Article

Leadership in the collaborative innovation process in the public sector: an integrative review

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Increasingly interconnected contemporary societies face complex problems that impact people's lives and demand collaborative innovative solutions. In the public sector, managers have shown a growing interest in collaboration to stimulate the development and implementation of innovative solutions. Despite this, the field of research on the role of leadership in this process is still incipient. This work aims to build a synthesis of the literature on the role of leaders in collaborative innovation processes in the public sector. The generation of a thematic map reveals two macro themes – roles and actions of leaders – associated with six themes: meta-governance, three-dimensional performance, observing basic requirements, restructuring the organization, overcoming obstacles, and exploring the drivers. This framework outlines how public leaders can act to engage in the development of more effective collaborative innovations for society. To review the evidence, it is also recommended that the profile of public leaders indicated to stimulate collaborative innovation processes to be more proactive and less attached to formalisms, should act as a meta-governor to convene, orchestrate, facilitate, regulate, mediate, and catalyze the processes of innovation.

Keywords: leadership; collaborative innovation; multi-actor; three-dimensional acting; public sector.

Liderança no processo de inovação colaborativa no setor público: uma revisão integrativa

As sociedades contemporâneas, cada vez mais interconectadas, enfrentam problemas complexos que impactam a vida das pessoas e demandam soluções inovadoras, construídas de forma colaborativa. No setor público, os gestores têm demonstrado crescente interesse na colaboração para estimular o desenvolvimento e a implementação de soluções inovadoras. Apesar disso, o campo de pesquisas sobre o papel da liderança nesse processo ainda é incipiente. O objetivo deste trabalho é construir uma síntese da literatura sobre o papel dos líderes em processos de inovações colaborativas no setor público. Por meio da metodologia de revisão integrativa e análise temática, o objetivo foi identificar as lacunas e as possíveis conexões que venham a direcionar futuras pesquisas no campo. A geração de um mapa temático revela dois macrotemas – papéis e ações dos líderes – associados a seis temas: metagovernança, atuação tridimensional, observação dos requisitos básicos, reestruturação da organização, superação de obstáculos e exploração dos impulsionadores. Essa estrutura prescreve como os líderes públicos podem atuar ao se engajar no desenvolvimento de inovações colaborativas mais efetivas para a sociedade. A revisão evidencia ainda que é

recomendável que o perfil dos líderes públicos indicado para estimular processos de inovações colaborativas seja proativo e menos apegado a formalismos, devendo observar uma atuação como metagovernante para convocar, orquestrar, facilitar, regular, mediar e catalisar os processos de inovação.

Palavras-chave: liderança; inovação colaborativa; multiatores; atuação tridimensional; setor público.

Liderazgo en el proceso de innovación colaborativa en el sector público: una revisión integradora

Las sociedades contemporáneas, cada vez más interconectadas, enfrentan problemas complejos que impactan en la vida de las personas y exigen soluciones innovadoras, construidas de manera colaborativa. En el sector público, los directivos han mostrado un creciente interés en la colaboración para estimular el desarrollo e implementación de soluciones innovadoras. A pesar de ello, el campo de investigación sobre el papel del liderazgo en este proceso es aún incipiente. El objetivo de este trabajo es construir una síntesis de la literatura sobre el papel de los líderes en los procesos de innovación colaborativa en el sector público. La generación de un mapa temático revela dos macrotemas – roles y acciones de los líderes – asociados a seis temas: metagobernanza, desempeño tridimensional, observación de requisitos básicos, reestructuración de la organización, superación de obstáculos y exploración de los impulsores. Esa estructura determina cómo los líderes públicos pueden actuar al involucrarse en el desarrollo de innovaciones colaborativas más efectivas para la sociedad. La revisión evidencia, asimismo, que es recomendable que el perfil de los líderes públicos indicados para estimular procesos de innovación colaborativa sea más proactivo y menos apegado a formalismos, y que actúe como metagobernante, convocando, instrumentando, facilitando, regulando, mediando y catalizando los procesos de innovación.

Palabras clave: liderazgo; innovación colaborativa; multiactores; actuación tridimensional; sector público.

1. INTRODUCTION

The innovation process in the public sector can improve government performance, expand its ability to solve problems, deliver value to the population and optimize the allocation of resources, with more benefits for society as the end user of services (Maia et al., 2021). There is growing certainty among public leaders that mere incremental adjustments to public policies and services are no longer sufficient to resolve the current economic, social and political crisis in Western societies (Osborne & Brown, 2011; Torfing, 2019).

A collaborative approach to innovation can stimulate the development, implementation and diffusion of solutions in the public sector. It suggests that innovation processes must be adopted, especially to enable external contributions and access to new sources of ideas (Revilla & Rodríguez-Prado, 2018). Collaborative innovation combines findings from recent research on collaborative governance with insights from innovation theories (Hartley et al., 2013).

The collaborative innovation approach questions the notion that innovation results from the heroic efforts of enlightened people and simultaneously repudiates the conception that positive and negative incentives, combined with a focus on performance measurement, stimulate innovation in the government sector (Torfing, 2019). The public sector aims to produce public value. Therefore, public and private actors, including citizen users of services, can contribute and will probably be motivated to collaborate in this search (Hartley et al., 2013).

