal or informal, the institutional pressures per se, and the context in which they occur (Jacobson, 2009). As an example, the adoption of structure mechanisms can make the decision-making process more transparent, giving

to the employees a perception of equitable IT decisions. The same occurs in the adoption of relationship mechanisms that disseminate a shared understanding among collaborators in IT and other areas, which might contribute to individuals assuming attitudes that support interpersonal harmony or individual initiative.

In order to contribute with the literature gap in combining IT Governance and OCB in public organizations and based on the aforementioned concepts and context, the research question that leads this study is the following: Does IT Governance mechanisms adoption contribute to individuals behaving in a manner consistent with that desired by IT Managers in Public Organizations? The goal of this study is to analyze the effect of IT Governance institutionalization on civil servants' Citizenship Organizational Behavior. In order to achieve this goal, a descriptive-confirmative *ex post facto* research was developed and operationalized through a survey research with civil servants in the Executive and Judiciary Branch of a Brazilian State. They were already developing their own IT Governance Model and implementing some mechanisms, so that this became an opportune moment to develop our research.

This article is organized in seven sections. In this section, the motivations for the study are presented, and the research problem and objectives are defined. Section 2 discusses the theoretical elements guiding the study. Section 3 presents the theoretical-empirical model. Section 4 describes the operationalization of the study, and is followed by a discussion of the results (Sections 5 and 6). The concluding remarks are set forth in Section 7.

2 Theoretical background

2.1 IT Governance

The main issues related to IT have gradually changed from the types of technology to be adopted, to the definitions and policies regarding how these technologies and resources should be used to generate a competitive advantage for organizations (Nfuka and Rusu, 2011; Bartenschlager and Goeken, 2010), and increase the level of alignment between IT and business. Governance of IT is a board and top-executive responsibility focusing on business performance and capability (Juiz and Toomey, 2015).
IT Governance is part of these new issues, pursuing long term IT, and not just managing but also governing IT. This is because IT has become a way to competitive leverage for organizations, while at the same time addressing the need to direct and govern IT for reaching the expectations of different stakeholders. Organizations are applying IT governance practices in day-to-day operations in order to strategically drive and control IT, in an effort to ensure that their IT investments enhance business value (Lunardi et al., 2016) and also to ensure appropriate positioning of technology opportunity and response to technology-enabled changes in the marketplace (Juiz and Toomey, 2015).

According to Weill and Ross (2004), IT Governance can be understood as the specification of the decision rights and accountability framework that encourage desirable behavior in IT use. ITG involves specifying decision-making structures, processes, and relational mechanisms for the direction and control of IT operations (Sambamurthy and Zmud, 1999). It is further characterized as a set of mechanisms associated with the structure, processes, and relationships; these mechanisms must be related to one or more objectives of the organization (Van Grembergen, De Haes and Guldentops, 2004). IT Governance amplifies organizational IT agility when aligned with the IT units' and line functions' peripheral knowledge (Tiwana and Kim, 2015).

ITG is considered part of the scope of corporate governance (Weill and Ross, 2004; Peterson, 2004). It is related to organizational effectiveness, compliance with laws and regulations, meeting stakeholder necessities, and adequately reacting to the pressures to demonstrate good returns on IT investments. According to Tiwana, Kosminsky and Venkatraman (2013), ITG is a combination of which is governed, who is governed, and how it is governed. ITG involves a set of high-level definitions, such as principles, values, and goals, operationalized through mechanisms. ITG mechanisms are a practical manifestation of these high-level definitions that are made a part of the day-to-day activities as a means to render the

ITG practicable. Considering its strategic importance, good governance should not be focused only on processes and structures, because people responsibilities and alignmães are essential for its implementation (Goldkuhl, 2016).

2.2 Organizational Citizenship Behavior

According to Barnard (1938), organizations can be understood as an activity system where two or more people integrate efforts in a conscious and coordinated manner. People aggregate themselves to an organization due to the human ability to share a purpose, the willingness related to organizational processes, and the ability to communicate. These three factors are the core of the Organizational Citizenship Behavior construct (Siqueira, 2003). Katz and Kahn (1978) denote some fundamental behavior for organizational dynamics, namely: a) enter and remain in a system; b) show reliable, innovative, and spontaneous behavior. According to the authors, innovative and spontaneous behavior is essential to the organization, because it constitutes a higher performance compared to the requirements for the achievement of organizational demands.

Organizations' members are intrinsically cooperative and inter-related, just like they are in their private lives. According to Smith, Organ, and Near (1983), Organizational Citizenship Behavior is characterized by the existence of system protective actions, aiming to safeguard the organization and whatever belongs to it. It is also characterized by the efforts of members to take responsibility for their own education. The objective is to improve the performance in their activities and to prepare them to take more responsibilities in the organization. Members are frequently presenting new ideas to the managers, and cooperating to develop a favorable environment to face the organization's external challenges.

