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PUBLIC SECTOR INNOVATION LABS: MAPPING AND ANALYSIS OF BRAZILIAN EXPERIENCES

Hironobu Sano

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Enap *Cadernos*

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The Brazilian National School of Public Administration (Enap) is a school of government under the supervision of the Ministry of Economy (ME). Its main attribution is the permanent training and development of public servants. It offers Professional Master's Degree and postgraduate courses, executive education and continuing education opportunities, as well as induction and professional development courses for careers in the public sector.

The institution also encourages the production and dissemination of knowledge related to public administration, government management and public policies, in addition to promoting the development and application of management technologies that increase the effectiveness and permanent quality of services provided by the State to citizens. To this end, it develops applied research and innovation projects aimed at improving the public service. The School's preferred public are federal, state and municipal public servants.

Headquartered in Brasília, Enap is a school of government with national coverage and its actions focus on all public servants, in each of the spheres of government. The National School of Public Administration (ENAP) maintains the Cátedras Brasil Program to promote and support initiatives for the production and dissemination of knowledge applied to Public Administration that can translate into public value.

The program grants are aimed at students, professors, researchers and professionals interested in engaging in the School's activities. They seek to absorb interdisciplinary and innovative contributions in fields of knowledge related to public policy management and public administration, both at the national and international levels. The most direct beneficiary of the Cátedras Brasil Program is the Brazilian public administration. In each new edition, grantees create applied knowledge that privileges the resolution of political, economic and social problems, with transformative potential and relevance for the performance of the public sector. Anyhow, the Program does not lose sight of the citizens, which are the real beneficiaries of this activity.

This publication is the result of this effort to contribute to the construction of qualified and evidence-based government action, which can more easily be translated into efficient and effective policies and development for the society.

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Summary

ABOUT GNOVA

GNova - Government Innovation Lab was created in 2016. Its mission is to develop innovative solutions through projects with federal government institutions so that the public service can better respond to society's demands. One of GNova's main directives is to contribute to change the way the State engages with citizens in the provision of public services, with a people-centered approach. This means recognizing the problems and needs of public services' users and public policies' beneficiaries.

In such projects, GNova uses agile methodologies and multidisciplinary approaches inspired by design practices, social sciences and behavioral economics. The Lab operates in three axes: exploration, experimentation and dissemination of innovation in services and public policies. Such activities are aimed at promoting a culture and practice of innovation in the public administration.

Mission: Promote innovation in the public sector to better respond to society's demands

Vision: Innovation as a transformative practice in the public sector.

Values: collaboration, proactivity, openness to risk, networking, empathy and user-centered approaches, experimentation and generation of public value.

To learn more, visit: gnova.enap.gov.br

Presentation

This publication presents the results of the exploratory research "Public Sector Innovation Labs: mapping and diagnosis of Brazilian experiences". The work was developed within the scope of the Cátedras Brasil Inovação Program, referring to the call for applications 5/2018, organized by GNova - Government Innovation Lab at the National School of Public Administration - Enap.

One of GNova's main exploratory activities is the *Cátedras Brasil Inovação* Program, which aims to foster the development of research applied to the public sector which contributes to innovation in the management and design of public policies.

The Program also enables Enap to get closer to innovators working in universities and in the private sector, as well as to identify new fields of activity.

The proposal is that applied research contributes to a better understanding and confrontation of public problems through diagnoses, solution prototypes, new technologies and methodologies which promote positive impacts on the reality of the public sector and generate value for society.

The program offered research grants lasting 12 months, during which the researchers developed reports based on the projects submitted on specific thematic areas. Innovation grants were also awarded. In such cases, grants were focused on the support of six-month innovation projects directed to the development of prototypes related to public services. The selection of projects took place through calls for application, in an evaluation process that included interviews and the analysis by an experts' committee.

In the context of call for applications 5/2018, seven research projects were selected. Their thematic areas included Design and innovation in the public sector and Behavioral perspectives applied to the improvement of government programs and public policies. Two innovation projects focused on the development of prototypes were also selected.

Call for applications 39/2018, carried out in partnership with the *Escola da Advocacia Geral da União,* was focused on legal innovation grants. Five innovation projects were selected. The researchers relied on GNova supervisors to monitor the progress of the innovation projects and to revise their products so that the knowledge produced could be relatable to public administration problems and to ensure adjustments were made in a timely manner. This process enabled a fertile dialogue between the team and the researchers and provided logistical support for the realization of prototype testing workshops.

Research projects related to both calls for applications will be published. They are grouped into six thematic areas:

1|Government innovation labs:

Mapping and diagnosis of national experiences

2| Behavioral Economics:

Additional solutions to promote engagements to supplementary pension plans: behavioral economics-based applications.

Strategy-app: behavioral insights to promote savings.

3| Public Policy Evidence Map: a Practical Guide

Evidence map prototype for prison systems: reflections on the use of the methodology

Evidence-informed policies: barriers and interventions

From the inside: challenges related to prison-related researches in Brazil

4| Technologies and open data for government innovation

IoT-APP (Internet of Things – storage & processing in the public sector)

Blockchain-based course portfolios

Crowdsourcing of Open Government Data: overcoming the 'availability model' with collective governance

Mobiliza 360: an experiment in the use of Virtual Reality as an empathy tool for public policy formulation

5| Innovation in the legal area: data science and opportunity costs

Data science applied to the analysis of costs associated with appeals filed by Federal Public Attorneys

Computational intelligence-based support system for the analysis of opportunity costs in legal proceedings

Court judicialization of the Continued Provision Benefit (BPC) – a proposed flowchart for the benefit's administrative-procedural management

Corruption and penal, civil and administrative composition: competences and articulated action

6| National System of Science, Technology and Innovation

The new national Science, Technology and Innovation System: interdisciplinary strategies for its implementation and regulation

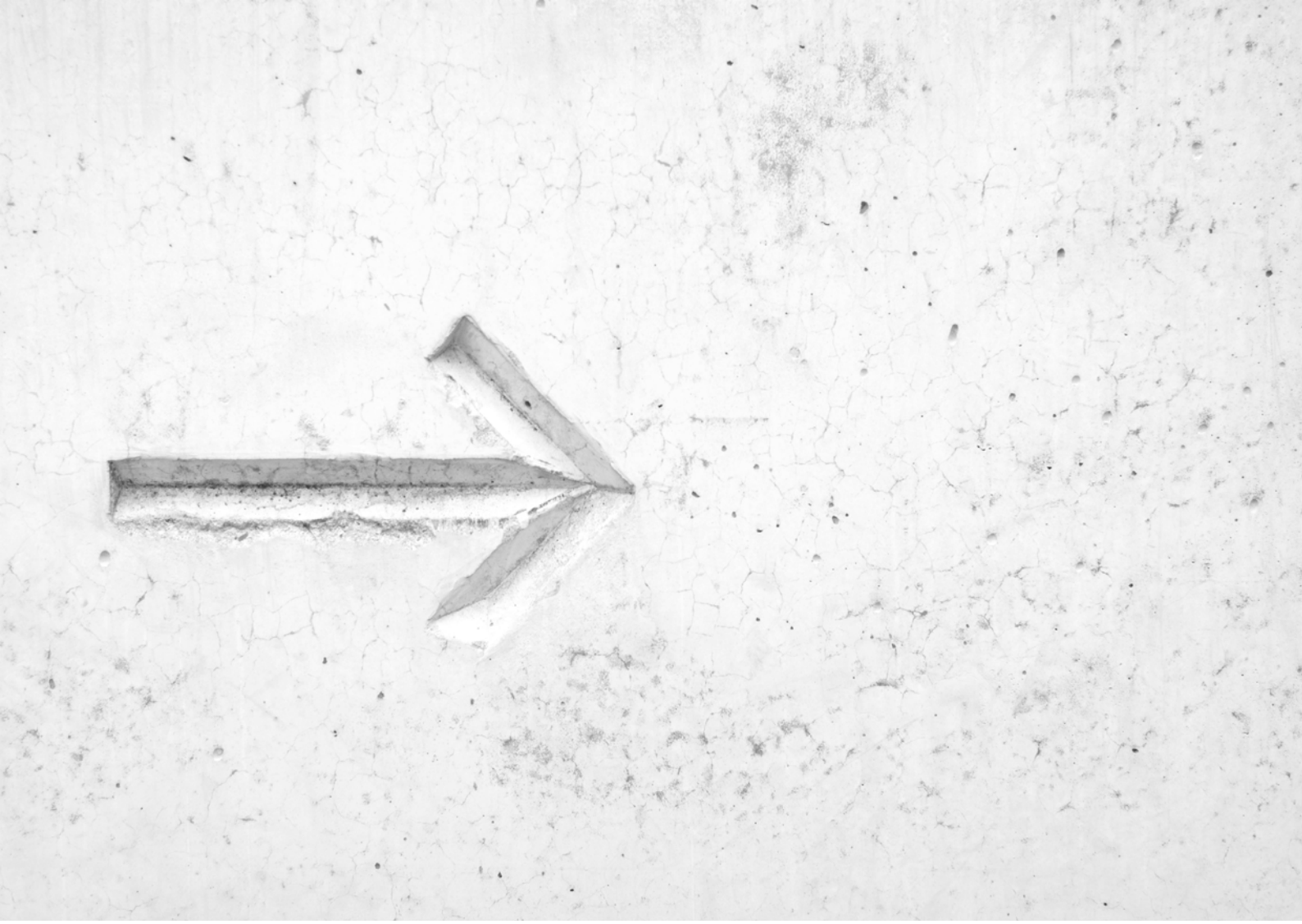
This is the first *Catedras Brasil* Program report to be published in English. This publication presents the results of the research *Public Sector Innovation Labs: mapping and diagnosis of Brazilian experiences*, by researcher Hironobu Sano. The research was supervised by Elisabete Ferrarezi from GNova. It identified the areas of activity of 43 Laboratories, in the three powers and in the federal, state and municipal spheres. Also, it drafted an analytical framework based on the review of the international literature to analyze the performance and characteristics of these laboratories.

With the publication of the research, Enap intends to disseminate the generated results to researchers and civil servants so that they can be adapted and used both in solving public policies' and organizations' management problems and in strengthening the knowledge generation concerning the Brazilian public sector.

ABSTRACT

The number of public sector innovation labs (PSIL) in Brazil has rapidly increased in the past few years, following an international trend. These initiatives are the empirical object of this research, which analyzes their operation and sheds light on their main results, based on a theoretical framework that uses national and international literature on innovation in the public sector and innovation labs. The study's theoretical part led to a definition of PSIL and contributed to building the dimensions of analysis adopted in empirical research. The second part consisted first of a broad survey of national initiatives, identifying 43 labs that fit the definition of PSIL, linked to the three branches of government (executive, judiciary, and legislative) and operating at the federal, state, and local levels, in all regions of Brazil. After the first initiative in 2010, there was an accentuated growth in 2017 (13 new labs were launched) and in 2019 (with 11 new labs). Because of the many laboratories identified, 13 were selected based on diversity criteria to participate in semi-structured interviews. The data showed that the labs work to create innovative ideas, develop and test prototypes, and implement innovations in the organization, using agile methodologies and co-creation. In addition, labs are part of the organizations' innovation strategy; they are linked to and contribute to a quest to improve public management, services, and policies. As PSIL are small units, one of their main limitations is the dependence on the organizations they are linked to and the consequent dependence on the priorities of these institutions' leaders. At the same time, despite some informal attempts, there has still been no progress in measuring the laboratories' results and improvements in public services.

Keywords: Innovation in the public sector; Public sector innovation labs in Brazil; Agile methodologies; Co-creation; Public value.



PUBLIC SECTOR INNOVATION LABS: mapping and analysis of Brazilian experiences

Hironobu Sano

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1. Introduction

This research focuses on public sector innovation labs (PSIL), due to the governments' growing interest in these initiatives. The increase in the number of these labs is an international trend, as observed in studies by Acevedo and Dassen (2016), Tonurist, Kattel, and Lember (2017). In Brazil, Cavalcante, Goellner, and Magalhães (2019), and Oliveira (2017) point out this tendency, which is associated with a movement around innovation in the public sector (Australian National Audit Office - Anao, 2009; Cavalcante et al., 2017).

Innovation labs are structures considered part of the public administration; in general, they have their own staff and structure and aim to foster creativity and experimentation to innovate and improve public services, as well as to address wicked problems (Head, 2008; Tonurist; Kattel; Lember, 2017, p. 2). PSIL adopt strategies to involve different actors – public and business sectors, and civil society – to design innovations (Fuller; Lochard, 2016; Head, 2008), operating in numerous areas and sectors.

