

# Information Technology Governance Institutionalization and the Behavior of Individuals in the Context of Public Organizations

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Published online: 30 July 2019

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## Abstract

This study aims to verify the effects of IT governance (ITG) institutionalization on civil servants' behavior. The general assumption is that ITG institutionalization exerts a positive effect on behavior, provided the ITG legitimation process enhances the perception of organizational justice since transparency and equity increases. Organizational citizenship behavior (OCB) was used to understand individuals' behavior, which describes individuals' voluntary commitment in organizations that is not necessarily part of their contractual tasks but is essential to reach the organizational goals. In order to achieve the objective, a multi-method study was developed and operationalized in the context of a diverse range of public organizations in Rio Grande do Sul State Government in Brazil. A theoretical-empirical model was created based on literature, focus group, and interviews. A descriptive-confirmative study was operationalized through a survey with 173 Brazilian civil servants. A questionnaire was developed and validated. All hypotheses were confirmed through a partial least squares structural equation modeling (PLS-SEM) data analysis. The main theoretical contribution is the development of an ITG framework and the demonstration of a positive and significant relationship with the OCB construct. The main finding is that individual behavioral changes are encouraged by ITG institutionalization.

**Keywords** IT Governance institutionalization · Organizational citizenship behavior · Public organizations · Partial least squares

## 1 Introduction

A particular challenge in public organizations is making initiatives perennial and more concerned with the state rather than the government, thereby avoiding constant unplanned changes every term. The same challenge accompanies Information and Communication Technology (ICT) initiatives, which should be crafted from a long-term perspective

in order to support governments better address the demands of the population (Meijer and Bolívar 2016). Long-term decisions and initiatives in public organizations have focused on tools that support citizen participation rather than on tools that only improve public services (Rana et al. 2015), which would allow a more open and transparent interaction with all stakeholders (Picazo-Vela et al. 2012) and enhance the delivery of public value (Pereira et al. 2017). The connections between government and citizens are changing (da Cunha and de Mello Miranda 2013), and this process generates new demands for data, information, and fast and reliable services whose operationalization depends on, evolves with, or is enhanced by IT solutions. Additionally, government service delivery currently involves a complex mix of political, organizational, technical, and cultural concerns (Al Qassimi and Rusu 2015), which can be more adequately dealt with by a governance structure.

Considering this scenario, managing IT is no longer sufficient; it is necessary to go one step further into a governance process. The differences between management and governance are related to time and orientation—management involves short-term and internal aspects, while governance addresses long-term and external aspects (De Haes and Van

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Grembergen 2009a). Governing IT, consequently, can assist an organization in meticulous IT decision making, thereby increasing or maintaining the alignment between IT and stakeholders' expectations. For public organizations, considering long-term and external aspects is mandatory, given that such organizations are part of a complex network of actors working together for the concretization of a service. IT governance (ITG) is part of the good governance of public organizations (Juiz et al. 2014).

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 represent the practical operationalization of ITG's high-level definitions (Luciano et al. 2016). Mainly, ITG includes the decision-making rights and responsibilities for encouraging desirable behavior related to IT (Weill and Ross 2004) and the strategic use of IT in organizations. Good governance provides transparency and clear decision-making, authority, and responsibility when dealing with public sector assets (Juiz et al. 2014) and it amplifies organizational IT agility when aligned with the peripheral knowledge of IT units and line functions (Tiwana and Kim 2015). ITG is also important to understand the nature of public administration at its operative level, where public policies are executed, and the everyday tasks of public governance are carried out (Goldkuhl 2016).

ITG studies suggest the existence of two main pillars of action in the adoption of ITG mechanisms (ISO 2008; Juiz and Toomey 2015). The first and most common one focuses on the legal and regulatory aspects (Tiwana and Kim 2015) and involves the specification of the key IT decisions and every actor's IT decision rights. The second pillar centers on the behavioral aspects inherent to individuals dealing with IT. Considering that, the ITG mechanisms should be able to encourage individuals' desired behavior regarding IT issues (Bradley et al. 2012; Huang et al. 2010; Weill and Ross 2004). The encouragement of this behavior complements the normative side of ITG, going beyond regulatory compliance, and contributes to a more consistent and aligned relationship between business and IT (Juiz and Toomey 2015). This behavioral expression of ITG is this study's focus.

The desired behavior in the use of IT resources is a result of the correct adoption of the ITG mechanisms (Juiz et al. 2014; Lunardi et al. 2016; Weill and Ross 2004). However, organizations have their specificities and thus different expectations regarding the adoption of ITG structures. For some organizations, obedience-oriented behavior and compliance are more important than voluntary behaviors, whereas, for others, it is the opposite (Schein 1999). Therefore, to be considered effective, the ITG structures should encourage the behaviors expected by high-level managers from each organization. Considering the changes in public administration goals and

especially in their interaction with citizens, the behavior of civil servants needs to change in order to support these goals. In highly bureaucratic countries, rules are confusing, overlapping, and, at times, not written or formally discussed and approved. In this context, civil servants need to use extra-role behaviors to reach high-level goals, as well as to maintain daily routines. This behavior is not illegal, but a way to deal with non-prescribed or uncharted situations and bureaucratic hoops. Considering this entire scenario, the concept of Organizational Citizenship Behavior (OCB) was chosen to evaluate the relationships between ITG and civil servants' behavior.

Organizational Citizenship Behavior is used to understand the behavior of individuals in different contexts, describing a person's voluntary commitment to an organization or company that is demonstrated in actions that are not part of his or her contractual tasks (Smith et al. 1983). OCB is characterized by the existence of employees' protective actions that aim to safeguard an organization and everything that belongs to it, contributing to a favorable organizational environment. Our premise is that ITG acts on the antecedents of OCB, such as job satisfaction and rewards perception. Thereby, citizenship behavior might improve because of the ITG process, a relation that this study aims to understand.

The proposed relationship between ITG and OCB is based on the potential effect that the adoption of ITG mechanisms can exert on the OCB constructs in the public-sector domain, which has not been yet studied. This effect can be potentialized when ITG mechanisms are institutionalized in the organization, which connects the stages of the ITG institutionalization, the needs of the organization with the adoption of the practices, and the institutional mechanisms that operate in the decision-making process (Viale Pereira et al. 2013). ITG can be better understood by analyzing the organization's response to institutional pressures, whether formal or informal, the institutional pressures per se, and the context in which they occur (Jacobson 2009). For instance, the adoption of structural mechanisms can turn decision-making processes more transparent, giving the employees the 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 adopting attitudes that support interpersonal harmony or individual initiative. Additionally, ITG objectives and principles that are not changed every other term are more consistent, and their implementation is more likely to endure through the years within an ITG process (Luciano et al. 2016).

In order to contribute to the literature gap in understanding behavioral aspects, resultant of ITG adoption in public organizations and based on the aforementioned concepts and context, the research question that leads this study is the following: Does ITG institutionalization influence civil servants' individual behavior in the context of public organizations?

The goal of this study is to analyze the effect of ITG institutionalization on civil servants' OCB. In order to achieve this goal, a descriptive-confirmative *ex post facto* study was developed and operationalized through a focus group, interviews, and a survey in the Rio Grande do Sul State Government, a Brazilian State.

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 describes the operationalization of the study. Section 4 presents the exploratory data analysis necessary to define the theoretical-empirical model, followed by the confirmatory data analysis (Section 5) and a discussion of the results (Section 6). The concluding remarks are set forth in Section 7.

