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Perspectives of control and management of research support foundations with the new legal framework for science, technology and innovation

Perspectivas de controle e gestão das fundações de amparo à pesquisa com o marco legal da ciência, tecnologia e inovação

Perspectivas de control y gestión de fundación de apoyo a la investigación con el marco legal de ciencia, tecnología e innovación

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ABSTRACT
The study investigated the Brazilian Research Support Foundations' adherence to the new legal framework for innovation regarding control by results. The law aims to simplify processes and maximize the innovation system, especially its control and accountability. We analyzed scientific articles, documents, and foundations websites from 2018 and 2019. The level of adherence was measured by an index generated from a checklist of points. The results showed that on average the foundations have an unsatisfactory level of adherence. New attributes of the law obtained less adherence. These foundations do not yet have a level of adherence to items that can better demonstrate the results, such as statistical indicators.
Keywords: new legal framework; accountability; control by results; technological innovation; RSF.

RESUMO
O estudo verificou a aderência ao novo marco legal da inovação nas fundações brasileiras de apoio à pesquisa quanto ao controle por resultados. A promulgação da lei visa simplificar processos e maximizar o sistema de inovação especialmente o controle e prestação de contas. Foram analisados artigos científicos, documentos e sítio das fundações no período de 2018 e 2019. O nível de aderência foi medido por um índice gerado a partir de uma lista de verificação de pontos. Os resultados apresentaram que, em média, as fundações têm um nível de aderência insatisfatório e que novas exigências da lei obtiveram menor aderência. Em suma, as fundações ainda não apresentaram repostas efetivas ao novo processo de gestão voltado a resultados.
Palavras-chave: novo marco legal; prestação de contas; controle por resultados; inovação tecnológica; FAP.

RESUMEN
El estudio verificó la adhesión del nuevo marco legal para la innovación en fundaciones brasileñas para apoyar la investigación en términos de control de resultados. La promulgación de la ley tiene como objetivo simplificar los procesos y maximizar el sistema de innovación, especialmente el control y la rendición de cuentas. Se analizaron sitios web de artículos científicos, documentos y fundaciones del período 2018 y 2019. El nivel de adherencia se midió mediante un índice generado a partir de una lista de puntos de verificación. Los resultados mostraron que, en promedio, las bases tienen un nivel insatisfactorio de adhesión. Los nuevos atributos de la ley obtuvieron menos adherencia. Estas fundaciones aún no tienen un nivel de adherencia a los elementos que pueden demostrar mejor los resultados, como los indicadores estadísticos.
Palabras clave: nuevo marco legal; rendición de cuentas; control por resultados; innovación tecnológica; FAP.

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1 INTRODUCTION

The process of technological innovation and investments in research and development (R&D) has characterized economic growth and social well-being in each country. As for Brazil, the stimulus to innovation grows slowly, remaining below the desired objectives even with the initiatives generated by the Federal Innovation Law (Cappa, Sperancini, & Machado, 2018). For Arbix (2017), the difference may lie in the fact that countries with more advanced innovation policies incorporate processes that aim at greater interaction between mechanisms, instruments, and institutions based on a systemic and multidisciplinary view, in addition to strengthening the public sector and the private sector.

Based on an interaction between society, the business sector, and the government, there was the perception that bureaucratic acts and the lack of legal clarification of the current legislation hampered the technological rise in the country (Santos, Miranda, Nodari, Froehlich, & Sena, 2020). Therefore, the so-called Framework for Science, Technology, and Innovation was promulgated in 2016, whose main objective was highlighted in its article 2: "[...] an incentive to innovation and scientific and technological research in the production environment, for the purpose of technological qualification, the achievement of technological autonomy and the development of the country's national and regional productive system [...] "(Law nº 13.243/16).

It should be noted that the process of socio-economic development is based on the approach of the triple helix, created in 1990 by Henry Etzkovitz, which describes the interactions between different actors in the process of generating and building knowledge: Government, companies, and university (Leydesdorff, 2018). The government presents itself as one of the sectors that assume an important role in evoking responsibility for the process of growth and development of technological and scientific innovation. For Hawkins (2014), this responsibility is based on the fact that the State is likely to face uncertainties in the production environment, especially those that are known in the early stages of the research and development of new technologies.

Another important role played by the government is public financing, which acts as a support for business innovation. Cappa et al. (2018) emphasize that public support for research and innovation generates contributions to structural changes in a country's economy, providing economic growth, increased productivity, improved public service, and social well-being. This way, government investments in the area of innovative processes aim primarily at direct and indirect returns to society.

However, there is a concern about the failures that can occur in this process of State involvement in actions to foster innovation, characterized by the misallocation of investments, and that prevented Brazil from maintaining constant flows of public resources destined for this purpose (Arbix, 2017). In this perspective, Miranda, Araújo, Freire, and Fernandes (2019) presented that, two years after the beginning of the new legal framework, even accounting for the economic recession scenario faced by the country, the legislation was found to be inefficient in achieving its objective, mainly with regard to structural reforms of the economy itself. In the meantime, in 2018, Decree nº 9.283/18 was sanctioned to comply with provisions of Law nº 13.243/16 that needed regulation.

In addition, society's demand for ethical attitudes and the government's commitment to efficient actions for the application of public resources have increased the need for better transparency and control. For the field of innovation, the challenge is even broader, since the need for resources becomes increasingly greater, thus expanding the monitoring and evaluation of the allocation process with adequate and efficient use of resources (Corder & Salles Filho, 2006).

This new management control is linked to the analysis of administrative efficiency aiming to focus on the substance of the project's actions, that is, on the results achieved (Costa, 2018). In this perspective, the new legal framework of innovation brought among its principles the simplification of procedures for the management of science, technology, and innovation projects and the adoption of control by results in its evaluation (Ministry of Science, Technology, Innovations, and Communications [MCTIC], 2018).

The new vision of management and society seeks to act in accordance with a positive interpretation of control, which considers the fact that actions can occur as planned, with error correction and the efficiency of fixed objectives available (Castro, 2018). In this way, the objective of this work is to investigate the Brazilian research support agencies' adherence to the new legal framework for innovation regarding control by results. As mentioned by Silva (2011), public management, with control by results as a guideline, requires extensive planning involving the various stakeholders. While Ferreira (2016) points out that adherence to the new legal framework should build processes that aim at the continued development of science, technology, and innovation (ST&I), Assunção (2019) emphasizes the role of the State in this induction. Therefore, society will benefit from clear and transparent responses from those who are executing public resources. It is worth noting that the changes related to the issue of accountability (Decree nº 9.283/18 and Law nº 13.243/16) stood out so that the process is simplified, privileging the results obtained.

The relevance of the study is in the fact that these development agencies are important concerning the new demands in the development of science and technology from a regional perspective. Such agencies act more particularly on local needs, generating a dynamic and sustainable effort. The adoption of clear procedures that elucidate the responsibilities assumed regarding the conclusion of contracts in compliance with legal

requirements allows an effective control process and helps to prevent risks arising from inefficient practices and any other inadequacies.