Despite the growing number of PSIL, it is still unclear how they are financed and operate, the processes of prototyping, experimentation, and implementation work, and the results they have achieved to improve the public sector and society as a whole (government Accountability Office - GAO, 2014; Whicher, 2017). This occurs because the first studies on these initiatives were limited to mapping them and describing their characteristics, activities, and methodologies, generating guidelines and instructions to create other labs (Undp, 2017; Unicef, 2012).

More recently, the studies started to examine the nature of PSIL, delving into themes such as the reasons for creation, the organizational structure, financing sources, role within the public sector, results achieved, and sustainability over time. Therefore, it is a fairly new field of study, with the potential to explore (Bloom; Faulkner, 2016; Gryszkiewicz; Lykourentzou; Toivonen, 2016; Timeus; Gascó, 2018). PSIL intend to influence the public sector as a whole, promoting structural and systemic changes and contributing to improve the performance and quality of public services. However, most labs do not pass the development and testing phase of an innovative idea, and the innovation is not implemented (Mulgan, 2014).

In Brazil, studies on innovation labs are recent (Cavalcante, 2019), which means that mapping and analyses about these phenomena are still limited. This research contributes to filling this gap in the literature, guided by the following question:

How do Brazilian public sector innovation labs operate, and what are their results?

Before addressing this research problem, it is crucial to explore what and where the PSIL are, which requires mapping the field and understanding the distribution of labs both in the three branches (executive, legislative, and judiciary) and in the three levels (federal, state, and municipal) of government. Several other questions are also important to understand PSIL in-depth, such as why are PSIL created? How do these labs work? What are the outcomes of their activities? How are they funded?

This study attempts to find answers and has the **main objective** of understanding whether the way PSIL work contributes to bringing innovation to the public sector.

The following **specific objectives** are proposed:

a. Map the Brazilian experiences of PSIL.

b. From the international literature review, elaborate an analytical framework with the dimensions of analysis of PSIL.

c. Analyze the characteristics of Brazilian PSIL.

The scientific relevance of this research lies in the fact that there are few studies on innovation labs vis-a-vis their potential capacity to foster innovation and improve the efficiency and quality of public services. There is a mismatch between the increase in PSIL in Brazil and the world and the small number of academic studies exploring these initiatives and their contribution to innovation (Tonurist; Kattel; Lember, 2017). The research on this topic is also justified by PSIL potential to tackle wicked problems such as climate change, changes in the population's aging and demographic profile, and public security. The literature is still not conclusive on how and what factors would enable these labs to produce innovative ideas and solutions, or whether governments incorporate and disseminate such solutions (Mcgann; Blomkamp; Lewis, 2018).

One of the aspects most highlighted in the literature is open innovation, i.e., the adoption of co-production of public services, involving specialists, civil society, and businesses. However, the forms and mechanisms adopted for interaction and participation are still unknown. There are not enough studies examining the tools and techniques used to generate ideas and experimentation or surpass the barriers to innovation in the public sector, such as risk aversion and bureaucratic ties (Cavalcante et al., 2017; Gascó, 2017).

In addition to this introduction, the report has four more sections. The second section presents the theoretical framework, encompassing the fact that the growth in the number of PSIL occurs amidst a wider movement of reforming the public sector, in which innovation takes on a central role (Bekkers; Homburg, 2005; Tonurist; Kattel; Lember, 2017). The theoretical discussion approaches the establishment of innovation labs, resuming their history, the reasons for their creation, and the main typologies identified in the literature. Section 3 describes the methodology adopted in this research, followed by section 4 presenting the studies' results and analyses, divided into two parts: the first shows the results of the phase of mapping the PSIL, which identified 43 labs; the second part offers an analysis of interviews conducted with 13 PSIL. The fifth and last section presents the final considerations.

2. Innovation in the public sector

From the beginning of the 1980s, the term innovation gained popularity and became a buzzword in the public sector (Osborne; Brown, 2011). In the 1990s, innovation was associated with the practices of new public management (Borins, 2000, 2001; Hansen, 2011) and, more recently, it has been associated with the advancement of information and communication technology (ICT) and digital government (Bekkers; Homburg, 2005). Currently, innovation remains at the top of the public sector agenda (Torfing; Triantafilou, 2016).

The concern about innovating in the public sector implied firstly in understanding the phenomenon. The comparison with the private sector was inevitable since innovation is a crucial topic for companies. Notwithstanding, it is important to recognize that, although businesses are commonly considered more innovative than public agencies, no conclusive studies support this belief (Hartley, 2013; Koch et al., 2005; National Audit Office, 2006a, 2006b). The debates on innovation have advanced regarding the similarities and differences between the sectors (Halvorsen; Hauknes; Miles; Røste, 2005; Hartley, 2013; Pinho; Santana, 1998), standing out the fact that companies operate in the competitive market and are committed to maximizing profits (Halvorsen et al., 2005). Competition among businesses is the main driver of innovation, leading to a process of creative destruction (Schumpeter, 1984). The public sector operates with other drivers, limiting the simple transfer of concepts from one sector to another, although some studies have reported this phenomenon (Albury, 2005; Hartley, 2005; Osborne; Brown, 2011).

Another weakness identified in studies on innovation in the public sector is the very concept of innovation. In a review of the literature on innovation in the public sector, De Vries, Bekkers, and Tummers (2016) identified that 76% of the articles did not have a basic definition for innovation, and others presented a vague and imprecise concept. Recognizing that "there is no widely accepted or common definition of what counts as 'innovation'" (National Audit Office, 2006b, p. 4), Table 1 lists examples of concepts found in the literature, which are observed to help to guide this study.

Table 1 – Definitions of innovation

Authors	Definition
Rogers (2003, p. 12)	"an idea, practice, or object that is perceived as new by an individual or other unit of adoption".
Mulgan, Albury (2003, p. 3)	Successful innovation is the creation and implementation of new processes, products, services and methods of delivery which result in significant improvements in outcomes efficiency, effectiveness or quality".
Osborne, Brown (2005, p. 6)	"Innovation is the introduction of new elements into a public service – in the form of new knowledge, a new organization, and/or new management or processual skills. It represents discontinuity with the past."
Farah (2008, p. 113)	"Response to a challenge or problem, which can be useful to others, as part of a repertoire of alternatives to be considered by those who face similar problems."
Walker (2006, p. 313)	"a process through which new ideas, objects and practices are created, developed or reinvented and which are new and novel to the unit of adoption"
De Vries, Bekkers, and Tummers (2014, p. 5)	"the introduction of new elements into a public service - in the form of new knowledge, a new organization, and/or new management or processual skills, which represents discontinuity with the past".
OECD (2018, p. 20)	*"An innovation is a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)."*

Source: Elaborated by the author based on the references.

There are two central aspects of the definitions shown in Table 1. First, innovation is a novelty in the unit adopting it. It is about the incorporation of something new that may have been used in another location. Second, it is useful in a given context; i.e., it is not about a mere idea; it must be put into practice and bring results to the organization. In other words, innovations are "new ideas that work" (Mulgan; Albury, 2003, p. 3).

Another aspect highlighted by Osborne and Brown (2005), de Vries, Bekkers, and Tummers (2014), and Cavalcante et al. (2017) is that innovation means a break from previous practices. It represents a disruption, which is an important element to distinguish the concept from the idea of continuous improvement.

Different classifications may be used to group innovations. Table 2 shows a classification according to the type of innovation, synthesizing typologies identified by different authors.

Table 2 – Types of innovation

#	Type of innovation	Description
1	Administrative processes	Introduction of new management tools, organizational and work methods, and general practices.
2	Technological processes	Adoption of new technology to provide services.
3	Services	Creation of new public services or new ways of accessing and delivering them.
4	Conceptual	Development of new word visions that question previous concepts and change paradigms resulting and, therefore, in possible solutions.
5	Governance	Introduction of new ways for actor and organizations to interact in the decision-making process. These interactions involve actors that are internal or external to the organization such as public agencies, citizens, non-profits, or the private sector.
6	Public policies	Changes to public policy, which can result from conceptual innovation.

Source: Adapted from Brandão and Bruno-Faria (2012), de Vries, Bekkers, and Tummers (2014), and Hartley (2005; 2013)

Another form of classification refers to the degree of innovation and the type of change observed in organizations (Table 3).

Table 3 – Levels of innovation

#	Level of innovation	Description
1	Incremental	"minor changes to existing services or processes" "they rarely change how organizations are structured or the relationships and dynamics within or between organizations."
2	Radical	"new services are developed." "the overall dynamics of the sector remains unchanged."
3	Systemic or transformative	"driven by the emergence of new technologies." "new workforce structures, new types of organization, new relationships between organization and step-change in overall performance."

Source: Mulgan and Albury (2003, p. 3)

Although related to small adjustments, incremental changes are essential for improving public services, mainly in terms of their adaptation to local or individual specificities. The dissemination of incremental changes throughout organizations reflects an environment open for innovation. Radical innovation leads to an improvement in performance, although the dynamics of the sector do not change. Systemic innovations also originate from conceptual changes, which alters the prevalent paradigm and, therefore, the way of analyzing a problem and the solutions proposed. In this sense, "they require fundamental changes in organizational, social and cultural arrangements" (Mulgan; Albury, 2003, p. 3), further promoting a substantial improvement in the organization's performance level.

A third classification analyzes the origin of the innovations, according to Table 4.

Table 4 – Origin of innovation

#	Origin of innovation	Description
1	*Top-down*	Innovation resulting from decisions made by political leaders or officials in the high echelon of public management. Associated with new laws.
2	*Bottom-up*	Innovation at an organizational level not from leaders.
3	Horizontal	Co-creation process among employees of one organization or with external actors.

Source: Adapted from Mulgan, Albury (2003); Hilgers, Ihl (2010)

According to Mulgan and Albury (2003), innovations may be top-down or bottom-up, which is a perspective related to two classic views of management. Thus, innovations are inherently intraorganizational and result from closed processes. However, recent debates have considered the notion that ideas are not exclusive to individuals who work in an organization and can originate externally, based on the contribution of specialists, users of public services, and the business sector (Veeckman et al., 2013). In this perspective, it is important to consider open innovation processes and the co-creation or co-production of public services, adopting horizontal innovation strategies to obtain solutions more quickly in comparison to closed processes (Hilgers; Ihl, 2010; Lee; Hwang; Choi, 2012; Veeckman et al., 2013).

The perspective of open innovation has contributed to the worldwide popularization of PSIL in the past few years (Tonurist; Kattel; Lember, 2017), a theme discussed in the next section.

2.1 Public sector innovation labs

In the context of governments' greater openness toward society's participation to find solutions to public problems, government innovation labs came to be seen as mechanisms to foster both participation and a way to absorb the innovation "available" in society (Tonurist et al., 2017, Gasco, 2017). The creation of PSIL is part of a broader context of expanding living labs, which are spaces led by private organizations or civil society that seek to foster open innovation and incorporate external actors as co-creators of innovation (Alves, 2013; Bommert, 2010; Mergel, 2017).

Government innovation labs

The origin of laboratories goes back to the eighteenth and nineteenth centuries when they were created as controlled spaces for carrying out experiments and evaluating new ideas, used widely in natural sciences and technology development (Mulgan, 2014). During the nineteenth century, the principles applied in laboratories started to be used in social issues, with the idea that small experiments could indicate paths for changes on a larger scale in society. This perspective found support in elements of positivism, utopian thinking, and reform (Mulgan, 2014).

Since 2010, there has been increased growth in the number of PSIL, although without shared definitions and methodological and operational aspects (Gascó, 2017; Tonurist et al., 2017). One of the challenges when analyzing PSIL is the absence of a single concept and consolidated theoretical framework, which is expected since the establishment of innovation labs to address issues related to government and the public sector is a quite recent topic. The practical experiences have led to a subsequent wave of analysis and theorization of these initiatives (Schuurman; Tonurist, 2017). Table 5 summarizes some definitions of government innovation labs.

