

## ARTICLE

## An Integrated Reporting Improvements Proposal Based on Gaps in Governance Systems from State Companies in Brazil

Gustavo Guimaraes Marchisotti<sup>1</sup>

gustavo.marchisotti@id.uff.br |  0000-0002-7028-0015

Jose Rodrigues de Farias Filho<sup>1</sup>

joserodrigues@id.uff.br |  0000-0003-1843-8695

Sergio Luiz Braga França<sup>1</sup>

sfranca@id.uff.br |  0000-0003-1783-3167

Rodrigo Gris Souza<sup>1</sup>

rgris@id.uff.br |  0000-0003-1441-8638

### ABSTRACT

The article proposes improvements in the integrated report, based on gaps identified in the governance system of Brazilian state-owned companies, which impact on their perception of value for the results/performance of these companies. The Governance System's gaps were obtained using the bibliometric, critical incident technique, and a lexical/content analysis. These gaps were compared to the Integrated Reporting identifying convergences and divergences. The following gaps influence a negative perception of the Governance System's ability to add value: inadequate people management, lack of results/performance orientation, harmful political influence, ineffective project management; misalignment with organizational culture; bureaucratization and complexity of processes; flaws in the organizational structure; unbalanced controls; and lack of cooperation and partnerships. The Integrated Reporting method could work more appropriately on the following variables, so that stakeholder perception is as close as possible to the real thing: Unbalanced controls, GS not focused on results, Inadequate People Management and Bureaucratic and Complex Processes, Harmful Political Influence, Conflicts in Partnerships/Cooperation, and Project Governance.

### KEYWORDS

Governance System, Integrated Reporting, Public Organizations, Value Perception

<sup>1</sup>Universidade Federal Fluminense,  
Niterói, RJ, Brasil

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According to Andrews et al. (2016), over the past 20 years, the issue of public sector performance and the ability to provide profitable and responsive services has gained significant political relevance, being a point of attention for market analysts and public policy makers. Faced with pressure from society and the need to update, the public sector has been relying on corporate governance practices, as they improve the efficiency and decision-making of public organizations, eliminating conflicts of interest (De Jesus & Dalongaro, 2018).

According to De Castro and Afonso (2018), the Brazilian public sector had a primary *deficit* of R\$2.47 billion in 2016, which has been on a growth trajectory in recent years. The public sector constitutes a significant part of a country's economy, and public purchases represent up to 16% of the Gross Domestic Product (GDP) of these countries. Unfortunately, this economic relevance is accompanied by political interference, non-active directors, and lack of transparency—that is, typical problems related to corporate governance. There is a lot to be done to improve the corporate governance practices of state organizations (Silva, 2018).

According to a report by the Brazilian Institute of Corporate Governance (IBGC, 2017), corporate governance practices in mixed public organizations are outdated in relation to the private sector. These movement came from an improvement in the public sector that brought public institutions—and those of the third sector—closer to market principles of efficiency, effectiveness, meritocracy, etc in addition to encouraging joint work between public and private companies, and between third sector organizations and private companies, creating a hybrid environment (Krøtel & Villadsen, 2016).

In terms of reporting the results of a Governance System (GS) - including performance, business model, and organizational strategy - Integrated Reporting (IR) is increasingly being used to provide a broad view of the organization's capabilities to create value (Marrone & Oliva, 2020). Asserting or not whether a GS adds value to organizations has been researched for some time, and it is still not possible to reach a consensus. However, the perceived value of a GS can vary according to each stakeholder, due to several factors, such as corruption scandals, for example. The perception of value impacts and is impacted by the GS (Ford & Ihrke, 2019).

Given this context, the article seeks to answer the following research question: How to improve the IR based on gaps in the Governance System (GS) from state companies in Brazil? Thus, this paper aims to identify how to improve the IR based on gaps in the GS from state companies that have a negative impact in the results/performance's perception of these companies.

These gaps represent attention points identified in the theory and/or during the interviews with Brazilian specialists in governance, regarding problems in the GS that impacts the results/performance's perception of these companies. Addressing these gaps in IR will guarantee that the GS evaluation for state companies will be also improved, taking into account some aspects that are recognized as important in order to guarantee the state companies' results/performance's perception, if well done, or jeopardize it, if not well done. According to Gore et al. (2020) researchers into hybridity in public administration is more focused on typologies of governance considering the traditional public administration categories. This research extends this view, incorporating GS's gaps identified in the literature and in the market, going beyond the traditional public administration, considering GS's perception impacts in the public companies in a sustainability context represented by IR.

There is little research about IR and its use for the dissemination of information of a GS to guarantee companies sustainable results, including economic, social, and environmental (Oliveira et al., 2017; Ford & Ihrke, 2019). So, this research contributes with this discussion,

suggesting improvements in the IR that will permit a better GS evaluation, based in the gaps that are perceived by academic and managerial stakeholders as relevant to guarantee the companies' results/performance. If the IR better address these gaps, the GS of the state companies will be better evaluated in terms of perceiving contributions to sustainable state companies' results/performance.

This paper also contributes to the academic field, showing how to execute a methodological approach defined by De Farias Filho et al. (2019), Marchisotti e Farias Filho (2022) and Marchisotti et al. (2022), that are used to identified gaps of knowledge for determined topics that consider academic and managerial perspectives.

## 2. LITERATURE REVIEW

### 2.1. GOVERNANCE SYSTEM

According to Prudêncio et al. (2021) and Ferraz and Santos Júnior (2021), the Governance System (GS) is relevant to potentialize a firm's competitiveness and image, being an important tool to improve the business results/performance. However, it is a complex system that involves different organization's elements, such as decision making and organization structure, technical and managerial internal process, property rights on production, and many other elements that must work in alignment in order to effectively help companies achieve better results.

#### 2.1.1. Perception of value and integrated reporting

For Bannister and Connolly (2014), the term value has varied and ambiguous meanings, but 2 (two) interpretations stand out: 1) value that can be measured, even if difficult in practice; and 2) value held by people or the organization, such as a behavior or way of performing a certain activity that is considered correct.

As much as organizational results are good, there are individuals who negatively perceive the value of a GS, especially regarding its impact on their day-to-day work. Others, on the other hand, cannot perceive the value of the GS due to the way it is operationalized, so that, if the GS is not well implemented, there will be a perception that its cost-effectiveness is not satisfactory (Diz et al., 2017; Dočekalová & Kocmanová, 2016).

In turn, according to De Jesus and Dalongaro (2018), a positive perception is associated with the sustainable and sustained value of the GS, requiring responsibility for results and long-term financial, social, and environmental performance. Ambrozini (2017) states that the size of an organization and growth opportunities, in addition to the size and gender diversity of the board of directors are relevant factors for the adoption of social and environmental practices by organizations.