Today's challenges are often too complex to be faced by a single individual. To deal with them, individuals, groups, and organizations must work collaboratively to explore, define and redefine direction, creating alignment and maintaining a commitment to the innovation process (McCauley & Velsor, 2004).

In this situation, leadership is decisive in developing an environment of multi-actor cooperation. Inter-organizational coordination between other interested parties requires means and methods to implement a climate of trust between the different parties. Studies indicate that leadership is essential

in building associations or alliances (Routelous, 2010) and their innovative performance (Capaldo & Petruzzelli, 2015). Although the topic is essential, there are few publications on the role of leaders in collaborative innovation processes in the public sector. Furthermore, a literature review that provides a current view of the state of the art regarding research in the area was not identified.

The present study aims to build a synthesis of the literature on the role of leaders in collaborative innovation processes in the public sector. With this, we intend to contribute to identifying research gaps in the area and generating new knowledge about the roles and behaviors of leaders in innovation processes in the public sector. As a social contribution, this research provides insights so that leaders of public organizations can act more effectively in collaborative innovation processes, promoting positive impacts on the quality of services provided by the State and the well-being of society as a whole.

2. COLLABORATIVE INNOVATION AND LEADERSHIP IN THE PUBLIC SECTOR

Innovating means developing and implementing new ideas, different from those derived from shared wisdom and habitual practices that, until then, dominated the context of solutions to the problems faced (Hartley et al., 2013; Osborne & Brown, 2011). Innovation is a complex and iterative process through which problems are defined; new ideas are developed and combined; prototypes and pilots are designed, tested and redesigned; and new solutions are implemented, used and problematized (Hartley et al., 2013).

Until the 1970s, innovation was considered relevant only to the private sector and public innovation policies focused exclusively on how the public sector could create favorable conditions for innovation to flourish alongside private companies (Sørensen & Torfing, 2017). Although some authors have argued that public innovation is highly unlikely due to the inflexibility of the public sector, the lack of market-based competition, and the risk-averse culture of the government sector, other authors maintain that the public sector is much more innovative than what is generally believed (Li, 2021).

Today, there is a growing perception that innovation can increase productivity and improve services and problem-solving capacity in the public sector, although not all innovations are practical or involve improvements (Cavalcante & Cunha, 2017; Hartley et al., 2013).

Public innovation is a learning process in which government organizations seek to address specific social challenges by developing and introducing new services, technologies, organizational structures, techniques, policies and governance processes (Budryte et al., 2020). Along the same lines, Wegrich (2019) argues that public innovation refers to implementing a new product, process, practice, technology or service to the adopting organization.

Research suggests that "bottom-up" public innovation, which involves citizens in the co-production of public services, often helps overcome problems caused by limited government funding, mainly through effectively identifying social problems and needs of service users, developing trust among citizens and reducing costs for taxpayers (Lam & Li, 2018).

The complex problems of modern society, in general, cannot be solved based on standardized solutions, often requiring joint efforts and collaborative action to produce innovative solutions that respond to the challenges of public management (Crosby et al., 2017). Thus, increasing attention is paid to stakeholders – for example, local communities, non-governmental organizations (NGOs), and businesses – as potential catalysts and developers of public sector innovations (Budryte et al., 2020).

In this context, collaboration is when two or more actors engage in constructive management of differences to define common problems and develop joint solutions based on tentative agreements that can coexist with disagreement and dissent (Hartley et al., 2013).

When discussing collaboration in the context of public innovation, Wegrich (2019) defines collaborative innovation as a governance arrangement in which one or more public organizations engage other stakeholders, state and non-state, in a collective, guided and deliberate decision-making process to design and implement new and creative solutions to respond to governance challenges. The collaborative capacity of the bodies that make up the public sector, that is, the set of attributes that actors employ to collaborate, will dictate the success of collaborative innovation (Kazmi & Naaranoja, 2019).

Because collaborative innovation is essentially distributive, horizontal, and adaptive (Torfing, 2019), public leaders need to focus more on coordination and oversight to connect a network with diverse stakeholder segments (Crosby & Bryson, 2010b); this opens space for emerging leadership models that present innovative and adaptive approaches capable of facing current challenges and demands for innovation in the public sector. Four leadership models stand out: transformational, ambidextrous, relational and integrative.

By emphasizing the leader's ability to inspire and motivate followers to achieve exceptional performance, transformational leadership, for example, promotes creating a shared vision through transforming followers' attitudes, values and beliefs (Bass, 1990; Burns, 1978). There is a consensus on the ability of transformational leaders to inspire and awaken a sense of common purpose in everyone involved, elevating their efforts to a level of significant achievements and contributing to innovation processes (Avolio et al., 2011; Chang & Lee, 2013).

Ambidextrous leadership, in turn, emphasizes the need to balance exploring new opportunities with exploiting capabilities and resources (Gerlach et al., 2020). This model recognizes the importance of innovating and adapting to external environment changes while maintaining the organization's efficiency and internal stability. Ambidextrous leaders can balance the search for new ideas and practices with the effective management of processes in the public sector (Rosing et al., 2011).