## 2 Theoretical Background

### 2.1 IT Governance in Public Organizations

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 (Goeken et al. 2017) and increase the level of alignment between IT and business. IT governance is a board and top-executive responsibility focusing on business performance and capability (Juiz and Toomey 2015). ITG pursues long-term IT through not only managing, but also governing IT. It is important because IT has become a type of competitive advantage for organizations, while, at the same time, there is a need to direct and govern IT to reach the expectations of different stakeholders. Organizations apply ITG practices in day-to-day operations to strategically drive and control IT aiming to ensure that their IT investments enhance business value or public value, in public organizations (Luciano et al. 2016). ITG also contributes to ensure appropriate positioning of technology opportunities, as well as appropriate response to technology-enabled changes in the marketplace (Juiz and Toomey 2015), which are both mandatory to reach digital government.

ITG can be understood as the specification of the decision rights and accountability framework that encourages desirable behavior in IT use (Weill and Ross 2004). 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 structure, processes, and relationships; these mechanisms must be related to one or more objectives of the organization (Van Grembergen et al. 2011). ITG amplifies organizational IT agility when it is aligned with the peripheral knowledge

of IT units and line functions (Tiwana and Kim 2015), and is considered part of corporate governance (Weill and Ross 2004). It is concerned with ensuring organizational effectiveness, complying with laws and regulations, meeting stakeholder necessities, and reacting adequately to pressures, which demonstrates a positive return on IT investments. ITG is a combination of what is governed, who are governed, and how it is governed (Tiwana et al. 2014). ITG involves a set of high-level definitions, such as principles, values, and goals, which are operationalized through mechanisms that operationalize the high-level definitions. Good governance should not be focused only on processes and structures since people's responsibilities are essential for its implementation (Goldkuhl 2016).

The role of IT has changed significantly from office and process automation to value aggregation and innovation. It means that the IT role is no longer primarily technical and reactive but has become proactive and focused on the core activities of organizations (Walsham, 2001). The efforts toward digital government confirm the important role of IT in the improvement of the relationship with citizens, mainly through the delivery of public e-services and accountability activities. The use of IT in public organizations has been considered as a driver for social, economic, and political changes such as government administrative reform, social transformation, and organizational change (Yildiz 2007). As a result, new models of relationship between the state and society have been rising, giving ways to opportunities to transform the connection between the government and its citizens (da Cunha and de Mello Miranda 2013). Amid this process, gradual changes in citizens' profiles have also occurred. Although citizens' participation in government decisions is still incipient in many parts of the world, this has shown an upward curve on three levels of an electronic participation model developed by the United Nations (UN, 2014), namely access to public information, public consultations, and electronic decision-making process.

Considering this scenario of change, only IT management is no longer enough; it is necessary to go one step further towards a governance process. The differences between management and governance are related to time and business orientation—management involves short term and internal aspects, while governance deals with long-term and external aspects (De Haes and Van Grembergen 2009b). Governing IT, consequently, can assist organizations in meticulous IT decision-making processes, increasing or maintaining the alignment between IT and stakeholders' expectations (Juiz and Toomey 2015). ITG can also contribute to improvement in public services and transparency, which are central to the public sector (Tonelli et al. 2017).

For a public organization, long-term aspects in decision-making should be considered as they are part of a complex actors' network where it is usually necessary for several

organizations working together to render a project or service for citizens operational (Al Qassimi and Rusu 2015). A critical challenge for public organizations is making state IT decisions rather than government IT decisions, so that they are retained for more than one political mandate. This is especially important in countries where democracy is not mature enough. The necessities of the population should be considered over the long-term (Meijer and Bolívar 2016). IT decisions that do not change with every administration tend to be more consistent, and their implementation is more likely to be kept over the years within an ITG process.

## 2.2 Organizational Citizenship Behavior

Organizations can be understood as an activity system where two or more people integrate efforts in a conscious and coordinated manner (Barnard 1938). People join an organization due to their human ability to share a purpose, their willingness to follow organizational processes, and their ability to communicate. These three factors are the core of the OCB construct (Siqueira 2003). Some key behaviors for organizational dynamics involve entering and remaining in a system and showing reliable, innovative, and spontaneous behavior (Katz and Kahn 1978a, b). According to the authors, innovative and spontaneous behavior is essential to the organization because it fosters higher performance compared to the behavior focused on organizational demands achievement.

Organizations' members are intrinsically cooperative and inter-related, as they are in their private lives. Organizational Citizenship Behavior is characterized by the existence of system protective actions aiming to safeguard the organization and whatever belongs to it (Smith et al. 1983). OCB is also characterized by the efforts of members to take responsibility for their education. Their objective is to improve their own performance and prepare themselves to take more responsibilities in their organization. Members frequently present new ideas to their managers and cooperate in developing a favorable environment for facing their organization's external challenges.

There are 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 organizational civics (Siqueira 1995). However, some important differences can be identified between the concepts (Podsakoff et al. 2000). OCB was chosen because it aligns with the corporate or organizational governance conceptual bases and, as a consequence, with ITG. Citizenship behavior is associated with a set of informal contributions that the participants of an organization can manifest or inhibit (Organ 1997) without any sanctions (Siqueira 1995).

## 2.3 IT Governance Institutionalization

Institutional theory can be observed through different perspectives of analysis (economics, political, and sociological). Institutions are constituted by regulative, normative, and cultural-cognitive elements (Scott 2008a, b). Institutions provide stability and meaning to social life, which is central to institutional structures. Scott (2008a, b) also considers associated behaviors and material resources as the central elements of institutions that encompass rules, norms, and beliefs as their constituents.

ITG institutionalization can be influenced by the necessity for legitimacy in the context in which organizations are inserted. Organizations can adopt different mechanisms institutionalized in their organizational context to obtain legitimacy, even if this is not the best option for their organizational structure. Alternatively, by questioning the legitimate processes and opting for innovative practices, organizations are subject to losing recognition in their organizational environment. However, depending on the influence that an organization has in its organizational field, adopting IT innovations, if they succeed, can affect and impact the beliefs regarding the institutionalized standard, resulting in a new standard (Rodríguez et al. 2007).

Institutions in a particular organizational field become homogenized in the attempt to obtain legitimacy through isomorphism (Romanelli et al. 1992). The authors identified three mechanisms in which institutional isomorphic changes occur—coercive isomorphism, mimetic isomorphism, and normative isomorphism. Concerning technology adoption in organizations, there is a tendency for similarity in this process through different isomorphisms. The Institutional Theory expands the focus of analysis (Orlikowski 2001), thereby allowing an understanding of how influential social and historical forces are. They are manifested by laws, norms, and cultural aspects, which are also affected by organizational actions and the way technologies are shaped by these institutional influences. The same occurs with ITG, provided it is also an organizational phenomenon.