In this context, IR is considered an instrument capable of demonstrating the value generated by the organization, considering 6 (six) capitals - financial, manufactured, intellectual, human, social, relationship and natural -, which can be better understood according to the Table 1 (Marrone & Oliva, 2020; IIRC, 2014).

According to IIRC (2014), not only organizational capital but the GS itself is evaluated by the IR, bringing responsibility to governance not only regarding its preparation, but also directly for the strategic direction, results achieved, and capacity to respond to different related parties. There is a need to answer the following question (IIRC, 2014, p. 25): "*How does the organization's governance structure support its ability to generate value in the short, medium and long term?*".

**Table 1**  
*Definitions and Concepts of the 6 IR Capitals.*

Type of Capital	Definition and Concepts	Author
Social	It is about the common behavior patterns and values shared within and outside an organization. An organization can demonstrate its concern with the social issue by presenting: 1) relationships with the local community; 2) equal opportunities; 3) respect for human rights; 4) concern with education and training; 5) low employee turnover rate; 6) employees governed by collective agreements; 7) monitoring of employee complaints; 8) existence of codes of ethics and conduct; 9) low rates of accidents at work and absenteeism; 10) analysis of the impact of products or services provided by the organization, on the health of those who use them, and 11) expenses to maintain the level of customer satisfaction.	IIRC (2014); Dočekalová and Kocmanová (2016); Goede (2018).
Natural	It refers to environmental resources - renewable and non-renewable - and their processes associated with the environment, production of goods or provision of services by an organization. An organization can demonstrate its concern for the environment by presenting: 1) energy efficiency; 2) origin of materials and raw materials; 3) consumption of fuel for transport; 4) Water consumption; 5) amount of land occupied for their activities; 6) waste production; proportion of hazardous and recycled waste; 7) greenhouse gas emissions; 8) number and amounts associated with violations of environmental regulations and 9) investments and expenses to guarantee the environment.	IIRC (2014); Ambrozini (2017); Dočekalová and Kocmanová (2016).
Financial	Set of resources available in the organization to produce goods and/ or provision of services. The disclosed data must be relevant and faithful to reality, ensuring an effective reduction in information asymmetry. An organization can demonstrate its concern with finances if it presents: 1) costs – total, personnel and operational; 2) investment and return on investments; 3) economic results – sales, profit, added value, turnover, cash flow and market share; 4) supplier reliability; 5) financial value of sanctions; 6) investment in research.	IIRC (2014); Villiers and Sharma (2020); Dočekalová and Kocmanová (2016)
Manufactured	Manufactured physical objects or goods - non-natural - available in the organization to produce goods and/ or provision of services, such as constructions, buildings, ports, power plants, equipment and infrastructure.	IIRC (2014); Sukhari and Villiers (2019); Diz et al. (2017).
Intellectual	They are the intangible assets of an organization based on the knowledge generated, such as patents or organizational culture. It must be measured, reported and managed properly so that the value to the business is not only maintained but developed. It is a complex measurement and disclosure capital.	IIRC (2014); Badia et al. (2019); Macedo et al. (2015).
Human	These are the skills, abilities and experience of employees, including their ability to innovate. It is understood by the <i>know how</i> ; education, qualification and knowledge accumulated by employees over the time they have been working. It also includes aligning and supporting employees with the GS, risk management and the organization's values.	IIRC (2014); Hsieh et al. (2019); Beretta et al. (2019).

*Source:* Authors

The use of IR in the public sector seeks to provide public administrators with the appropriate tools to explain how their organization achieves its goals and generates long-term results ([TCU] Tribunal de Contas da União, 2019). For Petcharat and Zaman (2019) and Alves et al. (2017), the relationship between IR and the perception of value generation is related to how organizations seek to understand how the composition of their organizational assets takes place. The IR is a way of bringing this information to light, in an integrated way between them and with tangible assets, showing in a comprehensive way how the organization's value is generated.

IR is associated with integrated thinking about corporate governance and its controls, because, when understanding where an organization's value creation process takes place, the performance measurement system proposed by the GS can be better and more focused. Successful organizations maintain good GSs, with transparency and disclosure of information. However, most organizations still do not have a good understanding of the IR value, so they do not use it (Petcharat & Zaman, 2019).

## 2.2. HYBRID ORGANIZATION

For Menegassi and Barros (2019), the term hybrid organizations have different meanings and interpretations, according to the area of knowledge which is being researched; so, there is no single, academically widely accepted concept. According to Wood (2010), the term 'hybrid organization' first appeared in the scientific community in 2000, that is, it is a relatively recent topic of study. There are other terms associated with hybrid organizations such as "hybrid", "hybridity" and "hybridization". Making a metaphor with biology, organizational hybridity would be a mixture of different species, giving rise to a new one, different from those that gave rise to it; but that have characteristics of both, which came together in a specific and unique way (Walchhutter, 2017).

Arellano-Gault et al. (2013) states that there are many studies on hybrid organizations, that is, public organizations that carry out public-private partnerships or arenas of multiple interested areas, through the contexts of their interactions, interdependence, and cooperation. According to Bishop and Waring (2016), hybrid organizations are new organizations or inter-organizations that combine to meet a certain objective. An example of hybrid organizations would be partnerships between a public sector company, a private sector company, and a third sector company; each one with its work assumptions, qualities, resources, and capacities that will be united to attend to complex problems that need to be solved, for the best service of the citizen.

Initially, the focus of studies on hybridization was on public management, seeking to understand the public organizations that acted at the interface between the public sector – public demands – and the private sector – commercial demands –; such as the Public Universities that provide consultancy services to private companies in various areas of knowledge. Subsequently, studies began to consider organizations hybrid which combined characteristics of non-profit organizations – voluntarism and social value – with the characteristics of private organizations – self-interest, market focus and economic value. An example would be the US company Freddie Mac, which is a government guaranteed company of the United States (government sponsored enterprise – GSE), which is not for profit, but provides financial services in the private market (Wood, 2010).

Santos (2018) states that, in public administration, examples of hybrid organization were government organizations that had characteristics of private companies; third sector organizations that acted in similar roles to the public sector; and private companies that operated in the production and service provision of the public sector. Hybridization followed historical evolution and impacted government, civil society, and market companies (Krøtel & Villadsen, 2016).

There was a gradual influence of business logic in public administration and the third sector. At the same time, in the late 1980s and early 1990s, companies in the market were under external pressure to incorporate environmental and social issues into their business strategies – Corporate Social Responsibility. In this way, private companies were also influenced by different institutional logics from other sectors (Santos, 2018).

According to Santos (2018), despite the plurality of concepts and definitions about hybrid organizations, there are characteristics that are common to all of them: there is always the coexistence of more than one management style, purpose and mission, which in turn will generate different combinations of results, through the way they coexist within a given context (Menegassi & Barros, 2019). Hybrid organizations are organizations that incorporate different elements - activities, structures, processes, and identities - from different institutional logics, and involve two mechanisms in their formation: 1) Strategic Responses - when it faces external conflicting demands, and 2) Managerial Responses - when it faces internal conflicting demands and identity claims (Huang et al., 2017).