In this scenario, the study also contributes as a form of evaluation of the organizational change of these research promotion agencies. Institutions that establish a better ordering of their actions and projects will be able to maximize their power to help the new innovative environment through simplified processes, and with the identification of points of local need and with improvements in investments with a strategic development focus.

2 LITERATURE REVIEW

2.1 Legal framework of innovation

The search for innovation has become an objective to be achieved in several organizational spheres (Azar & Ciabuschi, 2017). By the same token, companies are including in their development policies the focus on the innovation system. For governments, the term innovation is a growing narrative and there has been an increase in the number of innovation and technology centers in partnership with universities and other academic centers (Kahn, 2018). For Taylor (2016), the success of this advance is empirically proven by the involvement of government institutions and political actions to solve market failures. However, the diagnosis of innovation has found flaws, especially concerning the progress of science and technology

The movement of the contemporary economy is dependent on activities of generation and incorporation of innovations and, in this way, the act of innovating and possessing technological knowledge leads to economic and political domination (Arbix, Salerno, Amaral & Lins, 2017). However, the world of science is one of the important agents in this process. It is through the interaction of science, technology, and the organizational process that the production environment is tacitly increased. Thus, countries that have this domination of knowledge work with high levels of productivity, generating better living conditions for their inhabitants. Leydesdorff (2018) argues that the introduction of a new coordination mechanism, in addition to the market and political control, made knowledge production analogous to known economic models.

The application of science in the socioeconomic development process has a foundation in the approach of the triple helix. This term was created by Henry Etzkovitz in the 90s and aims to describe the circular model of innovation based on the multiple mutual relationships that occurred in the process of knowledge generation and dissemination. In this dynamic, relations are exercised by the triad Government, Companies, and University (Oliveira et al., 2017; Oliveira & Renault, 2020).

In Brazil, the promotion of scientific and technological development has undergone constant changes in order to improve these perspectives and reduce the difficulties in expanding the productive environment. The limitations of promoting ST&I (Science, Technology and Information) activities in the country can be characterized by problems such as instability of financial resources applied by the government at the disposal of the area; low participation of the private sector in research and development (R&D); implementation of long-term public policies; outdated R&D financing structures; and excessive bureaucracy (Staub, 2001; Kruglianskas & Matias-Pereira, 2005; Arbix et al., 2017; Lima Verde & Resende Miranda, 2018; Knorr Velho, Campagnolo & Dubeux, 2019).

The history of science and technology policies goes back to the post-World War II period, in the mid-1950s, with the creation of the *Fundação da Sociedade Brasileira para o Progresso da Ciência* (SPBC). Almost simultaneously, the *Conselho Brasileiro de Pesquisas Físicas* (CBPF) was created in 1949 and the *Conselho Nacional de Pesquisas* in 1951, currently called *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (CNPq), representing a milestone for the State's participation in Brazil's technological process. (Fonseca, 2013).

For Oliveira (2016), the institutional trajectory of Science, Technology, and Innovation (ST&I) policies in Brazil made a transition between the bureaucratic measures of the 1970s and the emergence of expertise in the present times. In this context, a sequence of events defined the evolution of technological, scientific, and intellectual development until the insertion of innovation mechanisms in the year 2000. As is the case with incentives for innovative development created in the Innovation Law in 2004, Law 10.973/2004 (Borges, Ghesti & Carmo, 2018) inspired by the North American Bayh-Dole Act (an act that allowed researchers financed with federal funds to apply for patents for their research results and receive for the use of their licenses) and the French law on innovation (Viotti, 2008; Paranhos, Cataldo & Pinto, 2018; Silva Junior, Kato & Ewerton, 2018).

The innovation law aimed to expand the partnership between universities and institutes in the innovation process, aiming at transferring their technologies to private companies. According to Rauen (2016), this presented a strengthening of the areas of research and the production of knowledge, encouraging new innovative environments, and also dealing with new rules for the researcher to contribute to technological advancement. The law also authorized the minority participation of the federal government in the capital of private companies focused on the development of innovations (Rocha, Alves & Santos, 2019).

Although the law of innovation has brought about a new enabling environment in stimulating R&D activities and innovative processes, some bureaucratic barriers have hindered the effectiveness of results (Miranda et al., 2019; Santos et al., 2020). So, in 2016 a new legal framework for innovation was enacted (Law No. 13,243 / 2016), known as the Science, Technology, and Innovation Code (S,T&I) subsequently regulated by Decree No. 9,283/2018. First, the changes in the law referred to the constitutional framework inserted by constitutional amendment 85 (EC 85), which, in turn, referred to the addition of provisions to

the Federal Constitution to "update the treatment of ST&I activities" (Marinho & Corrêa, 2016, p.44).

The purpose of this law was to stimulate the solving of the "institutional bottlenecks of the Brazilian national innovation system" (Pacheco, 2007, p. 29). The identification of these bottlenecks presented the need to update the legal framework, proposing a new vision regarding (i) incentives for innovation in science and technology institutions (STIs); (ii) stimulating researchers; (iii) stimulating innovation management; (iv) encouraging independent inventors; (v) new mechanisms to stimulate and strengthen innovation in companies; (vi) stimulating business technological risk; and (viii) adequacy of the budget and management of CTIs (Brazil, 2016).

The proposal for the law emerged as a result of discussions between actors involved in the innovation process in Brazil to recognize the need for changes in the law itself and in the other nine laws[1] that were related to the theme. According to Nazareno (2016), the new wording of this law brought integration, simplification, and decentralization as its three constitutional pillars. Therefore, it was hoped that such measures adopted by the government could serve to boost the innovation ecosystem in the country through the facilitation and approximation between private companies and STIs. The new innovation structure promoted the triple helix system favoring dynamic national ecosystems. Oh, Phillips, Park and Lee (2016) suggest that the inclusion of a new vision of economic development with the injection of new innovation systems brings some benefits, such as improvement in the emergence of technology and innovation parks and incentives for local development in high technology.

For Rauen (2016), the adoption of the new innovation law aimed to resolve legal and bureaucratic obstacles, in addition to filling the gaps left by the legal uncertainty of previous laws regarding the procedures in the management of innovation. The operationalization of innovative activities by the institutions was hampered, mainly in the actions involved in the management of external financial resources and human resources, which constantly led the STIs to the scrutiny of the control bodies. One reason was the possibility of different interpretations of the procedures of these institutions. Despite the fact that the innovation process in the country has a wide range of support instruments, efforts to promote the development of a competitive technological system are still inefficient (Rauen, 2017). Such problems are mainly centered on improper evaluations of innovation policies in Brazil.

According to Rauen (2017), the production of national ST&I is impaired by i) the low number of evaluations concerning the volume invested, (ii) inefficient performance indicators, (iii) lack of reliable official data, (iv) disconnection between innovation efforts in a planned political cycle and, lastly, (v) absence of consistent and coordinated evaluation policies. Thus, the metrics for measuring and monitoring innovative performance in the country were centered on purely formal processes and unconnected with the objectives of innovation policies, summarized in impractical documents on the management of available resources. In order to change that situation, it was decided that two of Brazil's new innovation management principles had to be the simplification of procedures for the management of ST&I projects and the adoption of control by results in their evaluation.

