

Innovation and Modernization as Vectors of Sustainability in Public Service: An Integrative Review

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Abstract: Innovation and modernization in the public sector have increasingly been associated with the pursuit of administrative, fiscal, and institutional sustainability, particularly in contexts marked by resource constraints, social pressure, and regulatory complexity. Recent literature highlights that digital technologies, workflow reorganization, and intersectoral coordination have been employed as strategies to address these structural challenges. However, a gap remains between isolated technological initiatives and the development of enduring institutional capacities, suggesting that innovation alone does not ensure organizational sustainability. In this context, innovation is no longer seen as an end in itself but as a conditional vector for institutional transformation and the creation of public value. This study aimed to analyze how innovation and modernization have been understood and operationalized as vectors of sustainability in the public sector. To this end, an integrative literature review was conducted, focusing on scientific and technical-academic publications from 2020 to 2025, retrieved from Google Scholar. The empirical and thematic delimitation was structured around three analytical axes: (i) digital innovation, automation, and efficiency in the public sector; (ii) administrative, fiscal, and institutional sustainability; and (iii) governance, networked innovation, and the sustainability of public modernization. The analysis adopted an institutionalist theoretical lens, considering innovation and sustainability as processes mediated by organizational structures, norms, and historical trajectories. The final sample comprised 24 documents, including scientific articles and seminar papers. Findings indicate that while technologies such as Robotic Process Automation (RPA) and workflow automation generate significant operational gains, their effectiveness depends on institutional arrangements that support learning, governance, and continuity. The study also found that public sector sustainability requires integration between administrative innovation, fiscal instruments, and normative coherence, under the risk of symbolic compliance and weak enforcement. Finally, the literature underscores that sustainable modernization relies on the State's capacity to orchestrate collaborative networks and promote adaptive governance capable of aligning actors, interests, and public values around structural missions.

Keywords: Public Sector; Innovation; Sustainability; Institutional Capacity; Modernization; Governance.

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I. INTRODUCTION

In recent decades, the pursuit of greater efficiency and legitimacy in the public sector has driven simultaneous processes of innovation and institutional modernization, often associated with objectives of administrative, fiscal, and socio-environmental sustainability. Recent studies indicate that the adoption of digital technologies, reorganization of flows, and intersectoral articulation are strategies increasingly used to address structural challenges, such as resource scarcity, social pressures, and regulatory complexity (Barbosa, 2025; Silva & Souza, 2025). However, authors such as Balbe (2025) and Ferreira (2024) warn that modernization only produces sustainable results when integrated with governance models capable of aligning transparency, risk management, and public value. In this scenario, innovation is understood not as an end in itself, but as a conditional vector for institutional transformation and the construction of more resilient and inclusive public responses.

Despite the expansion of the discourse on digital transformation and innovation in the public sector, a gap is observed between punctual technological initiatives and the construction of lasting institutional capacities. In many cases, modernization is treated as an end in itself, disconnected from organizational sustainability strategies and governance arrangements that ensure the coherence and continuity of public policies. In this context, it becomes essential to understand to what extent innovation and modernization have been mobilized as real vectors of sustainability and not just as efficiency rhetoric within public administration.

Given this scenario, the present study aims to analyze how innovation and modernization have been understood and operationalized as vectors of sustainability in the public sector. To this end, an integrative literature review will be carried out, with an emphasis on empirical and theoretical evidence produced between 2020 and 2025.

II. LITERATURE REVIEW

In recent decades, public administration has faced increasing challenges related to efficiency, responsiveness, and the ability to promote sustainable development in contexts marked by fiscal constraints, political volatility, and social pressure. In this scenario, innovation has come to occupy a central role in the discourse and practices of public management. However, the literature has moved away from the conception of innovation as the simple adoption of technologies, proposing to understand it as institutional transformation, which involves changes in routines, decision-making processes, and coordination mechanisms. According to Silva and Souza, effective innovation requires organizational redesign, investment in internal capabilities, and intersectoral articulation (2025).

This broader conception of innovation is directly connected to the idea of modernization of the public sector. Modernization is not reduced to the digitization of services or the introduction of private management methods, but comprises a more complex process of institutional reorganization around new public values. Ferreira discusses how reform experiences based on external models often fail when they are not translated to local institutional conditions (2024). Similarly, Melati observes that organizational intelligence is a key component of sustainable modernization, as it requires articulation between technical knowledge, data governance, and institutional learning (2022).