Mary Uhl-Bien (2006) discusses relational leadership and recognizes public sector organizations' multifaceted and dynamic nature. This model understands leadership as a complex phenomenon, influenced by several variables, such as individual characteristics, behaviors, social interactions and organizational contexts. The relational leadership approach fosters innovation by emphasizing the creation of networks of trust and collaboration among team members, allowing the exchange of ideas and the generation of creative solutions to complex challenges (Uhl-Bien, 2006).

Integrative leadership involves the five main sectors of society: public, private, organized civil society organizations, the Press and citizens (Crosby & Bryson, 2010), aiming to build mutual trust and understanding, in addition to negotiating joint goals (Cepiku & Mastrodascio, 2020). The emphasis is on collaborative processes that lead to shared results between agencies and sectors, promoting greater democratic responsibility to ensure responsiveness and inclusion (Cristofoli et al., 2021; Van Wart, 2013).

It is a non-hierarchical style of leadership in which the exchange of information and knowledge replaces the authority structure through a self-organized process, supported by mutual obligations that

develop over time, aiming to manage the diversity of members and establish a joint project (Crosby et al., 2017; Díaz-Gibson et al., 2017). To achieve these objectives, integrative leadership presupposes the adoption of democratic and shared governance, along with a collaborative work culture (Díaz-Gibson et al., 2017; Müller-Seitz, 2012).

3. METHODOLOGICAL PROCEDURES

An integrative literature review (Botelho et al., 2011; Mendes et al., 2008; Torraco, 2005) was carried out to synthesize the empirical and theoretical literature, providing a broad understanding of the role of leaders in collaborative innovation processes in the public sector.

The integrative review was chosen because it is a systematic method that allows reviewing, criticizing and synthesizing the knowledge produced on a topic in an integrated way (Torraco, 2005). Furthermore, as Whittemore and Knafl (2005) point out, the integrative review provides a better understanding of the state of the art in the literature on the phenomenon studied.

According to Botelho, Cunha and Macedo (2011), the integrative review is carried out in six stages: identification and elaboration of the theme and selection of the research question; establishment of inclusion and exclusion criteria; identification of selected studies; categorization of selected studies; analysis and interpretation of results; and presentation of the knowledge synthesis.

Articles eligible for inclusion met the following criteria: published in peer-reviewed journals in English, Portuguese, or Spanish and empirical or theoretical studies that discuss the roles of leaders in collaborative innovation processes in the public sector.

The searches were conducted in the Ebsco, SciELO, Scopus and Web of Science (WoS) databases, as they cover a wide range of quality journals in the social sciences. In the articles' titles, abstracts and keywords, the following search methods were adopted: (leadership and collaborative innovation) and (public sector or government). The time frame defined was from 2011 to 2022. It was decided not to include, among the keywords, the term open innovation since open innovation is not necessarily a joint and collaborative action but rather a more linear and direct process (Chesbrough, 2006; De Vries et al., 2018; Lopes & Farias, 2022).

Although open and collaborative innovations involve the participation of external stakeholders in the innovation process, the first focuses mainly on access to external knowledge and technologies to obtain market solutions (Chesbrough, 2006). This approach tends to be more oriented towards immediate results. Although it is valuable for innovation, it may not create the same level of synergy and long-term relationships that characterize collaborative innovation, which is more complex and dynamic, emphasizing active cooperation and co-creation between diverse stakeholders to generate innovative results capable of solving complex problems to create public value (Engeström, 2008; Hartley et al., 2013; Koppenjan & Klijn, 2004; Torfing et al., 2019).

This more horizontal strategy promotes an environment of co-creation in which various stakeholders actively contribute to the innovation process, sharing ideas, resources and expertise on an ongoing basis.

Following the preliminary searches, we proceeded to the portfolio refinement stage. Out of 56 articles, we selected those most relevant to the topic and concentrated on the public sector, applying the inclusion criteria and removing duplicates. Next, we read the titles and abstracts. Lastly, we read

the full documents and obtained the final sample of 18 articles. Figure 1 illustrates the number of articles retained after each stage.