Table 5 – Definitions of government innovation labs

Definition	Organization
"Government innovation labs are dynamic places that stimulate creativity for the design of public policy solutions. These labs usually have multisector teams and approach issues collaboratively." (Acevedo, Dassen, 2016, p. 19)	BID
"[…] it might be expected to include experimentation in a safe space at one remove from everyday reality, with the goal of generating useful ideas that address social needs and demonstrating their effectiveness." (Mulgan, 2014, p.2)	Nesta
"A lab is a space and set of protocols for engaging young people, technologists, private sector, and civil society in problem-solving." (Unicef, 2012, p. 14)	Unicef
"Government innovation labs are partnership spaces where government and other organizations experiment with new ways of solving old problems." (UNDP, p. 11)	UNDP

Source: Acevedo and Dassen (2016); Mulgan (2014); Unicef (2012); UNDP (2017)

These definitions have some common points. They seek to constitute their own space, designed to differentiate the lab from other structures related to the origin of the initiative (Acevedo; Dassen, 2016). The labs pursue a collaborative environment to find solutions to public issues, to dialogue with civil society and the business sector. Finally, PSIL search for solutions to public policy problems and must serve the society concretely and effectively.

Schuurman and Tõnurist (2017) highlight that, in terms of structure, these innovation labs are part of the government, but are spaces with great autonomy to define their objectives and how to operate. Thus, paradoxically, the lab's infrastructure would be preferably separated from public sector agencies. In addition, PSIL are typically small in terms of staff and, therefore, have less hierarchical rigidity, low turnover, and depend on external financial and human resources (Schuurman; Tõnurist, 2017; Tõnurist et al., 2017). However, Mulgan (2014) identified that some of these structures could be linked to large organizations and thus access resources and power. Regardless of whether having access to power and resources to produce and disseminate their solutions, the different PSIL have in common the aspiration to influence the system as a whole and are not restricted to the generation of innovative ideas.

Staff is hired based on political leaders' initiative and carry the expectation of overcoming barriers in the public sector, such as regulatory rigidities, the absence of a culture focused on experimentation and changes, and not very flexible budgets (Puttick et al., 2014). A study by UNDP identified that labs' staff is not always formed by people with experience only in the public sector. Teams are formed

of specialists from different areas, such as designers, researchers, and developers, according to the PSIL focus (UNDP, 2017).

In these small structures, it is not always possible to distinguish the laboratory's budget from the budget of the organization the lab is linked to, which raises the question of its sustainability (ACEVEDO; DASSEN, 2016; TÕNURIST et al., 2015).

As for the collaborative perspective adopted in the labs, the initiatives present a greater approximation, interaction, and participation of society than the standards observed so far in the public sector (BOMMERT, 2010; SCHUURMAN; TÕNURIST, 2017). They are driven by open innovation, which seeks to overcome the limitations of closed innovation models that have failed to respond to the emerging challenges governments face (BOMMERT, 2010; HILGERS; IHL, 2010). Despite being based on a more interactive approach, experiences have revealed that laboratories are still in an early stage of implementation, and there is a lack of understanding on how to promote social participation (HAM *et al.*, 2015; BEKKERS *et al.*, 2013).

According to Mulgan (2014), it is necessary to know the method used in the participatory process and the development of innovations (design science, behavioral economics, hybrid methods, for instance), which may also be a criterion for the classification of laboratories. The public sector should prepare to listen to ideas that come from outside its own system and develop communication strategies to increase different stakeholders' engagement. The innovation team should facilitate participation, allowing the emergence of innovation based on external inputs (SCHUURMAN; TÕNURIST, 2017).

The search for better forms of dialogue with society has led government innovation labs to adopt agile methodologies that privilege and encourage participation based on co-creation, co-production, and co-design (ALVES, 2013; MULGAN, 2014; TORFING; SØRENSEN; RØISELAND, 2016). Greater openness requires participatory methodologies such as design thinking or design science research (PEFFERS et al., 2008; JOHANSSON-SKÖLDBERG; WOODILLA; ÇETINKAYA, 2013), but the means and methods the laboratories adopt to engage society are still immature (BEKKERS et al., 2013).

Nesta, a British think tank, adopted the labs' activities as a criterion to classify the initiatives (Table 6).

Table 6 – Types and characteristics of laboratories

#	Category	Characteristics
1	Innovation developers and creators	"Creating solutions to solve specific challenges."
2	Enablers	"Engaging citizens, non-profits and businesses to find new ideas."
3	Educators	Promoting changes in how public organizations deal with innovation, primarily through "transforming the processes, skills and culture of government."
4	Architects	Observing a wider horizon in comparison to a specific solution and analyzing the social context as a whole.

Source: Puttick et al. (2014, p.6)

Based on research on PSIL in Latin America, the Inter-American Development Bank (BID) classified laboratories according to seven objectives (Table 7).

Table 7 – Objectives of PSIL

#	Objective
1	Foster an innovative environment in public administration
2	Develop specific innovations
3	Introduce technologies to public administration
4	Modernize public administration processes
5	Create new mechanisms of citizen participation
6	Introduce new communication methods in public administration
7	Open public administration data

Source: Acevedo and Dassen (2016)

Based on the categories elaborated by Nesta, it is possible to establish a relationship between both studies (Table 8).

Table 8 – Types of PSIL according to their objective or purpose

#	Objective	Nesta	BID
1	Innovation developers and creators	"Creating solutions to solve specific challenges."	Develop specific innovations; introduce technologies to public administration
2	Enablers	"Engaging citizens, non-profits and businesses to find new ideas."	Create new mechanisms of citizen participation; introduce new communication methods in public administration
3	Educators	Promoting changes in how public organizations deal with innovation, primarily through "transforming the processes, skills and culture of government."	Modernize public administration processes; foster an innovative environment in public administration; open public administration data
4	Architects	Observing a wider horizon in comparison to a specific solution and analyzing the social context as a whole.	(no match)

Source: Elaborated by the author based on Acevedo and Dassen (2016), Puttick et al. (2014, p. 6)

Mulgan (2014) also proposed the classification of PSIL according to how they work, highlighting that they can operate by developing innovations themselves, advising or funding others, or encourage participation through open innovation methods. The author also proposes a spiral of stages for innovation that may be used to classify PSIL (Figure 1).

Figure 1 – Nesta seven stages for innovation

Source: Mulgan (2014)

In the first stage, innovation labs are concerned with understanding a sector's challenges and identifying opportunities for action. After understanding this scenario, labs generate innovative ideas to overcome problems [2], which allows the development of prototypes to be tested for applicability and performance [3]. If the test shows positive results, the lab works to make the case, exemplifying the processes and demonstrating the advantages of the innovation [4], which are ready to be implemented in the organization [5] and, after adjustment, may gain in scale [6]. The spread of this innovation could finally lead to a change in the system as a whole [7]. It is necessary to know how the innovation process takes place from upstream to downstream, "from understanding issues, through generating ideas to implementation and scale" (Mulgan, 2014, p. 4).

In his research, Mulgan (2014) identified that most innovation labs focus on the initial three stages: they test an innovative idea but do not advance to defend their proposal to be implemented. This occurs due to the lack of resources, a situation that hinders PSIL expectations of being able to influence the entire public sector. Therefore, it is crucial to know labs' strategies to generate innovation through experimentation, open innovation methods, or funding other organizations (Mulgan, 2014, p. 4). Innovation difficulties may also lie in the norms and rules that reduce flexibility in terms of experimentation, partnerships, and funding (Mergel; Desouza, 2013).

In addition to the variables already mentioned, it is important to consider the political support given to laboratories, especially when considering that these initiatives' death rate is higher than the rate observed in other government endeavors (Puttick et al., 2014; Schuurman; Tõnurist, 2017). Alliances and partnerships with actors from other governmental agencies and external organizations are also relevant for the performance of PSIL (Puttick et al., 2014). It is necessary to consider whether and how these labs measure their impacts, avoiding that innovations remain restricted to the process of generating ideas (Mulgan, 2014; Puttick et al., 2014).

The international literature highlights the relevance of institutional and methodological aspects to understand how PSIL operate. As for institutional aspects, the size of the staff and sources of funding stand out. Regarding the methodologies adopted in their innovation processes, the studies explore issues such as how the labs engage society and conduct their operation, recognizing that many techniques adopted are based on active and, therefore, participatory dynamics.

Based on the literature review and for the purposes of this research, the following definition of PSIL was elaborated:

Public sector innovation labs are collaborative environments that foster creativity, experimentation, and innovation, adopting active methodologies and co-creation to solve problems.

This definition opens the possibility for PSIL to operate without necessarily having a specific facility/office (although the vast majority of the initiatives researched do have a physical space). Therefore, the labs' focus is to find answers to problems in public organizations, services, or policies. Additionally, the definition makes it clear that the processes of generating ideas and innovation involves an open innovation process, with the participation of actors external to the institution presenting the problem, which may be intragovernmental actors (from other agencies) or extra-governmental actors such as civil society or businesses.

Co-creation also seeks to differentiate innovation labs from consulting firms, which can offer innovative administrative and technological solutions, but whose solutions do not derive from a participatory and dialogical process that stimulates innovation and experimentation.

Experimentation is one of the challenges faced by PSIL since the perspective is that the solutions are tested on a smaller scale to analyze their feasibility and to understand the complexity involved in later implementation on a larger scale.

Active methodologies are an important step in this process, as they position participants and their perceptions at the center of the discussion. This approach reinforces the relevance of external actors, bringing other perspectives to the problems and seeking, at the same time, a collaborative action leading to consensus (Tamura et al., 2019).]

2.2 Methodology

This qualitative research adopts an exploratory and descriptive approach, working with secondary data such as documents obtained on websites or directly with PSIL managers. In addition, the study used primary data collected through semi-structured interviews.

The first part of the research consisted of a literature review to verify new contributions on the themes of innovation in the public sector and government innovation labs. A list of the dimensions of analysis was elaborated and reviewed by Enap's team (Table 9).

Table 9 – Dimensions of analysis and description

I	INSTITUTIONAL	Description to support systemization and analysis
1	History of the laboratory (origin and reasons)	Characterize the origin of the laboratories (year of creation, why, and by whom it was created). Organizational and contextual factors leading to the emergence of the laboratory.
2	Objectives and target public	Identify the focus of action to define the type of laboratory, based on the literature.
3	Institutional arrangement	Agency or entity to which it is linked, and other organizations to which it interacts.
4	Area of operation	Identify the areas in which the laboratory operates.
II	**FORM OF OPERATION**	**Description of the dimensions**
5	Planning and decision-making processes	Characterize the laboratory's administrative routine, identify whether there is strategic planning (open or not).
6	Relationship of the laboratory with the agency to which it is linked	Characterize the degree of autonomy to make internal decisions.
	Innovation method	Characterizing the dynamics adopted in the innovation process
7	Definition of problems or challenges to be addressed	Characterize the methods for generating ideas (e.g., brainstorming) or if it is due to external demand (e.g., external projects).
8	Methodologies for generating innovative ideas	Characterize the methods for generating ideas (design thinking, lean startup, agile methods, hacker marathons, benchmarking, and others).
	Forms of interaction with society and other organizations	Mechanisms adopted to engage society and interaction with other internal and external organizations
9	Forms of participation by society, the private sector or other public bodies	Identify if there is participation of other actors, exploring how they act.
	Innovation results	Mechanisms to measure the innovation's reach
10	Evaluation of innovative projects	Characterize the evaluation process and performance indicators.
11	Dissemination	Identify if the developed initiatives have been replicated.
	Innovation barriers	Factors that hinder the innovation process of the PSIL
12	PSIL main challenges	Understand the internal and external factors that hinder PSIL innovation process.
	Activities	Description of work routine
13	Number of projects under development or already completed	Number of innovative projects under development or completed by year of start and completion (if any).
14	Number of implemented projects.	Number of innovative projects implemented, per year.

III	GENERAL MANAGEMENT CHARACTERISTICS	Characteristics of the institution, its human resources, and financial management
15	Formally established organization	Check if the lab is formally established, recognized through a norm, decree, or resolution.
16	Physical space	Verify if the lab has its own facilities, an office.
17	Other activities	Check the responsibilities or other activities the lab performs related to the organization it is linked to.
18	Runs its own projects	Check the level of autonomy of the PSIL to generate their own innovation.
	Human resources	Characteristics of human resources
19	Characteristics of the staff	Number of people, organization chart, composition of the staff.
20	Employee origin	Specify the composition of the staff according to their connection with agencies of the public administration.
21	Employee background	Characterize the multi-disciplinarity of the staff and their training.
22	Hiring of consultants	Verify how consultants are hired and their role
	Financial resources	Characteristics of financial resources
23	Available financial resources	Characterize the sources of funds, checking for external sources, international partnerships, etc. Characterize the resource destination Characterize the amounts allocated to the projects

Source: Elaborated by the author

These dimensions of analysis were used to design the script of the semi-structured interview (Appendix 1). A pilot interview was conducted to test the script, which was considered adequate and maintained in the original format.