There are other similar denominations for the OCB concept, such as prosocial behavior (Brief and Motowidlo, 1986); civic virtue (Graham, 1991); extra-role performance behavior (Pearce and Gregersen, 1991); and civics in organizations (Siqueira, 1995). However, some important differences can be identified between the concepts (Podsakoff et al, 2000). OCB was chosen because its meaning is aligned with the Corporate Governance conceptual bases, and as a consequence with IT Governance. Organ (1988) argues that such behavior is associated with a set of informal contributions that the participants of an organization can manifest or inhibit, without having to answer to formal objectives of sanctions (Siqueira, 1995).

3 Theoretical Model

In this section the theoretical model of the research is developed and the hypotheses are formulated. The process of IT Governance institutionalization influences the behavior of individuals and the performance of organizations. Based on the theoretical background, the general hypothesis of this study is that IT Governance institutionalization has a positive effect on civil servants' organizational citizenship behavior.

The behavior is important because the best process model can often be defeated by inadequate human behavior and, on the other hand, good behavior compensates for deficiencies in it (Juiz and Toomey, 2015). IT Governance mechanisms are responsible for expressing the aspirations of Corporate Governance related to IT (Weill and Ross, 2004; Van Grembergen and De Haes, 2009). This structure influences the behavior of individuals and the organization's performance, as it may influence the ability of employees to commune for a purpose, the goodwill related to organizational processes, and the ability to communicate.

Based on this general hypothesis, the following theoretical-empirical model shown in Figure 1 was created by combining a pre-established model (OCB) and IT Governance Institutionalization variables that emerged from past publications of the authors (see Luciano et al. 2016).
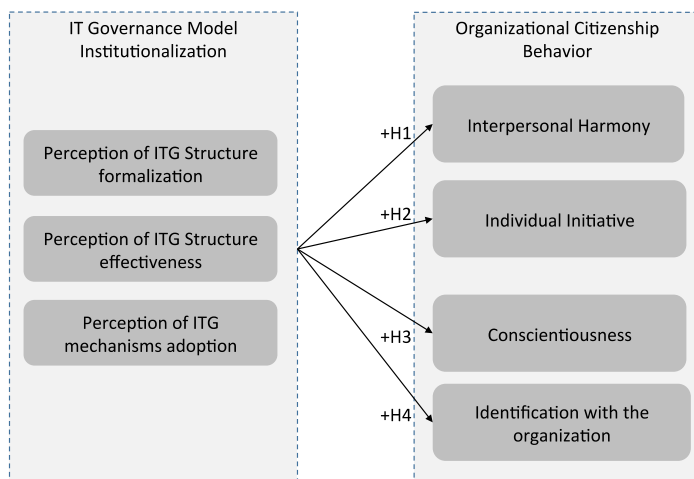
Figure 1.   Theoretical-Empirical Model

The theoretical-empirical model demonstrates that IT Governance Institutionalization exerts a positive effect on each variable of Organizational Citizenship Behavior, so the methodological procedures performed must test if:

a) The Interpersonal Harmony behavior is positively influenced by the Institutionalization of the IT Governance Model (+ H1);

b) The Individual Initiative behavior is positively influenced by the Institutionalization of the IT Governance Model (+ H2);

c) Conscientiousness behavior is positively influenced by the Institutionalization of the IT Governance Model (+ H3);

d) The Identification with the Organization behavior is positively influenced by the Institutionalization of the IT Governance Model (+ H4).

The OCB concept is related to behaviors that are not specifically part of individuals' roles, but they are very important for the organization. It is relevant to consider the desirable behavior as a way to go beyond the compliance behavior usually linked with ITG practices adoption. Desirable and citizenship behavior are very important for having long term IT planning, and to increase the effectiveness of ITG adoption.

Luciano et al. (2016) showed a preliminary relationship between OCB and ITG through a qualitative research, considering that ITG mechanisms establish a collective sense for the organization as a whole, and the default settings provide a guide for people in their decisions.

The proposed conceptual model shows that the principles of Corporate Governance are responsible for guiding the ITG objectives and mechanisms, as mentioned by Weill and Ross (2004). The ITG objectives at the same time come from the organization's strategies and are moderated by the principles of corporate governance, and are responsible for determining the IT Governance mechanisms that will be adopted by the organization.

4   Research Method

The epistemological research position of this study is the functionalist, in which the concern understands society in such a way as to generate knowledge that can be used by organizations (Burrel and Morgan, 1979). This study is characterized as an *ex post facto* research with a confirmatory-descriptive nature (Venkatesh, Brown and Bala, 2013)

A survey was performed at the Executive and Judiciary Branch of a State Government in Brazil. The respondents were civil servants working on IT related functions and employed for more than two years in their organization. Data were collected from May to November 2016.