FIGURE 1   PORTFOLIO FORMATION PHASES
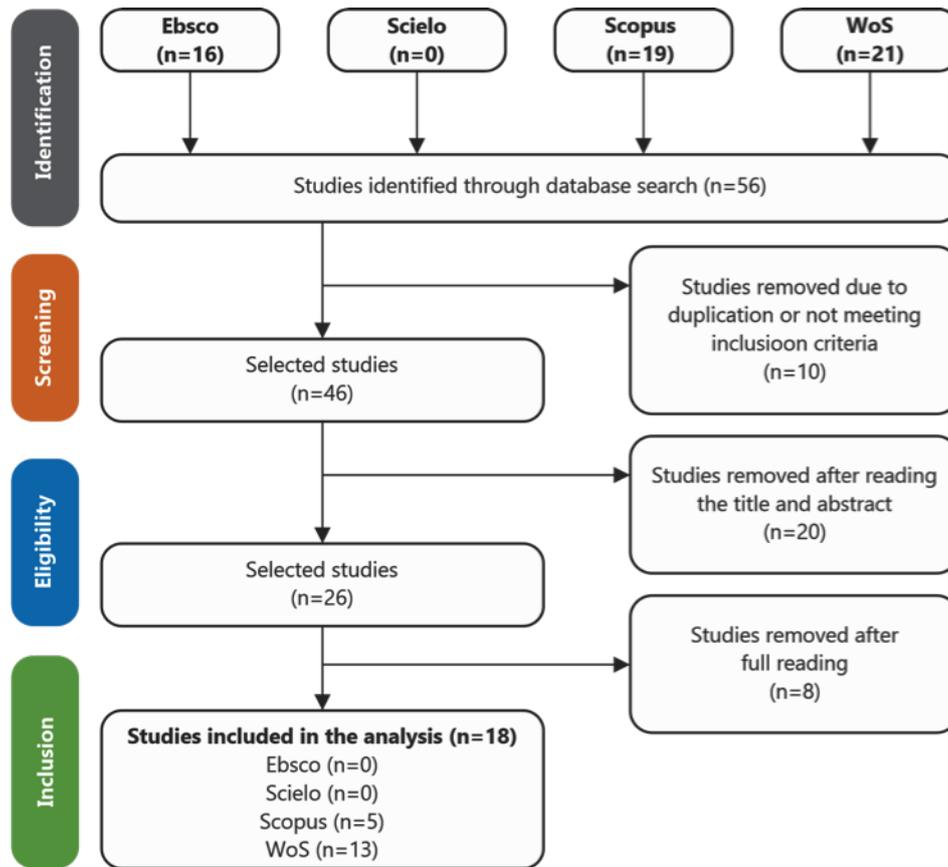
Source: Elaborated by the authors based on the Prisma protocol (Page et al., 2021).

This work's final portfolio consists of 18 articles, which we analyzed using the inductive thematic analysis technique at a semantic level, as Braun and Clarke (2006) suggested. This technique aims to uncover meaning patterns with detailed descriptions of some data aspects. Since the articles are scientific, we opted for a semantic-level analysis, focusing on the data's explicit meanings (Braun & Clarke, 2006). We present the results in the following section.

4. RESULTS

During data analysis, similar and related codes were grouped into potential categories, from which six themes emerged: three-dimensional action, meta-governance, observation of basic requirements, restructuring of the organization, overcoming obstacles and exploring drivers. These themes were later grouped into two macro themes: roles of leaders and actions of leaders.

The others reviewed the codes and themes identified by the first author to identify errors or misinterpretations in the coding to ensure the reliability of the findings. Differences regarding interpretation were resolved by discussion and agreement. The thematic map resulting from the analysis is presented in Figure 2.
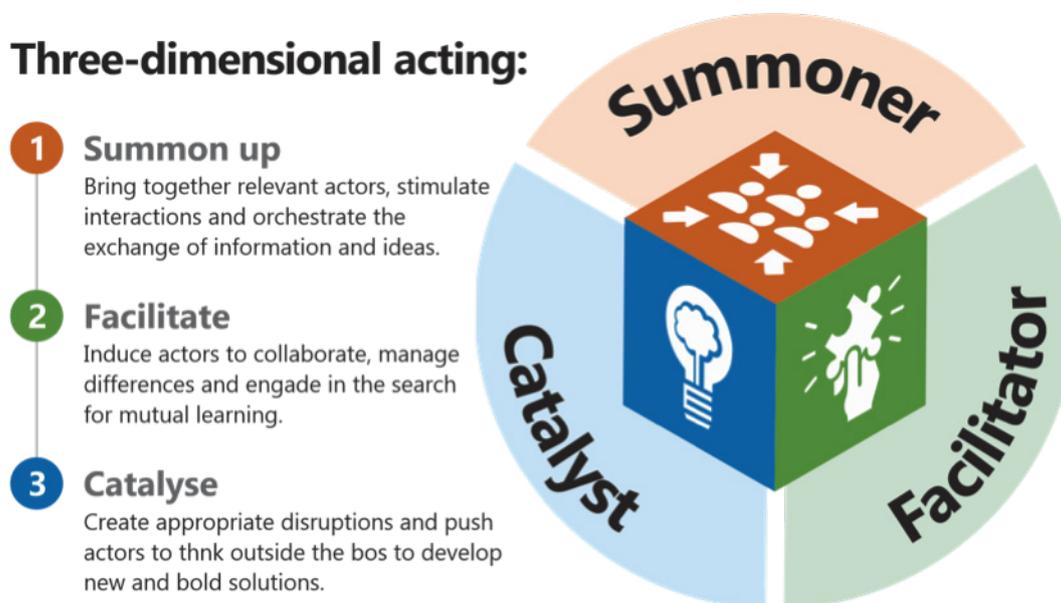
FIGURE 2   THEMATIC MAP
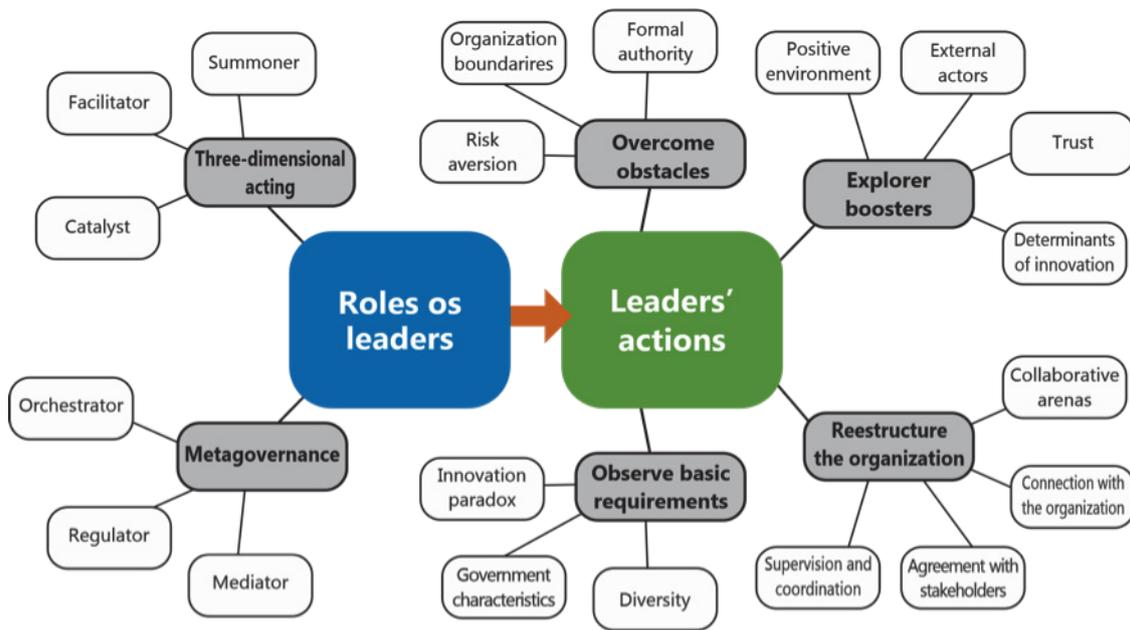
Source: Elaborated by the authors.