## 3 Research Method

This study assumes a functionalist epistemological research position, in which the concern is to understand society in such a way as to generate knowledge that can be used by organizations (Hassard 1991). This study is characterized as an *ex post facto* type of research with a descriptive-confirmatory nature (Venkatesh et al. 2013). The unit of analysis is the ITG adoption, considering the individual in the context of public administration. The data collection (focus group, interviews, and survey) and analysis were



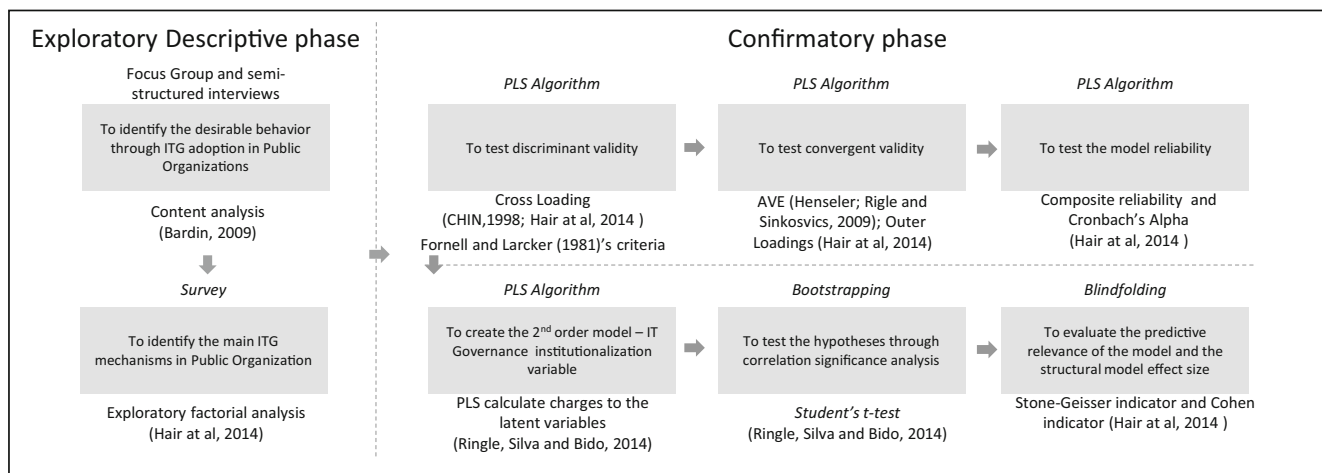


Fig. 1 Research schema

executed as a mixed-focus cross-sectional study (Venkatesh et al. 2013). Figure 1 shows the different procedures and techniques used in this study.

### 3.1 Exploratory Descriptive Phase Data Collection

The objective of this phase was to create the constructs and their dimensions and variables, and it was carried out by means of a focus group and semi-structured interviews.

A group of 11 civil servants participated in the focus group. They work on activities involving IT strategy, ITG, public corporate governance, public corporate strategy, and citizens' relationship. In an attempt to encompass the complexity of the public management structure in Brazil, the participants belong to seven different public organizations in Rio Grande do Sul (RS) State as follows: Vehicles and Licenses Authority, IT Company, Treasury Office, HR Office, Governance Office, General State Comptroller, and General State Prosecution. A heterogeneous group was chosen, as it would help derive different points of view, contexts, and forms to govern IT. All of these seven organizations are separate entities and either belong to the Rio Grande do Sul State Government (e. g., Vehicles and Licenses Authority) or the State (main owner) (e. g., IT Company). They wield autonomy and have their own budgets. Some organizations are government owned and some are state ones. Considering all these characteristics, especially their independence and the non-obligation to follow any general ITG model, they use their own ITG model and present different ITG archetypes (federal, feudal, business monarchy, IT monarchy, and IT duopoly). This kind of diversity is common in a big country like Brazil. For instance, the RS State has 125 thousand civil servants only on the Executive Branch.

The Brazilian federate states have the autonomy to decide about their own organization, government, and

administration, which are regulated by their state constitutions, once they abide by the federal constitution. Thus, there is an ecosystem formed by independent organizations (ministries, offices, public agencies, and public or semi-public organizations) connected through differed kinds of hierarchies (Campbell et al. 2015). In this ecosystem, the resources, work, and information is distributed or scattered, making it necessary to consider the interorganizational ITG, which engulfs the organization as well as its related network, including the synergy among its knots (Grant and Tan 2013).

The semi-structured interviews were conducted with IT managers from different departments and offices of the Rio Grande do Sul State. The interview protocol was based on the focus group results. The seven interviewees (Namely I1 to I7) were invited according to their experiences in activities related to IT management and governance in public organizations. The interviews were performed to get a better understanding of the desired behavior related to IT issues (therefore, not just within IT teams) in public administration.

### 3.2 Confirmatory Phase Data Collection

A survey was performed at the Executive and Judiciary Branch of the State Government in Brazil. The respondents were civil servants working on IT related functions (including strategic and governance positions) and employed for more than two years in their organizations.

### 3.3 Exploratory Analyses and Conceptual Model

This section presents the application of the techniques mentioned in the research method section and the discussion of the results.

### 3.4 Desired Behavior with the Adoption of IT Governance

The focus group provided clarification regarding the concepts involved and some information about the study. The participants were asked to form three groups, which were guided by the research team (one moderator and two observers) to use a panel created in order to assist the decision-making about desired behaviors concerning the adoption of ITG. This panel showed two axes—one related to the importance of behavior changes and the other related to the impact of ITG adoption in the individual behavior.

Seven statements related to the behavior of employees (Rego and Cunha 2008), which are as follows, were attributed to the groups:

- a). The adoption of ITG contributes to the employees providing voluntary help to other employees;
- b). The adoption of ITG encourages behaviors that benefit the organization rather than specific individuals or groups;
- c). The adoption of ITG encourages employees to promote the organization's image with external entities and maintains the commitment under adverse conditions;
- d). The adoption of ITG contributes to a greater tolerance for the inconveniences of organizational life;
- e). The adoption of ITG contributes to the employees' willingness to participate in the management of the organization;
- f). The adoption of ITG contributes to employees volunteering to accept further responsibilities; and
- g). The adoption of ITG contributes to employees seeking to improve their own knowledge, skills, and aptitudes.

They discussed and positioned each statement on a panel that was divided into four quadrants and formed by the intersection of two axes—one showing the behavioral change impact that was generated by the adoption of ITG, and the other showing the importance of changing the individual's behavior for the effectiveness of ITG. The letters from A to G represented each statement. Along with positioning each statement on the panel, respondents were asked to justify their answers. Figure 2 below shows the final results of the disposition of the statements by each group.

The results contributed to the consolidation of the premise that the adoption of ITG impacts the behavioral change of individuals through its mechanisms, principles, and objectives. Figure 2 shows most of the assertions to be positioned toward the upper right quadrant. It implies that ITG adoption has a great impact on the individuals' behavior changes. At the same time, these behavior changes are of great importance for the effectiveness of the ITG in the organizations in which they act. It is worth noting that this stage of the study did not seek to identify which behaviors are impacted by the adoption of ITG or the intensity of these relations, but rather whether a

relationship is perceived by the IT managers of public organizations regarding the existence of a relationship between the behavior of individuals and the adoption of ITG mechanisms.

Another relevant point is related to the dimensions of OCB. Katz and Kahn denote some fundamental behaviors of the organizational dynamics of any type of organization, namely, a) enter and remain in the system; b) reliable behavior, and c) innovative and spontaneous behavior (Katz and Kahn 1978a, b). OCB is characterized by the implementation of protective actions by the organizational system, aimed at safeguarding the organization and what belongs to it. It can be manifested by three different kinds of actions (Smith et al. 1983). The first action is related to the search for new ideas to solve organizational issues. The second involves the pursuit of self-education by members to better execute their own activities and prepare themselves to assume more responsibilities in the organization. The third action concerns the development's favorable environment for the organization toward the external environment.

The relationship between the desired behavior and OCB was evidenced through focus group in the justifications of the groups, such as the citation of Group 1: “[...] the adoption of ITG contributes to the employees providing voluntary help, since there is an understanding of why they are doing something [...]”. With regard to the adoption of ITG, OCB can be considered a behavior that goes beyond the compliance behavior, which is generally noted in the literature as a result of the adoption of ITG practices. We can also highlight a relationship between OCB and ITG in the statement “The adoption of ITG encourages behaviors that benefit the organization more than specific individuals or groups.” According to a quote from Group 2, they “[...] believe that behavior changes because ITG mechanisms establish a collective sense for the organization [...]”. Yet, according to Group 3, it happens because “[...] since the definitions of standards provide guidance for people in their decisions [...]”. These results reinforce the relationship between ITG adoption and OCB dimensions in public organizations.