Laurett et al. (2018) and Santos (2018) have compiled several approaches regarding the meaning of hybrid organizations (Menegassi & Barros, 2019), namely: 1) they are organizations that have more than one characteristics of different sectors, such as private, public or social, through combined management models; 2) they are networks of collaboration and partnership between public, private, and non-profit organizations; 3) are those that unify the social mission with the organization's business structure, which combine business – profit –, environment – environmental and charity – social; 4) they are organizations that share structures and practices, allowing the coexistence of values and artifacts from different logics and value systems, coming from different sectors and 5) they are heterogeneous arrangements of cultures, rationalities, logics of action and ideals, which are pure and incongruous.

For Walchhutter (2017), hybrid organizations are those that have the following characteristics, which in turn give rise to domains, each with its own logic: 1) nature of ownership, 2) governance, 3) operational priorities, 4) human resources and 5) other sources of primary resources. Given the plurality of definitions, the most accepted, according to Mair et al. (2015) and Almeida (2018), is the one that considers organizational hybridism based on the understanding and presence of 4 (four) different variables: 1) Presence of multiple and conflicting objectives, due to conflicting institutional logics (intraorganizational and interorganizational); 2) Presence of different stakeholders; 3) Presence of divergent or inconsistent activities.

Bishop and Waring (2016) also highlighted the importance of micro-level interactions, which report the disagreements and conflicts related to daily work - work organization, priorities and performance -, considering this hybrid organizational context. The authors proposed a way of dealing with these conflicts, analyzing how interactions at the micro level reflect and reconstitute broader institutional tensions. It brings to light the importance of the negotiation strategies of the actors inserted in the day to day of the organization, which with the establishment of points of difference and disagreement within these relationships, provided the basis for new forms of social order to be established.

According to Emery and Giauque (2014), hybrid environments can bring out the best or worst of organizations' environments, since the principles, rules, and values of different markets differ greatly from one another, and are often in conflict with each other. In this dubious environment, the agreements that the actors can negotiate among themselves are what allow them to overcome any contradictions between the different universes of reference. In the public initiative, this new way of acting by the public servant, who needs to reconcile multiple demands from society and

the market, and the conflicts arising from this hybridization of the way public organizations work is the focus of what many authors call studies of ‘post-bureaucracy’, or ‘new Weberian state’, or ‘new public service’, or ‘public value management’, or ‘new public governance’.

Based in the bibliographic research (theoretical) and in the interviews (practical) some gaps in the GS of state companies that have a negative (or a less positive) impact in the results/performance of these companies were identified, considering that these state companies are in a hybrid environment. The relevant gaps will be explained in the sequence, in the next subtitle, as these gaps were used to compare with the IR to be able to answer the paper research’s question.

### *2.2.1. Impacting variables to GS value perception*

#### *2.2.1.1. Political influence*

Political interference is either harmful or beneficial to public organizations. Political agents have a decisive impact on the direction and results of organizations, so that political aspects matter, even considering the limitations of the GS in dealing with them. Strategic planning serves as a shielding mechanism for state organizations from political intervention in their activities (Grossi et al., 2020; Liechti & Finger, 2019). Zhang (2018) is controversial in stating that the government’s participation in the ownership of an organization can influence its choice for the path of fraud.

#### *2.2.1.2. Coopetition and partnerships*

Good organizational performance is linked to strategic partnerships and good governance. The most potentially impacting changes in partnerships is the adoption of governance practices, as they contribute to their efficiency and better performance (Azmi et al., 2018; Moura et al., 2020). Hybrid organizations have different institutional logics, which coexist in the same organization or in a partnership between organizations. Hybridity impacts the GS, which needs to be effective and efficient in its role of directing, controlling and evaluating the hybrid organization, preventing and avoiding deviations arising from partnerships (Liechti & Finger, 2019; Kappel et al., 2017).

#### *2.2.1.3. Project governance*

Project governance (PG) is associated with improved organizational performance, long-term value delivery and greater strategic alignment. PG Integrates organizations-government-society in meeting the needs involved in sustainable development, bringing tangible and intangible gains. There is evidence that a significant part of public corporate projects does not bring concrete benefits for which they were created (Lappi & Asltonen, 2017; Ma et al., 2017; Cruz & Scur, 2016).

#### *2.2.1.4. Organizational culture*

The improvement of an organization’s results is intrinsically associated with the configuration of its institutional and cultural fabric. The insertion of a culture of transparency of information and control makes decision-making improved, enhancing its performance. Adequate GS, associated with a strong ethical culture is directly associated with health and financial control, with regulatory compliance and greater access to individual and corporate capital (Kharel et al., 2019; Nalukenge et al., 2018; Sari & Lupis, 2018).

#### *2.2.1.5. Process management*

A process-oriented organization positively influences its performance, providing good governance and management. The use of process management contributes to a GS focused on results/

organizational performance; especially in public organizations, which are hierarchical, bureaucratic and focused on processes/procedures. The more bureaucratic, the greater the tendency to leverage the negative effects of an already bureaucratized GS. Even corrupt practices can even be seen as a way of learning to better manage processes (Vom Brocke & Rosemann, 2010; Nwokorie, 2017; Racko, 2017).

#### *2.2.1.6. Organizational structure*

The GS presupposes the establishment of a document structure of laws, regulations, rules, guidelines, and codes, as well as a basic and minimally qualified organizational structure. The narrow definition of governance is focused on the internal governance structures - board, president, board, shareholders, etc. - by which organizations are directed and controlled. Good governance is achieved when there is a structure known to be strong by stakeholders, but with maximum flexibility. The more decentralized and branched the structure, the greater the relevance of leadership for good governance (Sergeeva, 2019; Andrews et al., 2016; Dragomir & Gutu, 2017).

#### *2.2.1.7. Controls*

According to Fu (2019) and Fontes and Alves (2018) there are two governance mechanisms: 1) internal - the board of directors as the controlling agent, the managers themselves controlling each other, executive compensation schemes, the use of debt financing and supervision performed by the organization's major shareholder, and 2) external - discussion of organizational controls, including external rules and regulations imposed on the organization, in addition to monitoring and pressure from investors and the market. The ombudsmen are instances of participation that strengthen the social control of public organizations by society, helping to improve governance and public management. In turn, the internal affairs department is essential for the prevention, treatment and investigation of all irregularities committed by any public entity or contracted private entities, ensuring the integrity of public organizations (CGU, 2019).

#### *2.2.1.8. People management*

It is a fundamental factor for good public governance and the improvement of organizational performance for leadership development. Good organizational results depend on the effective management of its human resources - employees satisfied, committed, engaged and loyal to the organization. The more positively the impact on the organization's performance will be the more aligned human resources and GS practices are (Oyewunmi et al., 2017; Dragomir & Gutu, 2017).