During the same period, the PSIL in Brazil were mapped, starting with Internet search engines. In addition, the researcher participated in a workshop on government labs, organized by GNova and 011.Lab, in the Fourth Innovation Week promoted by Enap and the Ministry of Economy (from November 26 to 29, 2018). In this event, several managers from laboratories from all over the country were contacted, which contributed to organizing the database. The managers approached recommended other initiatives, complementing the mapping.

After the data collection, the initiatives were analyzed, examining if their activities fit the definition of public sector innovation labs. Despite adopting a name suggesting similarities with the concept, many of them operated with different scopes, offering consultancy and elaborating projects. These experiences did not produce innovation through co-creation or with the adoption of agile methodologies and, therefore, were excluded from the research.

Next, the general characteristics of the PSIL in the sample were analyzed to obtain a broad panorama, including the region of the country they are located, their organizational link (including the initiatives related to the Public Ministry and higher education institutions), the year they were created, and the level of government they are serving (federal, state, or local).

In a subsequent stage of the research, some of the PSIL were selected for interviews. They were analyzed more deeply, considering the dimensions mentioned above. The criteria to select PSIL was building a diverse group of interviewees in terms of experiences, organizational link, location, and area and how long they were operating. The interviews were conducted face-to-face or online (video-conferencing software such as Skype, Hangout, WhatsApp, and others).

The results were organized in an Excel spreadsheet and analyzed, as presented in the next sections. Each step, including this methodology, was discussed with Enap's personnel in order to improve the research design.

3 Mapping innovation labs in Brazil

The mapping of PSIL was carried out prior to the presentation of the research project to the call of proposals *Cátedras Brasil* and was complemented with new online research and a study conducted by Enap. In addition, the participation of the researcher as a rapporteur in the workshop on government labs, organized by GNova and 011.Lab, in the Fourth Innovation Week in November 2018, facilitated the contact with several PSIL representatives, expanding the list of these initiatives and the relationship to approach them for interviews.

The mapping identified **63 initiatives using the term *laboratório de inovação* (Portuguese for innovation lab) in their names** and linked to public administration agencies and governmental institutions, in the three branches of government and the Public Ministry. These initiatives operate in all levels of government (federal, state, and local), in all the five regions of the country. The PSIL definition used in this research, based on the literature, resulted in the **exclusion of 20 initiatives** from the sample. The analysis considered their websites and available documentation that indicated other purposes, such as identifying innovative initiatives and their dissemination, product development, conducting research, projects, or consultancy (Appendix 3). Although these laboratories can produce innovation, their focus does not involve an open innovation and co-creation process based on experimentation, with the adoption of active methodologies for problem-solving.

Three laboratories were inoperative or closed, and it was not possible to obtain information on their current situation: LabProdam – Laboratory of Technological Innovation of the City of São Paulo, iGovLab – Government Innovation Lab of the State of São Paulo, and Lab.Rio – Participatory Laboratory of the City of Rio (Rio de Janeiro).

Therefore, 43 PSIL, from all over the country, formed the sample (Appendix 2). Table 10 presents an overview of their distribution, according to their connection with the branches of government or institution (Public Ministry and federal universities) and by area of activity.

Table 10 – The PSIL in branches and levels of government

	Federal		State		Local/Municipal		Total	
Branch or institution	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
Executive branch	12	28%	7	16%	3	7%	**22**	**51%**
Judiciary branch	11	26%	1	2%	---	---	**12**	**28%**
Legislative branch	3	7%	1	2%	---	---	**4**	**9%**
Public ministry	1	2%	2	5%	---	---	**3**	**7%**
Federal university	2	5%		0%	---	---	**2**	**5%**
Total	**29**	**67%**	**11**	**26%**	**3**	**7%**	**43**	**100%**

Source: Elaborated by the author

Most of the innovation labs are part of the executive branch, which concentrates more than half of the initiatives (51%), with a clear predominance at the federal level. There are only three initiatives at the local level, and all of them are linked to secretariats of the City of São Paulo.

When analyzing the judiciary branch and the public ministry together, they concentrate just over 1/3 of the labs (35%), with a clear prevalence of PSIL in the federal level. This is a recent movement, with the first experiences emerging in 2017 and the majority created in 2019.

Also, at the federal level and in the legislative branch, three PSIL were observed. The Chamber of Deputies has two laboratories; one focuses on innovation in public procurement, while the other works on legislative processes and social participation. The Federal Audit Court established the third lab. The fourth lab in the legislative branch is an experience in the Legislative Assembly of the Federal District (state level).

Federal universities have two initiatives; the Federal University of Espírito Santo has the oldest PSIL in Brazil, created in 2010 from the initiative of several departments. The other is linked to the Graduate Program in Administration of the University of Brasilia.

Most innovation laboratories in the public sector were created in the last three years, demonstrating a national trend (Table 11).

Table 11 – Year of the PSIL creation

Year of creation	#	%
2019	11	26%
2018	9	21%
2017	13	30%
2016	2	5%
2015	1	2%
2014	1	2%
2013	1	2%
2012	1	2%
2010	1	2%
no information	3	7%
Total	**43**	**100%**

Source: Elaborated by the author

Table 12 lists the seven oldest PSIL. The first two initiatives are linked to public higher education institutions, indicating the organizations' attention to the international movement toward the creation of these structures.

The third oldest initiative is the LabHacker of the Chamber of Deputies, which is the first laboratory linked to the legislative branch – and it is even older than initiatives in the executive. Other PSIL worth mentioning are the coLAB-i of the Federal Court of Accounts and, more recently, the LabHInova of the Legislative Assembly of the Federal District (2017) and LAB-COMP (2018), a lab also put forward by the Chamber of Deputies, focused on public procurement.

The executive branch's first laboratory was the MobiLab of the Municipal Secretary of Mobility and Transport of the City of São Paulo, created in 2014 and called today MobiLab +. GNova (2016), linked to the National School of Public Administration (Enap), is the first experience put forward by the federal government, and the Laboratory of Innovation Management (2016) of the Court of the Judiciary District of São Paulo, started the trend in the judiciary branch.

Table 12 – Older Innovation Laboratories

#	Laboratory	State*	Organizations	Ano
1	Laboratório de Tecnologias de Apoio a Redes de Inovação – LabTAR (Laboratory of Technologies for Supporting Innovation Networks)	ES	Federal University of Espírito Santo	2010
2	Laboratório de Inovação e Estratégia em Governo - Linegov – UnB (Laboratory of Government Innovation and Strategy)	DF	University of Brasilia	2012
3	LabHacker	DF	Chamber of Deputies	2013
4	MobiLab +	SP	Municipal Secretary of Mobility and Transport – City of São Paulo	2014
5	Laboratório de Inovação e Coparticipação – coLAB-i (Laboratory of Innovation and Coparticipation)	DF	Federal Court of Accounts	2015
6	GNova – Government Innovation Lab	DF	National School of Public Administration – Enap	2016
7	Laboratório de Gestão da Inovação – iJuspLab (Laboratory of Innovation Management)	SP	Court of the Judiciary District of São Paulo	2016

*The Brazilian states mentioned in this report are: CE: Ceará, DF: Distrito Federal, ES: Espírito Santo, MG: Minas Gerais, PE: Pernambuco, PR: Paraná, RJ: Rio de Janeiro, RN: Rio Grande do Norte, RO: Rondônia, RS: Rio Grande do Sul, SC: Santa Catarina, SP: São Paulo, TO: Tocantins.
Source: Elaborated by the author

Table 13 lists the PSIL linked to agencies of the executive branch at the federal level. In addition to the PSIL related to federal universities and agencies of the direct administration, there are three labs linked to regulatory agencies (National Civil Aviation Agency – Anac, National Supplementary Health Agency – ANS, and National Health Surveillance Agency – Anvisa), and three labs linked to state-owned companies (one related to the bank Caixa Econômica Federal, and two labs linked to the Brazilian Post and Telegraph Corporation, located in the Federal District and the municipality of São José, in the state of Santa Catarina).

Table 13 – PSIL linked to the executive branch at the federal level

#	Laboratory	Location	Organization	Year created
1	Laboratório de Tecnologias de Apoio a Redes de Inovação – LabTAR (Laboratory of Technologies for Supporting Innovation Networks)	Vitória (ES)	Federal University of Espírito Santo	2010
2	Laboratório de Inovação e Estratégia em Governo - Linegov – UnB (Laboratory of Government Innovation and Strategy)	Federal District	University of Brasilia	2012
3	GNova – Government Innovation Lab	Federal District	National School of Public Administration – Enap	2016
4	Lab InovANAC	Federal District	National Civil Aviation Agency – Anac	2017
5	Laboratório de Inovação Financeira (Laboratory of Financial Innovation)	Rio de Janeiro (RJ)	Brazilian Securities and Exchange Commission	2017
6	ConnectLab	São José (SC)	Brazilian Post and Telegraph Corporation	2017
7	Lab InovaANS	Federal District	National Supplementary Health Agency – ANS	2017
8	Laboratório de Inovação da ANVISA - LAB-i VISA (ANVISA's Innovation Lab)	Federal District	National Health Surveillance Agency – Anvisa	2018
9	Laboratório de Inovação do FNDE (FNDE's Innovation Lab)	Federal District	National Education Development Fund – FNDE	2018
10	Mistura&Faz (Mix&Do it)	Federal District	Brazilian Post and Telegraph Corporation	2018
11	#CAIXAlab	São Paulo (SP)	Caixa Econômica Federal Bank	2019
12	iMMA	Federal District	Ministry of Environment	s.i.*
13	InovaDAU	Federal District	Attorney General's Office of the National Treasury – PGFN	s.i.*
14	Lab Inova INCA	São Paulo (SP)	National Cancer Institute of Brazil	s.i.*

Source: Elaborated by the author

There was also an increase in experiences within the judiciary and the Public Ministry, mainly at the federal level, with only three at the state level (Table 14).

Table 14 – Innovation laboratories linked to the judiciary branch and public ministry

#	Laboratory	Branch/ Institution	Level	State*	Organizational link	Year created
1	Laboratório de Gestão da Inovação – iJuspLab (Laboratory of Innovation Management)	Judiciary	Federal	SP	Court of the Judiciary District of the State of São Paulo	2016
2	i9.JFRN	Judiciary	Federal	RN	Court of the Judiciary District of the State of Rio Grande do Norte	2017
3	Laboratório de Gestão e Inovação (Laboratory of Management and Innovation)	Judiciary	Federal	ES	Court of the Judiciary District of the State of Espírito Santo	2017
4	Espaço de Convivência e Inovação (JFRJ) (Living and Innovation Space)	Judiciary	Federal	RJ	Judiciary District of the State of Rio de Janeiro	2018
5	Escritório de Inovação (Innovation Office)	Judiciary	State	RO	Court of Justice of the State of Rondônia	2018
6	Laboratório de Inovação Tecnológica e de Negócios -MPLabs MPPE (Laboratory of Technological Innovation and Businesses)	Public Ministry	State	PE	Public Ministry of the State of Pernambuco	2018
7	Laboratório de Inovação do TRT-PR (Innovation Lab of the TRT-PR)	Judiciary	Federal	PR	Regional Labor Court of the State of Paraná	2019
8	LabJus	Judiciary	Federal	SC	Court of the Judiciary District of the State of Santa Catarina	2019
9	Laboratório de Inovação em Governança (Governance Innovation Lab)	Judiciary	Federal	RS	Judiciary District of the State of Rio Grande do Sul	2019
10	Laboratório de Inovação (Innovation lab)	Judiciary	Federal	CE	Judiciary District of the State of Ceará	2019
11	Laboratório de Inovação para o Processo Judicial em meio Eletrônico (Inova PJe) (Laboratory of Innovation for Electronic Judicial Processes)	Judiciary	Federal	DF	National Justice Council	2019
12	LAB-IN (TRE-TO)	Judiciary	Federal	TO	Regional Electoral Court of the State of Tocantins	2019
13	LABINOVA12 (TRT-SC)	Judiciary	Federal	SC	Regional Labor Court of the State of Santa Catarina	2019
14	Laboratório de Inovação, Inteligência e Objetivo de Desenvolvimento Sustentável – LIODS (Laboratory of Innovation, Intelligence, and Sustainable Development Goals)	Public Ministry	Federal	DF	National Council of the Public Ministry (CNMP)	2019
15	INOVA – MPRJ	Public Ministry	State	RJ	Public Ministry of the State of Rio de Janeiro	2019

Source: Elaborated by the author

Finally, there are four PSIL linked to the legislative branch (Table 15). Two of them in the Chamber of Deputies stand out, one working with transparency and social participation (LadbHacker), and the other with public procurement (LAB-COMP).