The unit of analysis is the IT Governance Mechanism, and the adopted analysis perspective is the individual in the context of public administration. The data collection and data analysis were executed as a mixed-focus cross-sectional study (Venkatesh, Brown and Bala, 2013). Figure 2 shows the relationships between the different procedures and techniques used in this research.
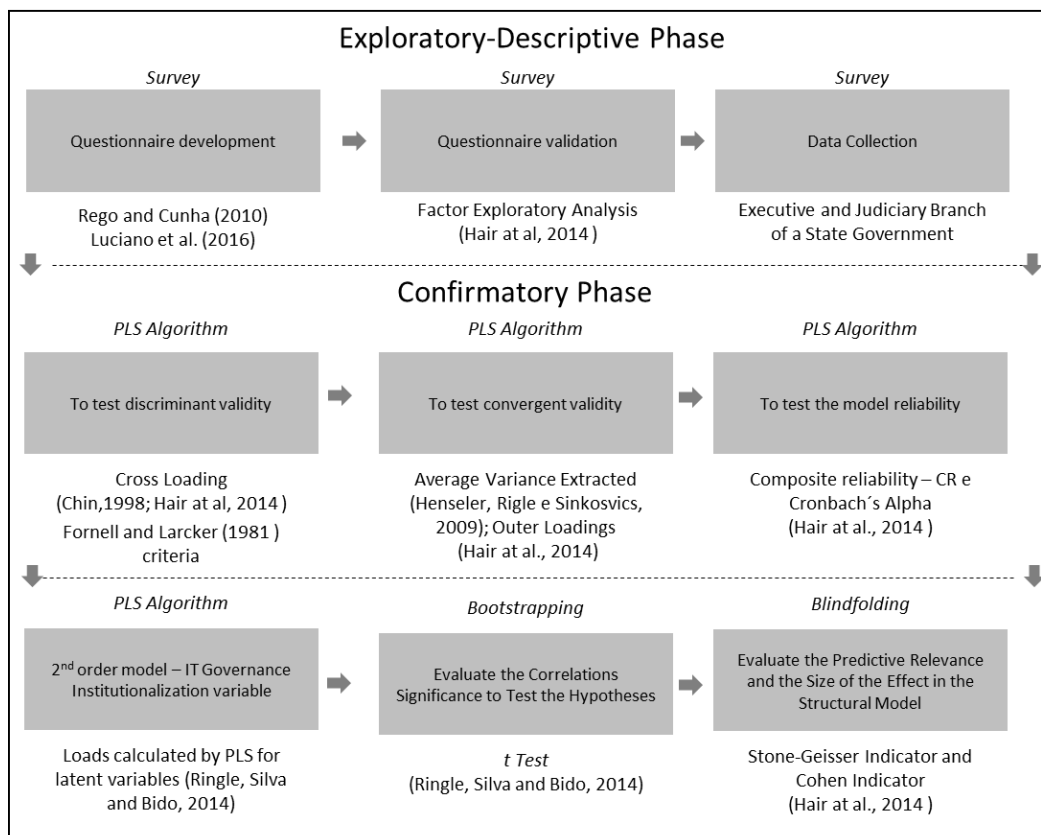

Figure 2.   Research schema

The questionnaire was divided into three parts. The first part was composed of 18 questions based on Luciano et al. (2016), and intended to measure the ITG institutionalization. The focus of the second was to identify the existence of organizational citizenship behavior through 15 questions based on Rego e Cunha (2010). The third part was made up of 11 social-demographic questions. Table 1 shows the variables operationalization.

Construct: IT Governance Institutionalization		
Variable/Dimension	**Description**	**Source**
IT Governance Mechanisms (Regulatory Institutionalization)	This dimension is related to the regulatory institutionalization of IT Governance. The individual perceives the adoption of IT Governance mechanisms as the establishment of rules, monitoring, and sanctions	Based on Scott´s Institutionalization Model (2008), and Luciano et al. (2016)
IT Governance structure formalization (Normative Institutionalization)	This dimension is related to the normative institutionalization of IT Governance. The individual perceives the formalization of the IT Governance Structure as normative systems of impositions to social behavior, authorizing and enabling social action	
IT Governance effectiveness perception (Cultural-cognitive Institutionalization)	Dimension related to the Cultural-Cognitive institutionalization of IT Governance, in which the individual perceives as effective the adoption of IT Governance Mechanisms	

Construct: Organizational Citizenship Behavior		
Variable/Dimension	**Description**	**Source**
Interpersonal Harmony	Dimension related to interpersonal harmony, participation, team spirit, camaraderie, and knowledge and experience sharing	Adapted from Rego and Cunha (2010)
Conscientiousness	Dimension that reflects behaviors of obedience, conscientiousness, and protection of the resources of the organization	
Individual initiative	Dimension revealing a spirit of initiative, willingness to solve problems and find alternative solutions for them, and spontaneity to make constructive suggestions for improvement.	
Identification with the organization	Dimension that denotes that the individual seeks to defend the image of the organization with attitudes that exalt the positive aspects in front of people from outside the organization	

Table 1.   Variables Description

Validation process started with face and content validation through a discussion with four experts in IT Governance and public administration. A pretest was performed through a survey research with 74 respondents presenting a similar profile as in the full data collection. The pretest data was analyzed through Factor Exploratory Analysis, KMO, Bartlett and Cronbach's Alpha.