#### *2.2.1.9. Performance/Result Orientation*

When implementing the principles of good governance in a public organization, the aim is to improve its management and performance, in a transparent, responsible and ethical manner, enabling the prediction of its future performance and bringing added value to the citizen. Good governance is associated with meeting performance targets and the results expected by different stakeholders. The main conflict identified in the public sector is the difficulty in following procedures, with legality and transparency, and at the same time, being effective and efficient in terms of results and performance (Mundzir, 2016; De Jesus & Dalongaro, 2018; Azmi et al., 2018).

### 3. METHODOLOGICAL PROCEDURES

The logic of this research is inductive, as it seeks to identify and analyze the theoretical, practical, and theoretical-practical gaps in the GS of state organizations that have a negative impact in the results/performance of these companies, comparing them with the IR. Regarding the objectives, this is exploratory research (Gray, 2016). The research methodology is mixed, as it mixes quantitative and qualitative approaches, as shown in Figure 1, to broaden and deepen its understanding and corroboration on the research topic (Creswell & Clark, 2015).

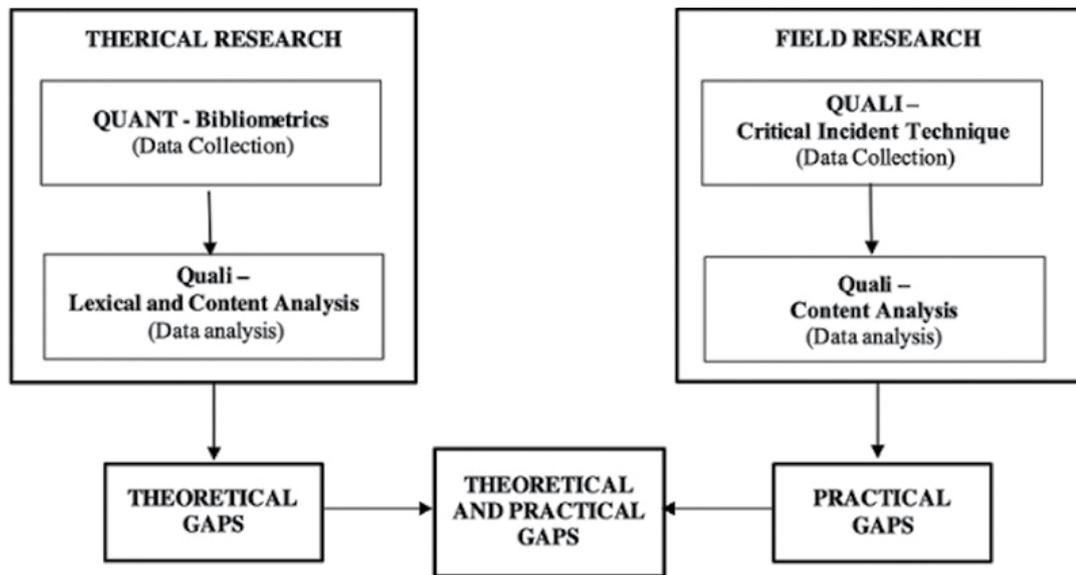


Figure 1. Methodological path.

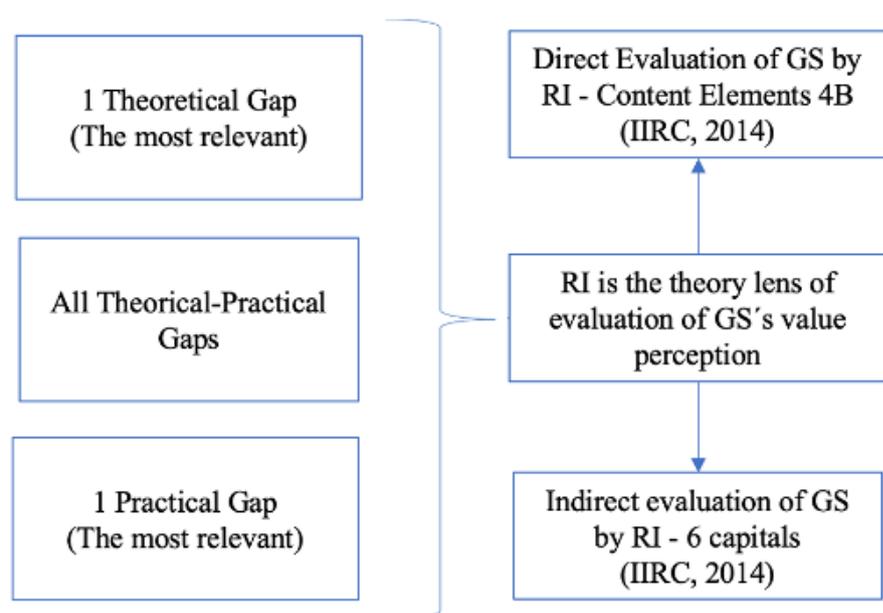
Source: Adapted from Marchisotti et al. (2022) and De Farias Filho et al. (2019).

The theoretical gaps – 1<sup>st</sup> phase of the methodology – were identified through bibliographic research, obtaining an initial mass of articles after researching the expression research (“public governance”) AND (*organ\* OR entit\* OR corporat\* OR organizat\* OR “public sector”*) in the Capes Journal database. Next, there was a prioritization and analysis of selected articles through multi-criteria analysis – number of article citations (weight 0.23), first author’s index h (weight 0.13), journal classification (weight 0.22) and thematic alignment (weight 0.42), using *EndNotes and Excel* (Treinta et al., 2014; Marchisotti & Farias Filho, 2022). Finally, 54 articles were selected that make up the 3<sup>rd</sup> Quartile of the prioritized sample, which will undergo lexical and content analysis (Vergara, 2008; Bardin, 2016), using NVIVO, identifying the 30 most frequently used words in the articles, with later obtaining of their meaning, through 4 (four) categorization cycles, using an expression associated with the word to name the category.

The practical gaps – 2<sup>nd</sup> phase of the methodology – were obtained through interviews with 10 specialists with an average of 15 years of experience, using the critical incident technique (CIT). They responded to a *survey* that presented a scenario that described a situation in which there were doubts on the part of a fictitious company about the advantages and disadvantages of GS, followed by questions that sought to understand the opinion of respondents in this regard, as well as to identify the factors of success and failure of a GS and what would be the ideal GS for the interviewees. This *survey* was reviewed by three researchers with experience in CIT and by an expert in the GS topic. The interviews were transcribed, and their content analyzed, after four cycles of categorization using NVIVO as well (Vergara, 2008; Bardin, 2016).

The theoretical-practical gaps—3<sup>rd</sup> phase of the methodology—were identified as those that are present both in theory and in practice and were obtained by comparing the categories found in the application of the 1<sup>st</sup> phase of the methodology with the 2<sup>nd</sup> phase, according to the analysis of their meaning. Thus, the categories previously created were compared and those from theory that had the same meaning as those from the interviews, which reported the same concern or problem, were considered as common and classified as theoretical-practical gaps, representing problems converging between theory and practice (Gray, 2016).