After the focus group was held, semi-structured interviews were conducted with seven IT managers. Data analysis was carried out through the analysis of categorial content with categories defined a priori, especially following the definitions of Bardin (Bardin 2015). In the first question, respondents were asked about the impact of ITG adoption on employees' daily life, and all interviewees stated that they perceived a clear relationship between the adoption of ITG and employee activities. The second question was about the impact of ITG on employees from other areas. Six interviewees claimed to acknowledge the influence of the ITG mechanisms on the behavior of employees in other areas. It can be evidenced by I3 who said, “[...] both collaborators – IT and non-IT - will perceive the difference in their daily lives because their roles and responsibilities become clearer.” I5 reinforced, “[...] such impact exists because IT is important for the areas related to the delivery of the main services [...]”. In addition to that, I7

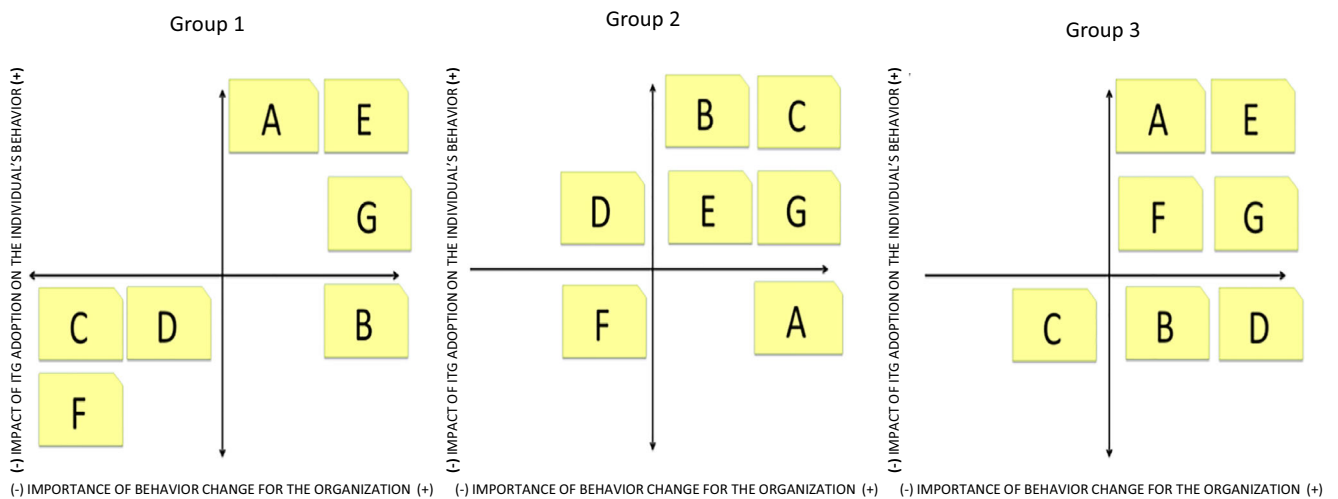


Fig. 2 Focus group response panel

mentioned, “[...] ITG can help other areas to better understand IT [...]”. It should be noted that only one of the interviewees mentioned that there would be no difference in other areas after the adoption of ITG mechanisms.

The next question involves the contribution of ITG adoption, so that the employees commit voluntarily to helping their colleagues. Three interviewees consider that ITG can contribute to this behavior since ITG “broadens the organization’s vision, helping them collaborate with others” (I7). According to I6, “ITG helps to share common goals related to the organization.” Another respondent (I5) mentioned that this contribution would not be possible since (Brazilian) public servants do not like to share with colleagues.

The contribution of adopted ITG mechanisms to encourage behaviors more focused on the organization than on specific individuals or groups was the focus of the next question. All seven respondents opined that the ITG mechanisms could encourage such behaviors. Respondent I1 mentioned that, as a result of the governance process, the focus turns on the entire organization, while I2 mentioned that, with the adoption of ITG, employees would be encouraged to have a systemic view of the organization. Respondent I7 agreed by saying, “ITG mechanisms can help to have common goals and think on the whole.” I6 mentioned a very important point, stating “[...] ITG works in a high-level process, reducing the ‘pen power’ resulting in a more organizational-focused view than on power and position [...]”.

When questioned about whether the adoption of ITG mechanisms could encourage employees to promote organizational image at other organizations and associations and even maintain positive actions under adverse conditions, five respondents agreed that this was possible. Respondent I7 mentioned that this occurs when the strategy is well defined and people are satisfied with the organization. For I6, these behaviors can occur because ITG can increase the sense of being a part of an organization that represents people in

society. I4 mentioned that ITG mechanisms can help the organization perform better, and this would encourage civil servants to represent their organizations.

The next question was related to the contribution of ITG adoption toward a more tolerant posture with regard to the negative issues related to working in public organizations. I7 mentioned, “[...] this certainly occurs because groups are more prepared to address these issues in organizations with a governance process [...].” I3 also agreed, “[...] a governance process broadens the individual and organizational horizons [...]”.

When asked about ITG contribution to encourage employees to participate in managerial activities, all interviewees were in agreement about the existence of this relationship. E7 mentioned, “[...] when a group’s activities are perceived positively in the organization, its members feel like being part of its management [...]”.

For I1, ITG would work to align IT with management, and this would make employees enthusiastic about how to contribute. The next question explored ITG contribution to employees accepting extra responsibility in relation to their roles. Four of the interviewees considered that this relationship was possible. I6 stated, “[...] the results of governance encourages employees to become more involved [...]” I7 stated that this would occur because “[...] they would be willing to do more to assist in changes in their area due to the governance process [...]” I5 added, “[...] if some improvement in their sectors is noticed, it is possible that there is extra involvement, even if there is no monetary reward [...]” Six respondents considered that ITG could encourage employees to improve their knowledge and skills with the help of their own means (I2; I5). I6 stated the following: “[...] in a results-oriented strategy it is mandatory to have continuous training [...]”.

The final question focused on the effect of ITG adoption on individual behavior that contributes to the reduction of infractions, contraventions, and legal and ethical nonconformities. Six respondents considered that this contribution would exist since “governance brings organization, reduces dissatisfaction

**Table 1** Categorical analysis of focus group and interviews

Content Analyses Categories (Rego, 2002)	Codes of Content Analyses (Rego, 2002)	Focus Group Frequency N = 11 (%)	Interviews Frequency N = 7 (%)
Interpersonal Harmony	5	10 (91%)	5 (71%)
Conscientiousness	3	11 (100%)	7 (100%)
Entrepreneurship	4	9 (82%)	6 (86%)
Identification with the Organization	3	8 (73%)	6 (86%)

and unreasonable postures as a consequence” (I4). I5 mentioned that this occurs as a result of rules, policies, and norms that are usually part of an ITG process.

Finally, the categorical content analysis of the data generated from the focus group and the interviews were performed (Table 1), using categories defined a priori and based on the OCB dimensions. It was possible to figure that the relationship between the OCB and ITG is supported by the perception of the interviewees.