A set of 243 survey instruments was completed. Data purification was conducted, specially following the statements of Hair et al. (2014). The incomplete questionnaires or the ones presenting 75% or more repeated answers were disregarded. At the end of the data purification procedure, there were 173 valid cases. The respondents' profiles are presented in Table 2.

PROFESSIONAL LEVEL	GENDER	EDUCATION	EXPERIENCE
Analyst (66)	Male (74.2%7) Female (25.8%)	MBA (48.5%); Undergraduate (40.9%); Master (10.6%)	66 Obs. Average = 13.06
Coordinator (19)	Male (75.0%) Female (25.0%)	Undergraduate (37.5%); MBA (56.2%); Master (6.3%)	19 Obs. Average = 14.03
Director (4)	Male (100.0%)	Undergraduate (100.0%)	4 Obs. Average = 5.75
Manager (14)	Male (85.7%) Female (14.3%)	MBA (71.4%); Undergraduate (28.6%)	14 Obs. Average = 10.07
Technician/Assistant (70)	Male (77.1%) Female (22.9%)	Undergraduate (48.6%); MBA (47.1%); Master (4.3%)	70 Obs. Average = 15.29
TOTAL (173)	Male (134) Female (39)	Undergraduate (76); MBA (85); Master (12)	173 Obs. Average = 13.43

Table 2.   Respondents' profiles

The Kolmogorov-Smirnov test showed that it is not possible to determine the sample normality. The estimation of structural equations by partial least squares (SEM-PLS) becomes the most adequate way to analyze data, because there is no such assumption to use the technique (Hair et al., 2014; Koufteros, 1999).

5   Data Analyses

The protocol for performing PLS techniques was divided into two steps to fit the specificities of this research, which are discussed in the following items.

5.1   Measurement Model Analysis

The theoretical-empirical model hypotheses were tested through the Smart-PLS® software. The first-order model was developed, and each of the three variables of the IT Governance Institutionalization

construct was linked to each of the four variables of Organizational Citizenship Behavior.

After design of the model, the PLS Algorithm module was used. It was configured according to Ringle, Silva and Bido's (2014) recommendations for the Path Weighting Scheme with the following parameters: mean = 0 and standard deviation = 1; maximum number of rotations to converge the model = 300; Abort Criterion for changes below 0.00001. Finally, the results of the calculations were generated, which were interpreted through the software report. Figure 3 shows the first order model of the constructs in the Smart-PLS software.
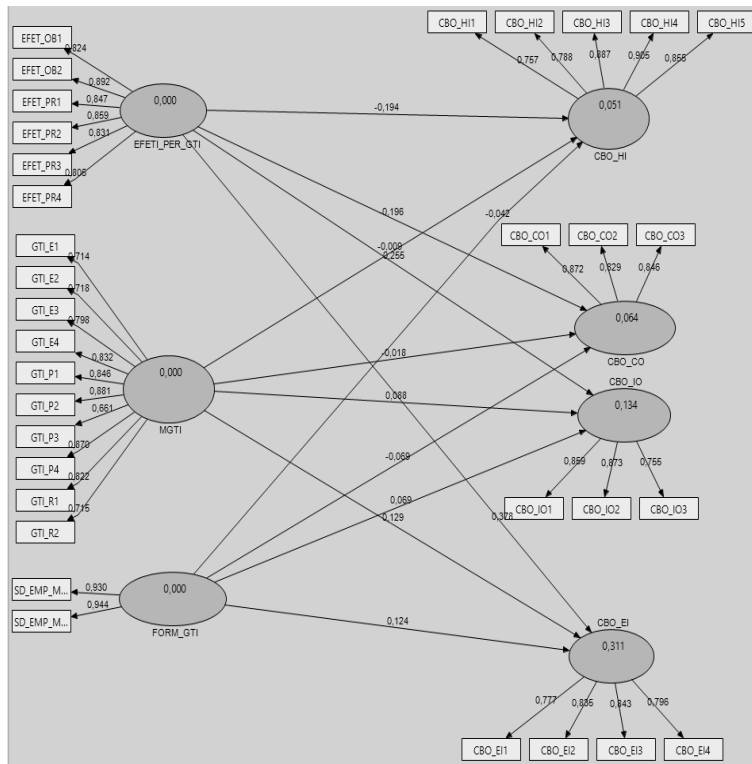

Figure 3.   1ˢᵗ order model

The analysis of the Measurement Model began with the evaluation of the discriminant validity, which was obtained as the latent constructs or variables are independent of each other (Hair et al., 2014). Following the recommendations of Ringle, Silva and Bido (2014), and Hair et al. (2014), cross loads were perceived between observable variables and their factors. Table 3 presents the discriminant validity test based on the Cross Loading analysis (Chin, 1998).