Finally, to identify what should be adjusted in the IR to improve it, based on gaps in GS from state companies in Brazil, comparative and content analysis methods were used. The objective is to identify similarities and differences between the most relevant theoretical and practical gaps, and all other theoretical-practical gaps with the IR – universe of analysis. It was compared 9 (nine) gaps – categories that define the dimensions to be analyzed – with the content of the IR 4B content elements – direct assessment – and the 6 IR capitals – indirect assessment, as shown in Figure 2. Thus, it was possible to identify the points of convergence and divergence between the gaps in GS and the IR (Prieto et al., 2009; Balestro et al., 2007; Bardin, 2016), that could orient what could be improved in the IR.



*Figure 2.* Identification of differences between the GS's gaps and the IR.

*Source:* Authors

In this way, it is possible to identify the possible impact of each model variable on the IR, directly and indirectly, enabling a better understanding of what needs to be done in the Brazilian public organization so that its SG is focused on results. In addition, it enables greater visibility of the contributions of the SG to the results of Brazilian public companies, so that they are better seen, disclosed and evaluated by different stakeholders, increasing the perception of value of the SG.

#### 4.1. VALUE PERCEPTION

In all, 24 theoretical gaps and 30 practical gaps were identified, and, from a confrontation between them, it was possible to identify the 7 theoretical-practical gaps, that is, gaps present both in theory and in practice: Harmful Political Influence, Lack of proper project management, GS not focused on results, Organizational Culture Misaligned with GS, GS with complex and bureaucratic processes, Inadequate Organizational Structure, and Inadequate People Management.

The two theoretical and practical gaps that had greater relevance to the research theme are: 1) Coopetition and Partnerships and 2) Unbalanced Controls. The theoretical gap - coopetition and partnerships (conflicts) - was included due to the number of times it was addressed in theory. The practical gap – unbalanced controls – was included because it presented a relevant paradox, as, for some respondents, there is an excess of control, while for others there is a lack of it.

Finally, when comparing the GS's gaps with the theoretical framework of the IIRC (2014), it is possible to identify points of convergence and divergences. The perception of the GS's value can be identified by the IR in 2 (two) ways: 1) Direct – through the assessment of the organization's GS; 2) Indirect – through the service and dissemination of organizational results, through the 6 capitals.

##### 4.1.1. Direct form

Comparing the proposed GS's gaps with the GS items that are evaluated by the IR, it was possible to build Table 2, which details the direct impact of the model's variables on the perception of the GS's value in the IR.

**Table 2**

*Relation between the GS's gaps and the GS Assessment Items in the IR (direct assessment).*

GS's Gaps	IR GS Assessment Items	Observations
Harmful political influence	No reference.	There is no way to visualize the direct impact of harmful political influence, poor project management/governance, and the impact of conflicts generated by partnerships/cooperation in the IR GS's assessment.
Bad project management		
Conflicts in Cooperation and Partnerships		
GS not focused on results	<i>"Actions by those responsible for governance to influence and monitor the organization's strategic direction and risk management."</i>	There is partial concern that the GS is driving the organization's objectives in line with organizational strategy but not in terms of goals.
Inadequate People Management	<i>"Governance leadership framework – skills, diversity, as well as demonstrating how this framework meets regulatory requirements."</i>	There is partial concern with the leaders responsible for governance, but not with the other organization managers.

Table 2

Cont.

GS's Gaps	IR GS Assessment Items	Observations
Organizational Culture not aligned with GS	<i>“Strategic decision-making process and monitoring of culture, including attitude to risk and linked to ethics and integrity.” &amp; “How culture, ethics and values are reflected in the capitals present in the organization, including the relationship with different stakeholders.”</i>	There is total concern with the organizational structure and culture.
Inadequate organizational structure	<i>“Governance leadership framework – skills, diversity, as well as demonstrating how this framework meets regulatory requirements.”</i>	
Bureaucratic and Complex Processes	<i>“Strategic decision-making process and monitoring of culture, including attitude to risk and linked to ethics and integrity.”</i>	There is a partial concern with the processes, in this case, the decision-making process. A broader concern is lacking.
Unbalanced Controls	<i>“Strategic decision-making process and monitoring of culture, including attitude to risk and linked to ethics and integrity,” &amp; “Actions by those charged with governance to influence and monitor the organization’s strategic direction and risk management.”</i>	There is partial concern with monitoring leadership, strategic planning and risks.

**Source:** Elaborated by Authors (2022).

The variables Harmful Political Influences, Conflicts in Partnerships/Cooperation, and Project Governance are not directly evaluated in the context of the GS. The variables Unbalanced Controls, GS not focused on results, Inadequate People Management and Bureaucratic and Complex Processes in a certain way are addressed; and the Organizational Culture not aligned with GS and Inadequate Organizational Structure variables are fully addressed as a direct GS assessment item.

#### 4.1.2. Indirect form

Regarding the indirect impact of the GS's gaps on the IR, through capitals, it is not possible to present which capitals are most impacted by the variables, as shown in Table 3, since, in a way, each GS's gaps indirectly impact more than one capital.

**Table 3***Relation between GS's gaps and IR capitals (indirect assessment).*

GS's gaps	IR Capitals (Most relevant)	Observations
Harmful political influence	Financial Capital	There is a more evident relationship between political influence and poor project management in reducing the organization's productivity.
Bad project management		
GS not focused on results	All	It is assumed that a GS not focused on results impacts all the capitals present in an organization.
Inadequate People Management	Human Capital	There is a more evident relationship between people management, with the skills, abilities and experiences of employees.
Organizational Culture not aligned with GS	Intellectual Capital	There is a more evident relationship between organizational culture, organizational structure and process management, with the tacit knowledge of an organization.
Inadequate organizational structure		
Bureaucratic and Complex Processes		
Conflicts in Cooperation and Partnerships	All capitals	It is assumed that conflicts in partnerships and unbalanced controls have the potential to equally impact any of the capitals present in an organization.
Unbalanced Controls		

**Source:** Elaborated by Authors (2022).

Each of the GS's gaps, to a greater or lesser degree, has the potential to impact at least one of the IR capitals.

## 5. CONCLUSION

From the analysis of the results, it was possible to meet the research objective - identify how to improve the IR based on gaps in the Governance System from state companies in Brazil that have a negative (ou less positive) impact in the results/performance's perception of these companies. It was also possible to identify that the IR could be adjusted, from the perspective of GS's gaps, so that it is possible to better assess and show, directly and indirectly, the contribution of the GS to the results/performance of state organizations in the face of different interested parts, considering the hybrid context.