2.2 Accountability with a focus on results

The process of managing innovation and development activities has taken on a new systemic vision. Ribeiro and Cherobim (2017, p. 5) present that "one of the ways to understand a process, is to plan it, execute it and measure its results so that it is possible to compare the ideal situation - established in the planning - with the real situation - result obtained with the process". The knowledge of practical results to be achieved with scientific and technological development is a process with intangible and subjective results. Thus, the strengthening of monitoring and evaluation policies must produce quantitative and qualitative metrics that express the improvement of public management, providing elements that amplify accountability, the effectiveness of the implemented policy, and the exercise of social control (De Negri, 2013; Paulo, 2016).

This inclusion of a results-oriented assessment has been widespread in Brazil and Latin America based on the promotion carried out by the World Bank and the Inter-American Development Bank to implement reforms of public support actions for innovation. Such processes generate important information for the rendering of public accounts (Cappa et al., 2018). Even though the discourse for the new vision focused on results has become a task under construction in public management, it is possible to verify the predominance of conventional accountability focused on conceptual and legal aspects.

The new approach to management and accountability for control by results presupposes the existence of planning with pre-established objectives focusing on improving the interaction of government activities with society. In this context, there is a change in the way in which accountability is performed. This process assumes the view that public choices must be deliberated in a transparent and efficient way because they involve public resources (Silva, 2011). Historically, accountability has been consolidated as a constitutional act by which "any person, public or private, must be submitted, who uses, collects, holds, manages or

[1] Law 10,973, of December 2, 2004 (Law of Innovation); Law 6,815, of August 19, 1980 (Foreigner); Law 8,666, of June 21, 1993 (Tenders); Law No. 12,462, of August 4, 2011 (RDC); Law No. 8,745, of December 9, 1993 (Temporary Contract); Law No. 8,958, of December 20, 1994 (Fundação de Apoio); Law No. 8,010, of March 29, 1990 (Import); Law 8,032, of April 12, 1990 (Import Tax); Law No. 12,772, of December 28, 2012 (Teaching Career) (MCTIC, 2018).

administers public resources and assets", as provided for in the sole paragraph of art. 70 of the 1988 Federal Constitution (CF / 88) (Quintão & Carneiro, 2015).

Beyond mere compliance with norms and regulations, the concept of accountability has become ever more important in the government's struggle to enforce public policies. The word "accountability", in its English form, is widely used in the specialized literature in Portuguese. Even though the term does not have a perfect Portuguese equivalent, "accountability" is strongly associated with the idea of responsibility, control, transparency, justifications for actions that were taken or that ceased to be taken, and of awards and/or punishment. (Campos, 1990; Pinho & Sacramento, 2009; Filgueiras, 2011; Hall, Frink & Buckley, 2017).

For Matias-Pereira (2010), accountability represents the procedures and mechanisms by which government managers and decision-makers are accountable for their actions by demonstrating the results applied to public policies with greater transparency. Thus, accountability has taken on importance when there is a demand from society for information that makes the public spending process more efficient and effective. According to Gonçalves, Gonçalves, Marques and Gordo (2019), the Brazilian constitutional text uses the term in its strict sense. However, accountability and evaluation apply to all the users of public resources.

In this regard, public administration has encouraged a modernization in public management processes aiming at less bureaucratic models, aimed at managerial models focusing on results, which Araújo and Carmo Mário (2016, p.123) classify as the inversion of the "old orientation of inputs for outputs (results)". Additionally, the context of accountability in the production of knowledge and innovation is affected (Gonçalves et al., 2019). Thus, the demand for accountability underscores the foundation of public governance based on systems that expand from a strictly financial dimension to one that deals with the management of the efficiency and effectiveness of public policies in the State (Conde, 2015).

For Martins (2013), the complexity that involves accountability lies in the analysis of the various perspectives of an organization, among them: legal, economic, and informational. For modern society, the development of science, technology and information is aligned with a newfound desire for knowledge, and not only with the value of material or financial production. In this context, there is a need for improvement in structures and processes so that the demand for assistance in allocating public resources can be met, and so that public resource allocation can achieve the expected results. According to Quirós (2006), results-oriented processes must include:

> [...] the programming, to ensure that the allocation of resources is consistent with national priorities and social demands; execution, by setting goals, monitoring programs and establishing selective controls to guide decision making; and evaluation, as a necessary condition for measuring public performance in terms of results and putting accountability into practice (p. 170).

The new vision of evaluation by results sought to address a problem related to the Brazilian public sector, which is the sharp bureaucratization of management that causes harmful obstacles to the control and evaluation of its policies. The characteristic of this sector is to emphasize, in its management process and relationship with the private sector, a set of regulations directed to the application of resources and an attempt to minimize the bad intentions of using resources (Rocha, Alves & Santos, 2019).

Thus, the control system requires management activities that ensure the reliability and timeliness of information, providing timely and appropriate elements. Therefore, the timing of accountability must have mechanisms and instruments that easily demonstrate the best performance of public funds made available to services provided to society (Monfardini, 2010). Gonçalves et al. (2019) emphasize that the adoption of accountability perspectives for borrowers of public resources should cause the production of accountability reports based on clear and objective information. Therefore, the information must be aligned with the qualitative accounting characteristics of timeliness, materiality, relevance, reliability, neutrality, and comprehensibility.

In this context, the processes must be dimensioned to the new governance practices of the public sector, mainly in the implementation of a system of internal controls that ensure that the actions are convergent with the fulfillment of the institution's strategic objectives (Committee of Sponsoring Organizations of the Treadway Commission [COSO], 2013). In this regard, the International Federation of Accountants (IFAC, 2001) defined four dimensions that guide governance in public management, namely: (i) standards and behaviors; (ii) organizational structure and processes, which focus on the transparency and accountability of the parties involved; (iii) structure of controls - with the objective of achieving effective internal control, autonomous internal auditing and training of employees to understand the responsibility for mitigating organizational risk in organizations; and (iv) management reports - whose objective is, among other elements, to link compliance with reported data and performance evaluation.

For Castro (2018), control can happen at three different times. The first is prior control, in which information precedes the action. The second is characterized by concomitant control, in which control actions occur during the execution of the act to inspect the actions taken. And finally, the third moment is the subsequent control, in which the act is already finalized, and the objective is to correct eventual nullities and deficiencies of the process.

Therefore, the new requirements for the adequacy of accountability reports to informational demands, especially concerning the funds made available to scientific, technological, and innovative development policies, reinforce the understanding of effective control system implementation to ensure efficient monitoring decisions,

thus ensuring results consistent with the efficient performance of the project. In effect, the environment for promotion institutions becomes a field with wide possibilities for the application of results-based control, since the final objective of the projects included in these activities is to achieve specific objectives that translate into mostly concrete goals and products. However, it is of utmost importance that there is an efficient forecast of the mechanisms that will be used in the periodic monitoring of these goals to predict possible consequences and other aspects that may harm efficient results (Pombo, 2018).