	CBO_CO	CBO_EI	CBO_HI	CBO_IO	EFETI_PER	MGTI	FORM_GTI
CBO_CO1	**0.8721**	-0.4420	0.7118	-0.1736	-0.2422	-0.2470	-0.1842
CBO_CO2	**0.8289**	-0.3814	0.5695	-0.1371	-0.2070	-0.1109	-0.1462
CBO_CO3	**0.8462**	-0.4230	0.7334	-0.2106	-0.1589	-0.1152	-0.1320
CBO_EI1	-0.3547	**0.7765**	-0.3826	0.3093	0.5059	0.3905	0.3700
CBO_EI2	-0.4039	**0.8347**	-0.4110	0.3263	0.3936	0.3627	0.3332
CBO_EI3	-0.4040	**0.8431**	-0.4466	0.3909	0.3908	0.3810	0.2896
CBO_EI4	-0.4338	**0.7956**	-0.4116	0.5182	0.4078	0.3721	0.3369
CBO_HI1	0.6142	-0.3797	**0.7567**	-0.1471	-0.1100	-0.0658	-0.0669
CBO_HI2	0.6619	-0.3603	**0.7879**	-0.0348	-0.0876	-0.0504	-0.0592
CBO_HI3	0.6812	-0.4956	**0.8874**	-0.2409	-0.2350	-0.2143	-0.1477
CBO_HI4	0.6953	-0.4479	**0.9049**	-0.1915	-0.2292	-0.1417	-0.1489
CBO_HI5	0.6882	-0.4120	**0.8550**	-0.1140	-0.1843	-0.1463	-0.1540
CBO_IO1	-0.1594	0.4024	-0.1919	**0.8586**	0.3069	0.2750	0.2316

	CBO_CO	CBO_EI	CBO_HI	CBO_IO	EFETI_PER	MGTI	FORM_GTI
CBO_IO2	-0.1636	0.4383	-0.1477	**0.8728**	0.3072	0.2537	0.2168
CBO_IO3	-0.1821	0.3315	-0.1400	**0.7548**	0.2553	0.2299	0.2114
EFET_OB1	-0.2949	0.5272	-0.2917	0.2382	**0.8244**	0.5521	0.4704
EFET_OB2	-0.2666	0.5066	-0.2467	0.3545	**0.8923**	0.6058	0.4728
EFET_PR1	-0.1202	0.4244	-0.1161	0.3696	**0.8467**	0.6080	0.4348
EFET_PR2	-0.1942	0.4203	-0.1609	0.3002	**0.8588**	0.5632	0.4583
EFET_PR3	-0.1666	0.3818	-0.1260	0.2239	**0.8309**	0.5403	0.4626
EFET_PR4	-0.1537	0.3718	-0.1349	0.2749	**0.8054**	0.4785	0.3662
GTI_E1	-0.2158	0.3750	-0.1743	0.2584	0.4022	**0.7461**	0.5708
GTI_E2	-0.1854	0.3266	-0.1251	0.1700	0.3630	**0.7338**	0.4563
GTI_E3	-0.2281	0.3618	-0.1456	0.2141	0.5638	**0.8016**	0.5280
GTI_E4	-0.3250	0.4225	-0.2721	0.2293	0.5753	**0.8465**	0.6159
GTI_P1	-0.2417	0.3957	-0.1654	0.1874	0.5544	**0.8488**	0.5147
GTI_P2	-0.2299	0.4446	-0.2173	0.2508	0.5653	**0.8847**	0.5898
GTI_P3	-0.2069	0.4930	-0.2087	0.1436	0.4947	**0.7359**	0.5534
GTI_P4	-0.2896	0.3982	-0.2318	0.2759	0.5612	**0.8655**	0.6059
GTI_R1	-0.2908	0.4210	-0.2372	0.3136	0.4870	**0.8269**	0.5704
GTI_R2	-0.2416	0.4715	-0.2147	0.2428	0.4762	**0.7517**	0.5432
MGTI_PER	-0.2646	0.3915	-0.1819	0.2704	0.3904	0.5893	**0.9225**
MGT_TIPO	-0.2667	0.4256	-0.2568	0.2725	0.5003	0.6938	**0.9354**

Table 3.   Discriminant validity – Cross Loading Analysis

Table 3 shows that the indicators have higher factor loads in their respective latent variables or constructs than in others, confirming the discriminant validity of the Measurement Model based on the Cross Loading criterion (Chin, 1998).