By comparing the theoretical and practical gaps, it was possible to identify the theoretical-practical gaps, which added to the main theoretical and practical gap, led to the generation of a model that answers the research question, which is composed of the following variables: Harmful political influence, Bad project management, GS not focused on results, Inadequate People Management, Organizational Culture not aligned with the GS, Inadequate Organizational Structure, Bureaucratic and Complex Processes, Conflicts in Cooperation and Partnerships - organizational hybridisms, and Unbalanced Controls. It can be seen, therefore, that the dynamics of the interaction between management and governance are mutually impacting, for better or for worse, on the perception of GS value.

It was identified that the IR indirectly reflects the GS's gaps in at least one of its capitals. Considering the direct impact of the variables on the assessment of the GS from the IR perspective, it was identified some gaps that could be better addressed in the IR - Unbalanced controls, GS not focused on results, Inadequate People Management and Bureaucratic and Complex Processes

-, as despite being partially reflected in the RI, their assessment could be broadly incorporated. There is also some GS's gaps that were totally ignored in the IR's direct assessment of the GS – harmful political influence, conflicts in partnerships/cooperation, and project governance. Thus, it is suggested that such elements could be more clearly incorporated into the direct assessment of the GS by the IR.

A limitation of this research involves the use of content analysis and potential biases and personal limitations of researchers in their decisions and analyses, which may interfere with the research results. Another identified limitation is the fact that the bibliographic research was carried out only on the international theoretical framework, which eventually failed to consider national contributions that may be relevant to the studied public environment.

It is noticed that the article contributes academically, as it allows the identification of possible research problems, which can later be better detailed and worked on by researchers. From a managerial point of view, the work adds value to professionals who work in the GS area, in their respective organizations. Knowledge about practical gaps makes managers able to visualize and subsequently work with their employees to mitigate such gaps, improving the governance of state organizations and their performance.

It was possible to infer a relationship between the different gaps, which opens the possibility of generating hypotheses for proposing improvements in the best governance practices for state organizations, to be carried out in future studies. The model, to be tested in the field in the future, has the potential to improve the GS of state organizations, so that it is possible to create a system more suited to the reality and needs of their different stakeholders.

Thus, a special attention to the variables of the model proposed in this article, together with the adoption of IR by public organizations, has the potential to expand the understanding of different stakeholders regarding the actual situation of the organization and the direct and indirect contribution of the GS in the results/performance of public organizations, improving the perception of GS value by different stakeholders.

## REFERENCES

- Almeida, M. C. C. D. (2018). *O efeito da natureza estatal para a integridade das sociedades de economia mista* [Doctoral dissertation, Fundação Getúlio Vargas].
- Alves, N. J. F., Kassai, J. R., Lucas, E. C., & Ferreira, H. M. G. (2017). Relato Integrado e o formato da informação financeira para evidenciar a criação de valor das empresas do Programa Piloto. *Revista Evidenciação Contábil & Finanças*, 5(3), 99-122.
- Ambrozini, L. S. (2017). Pressões internas e externas na utilização de padrões de divulgação de informações socioambientais amplamente aceitos: uma análise sobre estrutura de governança corporativa, ambiente institucional e a perspectiva de legitimação. *Revista Contemporânea de Contabilidade*, 14(31), 3-26. <http://doi.org/10.5007/2175-8069.2017v14n31p3>
- Andrews, R., Beynon, M. J., & McDermott, A. M. (2016). Organizational capability in the public sector: A configurational approach. *Journal of Public Administration Research and Theory*, 26(2), 239-258. <https://doi.org/10.1093/jopart/muv005>
- Arellano-Gault, D., Demortain, D., Rouillard, C., & Thoenig, J. C. (2013). Bringing public organization and organizing back in. *Organization Studies*, 34(2), 145-167. <https://doi.org/10.1177/0170840612473538>

- Azmi, Z., Misral, M., & Maksun, A. (2018). Knowledge Management, the Role of Strategic Partners, Good Corporate Governance and Their Impact on Organizational Performance. *Prosiding CELSciTech*, 3, 20-26.
- Badia, F., Dicuonzo, G., Petruzzelli, S., & Dell'Atti, V. (2019). Integrated reporting in action: Mobilizing intellectual capital to improve management and governance practices. *Journal of Management and Governance*, 23(2), 299-320. <https://doi.org/10.1007/s10997-018-9420-1>
- Balestro, M. V., Vargas, E. R., & Machado Junior, E. (2007). Estratégias comparativas em estudos de caso em administração. *II Encontro de Ensino e Pesquisa em Administração e Contabilidade*.
- Bannister, F., & Connolly, R. (2014). ICT, public values and transformative government: A framework and programme for research. *Government Information Quarterly*, 31(1), 119-128. <https://doi.org/10.1016/j.giq.2013.06.002>
- Bardin, L. (2016). *Análise de Conteúdo* (3rd ed.). Edições 70.
- Beretta, V., Demartini, C., & Trucco, S. (2019). Does environmental, social and governance performance influence intellectual capital disclosure tone in integrated reporting?, *Journal of Intellectual Capital*, 20(1), 100-124. <https://doi.org/10.1108/JIC-02-2018-0049>
- Bishop, S., & Waring, J. (2016). Becoming hybrid: The negotiated order on the front line of public-private partnerships. *Human Relations*, 69(10), 1937-1958. <https://doi.org/10.1177/00187267166630389>
- CGU - Controladoria Geral da União. (2019). *Como Implementar uma Corregedoria em Municípios*. <https://repositorio.cgu.gov.br/handle/1/44489>.
- Creswell, J. W., & Clark, V. L. P. (2015). *Pesquisa de Métodos Mistos: Série Métodos de Pesquisa* (2nd ed.). Penso Editora.
- Cruz, C. E., & Scur, G. (2016). Alinhamento do PMO à Gestão Organizacional: Estudo dos elementos do PMO sob as dimensões Estratégica, Tática e Operacional. *Gestão e Projetos: GeP*, 7(1), 32-40. <https://doi.org/10.5585/gep.v7i1.380>
- De Castro, K. P., & Afonso, J. R. R. (2018). Securitização de Recebíveis: Uma avaliação de créditos tributários e dívida ativa no setor público brasileiro. *Economic analysis of law review*, 9(2), 5-34.
- De Farias Filho, J. R., Marchisotti, G. G., Maggessi, K. M. F., & de Miranda Junior, H. L. (2019). Método de pesquisa misto para identificação do problema de pesquisa. *Conhecimento & Diversidade*, 10(22), 88-102. <http://doi.org/10.18316/rcd.v10i22.5155>
- De Jesus, M. R., & Dalongaro, R. C. (2018). Governança corporativa na administração municipal: uma análise do resultado econômico da secretaria de Fazenda de Ijuí (RS) – Brasil. *Revista Observatório de la Economía Latinoamericana*.
- Diz, A. J., Mantovani, D. M. N., & Lucas Júnior, D. (2017). A Relação entre a Percepção Sobre a Implantação dos Mecanismos de Governança Corporativa e o Comprometimento Organizacional: A Visão do Colaborador. *XIX ENGEMA*. São Paulo, SP, Brasil.
- Dočekalová, M. P., & Kocmanová, A. (2016). Composite indicator for measuring corporate sustainability. *Ecological Indicators*, 61, 612-623. <https://doi.org/10.1016/j.ecolind.2015.10.012>
- Dragomir, L., & Gutu, A. (2017). The importance of the concept of leadership in the context of public administration. *Administrarea Publică*, 94(2), 74-78.
- Fontes, J. R., & Alves, C. F. (2018). Mecanismos de controle na governança corporativa das empresas estatais: uma comparação entre Brasil e Portugal. *Cadernos Ebape.Br*, 16(1), 2-13. <https://doi.org/10.1590/1679-395172454>