This new management model requires an institutional effort to plan and evaluate. This is justified by the growing increase in innovation incentive instruments based on the combination of economic subsidy with credit and non-refundable transfers to cooperation programs (Arbix et al., 2017). The process of encouraging innovation in the country brought an update of the legal framework and new standards for the dynamics of institutional innovation policies (Machado, Sartori & Crubellate, 2017). Thus, results management in the development environment of the innovation field establishes the translation of desired objectives into reality and demonstrates the performance of the entity involved in results-based public policy, allowing for a system of evaluative feedback of the process.

2.3 Research Support Foundation

The organizational environment is a major system for developing a country's technology and innovation. That is why it is necessary to motivate local companies to strive for innovation. One stimulus is the economic subsidy defined by public investment in order to share the costs and risks of research and development between companies and the State. Thus, it is necessary to strengthen the strategic role attributed to the institutions that support the promotion of research (Borges, 2011; Borges & Barreto, 2012).

In line with this strengthening, the Brazilian challenge of propagating a new culture of innovation resulted in the need for the State to encourage and promote scientific development, research, and technological capacity in the country. The Federal Constitution of 1988 presents the Federal Government as responsible for this promotion and incentive. However, it was up to the States to link budgetary portions to public entities that promote research, encouraging the creation of Foundations for Supporting Research at the regional level (Oening, 2006). The reinforcement of the state's role in the field of science and technology occurred with the constitutional amendment that further required the State to adopt public policies aimed at promoting and encouraging innovation, in addition to reducing the bureaucracy of development (Santos & Silva, 2018).

The scenario of the creation of public policies responsible for the generation and financing of technological development led to the implementation of several agencies, companies, and development funds. These research promotion institutions are non-bank financial entities that, observing applicable regulations, finance fixed and working capital, subsidize guarantees, and cooperate with operations of scientific and technological research projects aimed at local development (Magalhães, Rangel & Silva, 2017).

The first experience of federal decentralization of ST&I policy was in 1960, with the creation of the São Paulo Research Foundation (FAPESP). When instituting the Research Support Foundations (RSFs), the state government sought to induce and encourage research on scientific and technological innovation based on regional realities. However, the vision of the innovation process was focused on financing scientific production and, especially, on the development of human resources and the expansion of graduate courses (Cavalcante, 2010).

Rocha Junior, Guimarães and Jeunon (2014) emphasize that RSFs are important actors in the role of discussing, elaborating, and implementing public ST&I policies at the regional level, since they are aware of the peculiarities of each Brazilian state. Currently, the RSFs operate in 25 states and the Federal District and are financially responsible for projects that assist professors and researchers at universities in their state. They also encourage the promotion of scientific and technological events, as well as institutional, scientific, and technological development projects in local institutions through economic contracts and grants. For Gonçalves et al. (2019), the capillarity of the Research Support Foundations is the reason why they are so instrumental in the development of science, technology, and innovation. Table 1 shows the existing RSFs in Brazil.

For Buainain, Lima Junior, and Corder (2017), the Brazilian experience regarding the financing of innovation policies revealed the challenges that need to be overcome, such as resource constraints, budget limits, and weak interaction between academia and the industrial field. Although these challenges exposed the reality of public policies for Brazilian innovation, the role played by the State was relevant in this process, mainly with the support of science and technology by the research support foundations. Assunção (2019) corroborates this understanding by emphasizing that the State, in the complex institutional arrangement of innovation, represents an indispensable agent with the ability to build and execute public policies capable of structuring, encouraging, and investing in the innovative process.

Indeed, the new Legal Framework creates expectations on the part of innovative environment participation chain agents that the promotion, regulation, and financing in the development of science, technology, and innovation will go in new directions. For Ferreira (2016), adherence to this new regulation will demonstrate its efficiency as soon as the legal provisions begin to do their job of proving that technological advances and research are assured and in continuity. In this way, the main objectives of integration, simplification, and decentralization of innovation policies will reflect a desirable innovative environment.

Table 1
List of research support foundations in Brazil

	Foundation by Brazilian State	Initials (in original)
1.	RESEARCH SUPPORT FOUNDATION OF ACRE	FAPAC
2.	RESEARCH SUPPORT FOUNDATION OF THE STATE OF ALAGOAS	FAPEAL
3.	RESEARCH SUPPORT FOUNDATION OF THE STATE OF AMAPÁ	FAPEAP
4.	RESEARCH SUPPORT FOUNDATION OF THE STATE OF AMAZONAS	FAPEAM
5.	RESEARCH SUPPORT FOUNDATION OF THE STATE OF BAHIA	FAPESB
6.	CEARENSE FOUNDATION SUPPORTING SCIENTIFIC AND TECHNOLOGICAL DEVELOPMENT	FUNCAP
7.	RESEARCH SUPPORT FOUNDATION OF THE FEDERAL DISTRICT	FAPDF
8.	FOUNDATION OF SUPPORT TO RESEARCH AND INNOVATION OF ESPÍRITO SANTO	FAPES
9.	RESEARCH SUPPORT FOUNDATION OF THE STATE OF GOIÁS	FAPEG
10.	FOUNDATION OF SUPPORT TO RESEARCH AND SCIENTIFIC AND TECHNOLOGICAL DEVELOPMENT OF MARANHÃO	FAPEMA
11.	RESEARCH SUPPORT FOUNDATION OF THE STATE OF MATO GROSSO	FAPEMAT
12.	FOUNDATION OF SUPPORT TO DEVELOPMENT OF EDUCATION, SCIENCE AND TECHNOLOGY OF THE STATE OF MATO GROSSO DO SUL	FUNDECT
13.	RESEARCH SUPPORT FOUNDATION OF THE STATE OF MINAS GERAIS	FAPEMIG
14.	AMAZÔNIA FOUNDATION OF SUPPORT TO STUDIES AND RESEARCH OF PARÁ	FAPESPA
15.	RESEARCH SUPPORT FOUNDATION OF THE STATE OF PARAÍBA	FAPESQ
16.	ARAUCÁRIA FOUNDATION OF SUPPORT TO SCIENTIFIC AND TECHNOLOGICAL DEVELOPMENT OF THE STATE OF PARANÁ	FA
17.	FOUNDATION TO SUPPORT THE SCIENCE AND TECHNOLOGY OF THE STATE OF PERNAMBUCO	FACEPE
18.	RESEARCH SUPPORT FOUNDATION OF THE STATE OF PIAUÍ	FAPEPI
19.	CARLOS CHAGAS FILHO FOUNDATION TO SUPPORT THE SCIENCE OF THE STATE OF RIO DE JANEIRO	FAPERJ
20.	RESEARCH SUPPORT FOUNDATION OF THE STATE OF RIO GRANDE DO NORTE	FAPERN
21.	RESEARCH SUPPORT FOUNDATION OF THE STATE OF RIO GRANDE DO SUL	FAPERGS
22.	FOUNDATION OF SUPPORT FOR THE DEVELOPMENT OF SCIENTIFIC AND TECHNOLOGICAL ACTIONS AND STATE RESEARCH OF RONDÔNIA	FAPERO
23.	FOUNDATION OF SUPPORT TO RESEARCH AND INNOVATION OF THE STATE OF SANTA CATARINA	FAPESC
24.	RESEARCH SUPPORT FOUNDATION OF THE STATE OF SÃO PAULO	FAPESP
25.	FOUNDATION OF SUPPORT TO RESEARCH AND TECHNOLOGICAL INNOVATION OF THE STATE OF SERGIPE	FAPITEC
26.	RESEARCH SUPPORT FOUNDATION OF THE STATE OF TOCANTINS	FAPT

Source: Developed by the authors.
Note: In the state of Roraima, the Foundation is still going through its creation process.