Continuing the Measurement Model tests, we compared the square roots of the Average Variance Extracted (AVE) of each latent variable with the other Pearson correlations latent variables. Thus, according to the Fornell and Larcker (1981) criterion, the square roots of the AVE should be larger than the correlations between the constructs. Table 4 presents the discriminant validity test based on the Fornell and Larcker (1981) criterion.

	CBO_CO	CBO_EI	CBO_HI	CBO_IO	EFETI_PER_GTI	FORM_GTI	MGTI
CBO_CO	**0.8492**						
CBO_EI	-0.4900	**0.8129**					
CBO_HI	0.7880	-0.5075	**0.8403**				
CBO_IO	-0.2014	0.4728	-0.1935	**0.8304**			
EFETI_PER_GTI	-0.2450	0.5289	-0.2226	0.3502	**0.8436**		
FORM_GTI	-0.1855	0.4128	-0.1515	0.2648	0.5291	**0.9370**	
MGTI	-0.1964	0.4655	-0.1676	0.3052	0.6643	0.6918	**0.7892**

Table 4.   Discriminant Validity (Items in bold represent the square root of the AVE scores)

Table 3 and Table 4 show that the model presents discriminant validity. The square roots of the latent variables AVE are larger than the correlations of the same ones with the other latent variables of the Model, in compliance with the Fornell and Larcker (1981) criterion, and also the Cross Loading criterion based on Chin (1998).

After confirming the discriminant validity, the values were observed in order to determine the convergent validity (AVE values), Internal Consistency - Cronbach's Alpha (CA) and Composite Reliability (CR), as presented in Table 5.

Latent Variables	AVE*	CR	CA
CBO_CO	0.7212	0.8858	0.8100
CBO_EI	0.6608	0.8862	0.8292
CBO_HI	0.7061	0.9228	0.8997

Latent Variables	AVE*	CR	CA
CBO_IO	0.6896	0.8691	0.7732
EFETI_PER_GTI	0.7116	0.9367	0.9192
FORM_GTI	0.8780	0.935	0.8614
MGTI	0.6228	0.9424	0.9312
Reference Values	AVE > 0.50	CR > 0.70	AC > 0.70

Table 5.   Convergent Validity and Internal Model Consistency
*Average extracted principal constructs variance.

Based on Table 5, it was possible to determine the convergent validity and the internal consistency. The Measurement Model is adequate for the purpose of this study, allowing the construction of the second order model, which makes it possible to carry out the tests of the research hypotheses.

After the analysis of the Measurement Model (1st order model), the procedures recommended by Sanchez (2003) and Hair et al. (2014) for the construction and analysis of the 2nd order Measurement Model were carried out. The Latent Variable Scores (unstandardized) calculated for the exogenous variables Perception of IT Governance Structure Effectiveness (EFETI_PER_GTI), Perception of IT Governance Structure Formalization (FORM_GTI), and Perception of the IT Governance Mechanisms Implementation (MGTI) were inserted in a new database to represent the indicators' values of the endogenous variable Institutionalization of the IT Governance Model (INST_GTI), as presented in Figure 4. (2nd order model)
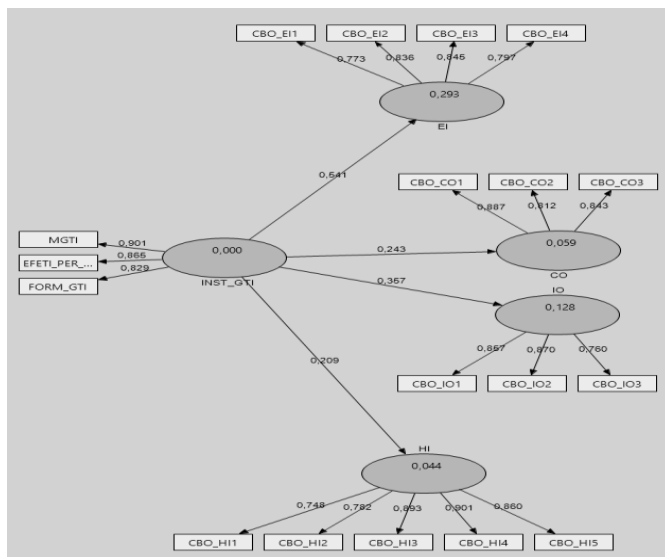

Figure 4.   2nd order model

The analysis of the Measurement Model began with the evaluation of the discriminant validity obtained as the latent constructs or variables are independent of each other (Hair et al., 2014). Following the recommendations of Ringle, Silva and Bido (2014), cross loads were perceived between observable variables and their factors. Table 6 presents the discriminant validity test based on Cross Loading analysis (Chin, 1998).