The macro themes highlight the roles of leaders in the collaborative innovation process in the public sector and the actions they must adopt to face the challenges inherent to the innovation process. Next, the elements (themes and subthemes) that make up the thematic map are described based on the macro themes.

4.1. Roles of leaders

The macro-theme "roles of leaders" comprises three-dimensional action and meta-governance. The first is related to the active role that public leaders need to adopt in collaborative innovation processes; that is, they must be able to skillfully combine their roles as conveners, facilitators and catalysts to ensure that suitable types of actors are brought together, encouraged to collaborate, explore and implement innovative solutions jointly (De Coninck et al., 2021; Hofstad & Torfing, 2017; Torfing, 2019; Wegrich, 2019). A three-dimensional cross-border collaboration is recommended. Figure 3 shows a graphical representation of this model.

FIGURE 3 **THREE-DIMENSIONAL LEADERSHIP ROLE IN THE COLLABORATIVE INNOVATION PROCESS**

Three-dimensional acting:

1 Summon up
Bring together relevant actors, stimulate interactions and orchestrate the exchange of information and ideas.

2 Facilitate
Induce actors to collaborate, manage differences and engage in the search for mutual learning.

3 Catalyse
Create appropriate disruptions and push actors to thnk outside the bos to develop new and bold solutions.

Source: Elaborated by the authors.

Leaders need to act as conveners, bringing together relevant actors, encouraging trust-based interaction and orchestrating the exchange of information, views and ideas. As facilitators, leaders need to induce actors to collaborate, constructively managing their differences and engaging them in mutual learning processes that take them beyond the status quo in search of innovative solutions. Ultimately, as catalysts, leaders are expected to create appropriate disruptions and lead actors to develop, implement, and disseminate new and bold solutions (Torfing, 2019).

The ability to mobilize relevant and affected parties, as well as citizens, depends on the willingness of public leaders to influence and convince the actors involved about the relevance of their political objectives and their willingness to negotiate and align these objectives in light of what others consider essential for society (Crosby & Bryson, 2010b; Sørensen et al., 2021); this demands political skills to stimulate productive dialogue between actors with different ideas, perspectives and interests, in addition to avoiding the trap of involving only public and private elites, failing to include ordinary citizens (Steen et al., 2018).

In a multi-actor governance context, it is essential to establish an authorization environment (Moore, 1997); this means that public leaders need to guarantee the necessary support to legitimize what comes out of co-creation processes, which requires a multifaceted and proactive effort to obtain formal or informal authorization, or both, of the objective, form, content and result of collaborative innovations. Support requires support from politicians, public managers, relevant actors, the general public and external stakeholders, involving top-down, bottom-up, outside-in and inside-out support, and external actors and internal staff under formal leadership (Sørensen et al., 2021).