Table 15 – Innovation laboratories linked to the legislative branch

#	Laboratory	Level	State	Organizational link	Year created
1	LabHacker	Federal	DF	Chamber of Deputies	2013
2	Laboratório de Inovação e Coparticipação – coLAB-i (Laboratory of Innovation and Co-participation)	Federal	DF	Federal Court of Accounts	2015
3	Laboratório Hacker de Inovação (Labhinova) (Innovation Hacker Laboratory)	State	DF	Legislative Assembly of the Federal District	2017
4	Laboratório de inovação em compras públicas - LAB-COMP (Laboratory of Innovation in Public Procurement)	Federal	DF	Chamber of Deputies	2018

Source: Elaborated by the author

The PSIL were classified according to their area of activity (Table 16). Each lab could be classified with up to two main areas, which explains why the number of labs working in all areas is higher than the number of PSIL.

As far as the information available on the websites allowed, it was possible to detail the areas the PSIL operated. As an example of this dynamic, the study concluded that many PSIL that worked with management also operated on specific topics, such as education or health. The topic of management was subdivided (management and judiciary management) to study the labs' operation in detail. The topic of judiciary management included searching for innovations in the core-activity, distinguishing it from innovations in the organization's administration.

PSIL main operation area is management (72% of the PSIL), suggesting a widespread notion that the state apparatus needs innovation to improve public services. Next is the judiciary management (26%), indicating a growing concern of the judiciary system – including the Public Ministry, although it constitutes an independent agency in the Brazilian legal system – to improve the management of its core-activities. The third most mentioned area was public services (14%). The diversity of topics addressed indicates that PSIL are acceptable strategies to identify solutions for various problems in the public sector.

Table 16 – Areas of operation of the PSIL

Area of operation	#	%
Management	31	72%
Judiciary management	11	26%
Public services	6	14%
Education	3	7%
Public policies	3	7%
Social participation	2	5%
Health	2	5%
Aviation	1	2%
Public spending	1	2%
Creative economy	1	2%
Sustainable finances	1	2%
Artificial intelligence	1	2%
Legislation	1	2%
Urban mobility	1	2%
Public security	1	2%
Information Technology	1	2%
Transparency	1	2%
No information	3	7%
Total	**71**	**---**

Source: Elaborated by the author

The PSIL are present in 12 states and the Federal District (DF), covering the five Brazilian regions (Table 17). The concentration in the Federal District reveals the predominance of initiatives linked to federal agencies, which may indicate an influence of the first labs – LineGov from the University of Brasília, Colab-i from the Federal Court of Accounts, and GNova from Enap – associated with greater state capacity. All states in the Southeast and South Regions have at least one lab, especially the city of São Paulo, where 7 initiatives are located, including the three initiatives of the City Hall and the first lab linked to the judiciary branch. In the Northeast, PSIL are present in only three states, two of which are related to regional offices of the federal judiciary (Ceará and Rio Grande do Norte) and one to the Public Ministry of the State of Pernambuco, indicating that state governments – executive branch – have not yet adopted PSIL as a strategy for innovation. In the North Region, the initiatives are also related to the judiciary, one from the Court of Justice of the State of Rondônia and another from the Regional Electoral Court of the State of Tocantins.

Table 17 – Location of PSIL – Region, state, number, and percentage

Region	State	#	%
Central-West (37%)	DF	16	37%
Southeast (37%)	SP	7	16%
	ES	4	9%
	RJ	4	9%
	MG	1	2%
South (14%)	SC	4	9%
	PR	1	2%
	RS	1	2%
Northeast (7%)	CE	1	2%
	PE	1	2%
	RN	1	2%
North (5%)	RO	1	2%
	TO	1	2%
Total		**43**	**100%**

Source: Elaborated by the author

In short, this first characterization identified the dissemination of PSIL as part of a strategy to improve, particularly, the management of government agencies and institutions in specific areas of public policies. The initiatives are significantly concentrated at the federal level, in the executive and legislative branches. The greatest expansion occurred after 2017, and a strong push from the judiciary and the Public Ministry.

The next section analyzes the thirteen PSIL selected for the interview stage.

4. Diagnosis and analysis of the PSIL

The selection of the PSIL approached for the interview used the criteria of diversity – regarding the operation, location, year of creation – and maintaining the same proportions found during the mapping stage regarding the organizational link. Thus, most of the interviews were with PSIL linked to the executive branch, followed by the judiciary, legislative, and federal university (Table 18).

As some PSIL did not respond to the invitation to participate in the interview stage, others were incorporated. The interviews were conducted with directors of the institution to which the PSIL are linked or the managers in charge of the labs. Table 18 lists the participating PSIL.

Table 18 – PSIL participating in the research

#	Laboratories	Branch or institution	Scope of Operation	State	Organizational link
1	GNova	Executive	Federal	DF	National School of Public Administration - Enap
2	Lab InovANAC	Executive	Federal	DF	National Civil Aviation Agency - Anac
3	MobiLab +	Executive	Municipal	SP	Municipal Secretary of Mobility and Transport – City of São Paulo
4	011.Lab	Executive	Municipal	SP	Municipal Secretary of Innovation and Technology – City of São Paulo
5	Pátio Digital	Executive	Municipal	SP	Municipal Secretary of Education – City of São Paulo
6	i9.JFRN (RN)	Judiciary	Federal	RN	Court of the Judiciary District of Rio Grande do Norte
7	Laboratório de Gestão da Inovação – iJuspLab (Laboratory of Innovation Management)	Judiciary	Federal	SP	Court of the Judiciary District of São Paulo
8	Espaço de Convivência e Inovação (JFRJ) (Living and Innovation Space)	Judiciary	Federal	RJ	Judiciary District of Rio de Janeiro
9	LABHacker	Legislative	Federal	DF	Chamber of Deputies
10	Laboratório de Inovação Financeira (Laboratory of Financial Innovation)	Executive	Federal	RJ	Securities and Exchange Commission
11	Laboratório de Inovação da ANVISA - LAB-i VISA (ANVISA's Innovation Lab)	Executive	Federal	DF	National Health Surveillance Agency – Anvisa
12	Laboratório de Inovação na Gestão - LAB.ges (Laboratory of Innovation Management)	Executive	State	ES	State Secretary of Management and Human Resources – Government of the State of Espírito Santo
13	Laboratório de Tecnologias de Apoio a Redes de Inovação – LabTAR (Laboratory of Technologies for Supporting Innovation Networks)	University	Federal	ES	Federal University of Espírito Santo

Source: Elaborated by the author

The next section presents the analysis of the laboratories based on the research instrument.

4.1 General characteristics of the researched PSIL

Table 19 presents the **organizational links** of PSIL. Most of the interviews were conducted with laboratories linked to the executive branch, followed by the judiciary, legislative, and universities.

Table 19 – Organizational links of the PSIL

Institution	Federal	State	Municipal	Total	%
Executive	4	1	3	**8**	**62%**
Judiciary	3			**3**	**23%**
Legislative	1			**1**	**8%**
University	1			**1**	**8%**
Total	**9**	**1**	**3**	**13**	**100%**

Source: Elaborated by the author

Regarding the **year of creation** (Table 20), most of the laboratories participating in this stage started in 2017. The oldest laboratory in operation in the country, the Laboratory of Technologies for Supporting Innovation Networks (LabTAR) from the Federal University of Espírito Santo was also included.

Table 20 – Number of PSIL per year of creation

Year created	#
2018	2
2017	6
2016	2
2014	1
2013	1
2010	1
Total	**13**

Source: Elaborated by the author

4.2 Origins and organizational link

As for the **origin** of the PSIL (Table 21), most were created from a mixed process (54%), with the joint participation of the top echelon of the public agency and the managers, reflecting a collaborative stance between the different hierarchical levels. In the bottom-up approach, the initiative started with the efforts of managers and technical staff, who obtained support from the public agency's leadership.

The top-down initiatives suggest that the agencies' leaders put forward the PSIL as a central strategy to bring innovation to the organizations. After creating the labs, the processes of innovation become more participatory and dialogical, engaging leaders, managers, and staff.

Table 21 – Origin of PSIL

Origin	#	%
Mixed	7	54%
Top-down	3	23%
Bottom-up	3	23%
Total	**13**	**100%**

Source: Elaborated by the author

Despite the classification in three types of origins (Table 21), the process of creating PSIL is more complex. However, organizational support is a relevant factor in facilitating the labs' creation in almost all cases. An exception is Labtar, which was a bottom-up initiative led by professors from the Federal University of Espírito Santo, and it did not involve the university's top leaders.

In many cases, the PSIL are part of a larger strategy of the agencies to address the issue of innovation. In other words, the public organization already has experience with innovation, and sometimes a specific event works as a catalyst for the emergence of an innovation lab, as shown in the following examples.

GNova Government Innovation Lab

The National School of Public Administration – Enap has a long history of working with innovation. Since 1996, for example, the institution holds the Public Sector Innovation Contest. The window of opportunity for the creation of the GNova Government Innovation Lab arose from the cooperation agreement signed between the Brazilian and Danish governments through the Strategic Sector Cooperation Project, focusing on digitalization and innovation (Brandalise; Ferrarezi; Lemos, 2018).

Although the cooperation agreement may be considered top-down, the entire process of creating GNova counted on the participation of Enap employees, which characterizes it as a mixed process. The support of Mindlab, the main world reference in government labs, is a factor that stands out when analyzing the case of GNova.

The emergence of the laboratory is connected to the creation of an Innovation and Knowledge Management Department in Enap, indicating the strategic role of innovation in the institution. Therefore, the establishment of the PSIL was part of a wider organizational process.

LAB InovANAC

Innovation at the National Civil Aviation Agency – ANAC is aligned with the agency's values, as stated in its Strategic Plan 2015/2019 (National Civil Aviation Agency, n.d.). The lab's history goes back to the actions of the agency's Department of People Management, which, in 2016, implemented activities of knowledge and innovation management. In November 2016, innovation projects became common, but still without the emphasis currently observed with the PSIL. The experience of working with innovation projects evolved to the idea of a laboratory, which was formalized through a norm enacted by the agency in 2017. Therefore, this case is considered a mixed process, with intense participation of professionals working in the ANAC's department of people management.

LAB-i Visa

This lab originated from a bottom-up process, started with the creation of the initiative "*Fábrica de Ideias*" (Idea Factory), which emerged during a course of the Applied Training Program for Anvisa's Employees (PFA). The initiative aimed to make better use of intellectual capital for innovation, seeking to overcome the organization's departmental and hierarchical limits. *Fábrica de Ideias* was formalized with a norm enacted by the agency in 2016, and it was considered part of the Department of Knowledge, Innovation, and Research. The training and capacity building processes were supported by GNova/Enap, with courses based on active methodologies (Silva; Oliveira; Buvinich, 2017). The evolution of the activities led to the creation of LAB-I Visa in 2018, within Anvisa's Innovation Policy scope.

There is diversity in the origin of the initiatives, i.e., there is no single path to be followed. Therefore, the creation of PSIL depends on the history of organizations and how the professionals and leaders act regarding innovation.

As for the PSIL **organizational link** (Table 22), there is a balance between those directly linked to the board of the public agency and those more closely related to a specific department or sector. The case of organizational link via commission is the experience of the Laboratory of Financial Innovation, created from the partnership of three institutions, the Brazilian Securities and Exchange Commission (CVM) – a federal agency linked to the Ministry of Economy, the Brazilian Development Association (ABDE) – an association of private and public banks, and the Inter-American Development Bank (IDB).

Table 22 – Organizational link of the PSIL

Organizational link	#	%
Board	6	46%
Department or sector of the organization	6	46%
Commission	1	8%
Total	**13**	**100%**

Source: Elaborated by the author

The analysis on the issue of being **formally established** (Table 23) showed that PSIL are, most of the time, created through a norm enacted by the agency. There are two different situations observed. Some of the actors consider that such formalization is a way to gain security regarding the lab's continuity, especially in situations of change of command in government. Others believe that informality is inherent in the PSIL model, thus allowing flexibility to address innovation processes.

In the case of the 011.Lab, the Municipal Decree 58.411 of September 13, 2018, created the initiative simply mentioning that it will be operationalized in a joint effort involving two coordinating units, the Platform of Innovation and the Public Innovation Office.