3 METHODOLOGY

This research is classified as an exploratory-descriptive study, as it seeks to understand and explain the knowledge gaps regarding the insertion of a new legal and regulatory scenario for the foundations supporting research. The research methodology uses qualitative and quantitative approaches, as it has characteristics of both types. First, data of a quantitative nature and secondary sources were collected through bibliographic research and documentary research looking for references in papers from national and international scientific journals, book chapters and specific legislation regarding accountability, webpages of the bodies related to the topic, as well as databases, in order to establish the indicators used.

The qualitative approach was performed using the content analysis technique (Bardin, 2008; Silverman, 2015; Weber, 1990). The focus of the research was on the theme of ST&I, accountability for results, a new legal framework for innovation, as well as on the identification of the sector for research support foundation.

In the development of the work, we carried out a document analysis. A checklist was created as a research tool and is presented in Table 2. The checklist is intended to analyze the level of adherence to the new legal framework of innovation (Law No. 13.243 / 2016 and Decree 9.283 / 2018) by the Brazilian research support foundations in 2018 and 2019 regarding items related to accountability. The instrument was divided into 2 factors: (1) recommended and (2) optional. According to Silva and Freire (2019), this instrument allows the researcher to obtain the elements he needs to carry out his analysis.

Table 2

Checklist for research

	Observed Item	Legal Basis
1	**Recommended**	
1,1	Has information been presented regarding the goals that are not reached due to the technological risk inherent in the object and that will not generate a duty to compensate?	Decree nº 9.283/18, Art. 48.º, I
1.2	Did the foundation have information about the statistical techniques adopted, such as sampling and grouping in bands or subsets of similar characteristics for the use of different analysis criteria in each one?	Decree nº 9.283/18, Art. 48.º, II
1.3	Did the foundation prioritize the use of electronic media?	Decree nº 9.283/18, Art. 48.º, III
1.4	Was it possible to verify whether the indicators used to monitor the beneficiaries preferred to be transparent, reasonable and auditable?	Decree nº 9.283/18, Art. 48.º, IV, §1º
1.5	Did the foundation have information regarding the provision of general guidelines and report templates to be used?	Decree nº 9.283/18, Art. 48.º, IV, alínea “a”
1.6	Is this information up to date?	Law n.º 13.243/16 Decree nº 9.283/18
1.7	Was it possible to find advertising for subsidized projects, their products, their results, their accountability and their assessments, without prejudice to intellectual property rights?	Decree nº 9.283/18, Art. 48.º, IV, alínea “b”
1.8	Did the monitoring data, without prejudice to any consolidations made by the grantors, favor disclosure in open, non-proprietary formats, such as spreadsheets and texts, in order to facilitate the analysis of the information?	Decree nº 9.283/18, Art. 48.º, IV, §2º
1.9	Did the foundation present clear information regarding monitoring and evaluation observing the objectives, schedule, budget, goals and indicators provided for in the work plan?	Decree nº 9.283/18, Art. 49.º
1.10	Did the person in charge of the project find it easy to present a partial result form, during the execution of the object, as defined in the concession instrument, or when requested by the granting institution?	Decree nº 9.283/18, Art. 50.º
1.11	Did the foundation ensure that the person responsible for the project consistently updated the information indicated in the electronic monitoring system of the agency or entity?	Decree nº 9.283/18, Art. 50.º, §1º
1.12	There was information regarding the analysis of the execution of the work plan, which should occur, periodically, by I – an evaluation committee, indicated by the agency or by the granting federal entity, or II – a designated public servant or employee, with specialized technical capacity in the area of the project to be evaluated	Decree nº 9.283/18, Art. 53.º, I e II
1.13	Was there a publication on the official website regarding the full technical opinion of the execution of the work, except in cases of legal secrecy, in which only the extract was published?	Decree nº 9.283/18, Art. 54.º e (single paragraph).
1.14	Is there information regarding the analysis of the final rendering of accounts that must be concluded by the grantor within a period of up to one year, which can be extended for an equal period, justifiably, and, when the complementation of data is necessary, can the term be suspended?	Decree nº 9.283/18, Art. 57.º, § 5º
1.15	Did the accountability process favor the simplification of acts and favor the results obtained?	Decree nº 9.283/18, Art. 58.º
1.16	Did the foundation establish in its own act a model of financial execution report and the list of documents that must be submitted in the event that the beneficiary must submit?	Decree nº 9.283/18, Art. 58.º, §3º
1.17	Did the foundation present information regarding the typologies and ranges of values in which the financial execution report will be required regardless of the analysis of the object's execution report?	Decree nº 9.283/18, Art. 57.º, § 7 º
1.18	Was there information about the documentation generated until the approval of the final rendering of accounts that should be organized and filed by the person responsible for the research, separated by project, for a period of five years, counted from the date of approval of the final rendering of accounts?	Decree nº 9.283/18, Art. 59.º
2.	**Optional**	
2.1	Did the foundation have information from independent audit companies to analyze the financial performance of the instruments based on objective criteria defined in internal regulations, considering, among other aspects, their operational capacity and the risk of fraud, abuse and waste in these instruments?	Decree nº 9.283/18, Art. 47.º, § 2º
2.2	Did the foundation present information to beneficiaries that, during the monitoring and evaluation of projects, visits could be made for technical monitoring or financial inspection?	Decree nº 9.283/18, Art. 51.º
2.3	The foundation’s prerogative to request a copy of the documentation was complied with by the beneficiary, and the beneficiary made it possible for the agency to verify the information contained in the documentation.	Decree nº 9.283/18, Art. 59.º, single paragraph
2.4	The foundation established, in its own act, guidance instruments for beneficiaries, providing legal certainty (presented by resolution)	Considered as a good transparency practice
2.5	There was information for the beneficiary to find it easy to clarify doubts, even for the accountability forms (Glossary / Dictionary)	Considered as a good transparency practice
2.6	The foundation presented information about prohibitions in order to avoid problems in the control process	Considered as a good transparency practice

Source: Developed by the authors according to MCTIC (2018).