To be successful in collaborative innovation, public leaders must recognize that a single entity or individual cannot achieve innovation and that collaboration is necessary to generate effective solutions to address public challenges (Torfing, 2019). By adopting this approach, public leaders can encourage participation and collaboration from a wide range of stakeholders, allowing solutions to be more inclusive and tailored to the specific needs of communities (Budryte et al., 2020). Moreover, they must be aware that they must give up the technocratic perceptions that only they have the professional expertise to make sensible decisions. Instead, they should act as meta-governors who orchestrate, regulate, and mediate collaborative arenas that absorb ideas and practices from a series of innovators (Hartley et al., 2013).

Meta-governance refers to a specific type of governance that aims to improve the functioning and capacity of relatively self-governing networks to produce governance solutions that increase the production of public value. The main challenge for meta-governors is to avoid over- or under-regulating governance networks (Sørensen & Torfing, 2017) and, in this way, ensure diversity that increases creativity, bringing all different types of knowledge, experiences, ideas, skills, information and other resources for innovation processes (Li, 2021).

Innovation networks are essentially self-organized, which implies that actors' interactions are not under the control of any individual actor and that several actors voluntarily share resources (Li, 2021). In collaborative innovation processes, leaders should not necessarily be public sector employees or politicians holding public office. The leadership role can also be collective, arise from various stakeholders, and not necessarily formal (Budryte et al., 2020).

In short, when faced with complex problems, public leaders must act as orchestrators of network interaction rather than relying solely on the ideas and transformative capacity of the organization itself. They must be mediators working with and through relevant and affected actors who hold important innovation assets such as experience, ideas, creativity, courage, authority and legitimacy (Crosby et al., 2017). Knowing some fundamental aspects of the collaborative innovation process in the public sector can help leaders who wish to follow this path.

4.2. Leaders' actions

The macro theme "leaders' actions" comprises four themes: observing basic requirements, restructuring the organization, overcoming obstacles and exploring drivers. The basic requirements involve the need for leaders to observe the paradox of innovation, diversity and particularities of the public sector.

First, they need to be aware of the innovation paradox. Regardless of its forms and sources, public innovation is strongly inspired by the expectation that innovative solutions will outperform solutions and offer new and better ways of doing things at the same or lower costs than before (Hofstad & Torfing, 2017). However, the innovation will not necessarily achieve the desired results or be implemented successfully. It is difficult to predict their consequences (Budryte et al., 2020), as many fail or do not achieve the intended results (Sørensen & Torfing, 2017).

This paradoxical concept is accentuated in the public sector since, at the same time, innovation is seen as a precondition for providing public services to citizens. Innovation requires responsibility and risk-taking on the part of institutions and public servants. It turns out that these factors break

with the traditional roles of public service, intrinsically linked to the lack of competition and the prevalence of centralized control, bureaucracy and institutional inertia (Budryte et al., 2020; Hofstad & Torfing, 2017). Awareness of this paradox is essential so the leader can define the best approach in his institution.

Collaborative innovation requires a diversity of actors who have essential innovation assets, such as direct experience with the problem or challenge at hand, specialized knowledge, capacity for creative thinking, courage to experiment, and tolerance for complexity (Lam & Li, 2018; Sørensen & Torfing, 2017). Diversity helps the public leader avoid "tunnel vision" and improve creative problem-solving, while dense interaction over a long period helps promote mutual trust and understanding, avoiding destructive conflicts that can block the innovation process (Li, 2021; Sørensen & Torfing, 2017).

The third subtheme of the basic requirements concerns the particularities of the public sector, which need to be taken into consideration by leaders, together with structuring actions which allow interaction with and between external actors. Thus, institutional designs need to be adapted to the behavior of public sector organizations that wish to foster the process of collaborative innovation, even though this cross-border opening can trigger internal reactions, territorial self-protection mechanisms, specialized silos and conflicts of competences (Wegrich, 2019).

The second theme of the leaders' actions is organizational restructuring, whose subthemes emerged as collaborative arenas, agreement with interested parties, connection with the organization, and focus on coordination and supervision. It is worth noting that attempts to innovate in the public sector, which do not include changing rigid structures, processes and behaviors, will probably not have the desired effect (Diamond & Vangen, 2017).

Innovation transforms current practices, requiring new institutional infrastructure to accommodate changing situations and facilitate the inclusion of relevant stakeholders (Li, 2021). For public innovation to become a permanent and systematic effort, it is essential to institutionalize arenas where collaborative innovation can occur (Sørensen & Torfing, 2017).

The institutional design of collaborative arenas in the public sector can vary according to the problem in question and the range of actors involved in the initiative (Hartley et al., 2013). In general, this analysis focuses on fundamental questions such as who should participate, where, how and when, as well as examining how institutional rules, norms, procedures and routines determine the tasks, membership, mandate, form and responsibility of partners involved (Hofstad & Torfing, 2017; Torfing, 2019).

Collaborative innovation brings together a range of public and private sector stakeholders, as well as users and citizens themselves, in interactive arenas that facilitate the cross-fertilization of ideas, mutual and transformative learning, and the development of joint ownership of new solutions (Cavalcante & Cunha, 2017; Hartley et al., 2013). Thus, the success of cross-border collaboration in solving complex problems depends on creating procedures that ensure agreement with stakeholders on the nature of the problem, help overcome power imbalances, and enable joint tracking of inputs, outputs, and results (Hofstad & Torfing, 2017).