Table 23 – PSIL formality

Status	#	%
Formally established by decree, norm, resolution, etc.	9	69%
Not formally established	4	31%
Total	**13**	**100%**

Source: Elaborated by the author

4.3 Operating areas, target audience, and objectives

Table 24 indicates the PSIL **areas of operation**. In this regard, the labs can operate on different topics. Most PSIL focus on management innovation, highlighting three PSIL linked to the judiciary that seek to develop improvements in the management of the system, dealing with the particularities of the judicial processes in different courts. Another three PSIL work with public policies in general, without focusing on public policies of a certain sector, as observed in the other labs.

Table 24 – Areas of operation of PSIL

Area of operation	#	%
Management	9	69%
Judiciary management	3	23%
Public policies	3	23%
Aviation	1	8%
Education	1	8%
Sustainable finances	1	8%
Legislation	1	8%
Urban mobility	1	8%
Social participation	1	8%
Health	1	8%

Source: Elaborated by the author

As for the **target audience** (Table 25), the majority of PSIL are concerned with meeting the challenges within their own organization, whether in the area of management or in the specific areas of public policies in which they operate.

Table 25 – Target public of PSIL actions

Target public	#	%
Only internal	7	54%
Internal and external	5	38%
Only external	1	8%
Total	**13**	**100%**

Source: Elaborated by the author

It is observed that the area of management is predominant among the laboratories, and Table 26 shows the target audience of initiatives with this characteristic. Most of them meet the organization's demands to which they are linked (only two initiatives serve different organizations).

Table 26 – Target public of operation in management

Target public	#	%
Only internal	6	67%
Internal and external	2	22%
Only external	1	11%
Total	**9**	**100%**

Source: Elaborated by the author

In the case of the Judiciary, which is not included in the table, the three PSIL meet internal demands.

Regarding the **objectives** (Table 27), all laboratories researched aim to promote innovative solutions. One strategy present in the vast majority (85%) of them is engaging actors from other government agencies, civil society, or the private sector in the ideation and creation processes. There is, therefore, concern with the establishment of open innovation processes, in which co-creation is seen not only as a tool, but also as a value to be spread throughout the organization.

Table 27 – Objectives of the PSIL

Objective	#	%
Promote innovative solutions	13	100%
Promote engagement of other actors in innovation	11	85%
Promote a culture of innovation	8	62%
Openness of risk/mistake	2	15%
Promote access to data	2	15%
Promote transparency	2	15%
Promote social participation	2	15%
Train people	2	15%
Increase social accountability	1	8%
Promote academic research	1	8%
Disseminate cases of success	1	8%
Innovation policy framework	1	8%

Source: Elaborated by the author

Fostering an innovation-driven organizational culture is a concern of 62% of the PSIL. In addition, it is worth noting that, considering that innovation involves risks and uncertainties, two initiatives highlight the value of operating in a scenario where errors are understood as part of the experimentation process: GNova/Enap and LabHacker, detailed below.

GNova Government Innovation Lab

"GNova's mission is to develop innovative solutions in federal government projects so that the public service can better respond to society's demands. To pursue its mission, GNova's objective is to experiment, prospect, and disseminate innovations. The values that guide the work are: collaboration, proactivity, **risk-taking**, networking, simplification, efficiency, empathy, and focus on the user, experimentation, and generation of public value." (Interview 1, emphasis added).

LabHacker

"LabHacker is a space of freedom for experiments and learning, where **error is allowed** in search of innovation, encouraging non-conventional perspectives. Here we perform usability tests for products and services, always focusing on the interest of the citizen. We also try different tools and discuss the use of new technologies to disseminate best practices." (LabHacker, n.d., emphasis added)

There are still few initiatives that clearly expose the possibility of "making mistakes" in the generation of an innovation, which is a factor that has been considered a barrier to innovation in the literature (Brandão; Bruno-Faria, 2017; Cavalcante; Camões, 2017a). However, when adopting experimentation as an operational strategy, PSIL end up fostering a culture in which error, in a controlled environment, is not punishable, but accepted as part of the learning process that potentially leads to new solutions.

4.4 Typology and work methods of PSIL

Regarding **typology**, Table 28 shows the classification of the laboratories. They operate as *developers and creators* of innovation, indicating that the Brazilian PSIL were established to develop innovative solutions.

In addition, the majority also operate as *facilitators* (92%), aiming to connect citizens, civil society, or the business sector, strengthening inter-institutional dialogue as a strategy to foster innovation. Brazilian laboratories also work engaging other governmental actors, whether from an intraorganizational perspective, when different sectors of an organization are invited to dialogue, or intragovernmental, when different government units participate in the innovation process.

The laboratories considered *educators*, i.e., initiatives that promote changes in the culture of innovation, are 77% of the total. Only one initiative, the Laboratory of Financial Innovation, was classified as *architect*. It addresses emerging themes with little regulation, such as investment crowdfunding, venture philanthropy, and fintechs.

The research revealed that part of the PSIL worked to identify and disseminate innovations, even though this was not their only or main occupation. One of the most adopted strategies to identify innovations is through contests, inviting participants to present their cases, rewarding the best ones. The dissemination of either the cases awarded or innovations internally developed in the labs occurs through publicizing online (creating repositories to display the cases on the labs' websites), preparing publications, holding events, among others.

Table 28 – Typology of the PSIL

		Typology				
#	**Laboratory**	**Developer and creator**	**Facilitator**	**Educator**	**Identify and disseminate**	**Architects**
1	011.Lab	•	•	•	•	
2	G.Nova	•	•	•	•	
3	LabHacker	•	•	•	•	
4	Laboratório JFRJ	•	•	•		
5	iJuspLab	•	•	•		
6	Lab InovAnac	•	•	•		
7	Lab.ges	•	•	•		
8	LAB-i Visa	•	•	•		
9	LIF	•	•			•
10	MobiLab +	•	•	•		
11	Pátio Digital	•	•	•		
12	LabTar	•	•			
13	i9.JFRN	•				
	Total	**13**	**12**	**10**	**3**	**1**
	%	**100%**	**92%**	**77%**	**23%**	**8%**

Source: Elaborated by the author

It is worth mentioning the i9.JFRN, because, despite being listed only as a developer and creator laboratory, the Federal Justice of the State of Rio Grande do Norte (JFRN) develops several other innovative projects, such as hacker marathons and internship in innovation technology. The initiatives are carried out through a specialization program in partnership with the Federal University of Rio Grande do Norte. The PSIL are only part of the JFRN's innovation

strategy, which is wider and, therefore, has more than one reference point.

This research identified a further category from the Puttick et al. (2014) typology. Therefore, a brief adaptation of the model is proposed, according to Table 29.

Table 29 – Types and characteristics of PSIL

#	Category	Characteristics of the laboratories
1	Innovation developers and creators	Aimed at solving specific challenges
2	Facilitators	Focus on engaging citizens, governmental organizations, civil society and the private sector in the innovation process
3	Educators	Focused on promoting changes in the way public organizations deal with innovation, mainly by developing skills and fostering a culture of innovation
4	Disseminators	They seek to disseminate their own innovations or those of other government agencies, after an identification and selection process
5	Architects	It has a larger horizon of action than the specific solution de-veloped and analyzes the broader social context

Source: Elaborated by the author based on Puttick et al. (2014)

There are many **methodologies** the laboratories adopt to generate innovative ideas and for the innovation cycle, the most cited being design thinking and design sprint, as shown in Table 30. Some interviewees mentioned that different methods are combined to give more meaning to the activity or to adapt to the specifics of the innovation.

Table 30 – Methodologies for creating innovative ideas

Methodology	# of times mentioned
Design thinking	8
Design Sprint	5
Agile methods	4
Agile immersion	3
Human centered design	2
Minimum viable product	2
Participatory Design	1
Wicked problems	1
Speculative Design	1
Feminine Design	1
Sense making	1
Brainstorming	1
Scrum	1
Design Science Research	1
Ethnography	1
Canvas	1

Source: Elaborated by the author

In addition to the agile working methods, the laboratories adopt different strategies to promote and stimulate innovation, often in a joint way to enhance their performance, shown in Table 31.

Table 31 – Strategies for innovation and dissemination adopted by the PSIL

Strategy	Characteristics	#	%
Events	Hold debates, seminars, speeches, etc.	8	62%
Innovation contest	Promote a contest to reward innovative projects	5	38%
Meet ups/Open meetings	Meetings to promote creation and strengthening of net-works and idea exchange	4	31%
Pitch	Meetings in which the public sector presents challenges for startups to develop solutions through pitches (quick presentations of solutions)	4	31%
Solution bank	Repository of solutions developed for dissemination	3	23%
Research project contest	Contest to select researchers for specific topics	3	23%
Hackathon	Work marathon focused on creating solutions to specific problems	3	23%
Open access to data	Open access to government data	2	15%
Suggestion box	Physical or virtual space to receive suggestions for inno-vations	1	8%
Coworking	Offer of shared space for project development and net-work formation	1	8%
Collaborative project editing	Strategy to promote participation of different actors in the development of projects	1	8%
Accommodation	Offer of space for startups residence/incubation	1	8%

Source: Elaborated by the author

The **participation** of actors external to the public sector is not yet a central concern of the PSIL, as only four have a participation strategy or openness to other actors, notably civil society. In other cases, participation depends on the type of problem being addressed or there is no predicted participation. Some interviewees reported that they would like to expand or promote greater participation, but they encounter internal difficulties, or are recent initiatives still being structured.

Table 32 – Participation of actors external to the public sector

Participation	#	%
Depends on the project	6	46%
Yes	4	31%
No	2	15%
Predicted	1	8%
Total	**13**	**100%**

Source: Elaborated by the author

With the exception of one laboratory, which is a recent initiative and has not yet implemented innovations, the others have concluded and implemented several innovative projects in the most varied themes, according to the areas of activity identified. Thus, considering Mulgan's proposal (2014), the PSIL classification regarding the **innovation stage** is shown in Table 33.

Table 33 – Innovation stage

Innovation stage	#	%
Implementing	12	92%
Generation of ideas *	1	8%
Total	**13**	**100%**

* Recently established PSIL

Source: Elaborated by the author

Therefore, the PSIL have advanced beyond the initial stages of generating ideas and prototyping, promoting the implementation of the innovative solution. On the other hand, it was not possible to identify the dissemination of innovations that would lead to systemic changes, that is, the last two stages of the model. This would require a more in-depth study to verify how the dissemination process evolves.

The observation of the last two stages is also hampered by the fact that most of the interviewed laboratories do not have an institutionalized process for **evaluating** innovations (Table 34), a situation often associated with the fact that the projects are recent. Some respondents said that the evaluation takes place through feedback or conversations with the sectors or partners that implemented the innovation.

Table 34 – Systematized evaluation of the innovations

Systematized evaluation	#	%
No	10	77%
Yes	2	15%
N/A *	1	8%
Total	**13**	**100%**

* No innovation has been implemented
Source: Elaborated by the author

Most PSIL (85%) have their own **facilities** (Table 35), revealing the importance of infrastructure. Even laboratories that do not have a full-time team have an office, considered a core element for the organization. The laboratory InovAnac planned to create its own space in 2019. The characteristics of the Laboratory of Financial Innovation does not justify having its own facilities. The initiative holds virtual meetings most of the time, and face-to-face meetings are held at the premises of one of the participating institutions.

Table 35 – PSIL facilities/offices

Facilities/offices	#	%
Yes	11	85%
No	2	15%
Total	**13**	**100%**

Source: Elaborated by the author

Some interviewees stated that PSIL have obtained more visibility than the department to which they are linked, making it difficult to dissociate the image of one from the other. In these cases, the PSIL and the department share the same staff, and professionals do not work exclusively in innovation projects.

When analyzing the **staff** exclusively dedicated to PSIL (Table 36), the number of employees varies from zero to 14. Short-staffed labs usually adopt the strategy of training employees of the public agency they are linked to, so they are familiar with agile methodologies and can be allocated in innovation projects.

Table 36 – Staff dedicated exclusively to PSIL

Exclusively dedicated staff	#	%
Yes	7	54%
No	6	46%
Total	**13**	**100%**

Source: Elaborated by the author

In other situations, specialists in a theme, such as information technology, can be contracted for a specific period (Table 37). The areas of expertise vary, from supporting the labs' creation and structuring, offering courses in design thinking and other agile methodologies to train the labs' staff, working as technicians for specific projects that require knowledge in software, applications, artificial intelligence, and finance, among others. Working with experts in temporary contracts is a strategy some labs adopt to strengthen specific innovation projects without having to hire full-time professionals. Some of the interviewees consider these types of contracts a way for the lab to learn, since the knowledge the specialists bring to the initiative is internalized. On the other hand, it may require a change in the staff's mindset with long-term contracts, as it is crucial to accept that innovation may come from external sources.