For each item analyzed, we assigned values that varied from 0 to 2 for the level of adherence, being 0 when the item was not identified; 1 when only part of the information requested by the item is presented; and 2 when the adherence to the item is properly verified. The maximum score for each foundation is 48 points. Bianchi, Machado, and Machado (2020) carried out a similar study. After the scores for each factor were determined, we weighted the results by assigning weights to each part in the final grade. Thus, the recommended items were multiplied by 0.75 and the optional ones by 0.25. Table 3 presents information on the measurement of the final grade.

Table 3
Adherence analysis model

Values	Adherence Indicators	Weight
0	Not identified.	
1	Partial Adherence: when only part of the information requested by the item is presented.	0.75 if the item is one of the "recommended" factors (*t*).
2	Total Adherence: when the adherence to the item is properly verified.	0.25 if the item is one of the "optional" factors (*w*).

Source: Developed by the authors.

Equation 1 demonstrates the mathematical operationalization for the final score of the adherence indicator for each Research Foundation (*INADFap*). The choice of an indicator is justified in an attempt to present approximate measures of a topic with possible measurement difficulties. The indicator can be classified as descriptive as, according to Carvalho and Barcellos (2009), it represents the characteristics and aspects of empirical reality. It is also considered that these indicators do not seek to demonstrate valuing meanings. For Parahos, Figueiredo Filho, Silva Junior, and Maia (2013), the indicators serve as useful information for the manager as they demonstrate in detail the reality that is to be analyzed. Studies in the accounting field used a similar methodology in their methodological procedures (Oliveira & Lemes, 2011; Zonatto, 2011; Sobreira & Rodrigues Junior, 2017).

$$INADFap = \left\{ \left(\frac{\sum_{i=1}^{36} REC}{n_{REC}} \right) x\ (t) + \left(\frac{\sum_{j=1}^{12} FAC}{n_{FAC}} \right) x\ (w) \right\}\ x\ 100\%$$

in which:

INADFap contemplates a total of 48 points due to the adherence to the legislation for the granting of public resources with regard to accountability.

REC represents the items for the recommended factor, and t is the assigned weight (0.75).

FAC represents the items for the optional factor, and w is the assigned weight (0.25).

n is the total of items.

After measuring the analysis, the results obtained were treated statistically with the aid of the Microsoft Excel tool in order to build charts, graphs, and tables. Thus, the values presented by the results of the observations allowed the presentation of an index that generated a ranking of adherence for the sample. At the same time, the final grades were separated by quartiles, according to the classification shown in Table 4. Luz, Borges Junior and Campos (2017) presented a similar study for classification in quartiles.

Table 4
Adherence level by quartilhes

Level	Indication	Classification
Level IV	For foundations with results between 75% and 100% of points.	Great
Level III	For foundations with results between 50% and 74% of points.	Satisfactory
Level II	For foundations with results between 25% and 49% of points.	Unsatisfactory
Level I	For foundations with results between 0% and 24% of points.	Bad

Source: Developed by the authors.

As an additional analysis, we verified some external factors, such as the foundation's history, its budget size, and its local legal system's ability to assist in the inference of the results, aiming to reduce the difference of characteristics between the inferred results and the actual situation in each RSF. It is understood that the analysis of the external environment may influence the inferences of the research, since latent variables may not be observed from the checking of items at the organizational level.

4 ANALYSIS AND DISCUSSION OF RESULTS

First, it is possible to analyze, from the application of the checklist, the percentage, on average, of adherence for each indicator. Thus, it was possible to obtain Figure 1, which presents the results found.

In Figure 1, it is possible to infer that in no item did the average percentage exceed 80% of adherence. Item 2.6, which was intended to assess the agencies' provision of information about the prohibitions on the use of resources, was the one with the highest percentage (69%). This allowed us to infer that the RSFs are concerned with the possible errors that generally occur with the rendering of accounts. That corroborates the findings of Gonçalves et al. (2019), which is a case study that included interviews and revealed the difficulties encountered by researchers in understanding the procedures for accountability.

Also noteworthy is the low percentage (3.8%) attributed to item 1.17. The item deals with cases in which a specific instrument will define the typology and ranges of values in which the financial execution report will be required regardless of another one that is already required. For the Comptroller General of the Union [CGU] (2018,

p.18) "while the burden of financial analysis is reduced, the need to establish robust procedures to combat fraud, abuse, and waste gains importance". It is inferred that the inclusion of this item allowed the RSFs to identify, in their processes, the incentives that demonstrate greater materiality, so that there is an increase in the robustness of the analysis and control processes, identifying the risks and the proposals for mitigating measures.

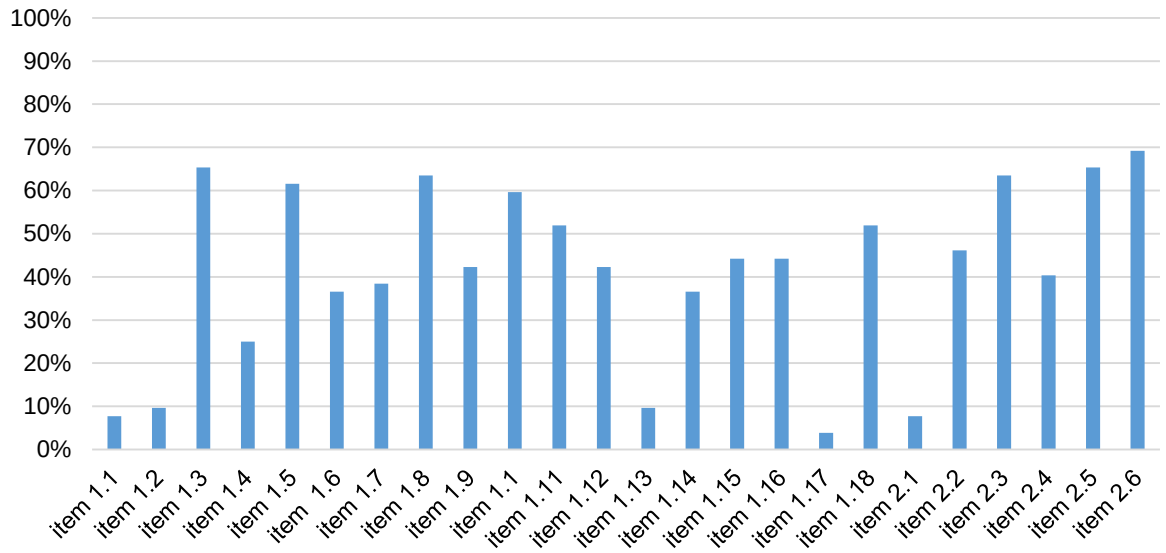

Figure 1. Percentage of adherence to each item
Source: Developed by the authors.