However, a careful balance is needed to allow for adequate flexibility so that the initiative flourishes and simultaneously maintains a connection with the existing organization (De Coninck et al., 2021). Implementing organizational rearrangements that distance the public institution from

its constitutional mandate, even if they result in collaborative innovations, would distort the reason for that public organization's existence.

Finally, leaders need to note that when rethinking institutional and organizational design, they must reflect on governance and its mechanisms in a broader sense, focusing on the supervision and systemic coordination of everything (Barandiaran & Luna, 2018). Promoting the organization's rearrangement to foster collaborative innovation is a prerequisite for leaders to face the obstacles that will arise along the way.

Overcoming obstacles is the third theme that makes up leaders' actions, consisting of three subthemes: organization boundaries, formal authority and risk aversion culture. The first obstacle commonly identified in the literature is related to the organization's boundaries. Public organizations often employ strategies that consider innovation a typically internal activity and position its locus within the organization (Torfing, 2019).

Collaborative innovation, however, is rarely the result of the work of a single organization, as it requires the inclusion and collaboration of a diverse range of public and private actors (Sørensen & Torfing, 2018). Therefore, the leader of the public organization needs to obtain internal support to prevent public innovation from being seen as something peripheral, which reduces prioritization, hinders access to the necessary resources and, consequently, prevents the allocation of sufficient time (De Coninck et al., 2021).

The second subtheme regarding obstacles is the need for public leaders to observe some detachment from the formal authority they usually exercise in their organizations. In collaborative innovation creation processes, the leader may not necessarily be formal; that is, it may emerge among interested parties, even if they are not part of the structure of the catalyzing public organization (Budryte et al., 2020). The integrative review by De Coninck et al. (2021) highlights that the fear of losing control of the process is an important obstacle to the emergence of collaborative innovations.

Finally, the culture of risk aversion is one of the most common obstacles in the studies analyzed (De Coninck et al., 2021; Maia et al., 2021; Sørensen & Torfing, 2018). Public organizations are organized as bureaucracies, so they face barriers such as hierarchical control and rule-based decision-making, risk-averse political leaders, and regulation characterized by thick layers of formal rules and rights (Sørensen & Torfing, 2018). It is up to leaders to recognize obstacles and find ways to avoid them. To go beyond this, however, they can explore elements that facilitate the collaborative innovation process.

The thematic analysis allowed us to identify a fourth theme that makes up the macro-theme "leaders' actions": exploring the drivers of public innovation. This theme comprises four subthemes: determinants of innovation, positive environment, external actors and trust.

Some determinants of innovation are specific to the public sector, such as the need for political leaders to satisfy popular demands, relatively easy access to new scientific knowledge, a highly educated workforce, and budgets large enough to finance innovation and absorb eventual costs of failure (Hartley et al., 2013). Despite recognizing the role of such factors, more recent research suggests that collaboration is a superior driver for public innovation (Sørensen & Torfing, 2017). The literature suggests public leaders should invest in the collaborative process regardless of other determinants.

As for the positive environment, people who work in the public sector can be motivated for several reasons besides financial gain, such as solving complex problems; the creation of a new public

policy, idea or rationality; the desire for personal or professional growth; and both personal and organizational reputation (Hartley et al., 2013). Job satisfaction is strongly affected by leadership in the organization and makes innovative behavior more likely. Therefore, a positive work environment tends to contribute to the engagement of public servants in collaborative innovation (Dijck & Steen, 2021) and should be encouraged by public leaders.

However, public leadership encounters the main driver of collaborative innovation beyond the institution's walls: the cooperation of multiple external actors. Leaders have the responsibility to promote the participation of various stakeholders, from deepening the understanding of the problem to be addressed to design and implementation, in addition to ensuring support and commitment to the problem and innovation (Cavalcante & Cunha, 2017; Hartley et al., 2013). By involving external knowledge and other public and non-public actors in innovation processes, public organizations are better positioned to face significant challenges and solve problems of general interest to the population (De Coninck et al., 2021).

The fourth subtheme of the "explore drivers" theme is trust. Because collaborative innovation is based on the willingness and ability of a diverse group of actors to engage in dialogue, it is up to leaders to clarify expectations for working together and emphasize the importance of building trust. Therefore, there must be recognition that trust may be low when individuals who do not work together must act in groups in new or different ways, crossing organizational boundaries (Diamond & Vangen, 2017).

With a focus on increasing trust, it is necessary to pay attention to the processes of creating and sharing knowledge, vital for the effective development of innovations (Budryte et al., 2020). Trust-building requires enabling the participants to advocate for the process, which involves having competent and dedicated leaders who can facilitate collaboration (Diamond & Vangen, 2017).

4.3. In addition to papers and shares

The integrative review made it possible to identify the leading roles and possible actions that, according to research, leaders adopt in collaborative innovation processes in the public sector. In addition to the roles and actions, it was also possible to verify that some of the authors analyzed, in their discussions, introduced leadership theories that can contribute to a better understanding of the phenomenon of collaborative innovation. Box 1 presents the leadership theories cited in the articles that made up the portfolio.