Some labs offer to mentor the other units recently started, exchanging experiences and training them on agile methodologies. They work as an alternative to consultants and companies focused on government innovation. However, there is little interaction between universities and the public sector regarding innovation processes or the implementation of labs.

The case of **Mobilab +** is worth highlighting. After a hacker marathon on urban mobility, the laboratory contracted the winning startups through a startup in residence program to develop the concepts presented in the event.

Table 37 – Hiring of external professionals

External hiring	#	%
Yes	6	46%
No	7	54%
Total	13	100%

Source: Elaborated by the author

The larger teams are multidisciplinary, with people from backgrounds such as administration, public administration, architecture and urbanism, environmental sciences, social communication, design, law, engineering, nutrition, pedagogy, psychology, international relations, sociology, in addition to specialists, and scholars holding masters and PhDs in the most diverse backgrounds.

PSIL have more than one source of funding, which explains the fact that the total number of sources used is higher than the number of labs participating in the interview stage (Table 38). Most labs depend on the public agency's resources to which they are linked (77%), and only three PSIL are funded separately, managing an independent budget (23%). The analysis indicates that labs raise funds from other sources such as clients (other governmental agencies) requesting projects, calls for proposals, grants from membership organizations, grants from multilateral organizations (all of these considered external sources – 38%), and donations (31%). In the case of donations, they usually refer to receiving furniture when there is a renovation in the organization to which they are linked, or they use more structured strategies such as releasing a public notice requesting the donation of specific resources.

Table 38 – Source of resources

Origin of resources	#	%
Dependent on the organization's budget	10	77%
External	5	38%
Donation	4	31%
Independent budget	3	23%
Total	**22**	**---**

Source: Elaborated by the author

Although most laboratories receive resources from the organization they are linked to, the diversification of resources indicates a strategy to enhance performance or reduce dependence.

4.6 PSIL's challenges

Table 39 summarizes the **challenges** interviewees reported regarding PSIL operation. One of the main challenges refers to upward accountability, showing the agencies' senior management the relevance of the labs and the results achieved. This type of concern seems to increase with the prospect of change in senior management as it creates a feeling of insecurity regarding the future of the PSIL under new management.

The internal culture of agencies and institutions also poses challenges since the way innovation labs operate may be distant from many people's reality or knowledge. This conflict is reflected in criticisms regarding PSIL design facilities/offices, which use various colors and panels, different from the standard observed in regular public agencies' offices. In addition, the fact that PSIL activities include role-playing or games in some stages of the innovation process, the labs are pejoratively called toy library, playground, or even as an nonsense initiative. The challenge, therefore, is to convince employees that these activities are capable of generating relevant innovations.

Table 39 – PSIL Challenges

Category	Dificuldades
Laboratory	• Explain what it is and how it works • Lack of credibility • Ignorance of the themes addressed by the laboratory • Lack of visibility of actions • Ignorance of the co-creation process
Structure	• Small team • Team without exclusive dedication to the laboratory • Absence of own structure • Restricted budget • Difficulty raising funds
Culture	• Internal resistance to changes • There is no tolerance for error
Innovation	• Apply the legal innovation framework • Explain the innovation process • Ignorance about innovation in the public sector • Absence of incentives for innovation • Scale to promote systemic innovations
Policy	• Change of priority under new management • Explain the value of the laboratory to superiors

Source: Elaborated by the author

Following the Nesta seven stages for innovation (Mulgan, 2014), most PSIL can be classified in stage 5 (Figure 1), in which innovation is delivered and implemented. Due to the challenges regarding the evaluation of implemented innovations, and the fact that they are very recent experiences, it was not possible to observe the advance to the next stage, in which the innovation grows and gains scale.

This analysis identified a growing tendency in the number of PSIL in Brazil, following the past three years' dynamic observed. This movement is part of a broader process within public agencies and institutions, searching for innovations to improve public management, services, and policies. The public sector is, in many cases, seeking to incorporate active methodologies and implement co-creation processes in an attempt to shift to an open innovation perspective. Although this research could not identify systematic processes designed to evaluate innovations, the majority of PSIL have already developed several innovations, reinforcing their commitment to improving the public sector.

5 Final considerations

This research's general objective was to understand if the performance of public sector innovation labs (PSIL) indeed contributes to innovation in government. The analysis of the PSIL selected from the initiatives mapped showed that the labs advanced through the innovation stages (MULGAN, 2014), i.e., they identify opportunities and challenges, generate ideas, elaborate prototypes, and work on implementation. They adopt agile methodologies and use co-creation as one of the main strategies, counting on the participation of different actors from the civil society and the public and business sectors.

The research conducted a literature review on the topic, observing that there is no single concept for innovation in the public sector, which means that the debate around the definition for PSIL remains open. Therefore, the study identified elements in the national and international literature to offer a working definition for PSIL, considering its forms of operation and general characteristics.

After examining the literature, the research focused on mapping the experiences of innovation labs related to government in Brazil. The first point to be highlighted in this stage of the study was the widespread use of the term "*laboratório de inovação*" (laboratory of innovation or innovation laboratory/lab, in English), both by public agencies and in higher education institutions. However, the use of the term by these actors did not always reflect the characteristics that supported the definition of PSIL adopted in this work, since some experiences focused on developing projects, research, or consultancy without using co-creation processes based on active methodologies. Thus, out of the firstly mapped 63 initiatives somehow connected to the government that defined themselves as "*laboratório de inovação*," 20 were excluded for not fitting the study's working definition.

The analysis of the remaining 43 experiences considered, among other characteristics, the year of creation, location, organizations they were linked to, and area of operation. The numbers showed an increase in PSIL in Brazil since 2017, indicating a growth trend for the near future. There is a preponderance of initiatives in the executive branch, with an accentuated number of experiences at the federal level, followed by initiatives at the state level. As for PSIL operating at the local level, the three municipal experiences identified are all linked to the city of São Paulo, in specific areas: education, urban mobility, and public services. Apart from the experiences at the executive branch, the instance with more PSIL is the judiciary and the Public Ministry. Again, the majority are linked to federal agencies, with only three experiences at the state level. The legislative branch has four initiatives and federal universities are the ones with the least number of PSIL (2), although they are the pioneers in the country. The PSIL main area of operation is in the public agencies' management, revealing a concern with innovations in internal processes, even though they also address other specific topics of interest of the organizations they are linked to.

The next stage of the research sought to know in-depth the mapped PSIL. Thus, thirteen of them were selected to participate in semi-structured interviews conducted face-to-face or online (via video-conferencing software). The data was treated to allow analyzing the dimensions established to address the research problem.

PSIL are often part of a wider innovation strategy of the organization they are linked to. The establishment of a lab may be, in these cases, the result of a previous process in which the institution was looking for alternatives to improve public management, services, or policies. These innovation labs seem to catalyze the public sector's tendency to incorporate an innovation process based on ideation and prototyping before implementing a solution on a larger scale, using open innovation and co-creation methods to engage civil society and other players.

In this context where labs are part of the public agencies' broader innovation strategy, it is important to note that, in most cases (77%), the creation of PSIL was a process that combined the will of the agencies' senior management and staff, or it was an initiative from the staff, without the direct influence from top managers. Only three PSIL were created based on a top-down approach. This characteristic reinforces the perspective that innovation results from a participatory process. The search for innovation is a clear objective of all PSIL, and the process to achieve this goal through a co-creation is present in 85% of them, reinforcing their participatory nature.

Among the methodologies the labs adopt during the innovation cycle, the most cited were design thinking, design sprint, and agile methods (adapted according to their needs). The PSIL demonstrated the preference for human-centered methodologies, focusing on processes to raise awareness regarding the importance of participation to generate and develop innovation.

Debates, seminars, hacker marathons, innovation contests, meetups, pitches, and co-working are other strategies adopted to encourage participation, particularly the engagement of civil society. Such participation, however, does not seem to be a central concern for most PSIL, either because they are still in an early stage of structuring or because this element is not a general requirement but a requisite only in specific projects.

Concerning the typology, most are classified as developers and creators, followed by facilitators, educators, disseminators, and architects. It should be noted that the category of disseminators was not observed in the international literature, which may be a particularity of Brazilian PSIL. Among the PSIL studied, only one was considered in the category of architects, that is, labs that analyze the broader context and have a bigger scope of action, addressing challenges that still have not been faced or subjected to regulation, or topics that may be in the public agenda in the near future.

Although most PSIL have completed and implemented several projects, the systematic evaluation of innovation is not yet part of their routine, which jeopardizes an analysis of the effectiveness and impact of the innovation they produce. The challenges related to systematic evaluation may be attributed to internal demands for new solutions, coupled with short-staffed labs, where the professionals are not always exclusively dedicated to the PSIL.

Despite the tendency of growth in the number of PSIL throughout Brazil, especially after 2017, most of the experiences are concentrated in agencies and institutions of the executive branch at the federal level, revealing their greater state capacity and proximity with the topic.

This study inspired new questions. The analyses led to ask what is the potential of PSIL when it comes to promoting systemic changes, considering they count on small teams and that most of them do not have their own budget? Is it possible to expect PSIL to act as architects considering the financial and human resources limitations, in addition to the fact that the majority of these labs are focused on the management of public organizations? These questions deserve further research, examining how PSIL could address wicked problems.

Regarding the formalization of PSIL, the research pointed out two perspectives. Some interviewees considered formalization important for the initiatives' continuity, while others argue that the labs should be flexible and free from bureaucratic restraints. In addition, the issue of accepting errors was highlighted during the interview stage and requires further studies to explore how to align the risk-taking approach of innovation with the demands related to control and accountability.

As for the research limitations, it is important to observe that innovations in the public sector are not restricted to PSIL, and this work is not considering other structures operating innovation in public organizations. The fact that PSIL are part of broader strategies to promote innovation within the government implies that this is not the only type of structure producing and transforming ideas into solutions. Thus, it is necessary to analyze the context of public organizations to understand their innovation history better. The growing concern of the Brazilian public agencies with innovation is an encouraging novelty, revealing a more explicit concern with the results and impact of their work.

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Appendix 1 – Interview script

IDENTIFICATION (Data to be collected before the interview)		
PSIL Name		
Manager inter-viewed		
E-mail		**Web-site**
Social media	Facebook:	Twitter:
	Instagram:	Youtube:
Telephones		
Obs		

#	INTERVIEW QUESTIONS	DESCRIPTION TO SUPPORT THE INTERVIEW SYSTEMIZATION AND ANALYSIS
I	**HISTORY**	**PSIL origin**
1	How did the laboratory originate, when and how was it creat-ed? Why? What favored its creation?	Characterize the origin of the laboratories (year of creation, why, and by whom it was created). Organizational and contextual factors leading to the emergence of the laboratory.
2	What are the laboratory's objectives and its target audience? Is its focus internal or external? (If not mentioned earlier).	Identify the focus of action to define the type of laboratory, based on the litera-ture.
3	Please explain the institutional arrangement around the lab. To which agencies is the lab linked and with which does it interact directly?	Agency or entity to which it is linked, and other organizations to which it inter-acts.
4	What are the PSIL areas of expertise/vocation? How were these areas defined?	Identify the areas in which the laboratory operates.
II	**FORM OF OPERATION**	**Description of the dimensions**
5	What are the planning and decision-making processes in the laboratory's administrative routine?	Characterize the laboratory's administrative routine, identify whether there is strategic planning (open or not).
6	How is the laboratory's relationship with the agency to which it is linked?	Characterize the degree of autonomy to make internal decisions.
	Innovation method	Characterizing the dynamics adopted in the innovation process
7	How are the problems or challenges defined or identified?	Characterize the methods for generating ideas (e.g., brainstorming) or if it is due to external demand (e.g., external projects).
8	After defining a problem or challenge, what methodologies guide the generation of innovative ideas? What does the work routine look like after an innovative idea has been identified?	Characterize the methods for generating ideas (design thinking, lean startup, agile methods, hacker marathons, benchmarking, and others).
	Forms of interaction with society and other organizations	Mechanisms adopted to engage society and interaction with other internal and external organizations
9	How do society, business sector, or other public agencies par-ticipate in laboratory's initiatives? Please provide details	Identify if there is participation of other actors, exploring how they act.
	Innovation results	Mechanisms to measure the innovation's reach
10	How do you evaluate the implemented innovative projects? What are the evaluation parameters?	Characterize the evaluation process and performance indicators.