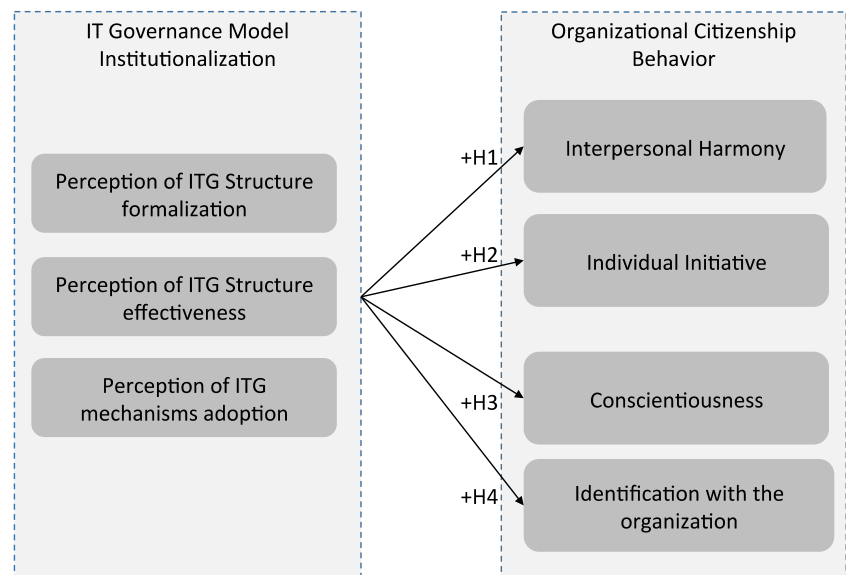
The evidence presented in Table 1 displays a strong relationship between ITG and organizational citizenship dimensions, emphasizing a frequency of over 70% in all categories observed in both techniques. The results of this exploratory research stage are not sufficient to verify whether a relationship exists between OCB and ITG, yet they function as an empirical basis for the theoretical model (Section 4.2) and the confirmatory stages of this study (Section 5). It is important to emphasize that, although sufficient to guarantee the rigor and relevance of this research, the focus group participants are not representatives of all public institutions in the state of Rio Grande do Sul. Therefore, the extrapolation of these results should consider the characteristics and limitations of the cases represented by their participants.

### 3.5 Theoretical-Empirical Model

This section presents the theoretical model and the hypotheses. Based on the theoretical background, the general hypothesis of this study is that ITG institutionalization has a positive effect on civil servants’ OCB.

Behavior is important because the best process model can often be defeated by inadequate human behavior, and good behavior compensates for the deficiencies in the process model (Juiz and Toomey 2015). ITG mechanisms are responsible for expressing the aspirations of corporate governance in relation to IT (De Haes and Van Grembergen 2009a; Weill and Ross 2004). This structure influences the behavior of individuals and the performance of the organization, 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 theoretical-empirical model shown in Fig. 3 was created by combining a pre-established model (OCB) and ITG institutionalization variables.

**Fig. 3** Theoretical-empirical model



**Table 2** Variables description

Variable/Dimension	Description	Source
<b>Construct: IT Governance Institutionalization</b>		
ITG mechanisms (Regulatory Institutionalization)	This dimension is related to the regulatory institutionalization of ITG. The individual perceives the adoption of ITG mechanisms as the establishment of rules, monitoring, and sanctions	(Luciano et al. 2016; Scott 2008a, b)
ITG structure formalization (Normative Institutionalization)	This dimension is related to the normative institutionalization of ITG. The individual perceives the formalization of the ITG structure as normative systems of imposition to social behavior, authorizing and enabling social action	
ITG effectiveness perception (Cultural-cognitive Institutionalization)	This dimension is related to the Cultural-Cognitive Institutionalization of ITG, in which the individual perceives the adoption of ITG mechanisms as effective	
<b>Construct: Organizational Citizenship Behavior</b>		
Interpersonal Harmony	This dimension is related to interpersonal harmony, participation, team spirit, camaraderie, and knowledge and experience sharing	Adapted from (Rego and Cunha 2010)
Conscientiousness	This dimension reflects behaviors of obedience, conscientiousness, and protection of the resources of the organization	
Individual initiative	This dimension reveals 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	This dimension 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	

The theoretical-empirical model demonstrates that ITG institutionalization exerts a positive effect on each variable of OCB.

The institutionalization of ITG mechanisms helps to create a shared understanding of IT meaning in the organization, thereby reducing interpersonal conflicts caused by communication problems. The perception in the organization of a culture of cordiality, support, trust, and communication aids in explaining contextual performance (Goodman and Svyantek 1999). Positive relationships can contribute to the humanization of workplaces, thereby fostering interpersonal harmonious behavior (Hodson and Costello 2007).

Based on this, the following hypothesis was established (H1):

Interpersonal harmonious behavior is positively influenced by the institutionalization of the ITG model (+ H1)

The ITG institutionalization contributes to the creation of a long-term vision and provides a sense of organizational fairness through the adoption of the mechanism provided it ensures or increases equity and transparency concerning IT resources. Spontaneous extra-role behavior is important for organization