Items 1.1 and 2.1 also showed a considerably low percentage of adherence (7.7%). Item 1.1 corresponds to the treatment given to the goals not reached due to the technological risk. Jesus, Böck and Chrispino (2014) emphasize that technological risks are inserted in the current context of the techno-scientific society, and that the judgment of uncertainties regarding the effects of technological promotion is still a paradigmatic issue. It is inferred that the foundations may be inserted in this process of discussion and understanding of the risk. Thus, it is necessary to ratify the role they assume as promoters of innovation and knowledge who are called to point out new models of analysis and risk management, aiming to provide information that avoids practices with potential damage, be they ethical, social, environmental and economic. For item 2.1, which deals with the optional hiring of independent audits, the intention of the legislator to offer new alternatives in the process of controlling resources is reinforced.

Another important data to be analyzed is the fact that the level of adherence to up-to-date information, as well as instruments and reports on the topic, was only 36.5%. Only FUNDCET, FAPEMA, FACEPE, FAPEAL, FAPEAM, FAPEMIG, FAPESP, FAPES, FAPESC and FAPERGS presented updated information for 2018. In the FA, the instrument used as a guideline for accountability presented an act of management dated from 2006.

The percentages of adherence to the prioritization of accountability (item 1.6) and of advertising (item 1.7) by electronic means were, respectively, 65.3% and 38.4%, which also demonstrates concern about these procedures. This fact corroborates the understanding of COSO (2013) when elucidating that the entity responsible for the control of resources, can monitor the progress of the budgetary execution of the projects to prevent situations that are not allowed and that compromise the transparency of the projects.

It is known that the development of information technology enables better treatment of text and communications in accountability documents, in addition to facilitating the analysis and control process (Martins, 2013; Bianchi et al., 2020). In this context, it was possible to verify that, in their majority, RSFs have an information system for the rendering of accounts. However, the process is still focused on checking documents delivered personally. One of the recommendations of the CGU (2018) is that development agencies be attentive to electronic tools that can maximize results and mitigate errors, such as an electronic system of invoice bases in the state.

It is also possible to infer a low adherence of the RSFs to the items that deal with the monitoring and evaluation of the projects promoted, as well as low qualitative indicators for assessing the efficiency of these projects. These items are vital for the new process of rendering of accounts envisioned by the law, a process that focuses not only on the financial perspective of the projects, but also on maximizing their favorable impacts on society, the economy, and the environment (Araújo & Carmo Mário, 2016). Thus, the RSFs must overcome the barriers that constrain their performance at each quantitative indicator and also provide qualitative information that enables the observation of their results. Cavalcante (2010) emphasizes that analyzing the ST&I policy in Brazil has to be based on aggregated input and on result indicators, the latter being aimed at physical human resources and the former being aimed at measuring

what was obtained from inputs, as referenced by the Oslo Manual (2005).

As for the results of *INADFap*, Table 5 presents the values attributed to each factor and the position in the final ranking.

Table 5
Ranking of Brazilian RSFs according to *INADFap*

Foundation	Recommended	Partial score (weight 7.5)	Optional	Partial score (weight 2.5)	FINAL SCORE (%)	Ranking Position
FAPEMIG	33	91.67	10	83.33	89.58	1º
FAPEAM	27	75.00	9	75.00	75.00	2º
FAPEMA	25	69.44	10	83.33	72.92	3º
FAPES	24	66.67	10	83.33	70.83	4º
FUNDCET	24	66.67	8	66.67	66.67	5º
FAPEAL	22	61.11	9	75.00	64.58	6º
FACEPE	24	66.67	6	50.00	62.50	7º
FAPESC	20	55.56	9	75.00	60.42	8º
FA	21	58.33	7	58.33	58.33	9º
FAPESP	19	52.78	9	75.00	58.33	10º
FAPERGS	18	50.00	9	75.00	56.25	11º
FAPDF	21	58.33	5	41.67	54.17	12º
FAPEMAT	12	33.33	7	58.33	39.58	13º
FAPERO	7	19.44	9	75.00	33.33	14º
FAPERJ	10	27.78	5	41.67	31.25	15º
FAPEG	10	27.78	4	33.33	29.17	16º
FAPESPA	6	16.67	8	66.67	29.17	17º
FUNCAP	6	16.67	2	16.67	16.67	18º
FAPESB	4	11.11	4	33.33	16.67	19º
FAPAC	5	13.89	2	16.67	14.58	20º
FAPITEC	3	8.33	4	33.33	14.58	21º
FAPEAP	6	16.67	0	0.00	12.50	22º
FAPESQ	5	13.89	1	8.33	12.50	23º
FAPERN	2	5.56	4	33.33	12.50	24º
FAPEPI	5	13.89	0	0.00	10.42	25º
FAPETO	2	5.56	1	8.33	6.25	26º
Mean	13.88	38.57	5.85	48.72	41.11	
Maximum	33	91.67	10	83.33	89.58	
Minimum	2	5.56	0	0.00	6.25	

Source: Developed by the authors.

FAPEMIG took first place in the ranking with an overall adherence level of 89.58%. The foundation had 91.67% adherence to the recommended items and 83.33% to the optional ones. Among others, the entity presented general information on accountability, financial execution, and analysis and monitoring of this process. In the form of a booklet, the foundation provides a manual structured in two types of accountability procedures: (a) simplified procedure and (b) complete procedure. Its distinctive feature lies precisely in this fact, since it was the only Research Foundation that was in adherence to item 1.17, which deals with the typology and range of values. FAPETO was in 26th place with only 6.25% of adherence level, with 5.56% attributed to mandatory items and 8.33% to optional items. There was an accountability information icon available on the institution's website, but access was not possible. Furthermore, in the news available for consultation, there was little information on the subject.

For the Research Foundations that achieved the same final score for their overall level of adherence, their score of adherence to the “recommended” items was used in deciding the ranking order between them, as in the case of FA and FAPES, which respectively assumed 9th and 10th place; FAPEG and FAPESPA, FUNCAP and FAPESB; FAPAC and FAPITEC; and ultimately FAPEAP, FAPESQ and FAPERN.

The different weights attributed to the items determined the order of the RDFs in the ranking, especially when two or more foundations got the same score in one of the items. Also, the "recommended" items were attributed a weight of 7.5, whereas the "optional" items were attributed a weight of 2.5. That made some institutions seem to perform better than they did in reality. This is true about FAPEAP and FAPEPI, which scored zero points in the "optional" items but, because they had scored enough points in the recommended items, still ranked higher than other institutions who achieved more balanced, and therefore more desired, results.

Scoring high in the recommended items and low in the optional ones does not mean that a RSF is streamlined for innovation. Likewise, complying with the New Legal Framework for ST&I but failing to adopt other best practices that are deemed essential for the development of innovation does not mean that a foundation is streamlined for innovation. This goes to show that the new law may have failed to regulate some of the practices that would be vital to push Brazil further and faster along the path of innovation.