11	Have other institutions adopted any innovative projects devel-oped in the laboratory? If so, please describe the changes after adoption.	Identify if the developed initiatives have been replicated.
	Innovation barriers	Factors that hinder the innovation process of the PSIL
12	What were the main challenges encountered in the execution of the innovation objectives proposed by the laboratory?	Understand the internal and external factors that hinder PSIL innovation process.
	Activities	Description of work routine
13	How many innovative projects are under development or have been completed? And which institutions are involved? (indi-cate the number of projects by year of start and completion)	Number of innovative projects under development or completed by year of start and completion (if any).
14	How many completed innovative projects have been imple-mented? (indicate by year)	Number of innovative projects implemented, per year.
III	**GENERAL MANAGEMENT CHARACTERISTICS**	**Characteristics of the institution, its human resources, and financial manage-ment**
15	Is the laboratory formally established (ordinance, law, etc.)? If so, how was the process? If not, could you explain why?	Check if the lab is formally established, recognized through a norm, decree, or resolution.
16	Does the laboratory/staff have its own facilities/office? How was the process of obtaining and organizing this space?	Verify if the lab has its own facilities, an office.
17	In addition to the activities already reported, would you like to include others developed by the laboratory? How do they oc-cur?	Check the responsibilities or other activities the lab performs related to the organ-ization it is linked to.
18	Does the laboratory carry out its own projects? Could you de-scribe how this happens?	Check the level of autonomy of the PSIL to generate their own innovation.
	Human resources	Characteristics of human resources
19	Concerning the staff working in the laboratory, please state aspects such as how many people are in the team, their roles, their positions in the organization chart, and the process of forming the team	Number of people, organization chart, composition of the staff.
20	About the laboratory's staff, how many of them are public servants still working in the agency to which the lab is linked? How many employees were allocated to work full time in the lab? To which agencies were the labs' staff originally related? Are there appointed professionals? Please describe other condi-tions related to the staff employment contracts.	Specify the composition of the staff according to their connection with agencies of the public administration.
21	What are the labs' employees' background? How did/does the qualification process occur?	Characterize the multi-disciplinarity of the staff and their training.
22	Are consultants hired for specific projects? How is contracting carried out (public selection process, invitation letter, etc.)? What is their role?	Verify how consultants are hired and their role
	Financial resources	Characteristics of financial resources
23	Please state the laboratory's financial sources and the amounts received. Describe how the resources are used in the laboratory's activities (costs, capital expenditure, possible cost items).	Characterize the sources of funds, checking for external sources, international partnerships, etc. Characterize the resource destination Characterize the amounts allocated to the projects

Source: Elaborated by the author

Appendix 2 – List of Brazilian PSIL

N.	Laboratório	Poder/ Instituição	Nível de atuação	UF	Vinculação institucional	Ano de criação
1	Laboratório de Inovação do Tribunal Regional do Trabalho (TRT-PR)	Judiciary	Federal	PR	Regional Labor Court of the State of Paraná	2019
2	Laboratório de Aceleração da Eficiência Pública – LAEP	Legislative	State	RJ	Office of the Chief of Staff and Secre-tary of Governance	2019
3	#CAIXAlab	Public Mi-nistry	Federal	SP	Caixa Econômica Federal – State-owned bank	2019
4	LabJus	Executive	Federal	SC	Court of the Judiciary District of the State of Santa Catarina	2019
5	Laboratório de Inovação em Governança – Justiça Federal do Rio Grande do Sul	Executive	Federal	RS	Judiciary District of the State of Rio Grande do Sul	2019
6	Laboratório de Inovação da Justiça Federal no Ceará – Inova-jus	Executive	Federal	CE	Judiciary District of the State of Ceará	2019
7	Laboratório de Inovação para o Processo Judicial em meio Eletrônico – Inova PJe	Executive	Federal	DF	National Justice Council	2019
8	LAB-IN (TRE-TO)	Executive	Federal	TO	Regional Electoral Court of the State of Tocantins	2019
9	LABINOVA12 (TRT-SC)	Executive	Federal	SC	Regional Labor Court	2019
10	Laboratório de Inovação, Inteligência e Objetivo de Desen-volvimento Sustentável – LIODS	Executive	Federal	DF	National Council of the Public Minis-try (CNMP)	2019
11	INOVA – MPRJ	Executive	State	RJ	Public Ministry of the State of Rio de Janeiro	2019
12	Laboratorio de Inovação da ANVISA - LAB-i VISA	Executive	Federal	DF	National Health Surveillance Agency – Anvisa	2018
13	Laboratório de Inovação do FNDE	Executive	Federal	DF	National Education Development Fund – FNDE	2018
14	Epicentro – Hub de inovação	Judiciary	State	ES	Development Bank of the State of Espírito Santo	2018
15	Lab InovaSES-DIFERENTE	Judiciary	State	DF	Health Secretary of the Federal District	2018
16	Mistura&Faz	Legislative	Federal	DF	Brazilian Post and Telegraph Corpora-tion	2018
17	Espaço de Convivência e Inovação (JFRJ)	Executive	Federal	RJ	Judiciary District of the State of Rio de Janeiro	2018
18	Escritório de Inovação (TJ-RO)	Judiciary	State	RO	Court of Justice of the State of Ron-dônia	2018
19	Laboratório de inovação em compras públicas – LAB-COMP	Legislative	Federal	DF	Chamber of Deputies	2018
20	Laboratório de Inovação Tecnológica e de Negócios –MPLabs MPPE	Executive	State	PE	Public Ministry of the State of Per-nambuco	2018
21	Lab InovANAC	Legislative	Federal	DF	National Civil Aviation Agency – ANAC	2017
22	011.Lab	University	Munici-pal	SP	Municipal Secretary of Innovation and Technology (SMIT) – City of São Pau-lo	2017
23	Pátio Digital	University	Munici-pal	SP	Municipal Secretary of Education – City of São Paulo	2017

N.	Laboratório	Poder/ Instituição	Nível de atuação	UF	Vinculação institucional	Ano de criação
24	Laboratório de Inovação Financeira – LIF	Executive	Federal	RJ	Brazilian Securities and Exchange Commission	2017
25	Laboratório de Inovação na Gestão – LAB.ges	Executive	State	ES	State Secretary of Management and Human Resources – Government of the State of Espírito Santo	2017
26	Laboratório de Inovação em Segurança Pública – HUBSSP/SC	Executive	State	SC	Secretary of Public Safety of the State of Santa Catarina	2017
27	ConnectLab	Judiciary	Federal	SC	Brazilian Post and Telegraph Corpora-tion (State of Santa Catarina)	2017
28	Lab InovaANS	Legislative	Federal	DF	National Supplementary Health Agen-cy – ANS	2017
29	Laboratório de Inovação da Gerência Jurídica (LabGJU)	Ministério Público	State	SP	São Paulo State Metro Company	2017
30	Sala de Inovação	Executive	State	MG	Company of Information Technology of the State of Minas Gerais – PRODEMGE	2017
31	i9.JFRN (JFRN)	Executive	Federal	RN	Court of the Judiciary District of the State of Rio Grande do Norte	2017
32	Laboratório de Gestão e Inovação (JFES)	Executive	Federal	ES	Court of the Judiciary District of the State of Espírito Santo	2017
33	Laboratório Hacker de Inovação (Labhinova)	Executive	State	DF	Legislative Assembly of the Federal District	2017
34	G.NOVA Laboratório de Inovação em Governo	Executive	Federal	DF	National School of Public Administra-tion – Enap	2016
35	Laboratório de Gestão da Inovação da Justiça Federal – iJus-pLab (JFSP)	Executive	Federal	SP	Court of the Judiciary District of the State of São Paulo	2019
36	Laboratório de Inovação e Coparticipação – coLAB-i	Executive	Federal	DF	Federal Court of Accounts	2019
37	MobiLab +	Executive	Munici-pal	SP	Municipal Secretary of Mobility and Transport – City of São Paulo	2019
38	LABHacker	Executive	Federal	DF	Chamber of Deputies	2019
39	Laboratório de Inovação e Estratégia em Governo – Linegov – UnB	Executive	Federal	DF	University of Brasilia	2019
40	Laboratório de Tecnologias de Apoio a Redes de Inovação – LabTAR (ES)	Judiciary	Federal	ES	Federal University of Espírito Santo	2019
41	iMMA	Judiciary	Federal	DF	Ministry of Environment	2019
42	InovaDAU	Legislative	Federal	DF	Attorney General's Office of the Na-tional Treasury – PGFN	2019
43	Lab Inova INCA	Executive	Federal	SP	National Cancer Institute of Brazil	2019

Source: Elaborated by the author

Appendix 3 – Laboratories excluded from the first list in the stage of mapping, since they did not fit the working definition

#	Laboratory	Branch/ Institution	Level	State	Organization	Year of creation	Exclusion criteria
1	Innovation Laboratory APS FORTE (Basic Health Care)	Executive	Federal	DF	Pan-American Health Organiza-tion/Ministry of Health	2018	Identifies innovative experiences
2	Laboratory of Organizational Innova-tion and Entrepreneurship in the Pub-lic Sector – E InovaLab	University	Federal	RN	Federal University of Rio Grande do Norte	2018	Consultancy
3	Laboratory of Innovation in Health Education	Executive	Federal	DF	Pan-American Health Organization /Ministry of Health	2017	Identifies innovative experiences
4	LabProdam – Laboratory of Techno-logical Innovation of the city of São Paulo	Executive	Municipal	SP	Prodam (Technology Company of the City of São Paulo)	2016	Inoperative or closed
5	iGovLab – Government Innovation Lab of the State of São Paulo	Executive	State	SP	Government Secretary – São Paulo State	2015	Inoperative or closed
6	GPP LAB – Laboratory of Manage-ment and Public Policies - FGVP-SP	University	(Private)	SP	FGV-SP	2015	Research and projects
7	Laboratory of Management of Labor in Health	Executive	Federal	DF	OPAS/Ministry of Health/UnB	2014	Monitoring innovative experiences
8	Laboratory of Supplementary Health	Executive	Federal	DF	OPAS/Ministry of Health	2014	Identifies innovative experiences
9	Lab.Rio – Participatory Lab of the City of Rio de Janeiro	Executive	Municipal	RJ	n.d.	2014	Inoperative or closed
10	Laboratory of Integral Health Care for Youth and Adolescents	Executive	Federal	DF	Pan-American Health Organization /Ministry of Health	2013	Identifies innovative experiences
11	Laboratory of Care for Chronic Con-ditions	Executive	Federal	DF	Pan-American Health Organization /Ministry of Health/CONASS	2012	Identifies innovative experiences
12	National Health System (SUS) Labor-atory of Home Care	Executive	Federal	DF	Pan-American Health Organization /Ministry of Health	2012	Identifies innovative experiences and best practices
13	Laboratory of Innovation on Obesity Management in Health Care Systems	Executive	Federal	DF	Pan-American Health Organization /Ministry of Health	2012	Identifies innovative experiences and best practices
14	Social Participation Innovation Lab	Executive	Federal	DF	Pan-American Health Organization /Ministry of Health	2011	Identifies innovative experiences
15	Laboratory of Technological Innova-tion in Health – LAIS/ HUOL/UFRN	University	Federal	RN	Federal University of Rio Grande do Norte	2011	Development of tech-nological products
16	Laboratory of Experiments in Educa-tion Management	Executive	Federal	DF	National Institute of Educational Studies and Research Anísio Teixei-ra – INEP/ Ministry of Education	2006	Identifies innovative experiences
17	Laboratory of Public Policies	Executive	Federal	MG	Federal University of Alfenas	n.i.	Research and projects
18	Government Management Lab – EACH/USP	University	State	SP	São Paulo State University (USP/EACH)	n.i.	Research and projects
19	Public Policy Innovation Lab of the Fundação Getulio Vargas	University	(Private)	RJ	FGV-EBAPE (RJ)	n.i.	Research and projects
20	DAPP LAB – Laboratory of Innova-tion and Technology Applied to Pub-lic Policies (Fundação Getulio Var-gas)	University	(Private)	RJ	FGV- EBAPE (RJ)	n.i.	Research, projects, and consultancy

n.i.: no information.
Source: Elaborated by the author