**Table 3** Respondents' Profiles

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

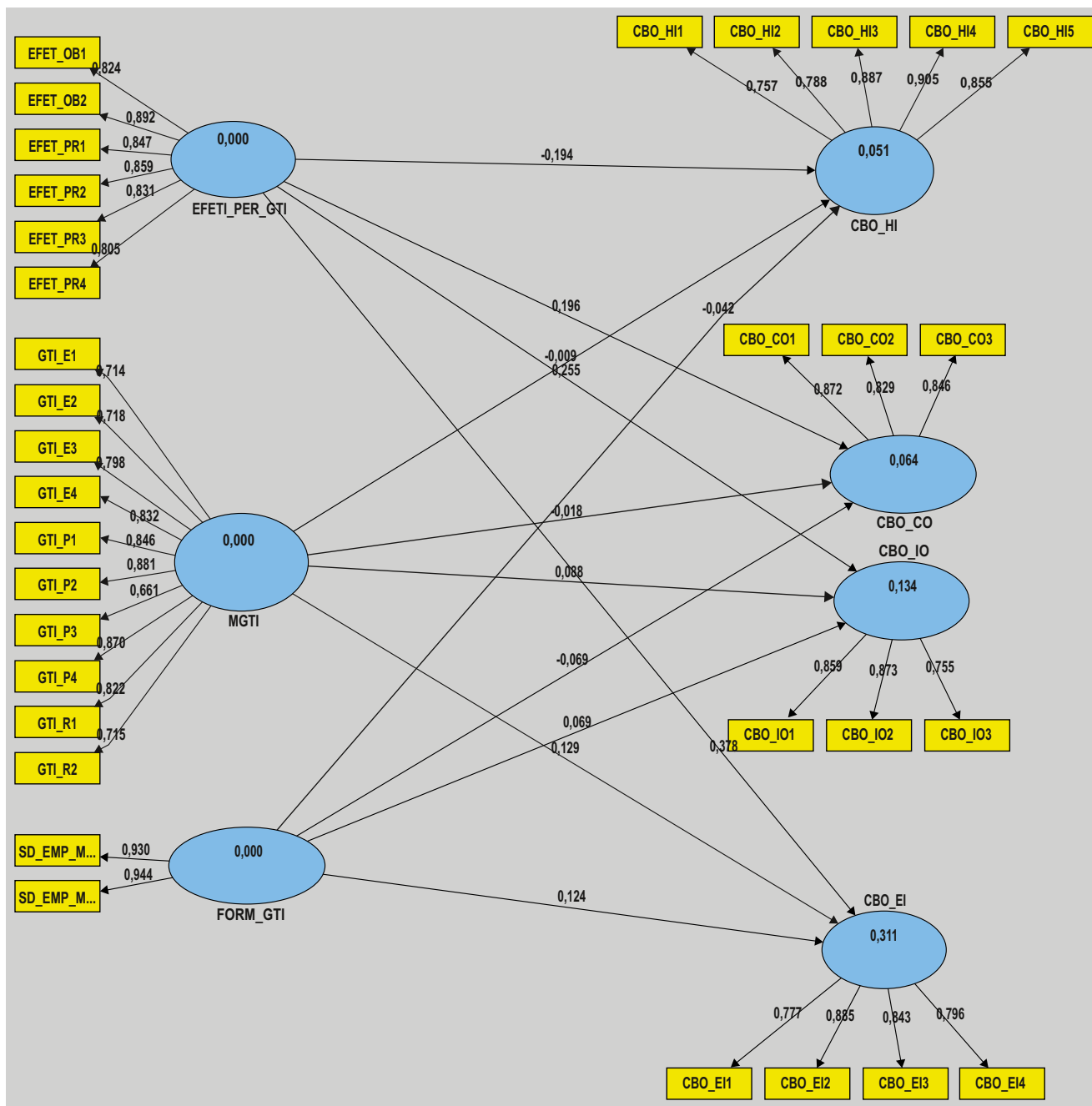


Fig. 4 1st Order model

continuity and the effectiveness of its practices (Katz and Kahn 1978a, b). Extra-role behavior is not specified in the job description, not formally recognized by the formal gratification system, and not a source of punitive consequences when they are not performed. These behaviors are preceded by a sense of organizational justice and the long-term view (e Cunha et al. 2010; Katz and Kahn 1978a, b).

Based on this, the following hypothesis was established (H2):

Individual initiative behavior is positively influenced by the institutionalization of the ITG model (+H2)

The ITG institutionalization stimulates the responsible participation of the individual in the organization’s policies. The perception of ITG effectiveness helps the individual who engages in civic virtue to develop skills and habits that can benefit other individuals and society (e Cunha et al. 2010; Katz and Kahn 1978a, b).

Based on this, the following hypothesis was established (H3):

Conscientiousness behavior is positively influenced by the institutionalization of the ITG model (+ H3)

**Table 4** Discriminant validity – cross-loading analysis (Items in bold represent the indicators factor loadings in their respective latent variables or constructs)

	CBO_CO	CBO_EI	CBO_HI	CBO_IO	EFETI_PER	MGTI	FORM_GTI
CBO_CO1	<b>0.8721</b>	-0.4420	0.7118	-0.1736	-0.2422	-0.2470	-0.1842
CBO_CO2	<b>0.8289</b>	-0.3814	0.5695	-0.1371	-0.2070	-0.1109	-0.1462
CBO_CO3	<b>0.8462</b>	-0.4230	0.7334	-0.2106	-0.1589	-0.1152	-0.1320
CBO_EI1	-0.3547	<b>0.7765</b>	-0.3826	0.3093	0.5059	0.3905	0.3700
CBO_EI2	-0.4039	<b>0.8347</b>	-0.4110	0.3263	0.3936	0.3627	0.3332
CBO_EI3	-0.4040	<b>0.8431</b>	-0.4466	0.3909	0.3908	0.3810	0.2896
CBO_EI4	-0.4338	<b>0.7956</b>	-0.4116	0.5182	0.4078	0.3721	0.3369
CBO_HI1	0.6142	-0.3797	<b>0.7567</b>	-0.1471	-0.1100	-0.0658	-0.0669
CBO_HI2	0.6619	-0.3603	<b>0.7879</b>	-0.0348	-0.0876	-0.0504	-0.0592
CBO_HI3	0.6812	-0.4956	<b>0.8874</b>	-0.2409	-0.2350	-0.2143	-0.1477
CBO_HI4	0.6953	-0.4479	<b>0.9049</b>	-0.1915	-0.2292	-0.1417	-0.1489
CBO_HI5	0.6882	-0.4120	<b>0.8550</b>	-0.1140	-0.1843	-0.1463	-0.1540
CBO_IO1	-0.1594	0.4024	-0.1919	<b>0.8586</b>	0.3069	0.2750	0.2316
CBO_IO2	-0.1636	0.4383	-0.1477	<b>0.8728</b>	0.3072	0.2537	0.2168
CBO_IO3	-0.1821	0.3315	-0.1400	<b>0.7548</b>	0.2553	0.2299	0.2114
EFET_OB1	-0.2949	0.5272	-0.2917	0.2382	<b>0.8244</b>	0.5521	0.4704
EFET_OB2	-0.2666	0.5066	-0.2467	0.3545	<b>0.8923</b>	0.6058	0.4728
EFET_PR1	-0.1202	0.4244	-0.1161	0.3696	<b>0.8467</b>	0.6080	0.4348
EFET_PR2	-0.1942	0.4203	-0.1609	0.3002	<b>0.8588</b>	0.5632	0.4583
EFET_PR3	-0.1666	0.3818	-0.1260	0.2239	<b>0.8309</b>	0.5403	0.4626
EFET_PR4	-0.1537	0.3718	-0.1349	0.2749	<b>0.8054</b>	0.4785	0.3662
GTI_E1	-0.2158	0.3750	-0.1743	0.2584	0.4022	<b>0.7461</b>	0.5708
GTI_E2	-0.1854	0.3266	-0.1251	0.1700	0.3630	<b>0.7338</b>	0.4563
GTI_E3	-0.2281	0.3618	-0.1456	0.2141	0.5638	<b>0.8016</b>	0.5280
GTI_E4	-0.3250	0.4225	-0.2721	0.2293	0.5753	<b>0.8465</b>	0.6159
GTI_P1	-0.2417	0.3957	-0.1654	0.1874	0.5544	<b>0.8488</b>	0.5147
GTI_P2	-0.2299	0.4446	-0.2173	0.2508	0.5653	<b>0.8847</b>	0.5898
GTI_P3	-0.2069	0.4930	-0.2087	0.1436	0.4947	<b>0.7359</b>	0.5534
GTI_P4	-0.2896	0.3982	-0.2318	0.2759	0.5612	<b>0.8655</b>	0.6059
GTI_R1	-0.2908	0.4210	-0.2372	0.3136	0.4870	<b>0.8269</b>	0.5704
GTI_R2	-0.2416	0.4715	-0.2147	0.2428	0.4762	<b>0.7517</b>	0.5432
MGTI_PER	-0.2646	0.3915	-0.1819	0.2704	0.3904	0.5893	<b>0.9225</b>
MGT_TIPO	-0.2667	0.4256	-0.2568	0.2725	0.5003	0.6938	<b>0.9354</b>

ITG institutionalization increases the affective commitment and perception of organizational support through legitimation by mimetic and isomorphic mechanisms. The behavior of identification with the organization increases when organizational processes that favor human relations are transparent and fair (Katz and Kahn 1978a, b).

Based on this, the following hypothesis was established (H4):

Identification with the organization behavior is positively influenced by the institutionalization of the ITG model (+ H4)

OCB is related to behaviors that are not specifically part of individuals' roles but 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 the

**Table 5** Discriminant validity (Items in bold represent the square root of the AVE scores)

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

adoption of ITG practices. Desirable citizenship behavior is very important for long-term IT planning and increased effectiveness of ITG adoption.

The authors (Luciano et al. 2016) found a preliminary relationship between OCB and ITG through a qualitative study, 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 decision making.

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). At the same time, the ITG objectives coming from the organization's strategies are moderated by the principles of corporate governance and are responsible for determining the ITG mechanisms that will be adopted by the organization.