Regarding the classification of RSFs by their levels of adherence, shown in Table 6, it appears that 38.4% are in the "satisfactory" level quartile. Paradoxically, FAPEMIG, and FAPEAM presented results that classified them at the "excellent" level. This result presents important information about the innovative system in the country. Previous studies (Karolczak, Fedato, & Sznitowski, 2016; Pontes & Genuíno, 2019) dealt with the asymmetry between Brazilian regions in terms of technological development, in which hegemonically focuses on the south/southeast axis. The insertion of FAPEAM in this axis may be related to the treatment given by the public policies and administration to the organizations involved with the environmental context of the Amazon.

Table 6
Classification of RSFs by adherence level

Level	Indication	Classification
Level IV	FAPEMIG and FAPEAM.	Great
Level III	FAPEMA; FAPES; FUNDCET; FAPEAL; FACEPE FAPESC; FA; FAPESP; FAPERGS and FAPDF.	Satisfactory
Level IV	FAPEMAT; FAPERO; FAPERJ; FAPEG; FAPESPA; FUNCAP and FAPESB.	Unsatisfactory
Level I	FAPAC; FAPITEC; FAPEAP; FAPESQ; FAPERN; FAPEPI and FAPETO.	Bad

Source: Developed by the authors.

Most foundations are classified as "unsatisfactory" and "bad", as many as 53.8% of the analyzed RSFs. Except for FAPEMAT and FAPERJ, all foundations in the "unsatisfactory" and "bad" group belong to the North/Northeast axis, corroborating previous findings regarding regional scientific and technological development (Casali, Silva & Carvalho, 2010; Pontes & Genuíno, 2019). However, it is important to note that, although regional scientific and technological development is related to public policies and administrative processes, other variables are closely linked to this context, such as the quality of the region's legal system. It was not possible to find the necessary information regarding the North's and the Northeast's legal systems, therefore it was impossible to determine how the new law has played out in those systems.

In conclusion, it appears that the changes proposed by the new legal framework have not yet received an effective response from the foundations, despite the efforts made by the new innovation policy. For Arbix (2017), compliance with the implementation of this new regulatory environment is important for the growth of new businesses and for technological development. It should also be noted that investment in innovation is oriented towards more open and transparent processes, corroborating the idea of the requirements attributed by legislation. It is known that from none of these new attitudes the State can abstain, but it must robustly expand its collaboration with the private sector. In this way, a new vision focused on control by results will allow a logical change in the conceptualization of investments for the innovation system that until now is still grounded in disconnected public policies and without a flow of continuity. The consolidation of the ST&I system, prioritizing results, and concrete objectives allows reducing uncertainties and raising the standard of technological knowledge, whether at the regional or national level.

5 CONCLUSIONS

The process of scientific and technological development in Brazil has been overcoming challenges since the end of the 2nd World War. The State's efforts to encourage the maximization of research and development in the country, strengthening scientific production and promoting the inclusion of the country in global innovation system, became more evident with the advent of the general innovation law (Law nº. 10,973/14), in 2004. However, the focus on bureaucratic acts and the existence of legal uncertain were hampering the development of innovation in the country.

In this regard, in 2016, the Federal Government enacted Law No. 13,243 / 2016, then known as the Framework for Science, Technology, and Innovation, which aimed at building a new environment conducive to stimulating research and development activities and innovative processes by mitigating acts that made such processes very bureaucratic. Shortly afterward, the law was regulated by Decree No. 9,283 / 2018, which included simplified accountability among its objectives, focusing on the results obtained.

In addition, this objective is presented in accordance with the new concepts adopted by the public administration, since the insertion of accountability has represented the desire of government managers and decision-makers to provide procedures and mechanisms by which it is possible

for them to be accountable for their actions and demonstrate greater transparency in the results generated by public policies. Thus, the demand for accountability is a fundamental principle of good management, which is based on the efficiency of results, an important factor for the process of streamlining the innovation system.

The research was characterized by a qualitative and quantitative approach. Articles from national and international scientific journals, book chapters, and specific legislation regarding accountability, webpages of the bodies related to the theme, as well as databases for the establishment of the indicators used in the 2018 and 2019 period were analyzed. On a checklist, points were attributed to the level of adherence shown by each RSF, generating an indicator (*INADFap)* that demonstrated the level of adherence as well as the separation by quartiles.

Although it is difficult to measure an entity's level of adherence to the legal framework at the maximum level of efficiency and effectiveness, this indicator is useful for planning and implementing policies in the public sphere. It can also assist the RSFs to observe their management process with a view to organizing, interpreting, and analyzing the information provided for in decrees and laws.

In this context, the present study aimed to analyze the level of adherence of Brazilian Research Foundations to the provisions of the law concerning accountability and control by results. It was found that the average percentage of adherence in the index surveyed (INADFap) reached 80% due mainly to the lack of observation to the requirement that dealt with the division in typology and range of values, expressing a distortion in the legislator's decision to focus management processes on projects that assume greater materiality and that are at greater technological risk. It is worth remembering that public management results control guidelines should prioritize the characteristics of the practices of good governance, already advocated by Silva (2011), Ferreira (2016) and Assunção (2020).

On the other hand, the results showed that, in the greatest proportionality, RSFs have an unsatisfactory level of adherence to the innovation framework regarding accountability. The item that represented the highest proportionality of adherence was the one that cautioned researchers against taking forbidden actions, which shows that RSFs are concerned with possible future errors. Regarding the ranking, FAPEMIG showed the best level of adherence to the new process with 89.58% of the points, closely followed by FAPEAM and FAPEMA. In the last three positions were FAPERN, FAPEPI, and FAPETO, which showed an adherence level classified as bad.

In short, when it comes to adapting to the new management procedures that have favored the reduction of bureaucracy and the use of electronic systems, it was found that several foundations use this mechanism for their accountability process. This situation can also meet the demands for monitoring projects, suggested by the legislator. It was also possible to find that adherence to items indicating the production of results was not satisfactory, demonstrating a difficulty that RSFs may have in adhering to the new model of an accountability process for results.

In this perspective, the various amendments proposed by Law nº. 13,243/16 and Decree nº. 9,283/18 that constituted the provisions for ST&I's new strategic vision of development, promote benefits that involve the private sector, STI and funding agencies. Among these benefits are the transfer of technology between sectors and the regulations to support the creation and consolidation of environments that promote innovation. Added to this, there is an incentive for the institutions' management processes to take place in an agile manner and based on simplification so that the focus is on monitoring indicators and targets. This is considered one of the important points, as they can demonstrate, logistically, in which areas governmental actions should be taken, and on which public policies they should be based.

Indeed, the most incisive disclosure of beneficial changes for research, technological development, and innovation activities involves the participation of state or municipal agencies, in addition to the other sectors involved, especially academia. It is important that updating this management process promotes profound changes in activities. And that the improvement emphasized by the new legislation regarding accountability, transcends the pragmatic control framework with a focus on compliance with legal requirements, especially the financial ones, but that serve as guiding procedures for users, indicating compliance with the principles of results-oriented control and accountability. In this way, the processes by which the results demonstrate an efficient change in the application of public resources will serve as drivers for the construction of an innovative environment in the country, based on policies that aim at long-term continuity resulting in socioeconomic development.

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