	OI	EI	HI	IO	INST_GTI
CBO_CO1	**0.8868**	0.4423	0.7122	0.1739	0.2577
CBO_CO2	**0.8121**	0.3810	0.5683	0.1372	0.1797
CBO_CO3	**0.8430**	0.4238	0.7318	0.2111	0.1547
CBO_EI1	0.3531	**0.7726**	0.3826	0.3090	0.4910
CBO_EI2	0.4067	**0.8363**	0.4129	0.3256	0.4166
CBO_EI3	0.4065	**0.8446**	0.4481	0.3902	0.4078
CBO_EI4	0.4338	**0.7970**	0.4122	0.5184	0.4290

	OI	EI	HI	IO	INST_GTI
CBO_HI1	0.6132	0.3793	**0.7482**	0.1472	0.0914
CBO_HI2	0.6655	0.3608	**0.7815**	0.0345	0.0725
CBO_HI3	0.6872	0.4962	**0.8930**	0.2408	0.2287
CBO_HI4	0.6974	0.4479	**0.9007**	0.1919	0.1995
CBO_HI5	0.6877	0.4117	**0.8600**	0.1140	0.1837
CBO_IO1	0.1586	0.4028	0.1934	**0.8574**	0.3142
CBO_IO2	0.1646	0.4389	0.1495	**0.8697**	0.3019
CBO_IO3	0.1834	0.3320	0.1409	**0.7598**	0.2718
EFETI_PER_GTI	0.2377	0.5195	0.2150	0.3489	**0.8653**
FORM_GTI	0.1859	0.4110	0.1513	0.2661	**0.8288**
MGTI	0.2010	0.4617	0.1689	0.3027	0.9012

Table 6.   Discriminant Validity - Cross Loading Analysis - 2nd order model

It was possible to determine that the 2nd order model, as well as the 1st order one, present Discriminant Validity according to the Cross Loading criterion (Chin, 1998) analysis in Table 6. Following the analysis of the 2nd order Measurement Model, the Fornell and Larcker (1981) criteria were analysed and then the values were used to determine the Convergent Validity (AVE values) and Internal Consistency, Cronbach's Alpha values (AC), and Composite Reliability (CR), as presented in Table 7.

	AVE*	*Composite Reliability*	*Cronbach's Alpha*	*CO***	*EI***	*HI***	*IO***	*INST_GTI***
CO	0.7188	0.8845	0.8100	**0.828**				
EI	0.6612	0.8863	0.8292	-0.575	**0.8096**			
HI	0.7038	0.9220	0.8997	0.7883	-0.5678	**0.8357**		
IO	0.6896	0.8691	0.7732	-0.396	0.4919	-0.3128	**0.8272**	
INST_GTI	0.7493	0.8995	0.8334	-0.377	0.5629	-0.3052	0.3561	**0.8552**
Reference Values	**AVE > 0.50**	**CR > 0.70**	**AC > 0.70**	Fornell and Larcker criterion (1981)				

Table 7.   Discriminant Validity and 2nd order model reliability.

   *Average extracted principal constructs variance.

   **Items on the diagonal (in bold) represent the square root of the AVE scores.

5.2   Analysis of the Structural Model

This step began with the evaluation of the Pearson coefficient of determination (R^2 value) (Ringle, Silva and Bido, 2014). Table 8 presents the values of the Pearson coefficient of determination (R^2).

Variable	*R^2*
Conscientiousness	0.0590
Individual Initiative	0.2926
Interpersonal Harmony	0.0437
Identification with the Organization	0.1276

Table 8:   Coefficients of Determination (R^2)

All of the tests carried out so far show the suitability of the proposed model, allowing us to test the hypotheses. *T Statistics* was calculated using the original values of the data and those obtained by the resampling technique through the Smart-PLS software Bootstrapping module. Table 9 presents the effects and significance of the relationships identified between the Institutional Variability of IT Governance and the Organizational Citizenship Behavior Variables.

	Original Sample (O)	Sample Mean (M)	Standard Deviation	Standard Error	T Statistics
INST_GTI -> CO	0.2429	0.2529	0.0647	0.0647	3.7525
INST_GTI -> EI	0.5410	0.5443	0.0538	0,0538	10.0592

	Original Sample (O)	Sample Mean (M)	Standard Deviation	Standard Error	T Statistics
INST_GTI -> HI	0,2091	0.2262	0.0637	0.0637	3.2815
INST_GTI -> IO	0.3571	0.3645	0.0590	0.0590	6.0541

Table 9:   Test of significance of the relations between ITG Institutionalization and CBO

The values of t test are above 1.96, corresponding to p-values> 0.05, confirming that the identified relationships are significant (Ringle, Silva and Bido, 2014). In a normal distribution, the values between -1.96 and +1.96 correspond to a 95% probability, and 5% probability when they are outside this range. Finally, the predictive validity was evaluated through the Stone-Geisser indicator (Q^2) and the effect size through the Cohen indicator (f^2). Table 10 presents the values of the Stone-Geisser (Q^2) and Cohen (f^2) indicators.