### 3.6 Research Instrument and Survey Data Collection

The questionnaire was divided into three parts. The first part was composed of 18 questions and intended to measure the ITG institutionalization based on Luciano et al.'s (2016) study. The ICT Governance Policy from RS State Government was used as a source of the mechanisms used (ICTGP-RS 2018). The focus of the second part was to identify the existence of OCB through 15 questions based on Rego and Cunha (2010) study. The third part was made up of 11 socio-demographic questions. Table 2 shows the operationalization of the variables.

The validation process began with face validation and content validation through a discussion with four experts in ITG and public administration. A pretest was performed through a survey with 74 respondents presenting a profile similar to that in the full data collection. The pretest data was analyzed through factor exploratory analysis, KMO, Bartlett's, and Cronbach's alpha.

A set of 243 survey instruments was completed. The survey respondents came from IT and non-IT related areas, such as ITG, IT strategy, business analyses, corporate governance, and strategy. Data purification was specifically conducted following the statements of Sarstedt et al. (2014). The incomplete questionnaires or those 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 3.

The Kolmogorov-Smirnov test showed that it is not possible to determine the sample normality, considering the estimation of structural equations by partial least squares (SEM-PLS) is the most adequate way to analyze the data (Hair et al. 2014; Koufteros 1999).

## 4 Confirmatory Analysis

### 4.1 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 ITG institutionalization construct was linked to each of the four variables of OCB. After designing the model, the PLS algorithm module was used. It was configured according to Ringle et al.'s recommendations for the path weighting scheme along with the following parameters: mean = 0; standard deviation = 1; maximum number of rotations to converge the model = 300, and abort criterion for changes below 0.00001 Ringle et al. (2014). Finally, the results of the calculations were generated and interpreted through the software report. Figure 4 shows the first-order model of constructs in the Smart-PLS software.

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 (Sarstedt et al. 2014). Following the recommendations of Ringle et al. (2014), cross-loadings were perceived between observable variables and their factors. Table 4 presents the discriminant validity test based on the cross-loading analysis (Chin 1998).

Table 4 shows that the indicators have higher factor loadings 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 latent variables, according to the Pearson correlations. Thus, according to the Fornell and Larcker criterion, the square roots of the AVE should be larger than the correlations between the constructs (Fornell and Larcker 1981). Table 5 presents the discriminant validity test.

Table 4 and Table 5 show that the model presents discriminant validity. The square roots of the AVE of the latent variables are larger than the correlations of the same variables with the other latent variables of the model, in compliance with the

**Table 6** Convergent validity and internal model consistency

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
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

\*Average extracted principal constructs variance

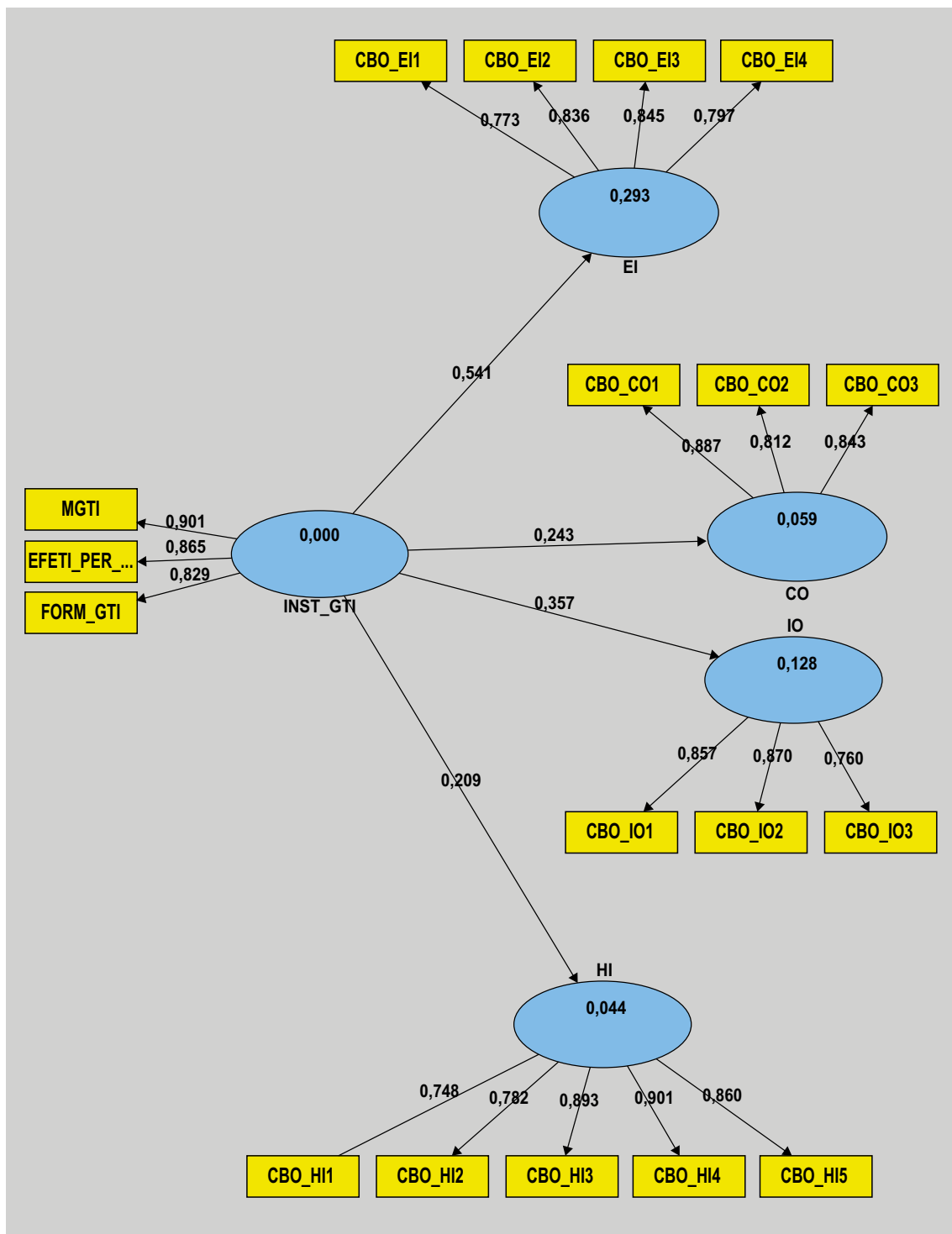


Fig. 5 2nd Order model

Fornell and Larcker (1981) criterion and the cross-loading criterion based on Chin (1998).

After confirming the discriminant validity, the values were observed to determine the convergent validity (AVE values), internal consistency, Cronbach’s alpha (CA) and composite reliability (CR), as presented in Table 6.

Based on Table 6, it was possible to determine the convergent validity and the internal consistency. The measurement model is adequate for the purpose of this study and allows the construction of the second-order model, which makes it possible to carry out the tests of the research hypotheses.