- Ford, M. R., & Ihrke, D. M. (2019). Perceptions are reality: A framework for understanding governance. *Administrative Theory & Praxis*, 41(2), 129-147. <https://doi.org/10.1080/10841806.2018.1512337>
- Emery, Y., & Giauque, D. (2014). The hybrid universe of public administration in the 21st century. *International Review of Administrative Sciences*, 80(1), 23-32. <https://doi.org/10.1177/0020852313513378>
- Ferraz, I. N., & Santos Júnior, C. D. (2021). Organization of Free and Open-Source Software Projects: In-between the Community and Traditional Governance. *Brazilian Business Review*, 18(3), 334-352. <https://doi.org/10.15728/bbr.2021.18.3.6>
- Fu, Y. (2019). The value of corporate governance: Evidence from the Chinese anti-corruption campaign. *The North American Journal of Economics and Finance*, 47, 461-476. <https://doi.org/10.1016/j.najef.2018.06.001>
- Goede, M. (2018). The Corporation: A circular process of value creation. *Archives of Business Research*, 6(5), 113-124. <https://doi.org/10.14738/abr.65.4556>
- Grossi, G., Kallio, K. M., Sargiacomo, M., & Skoog, M. (2020). Accounting, performance management systems and accountability changes in knowledge-intensive public organizations: a literature review and research agenda. *Accounting, Auditing & Accountability Journal*, 33(1), 256-280.
- Huang, J. S., Pan, S. L., & Liu, J. (2017). Boundary permeability and online-offline hybrid organization: A case study of Suning, China. *Information & Management*, 54(3), 304-316.
- Gore, O., McDermott, I., Checkland, K., Allen, P., & Moran, V. (2020). Discretion drift in primary care commissioning in England: Towards a conceptualization of hybrid accountability obligations. *Public Administration*, 98(2), 291-307. <https://doi.org/10.1111/padm.12554>
- Gray, D. E. (2016). *Pesquisa no mundo real*. Penso Editora.
- Hsieh, C. T., Hurst, E., Jones, C. I., & Klenow, P. J. (2019). The allocation of talent and us economic growth. *Econometrica*, 87(5), 1439-1474. <https://doi.org/10.3982/ECTA11427>
- IIRC - International Integrated Reporting Council. (2014). *The International Integrated Reporting Framework*. <<https://integratedreporting.org/wp-content/uploads/2015/03/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-Portugese-final-1.pdf>>.
- IBGC – Instituto Brasileiro de Governança Corporativa. (2017). *Governança Corporativa em Empresas Estatais Listadas no Brasil*. <[http://www.ibgc.org.br/userfiles/files/Publicacoes/IBGC\\_Pesquisa/Publicacao-IBGCPesquisa-GC\\_SEMs-2017.pdf](http://www.ibgc.org.br/userfiles/files/Publicacoes/IBGC_Pesquisa/Publicacao-IBGCPesquisa-GC_SEMs-2017.pdf)>.
- Kappel, L. B., Seno, J. P., & De Sousa, E. G. (2017). Parcerias no Terceiro Setor: Algumas Contribuições da Literatura Científica Nacional e Internacional. *Revista Economia & Gestão*, 17(47), 179-199. <https://doi.org/10.5752/P.1984-6606.2017v17n47p179>
- Kharel, S., Magar, S., Chaurasiya, N., Maharjan, S. & Rijal, CP. (2019). Transparency and accountability in the Nepalese corporate sector: A critical assessment. *Quest Journal of Management and Social Sciences: Corporate Governance Edition*, 1(1), 1-25. <https://doi.org/10.3126/qjmss.v1i1.25972>
- Krøtel, S. M., & Villadsen, A. R. (2016). Employee turnover in hybrid organizations: the role of public sector socialization and organizational privateness. *Public Administration*, 94(1), 167-184.
- Lappi, T., & Aaltonen, K. (2017). Project governance in public sector agile software projects. *International Journal of Managing Projects in Business*, 10(2), 263-294.

- Laurett, R., Mainardes, E. W., do Paço, A. M. F., & Sidoncha, I. M. (2018). Empreendedorismo em organizações sem fins lucrativos, empreendedorismo social e hibridismo: Iguais, similares ou diferentes?. *Revista de Administração de Roraima-RARR*, 8(2), 379-399. <https://doi.org/10.18227/2237-8057rarr.v8i2.4902>
- Liechti, F., & Finger, M. (2019). Strategic Objectives for State-Owned Enterprises as A Means to Mitigate Political Interference: An Empirical Analysis of Two Swiss State-Owned Enterprises. *Annals of Public and Cooperative Economics*, 90(3), 513-534. <https://doi.org/10.1111/apce.12227>
- Ma, H., Zeng, S., Lin, H., Chen, H., & Shi, J. J. (2017). The societal governance of megaproject social responsibility. *International Journal of Project Management*, 35(7), 1365-1377. <https://doi.org/10.1016/j.ijproman.2017.01.012>
- Macedo, Á. F. P. D., Oliveira, A. M., Nobre, L. N., Brito, S. G., & Quandt, C. O. (2015). Governança corporativa e evidencição de capital intelectual em empresas brasileiras. *Revista Evidenciação Contábil & Finanças*, 3(1), 18-33. <https://periodicos.ufpb.br/index.php/recfin/article/view/20678>
- Marchisotti, G. G., & Farias Filho, J. R. (2022). Application of a Multi-method to Identify a Research Problem. *Revista de Administração Contemporânea*, 26(6), e-210020. <https://doi.org/10.1590/1982-7849rac2022210020.en>
- Marchisotti, G., Franca, S., Toledo, R., Castro, H., Alves, C., & Putnik, G. (2022). Hybrid governance system value perception model. *International Journal for Quality Research*, 16(1), 261-278.
- Marrone, A., & Oliva, L. (2020). The Level of Integrated Reporting Alignment with the IIRC Framework: Evidence from South Africa. *International Journal of Business and Management*, 15(1), 99-108. <https://doi.org/10.5539/ijbm.v15n1p99>
- Mair, J., Mayer, J., & Lutz, E. (2015). Navigating institutional plurality: Organizational governance in hybrid organizations. *Organization studies*, 36(6), 713-739. <https://doi.org/10.1177/0170840615580007>
- Menegassi, C. H. M., & Barros, S. M. (2019). Conhecimento acadêmico no campo das organizações híbridas e das empresas de economia de comunhão. *Cadernos de Campo: Revista de Ciências Sociais*, (26), 217-238.
- Moura, D. H., de Sá Freire, P., & Kempner-Moreira, F. K. (2020). Governança compartilhada para redes interorganizacionais de segurança pública. *P2P E INOVAÇÃO*, 6(2), 156-177. <https://doi.org/10.21721/p2p.2020v6n2.p156-177>
- Mundzir, H. (2016). Harmonization Concept of Good Corporate Governance and Company Culture. *Journal Dinamika Hukum*, 16(1), 85-91. <https://doi.org/10.20884/1.jdh.2016.16.1.388>
- Nalukenge, I., Nkundabanyanga, S. K., & Ntayi, J. M. (2018). Corporate governance, ethics, internal controls and compliance with IFRS. *Journal of Financial Reporting and Accounting*, 16(4), 764-786. <https://doi.org/10.1108/JFRA-08-2017-0064>
- Nwokorie, E. (2017). *Challenges to effective management of public sector organizations in an institutionally corrupt society: A study of Nigeria*. Vaasan yliopisto.
- Oliveira, M. C., Ceglia, D., Lima, L. S., & Ponte, V. M. R. (2017). Analysis of corporate governance disclosure: a study on Brazilian companies. *Contextus: Revista Contemporânea de economia e gestão*, 15(1), 172-194. <https://doi.org/10.19094/contextus.v15i1.945>
- Oyewunmi, O. A., Adeyemi, K. S., & Ogunnaike, O. O. (2017). Corporate governance and human resource management in Nigeria's downstream petroleum sector. *Scientific Annals of Economics and Business*, 64(2), 139-153.