Latent variable	Stone-Geisser (Q^2)	Cohen (f^2)
INST_GTI	0.481	0.481
CBO_CO	0.031	0.421
CBO_EI	0.182	0.424
CBO_HI	0.023	0.553
CBO_IO	0.083	0.421

Table 10:   Model Predictive Validity and Constructs Effects

The Q^2 Indicator evaluates the quality of prediction of the model and the accuracy of the adjusted model. The values are higher than zero, confirming the accuracy of the adjusted model (Hair et al., 2014). Subsequently, evaluation of the indicator f^2 allowed determining how much each construct contributes to the adjustment of the model. According to Hair et al. (2014), $f^2 > 0.02$, $f^2 > 0.15$ and $f^2 > 0.35$ are considered small, medium, and large, respectively. Thus, it is possible to determine that all constructs are really important to the model fit. The following section is dedicated to discussing the results of the hypothesis tests.

6   Discussion

The evaluation tests of the measurement and structural models allow the analysis of the model paths and the research hypotheses. Based on the values shown in Table 9, which demonstrate the existence of significant relations (p-value> 0.05) between the IT Governance Institutionalization and Organizational Citizenship Behavior constructs, the research general hypothesis, that IT Governance Institutionalization has a positive effect on the Behavior of Individuals, can be confirmed. It is important to emphasize that Individual Initiative behavior is positively encouraged by IT Governance institutionalization (β = 0.5410; p-value> 0.05) in a way that it is possible to predict that the Individual Initiative behavior will increase up to 54% if IT Governance Institutionalization is increased by 1 point.

Similarly, the model demonstrates a smaller effect for Organizational Identity behavior (β = 0.3571; p-value> 0.05). These results contribute to the managers' understanding that the adoption and institutionalization of IT Governance mechanisms contribute to individuals' willingness to find alternative solutions for problems, and lead to spontaneity in making constructive suggestions for the improvement of organizational issues. The model also contributes to indicating that institutionalization of IT Governance instigates individuals to defend the image of the organization with attitudes that exalt the positive aspects of the organization, towards people outside the organization.

The positive correlation between IT Governance Institutionalization and Individual Initiative and Identification with the Organization behaviors allowed the confirmation of the hypotheses H2 and H4. The effect expected by IT managers related to the IT Governance Institutionalization, regarding Interpersonal Harmony (H1 - β = 0.2429; p-value> 0.05) and Conscientiousness (H3 - β = 0.2091; p-value>

0.05) occurred as expected, confirming the hypotheses H1 and H3. Interpersonal Harmony behavior was expected because IT managers believed that the Institutionalization of IT Governance would encourage the participation of individuals, creating team spirit and camaraderie, and increasing knowledge and experience sharing. The Conscientiousness behavior was expected by IT managers, given that IT Governance Institutionalization would promote greater compliance with organizational rules, making individuals aware of the importance of effective and optimized use of the resources of the organization.

7 Conclusions

Besides the ICT infrastructure that is required for creating smart operations and promoting smart services, Scholl and AlAwadhi (2016b) have identified the need for fundamental changes in organizational integration, alignment, and interorganizational cooperation, especially regarding information systems interoperability, as well as an adequate IT governance model. This research states that there is a relation between the individuals' behavior according to the desires of IT Managers in Public Organizations and IT Governance mechanisms adoption. This research aimed at confirming that IT Governance institutionalization has an effect on civil servants' Citizenship Organizational Behavior. To achieve the main objective of the research, hypotheses were formulated through a survey research with civil servants in the Executive and Judiciary Branch of a Brazilian State. The general hypothesis on the positive impact of IT Governance Institutionalization on the Behavior of Individuals was confirmed, as well as the four supplementary hypotheses of the study, which leads to the theoretical-empirical model generated.

This study provides both practical implications for professionals in government and theoretical implications for academics and professionals in the IT governance and organizational fields, considering the thoroughness of the theoretical background. This study contributes to the theory in three distinct ways. Firstly, the identification and development of an IT Governance institutionalization construct; secondly, the validation of the dimensions proposed by Rego and Cunha (2010) about OCB; and last, the demonstration of the existence of a positive and significant relationship between the two previous constructs. As a practical contribution, this study highlights the possibility of IT managers performing their IT tasks through the behavior change of individuals encouraged by the Institutionalization of IT Governance.

A limitation of this study is that the results generalization needs to consider that data was collected in one Brazilian State, so different organizational and cultural contexts may be considered. Further research should involve the application of the developed and validated model on other public and private organizations, increasing the comprehensiveness and tackling different contexts. After that, it would be possible to verify if the factorial structure and the relationship confirmed in this study remain significant.

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