**Table 7** Discriminant validity—cross-loading analysis—2nd order model Factor loadings in their respective latent variables in bold

	OI	EI	HI	IO	INST_GTI
CBO_CO1	<b>0.8868</b>	0.4423	0.7122	0.1739	0.2577
CBO_CO2	<b>0.8121</b>	0.3810	0.5683	0.1372	0.1797
CBO_CO3	<b>0.8430</b>	0.4238	0.7318	0.2111	0.1547
CBO_EI1	0.3531	<b>0.7726</b>	0.3826	0.3090	0.4910
CBO_EI2	0.4067	<b>0.8363</b>	0.4129	0.3256	0.4166
CBO_EI3	0.4065	<b>0.8446</b>	0.4481	0.3902	0.4078
CBO_EI4	0.4338	<b>0.7970</b>	0.4122	0.5184	0.4290
CBO_HI1	0.6132	0.3793	<b>0.7482</b>	0.1472	0.0914
CBO_HI2	0.6655	0.3608	<b>0.7815</b>	0.0345	0.0725
CBO_HI3	0.6872	0.4962	<b>0.8930</b>	0.2408	0.2287
CBO_HI4	0.6974	0.4479	<b>0.9007</b>	0.1919	0.1995
CBO_HI5	0.6877	0.4117	<b>0.8600</b>	0.1140	0.1837
CBO_IO1	0.1586	0.4028	0.1934	<b>0.8574</b>	0.3142
CBO_IO2	0.1646	0.4389	0.1495	<b>0.8697</b>	0.3019
CBO_IO3	0.1834	0.3320	0.1409	<b>0.7598</b>	0.2718
EFETI_PER_GTI	0.2377	0.5195	0.2150	0.3489	<b>0.8653</b>
FORM_GTI	0.1859	0.4110	0.1513	0.2661	<b>0.8288</b>
MGTI	0.2010	0.4617	0.1689	0.3027	0.9012

After the analysis of the measurement model (1st order model), the procedures recommended by Sanchez (2013) and Sarstedt 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 ITG structure effectiveness (EFETI\_PER\_GTI), perception of ITG structure formalization (FORM\_GTI), and perception of the ITG mechanisms' implementation (MGTI) were inserted into a new database to represent the indicator values of the endogenous variable institutionalization of the ITG model (INST\_GTI), as presented in Fig. 5 (2nd order model).

The analysis of the measurement model began with the evaluation of the discriminant validity, which was obtained

**Table 9** Coefficients of determination ( $R^2$ )

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

because the latent constructs or variables are independent of each other (Sarstedt et al. 2014). Following the recommendations of Ringle et al. (2014), cross-loadings were perceived between observable variables and their factors. Table 7 presents the discriminant validity test based on cross-loading analysis (Chin 1998).

It was possible to determine that the 2nd order model, as well as the 1st order model, presented discriminant validity, according to the cross-loading criterion (Chin 1998) analysis in Table 7. Following the analysis of the 2nd order measurement model, the Fornell and Larcker (1981) criterion was analyzed, 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 8.

### 4.2 Analysis of the Structural Model

This step began with the evaluation of the Pearson coefficient of determination ( $R^2$  value) (Ringle et al. 2014). Table 9 presents the values of the Pearson coefficient 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 were calculated using the original values of the data, and the values obtained by the resampling technique through the Smart-PLS software-bootstrapping module. Table 10 presents the effects and significance of the relationships identified between the institutional variability of ITG and the OCB variables.

**Table 8** Discriminant validity and 2nd order model reliability Square root of the AVE scores on the diagonal (in bold)

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

\*Average extracted principal constructs variance

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

**Table 10** Test of Significance of the Relations between ITG Institutionalization and CBO

	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
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

The t-test values are above 1.96, corresponding to  $p$ -values > 0.05 and confirming that the identified relationships are significant (Ringle et al. 2014). In a normal distribution, values between -1.96 and + 1.96 correspond to a 95% probability, and those outside this range correspond to a 5% probability. Finally, the predictive validity was evaluated through the Stone-Geisser indicator ( $Q^2$ ) and the effect size through the Cohen indicator ( $f^2$ ). Table 11 presents the values of the Stone-Geisser ( $Q^2$ ) and Cohen ( $f^2$ ) indicators.

The  $Q^2$  indicator evaluates the quality of prediction of the model and the accuracy of the adjusted model. The values are greater than zero, confirming the accuracy of the adjusted model (Sarstedt et al. 2014). Subsequently, evaluation of the  $f^2$  indicator determined 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 important for the model fit. The following section discusses the results of the hypothesis tests.

### 5 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 ITG institutionalization and OCB constructs, the study’s general hypothesis that ITG institutionalization has a positive effect on the behavior of individuals can be confirmed. It is important to emphasize that individual entrepreneurship behavior is positively encouraged by ITG institutionalization ( $\beta = 0.5410$ ;  $p$  value > 0.05), in that individual entrepreneurship behavior can be predicted to increase by up to

**Table 11** Model predictive validity and construct effects

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

54% if ITG institutionalization is increased by 1 percentage point.

Similarly, the model demonstrates a smaller effect for organizational identity behavior ( $\beta = 0.3571$ ;  $p$  value > 0.05). These results contribute to managers’ understanding that the adoption and institutionalization of ITG mechanisms contribute to individuals’ willingness to find alternative solutions for problems and their spontaneity in making constructive suggestions for the improvement of organizational issues. The model also indicates that the institutionalization of ITG encourages individuals to defend the image of their organization with attitudes that promote the positive aspects of the organization toward people outside the organization.

The positive correlation between ITG institutionalization and individual entrepreneurship and identification with the organization behaviors allowed the confirmation of hypotheses H2 and H4. The effect expected by IT managers related to the ITG institutionalization and regarding interpersonal harmony (H1 -  $\beta = 0.2429$ ;  $p$  value > 0.05) and conscientiousness (H3 -  $\beta = 0.2091$ ;  $p$  value > 0.05) occurred as expected, confirming hypotheses H1 and H3. Interpersonal harmonious behavior was expected because IT managers believed that the institutionalization of ITG would encourage the participation of individuals, build team spirit and camaraderie, and increase knowledge and shared experience. Conscientiousness behavior was expected by IT managers, given that ITG institutionalization would promote greater compliance with organizational rules and make individuals aware of the importance of effective and optimized use of the resources of their organization.

### 6 Final Remarks

In addition to the ICT infrastructure, which is required for creating smart operations and promoting smart services, Scholl and Alawadhi have identified the need for fundamental changes in organizational integration, alignment, and inter-organizational cooperation, especially regarding information systems interoperability and an adequate ITG model (Scholl and Alawadhi 2016). This study finds that there is a relation between individuals’ behavior according to the desires of IT managers in public organizations and the adoption of ITG mechanisms. This study aimed at confirming that ITG

institutionalization has an effect on civil servants' OCB. To achieve the main objective of the study, hypotheses were formulated through a survey of civil servants in the executive and judiciary courts of a Brazilian state. The general hypothesis concerning the positive impact of ITG institutionalization on the behavior of individuals was confirmed, as were the four supplementary hypotheses of this study, yielding a theoretical-empirical model.

This study provides both practical implications for professionals in government and theoretical implications for academics and professionals in the ITG and organizational fields, considering the thoroughness of the theoretical background. This study contributes to the theory in three distinct ways. First, it identifies and develops an ITG institutionalization construct; second, it validates the dimensions proposed by Rego and Cunha (2010) about OCB; and finally, it demonstrates the existence of a positive and significant relationship between the two previous constructs. As a practical contribution, this study highlights the possibility that IT managers may perform their IT tasks through the behavioral change of individuals who are encouraged by the institutionalization of ITG.

A limitation of this study concerns the generalization of the results. Since the data were collected in one single Brazilian state, different organizational and cultural contexts may potentially generate different results. Thus, the extrapolation of the results should respect the characteristics and limitations of the cases represented in the different techniques of data collection. Future research should apply the developed and validated model to other public and private organizations, increase the model comprehensiveness, and consider different contexts. Subsequently, it would be possible to verify whether the factorial structure and the relationship confirmed in this study remain significant. Further studies can also be compared with the ones verifying the ITG effects on OCB in non-government organizations. Additionally, the authors suggest carrying out studies comparing the different types and models of ITG, focusing on how this may potentially exert different effects on the behavior of individuals.

**Acknowledgements** The authors want to thank the two anonymous reviewers for their insightful and constructive feedback.

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**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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