BOX 1 LEADERSHIP THEORIES CITED IN THE ARTICLES ANALYZED

Theories	Authors
Adaptive leadership	Sørensen and Torfing (2018)
Collaborative leadership	Diamond and Vangen (2017); Hofstad and Torfing (2017)
Distributed leadership	Crosby et al. (2017); Hartley et al. (2013); Sørensen and Torfing (2018)
Entrepreneurial leadership	Hartley et al. (2013); Sørensen and Torfing (2017)
Strategic leadership	Hofstad and Torfing (2017)
Horizontal leadership	Sørensen and Torfing (2018)
Integrative leadership	Crosby et al. (2017); Hofstad and Torfing (2017); Sørensen and Torfing (2018)
Post-transformational leadership	Crosby et al. (2017); Hartley et al. (2013)
Pragmatic leadership	Sørensen and Torfing (2018)
Transformational leadership	Hartley et al. (2013)

Source: Elaborated by the authors.

Although discussion of these theories is beyond the scope of this article, some considerations are essential. Although transformational leadership has been a source of inspiration for academics involved in studies of social innovation and collaborative innovation Crosby et al. (2017), Dijck and Steen (2021), as well as Hartley et al. (2013), propose a shift in focus towards post-transformational thinking, more suited to the complexity of collaborative innovation.

A synthetic look at Box 1 allows us to identify that the theories most cited as suitable for contributing to collaborative innovation processes are distributed leadership and integrative leadership. When analyzing Danish cases of collaborative innovation, Sørensen and Torfing (2018) produce a synthesis that corroborates our findings. According to them, there is an increasing concern about how to lead and manage public innovation through adaptive leadership based on coalition building (Heifetz et al., 2009) and pragmatic leadership based on design thinking (Bason, 2014). Recent leadership theories have also addressed how to lead and manage collaborative processes through distributive (Pearce & Conger, 2003), horizontal (Denis et al., 2012) and integrative (Crosby & Bryson, 2010a) leadership.

6. CONCLUSIONS

This research sought to contribute to developing knowledge about the roles and actions of leaders in collaborative innovation processes in the public sector. As a result of the integrative literature review, generating a thematic map that indicates the leading roles and actions to be adopted by public leaders who wish to develop collaborative innovations stands out.

From the thematic analysis, two roles emerged that leaders must assume in collaborative innovation processes in the public sector – three-dimensional action and meta-governance – in addition to four actions that public leaders must adopt to face the challenges inherent to collaborative innovation processes in the sector: overcoming obstacles, explore drivers, restructure the organization and observe the basic requirements.

Another significant result shows that distributed and integrative leadership theories are the most cited as capable of providing elements to support leaders in collaborative innovation processes in the public sector. Traditional forms of leadership based on command and control do not seem suitable for collaborative work arrangements involving multiple actors. Because collaborative innovation is essentially distributive, horizontal, and adaptive (Torfing, 2019), public leaders must focus more on coordination and oversight to connect a network with diverse stakeholder segments (Crosby & Bryson, 2010b).

To face today's complex problems, public leaders must act as meta-governors and exercise a three-dimensional role in this process, convening interested parties, facilitating the work of this collaborative network and catalyzing the generation and implementation of innovative solutions. Only in this way will it be possible to access innovation assets present beyond the organization's borders, stimulate interaction, and exchange knowledge and resources to generate public value.

The analysis suggests that the mapped roles and actions are fundamental for leaders to assume a direct role in supporting and guiding the collaborative innovation process. This way, they can improve the drivers of collaborative innovation and overcome or mitigate the obstacles that will arise. Some questions, however, remain unanswered. For example, how can public leaders ensure that innovation becomes systemic and permanent and does not become a mere accidental or episodic result?

Furthermore, it has already been demonstrated that politicians directly affect collaborative innovation processes in the public sector, with positive effects, such as budget prioritization, or negative ones, such as the loss of neutrality (Van Dijck & Steen, 2022). Thus, another critical question is whether three-dimensional action can be exercised by career civil servants or only political leaders would be able to exercise it effectively.

Another question that arises, considering that the literature indicates that public leadership must be distributive, is whether three-dimensional action can be shared between political leaders, whose role seems to be essential for the construction of coalitions (convocation), and career civil servants, which could focus on facilitating and provoking catalysis in the collaborative network. In the same vein, since leadership capacity must be expanded beyond the boundaries of the organization (McCauley & Velsor, 2004), how can public organizations act to develop the leadership capabilities of collectives – for example, work groups, teams and communities?

More studies are needed to help understand these issues and determine whether the concepts highlighted in international literature are fully applicable or adaptable to developing countries, as is the case in Brazil. In conclusion, the importance of the work to support the development of studies related to leadership in the process of collaborative innovation in the public sector is highlighted.

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DATA AVAILABILITY

The entire dataset supporting the results of this study is available upon request to the corresponding author, Waldemir Paulino Paschoiotto (paschoiottow@gmail.com). The dataset is not publicly available due to the formation of the doctoral thesis portfolio in preparation.