- Perego, P., Kennedy, S., & Whiteman, G. (2016). A lot of icing but little cake? Taking integrated reporting forward. *Journal of cleaner production*, 136, 53-64.
- Petcharat, N., & Zaman, M. (2019). Sustainability reporting and integrated reporting perspectives of Thai-listed companies. *Journal of Financial Reporting and Accounting*, 17(4), 671-694. <https://doi.org/10.1108/JFRA-09-2018-0073>
- Prieto, V. C., Carvalho, M. M. D., & Fischmann, A. A. (2009). Análise comparativa de modelos de alinhamento estratégico. *Production*, 19(2), 317-331. <https://doi.org/10.1590/S0103-65132009000200008>
- Prudêncio, P., Forte, H., Crisóstomo, V., & Vasconcelos, A. (2021). Effect of Diversity in the Board of Directors and Top Management Team on Corporate Social Responsibility. *BBR. Brazilian Business Review*, 18(2), 118-139. <http://doi.org/10.15728/bbr.2021.18.2.1>
- Racko, G. (2017). Bureaucratization and medical professionals' values: a cross-national analysis. *Social Science & Medicine*, 180, 76-84. <https://doi.org/10.1016/j.socscimed.2017.03.027>
- Santos, L. F. M. D. (2018). *Lógicas em negociação nas práticas de monitoramento e avaliação de organizações híbridas: os casos de duas empresas sociais brasileiras* [Doctoral dissertation, Fundação Getúlio Vargas].
- Sari, M., & Lubis, A. D. (2018). The Influence of Organization's Culture and Internal Control to Corporate Governance and Its Impact on Bumh (State-Owned Enterprises) Corporate Performance in Indonesia. *Journal of Advanced Research in Law and Economics*, 9(2), 681.
- Sergeeva, N. (2019). Towards more flexible approach to governance to allow innovation: the case of UK infrastructure. *International Journal of Managing Projects in Business*, 13(1), 1-19. <https://doi.org/10.1108/IJMPB-10-2018-0216>
- Silva, F. D. D. (2018). *Implantação da Lei n. 13.303/16 de governança corporativa: um estudo do impacto no desempenho das empresas estatais* [Doctoral dissertation, Fundação Getúlio Vargas]. <https://bibliotecadigital.fgv.br/dspace/handle/10438/25717>
- Sukhari, A., & Villiers, C. (2019). The influence of integrated reporting on business model and strategy disclosures. *Australian Accounting Review*, 29(4), 708-725. <https://doi.org/10.1111/auar.12264>
- TCU – Tribunal de Contas da União. (2019). *Guia para Elaboração na Forma do Relatório Integrado*. <https://portal.tcu.gov.br/lumis/portal/file/fileDownload.jsp?fileId=8A81881F6E798244016EA26EAF6D3AC1>.
- Treinta, F. T., Farias Filho, J. R., Sant'Anna, A. P., & Rabelo, L. M. (2014). Metodologia de pesquisa bibliográfica com a utilização de método multicritério de apoio à decisão. *Production*, 24(3), 508-520. <https://doi.org/10.1590/S0103-65132013005000078>
- Vergara, S. C. (2008). *Projects and research reports in administration*. São Paulo: Atlas.
- Vom Brocke, J., & Rosemann, M. (Eds.). (2010). *Handbook on business process management 2: Strategic alignment, governance, people and culture*. Springer.
- Villiers, C., & Sharma, U. (2020). A critical reflection on the future of financial, intellectual capital, sustainability and integrated reporting. *Critical Perspectives on Accounting*, 70, e101999. <https://doi.org/10.1016/j.cpa.2017.05.003>
- Walchhutter, S. (2017). *Negócios sociais como organizações híbridas: estudo sobre tensões inerentes a esse tipo organizacional* [Doctoral dissertation, Centro Universitário FEI].

- Wood Jr, T. (2010). Organizações híbridas. *Revista de Administração de Empresas*, 50(2), 241-247. <https://doi.org/10.1590/S0034-75902010000200008>
- Zhang, J. (2018). Public governance and corporate fraud: Evidence from the recent anti-corruption campaign in China. *Journal of Business Ethics*, 148(2), 375-396. <https://doi.org/10.1007/s10551-016-3025-x>

#### AUTHOR'S CONTRIBUTION

GGM: Conceptualization (Lead); Data curation (Lead); Formal analysis (Lead); Investigation (Lead); Methodology (Lead); Project administration (Lead); Resources (Lead); Supervision (Lead); Validation (Lead); Visualization (Lead); Writing – original draft (Lead); Writing – review & editing (Lead). JRFF: Conceptualization (Supporting); Validation (Supporting); Writing – original draft (Supporting); Writing – review & editing (Supporting). SLBF: Conceptualization (Supporting); Validation (Supporting); Writing – original draft (Supporting); Writing – review & editing (Supporting). RGS: Conceptualization (Supporting); Validation (Supporting); Writing – original draft (Supporting); Writing – review & editing (Supporting).

#### CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

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