Recent literature has also emphasized the relationship between innovation and sustainability, highlighting that the transition to more sustainable models of public management depends on the State's ability to incorporate environmental, social, and fiscal criteria into its practices. Pereira and Costa analyze how organizational sustainability requires stable governance mechanisms and budgetary integration, overcoming punctual approaches (2023). Barbosa shows that policies such as sustainable public procurement only produce concrete effects when supported by institutional capacities that sustain their execution over time (2025).

This complexity makes it clear that innovation and sustainability are not neutral or automatic phenomena, but processes highly mediated by institutions. Institutional theory contributes to understanding the limits and possibilities of these processes, showing how organizational norms, values, and routines condition the choices of public actors. DiMaggio and Powell highlight that institutional isomorphism, present in public organizations, can lead to the adoption of standardized solutions more due to environmental pressure than to real innovation capacity (1991). In the same vein, North argues that institutional trajectories generate patterns of stability that make organizational change slower and dependent on historical milestones (1990).

These elements are evident in Pinto's study, which analyzed conflicts between institutional logics at Inmetro and demonstrated how innovation can be blocked by normative structures that prioritize control and stability over adaptability (2022). Oliveira also identified that, even in contexts of high pressure for performance, inhibiting institutional factors—such as resistance to change, fragmentation of processes, and capacity deficits—limit the effects of modernization (2024). This evidence reinforces the importance of understanding innovation as an institutional phenomenon, strongly shaped by internal structures and organizational incentives.

In addition, public sustainability has been addressed in research that relates innovation and regulation. Ribeiro Filho, when examining the migration of public bodies to the free energy market, argues that sustainable decisions require

flexible regulatory structures and the building of internal decision-making capacities that balance autonomy and public responsibility (2025). This approach is complemented by SEM XXI, which highlights, from the agro-industrial sector, how the adoption of sustainable technologies and practices depends on institutional incentives and the strengthening of local innovation networks (2024).

In the debate on governance, Balbe proposes that the generation of public value requires governance that balances control, participation and openness to experimentation (2025). This implies that the state's capacity to innovate sustainably lies not only in the adoption of technologies, but in the institutional ability to organize networks, mediate interests and produce legitimate solutions. This point of view finds an echo in Mazzucato, who defends the State's role as a guiding agent for public missions that transcend the short term and are committed to structural transformation (2013). Kattel and Mazzucato emphasize that this performance requires dynamic capabilities, reflective structures, and constant alignment between means and ends (2018).

When modernization is considered as an institutional process and not just a managerial one, it becomes clear that the adoption of technological innovations, however sophisticated they may be, does not guarantee structural results if they are not integrated into institutional practices and public objectives. Modernization, therefore, involves the reconstruction of decision-making methods, the strengthening of accountability, and the expansion of the State's analytical and operational capacities. The absence of these elements compromises the sustainability of policies and transforms innovation into a mere instrument of symbolic legitimation, as Mahoney warns when discussing path dependence (2000) and Peci when analyzing the limits of public reforms in Brazil (2006).

Thus, contemporary studies indicate that innovation and sustainability in public administration are traversed by complex institutional dynamics, which require a critical reading of state capacities and the organizational conditions in which these agendas develop. Modernization, far from being an automatic path, needs to be understood as a social construction, normatively oriented and institutionally mediated. It is from this theoretical basis that this study is guided to analyze how innovation and modernization have been mobilized as vectors of sustainability in the Brazilian public sector.

III. MATERIALS AND METHODS

The construction of the theoretical framework followed a qualitative approach, grounded in narrative literature analysis and guided by an interpretative perspective. To organize the theoretical basis in a manner consistent with the object of investigation, the review was structured around three main thematic axes: (i) digital innovation, automation, and efficiency in the public sector; (ii) administrative, fiscal, and institutional sustainability; and (iii) governance, network innovation, and the sustainability of modernization.

The definition of these axes stemmed from a convenience analysis strategy, based on thematic recurrence and the relevance of the topics identified in the collected materials, especially in conjunction with the empirical findings described in the results. The bibliographic search was conducted using the Google Scholar platform, using combinations of the descriptors "innovation," "modernization," "sustainability," and "public sector." The adopted time frame was from 2020 to 2025, in order to ensure conceptual updating without abandoning classic authors indispensable to the theoretical support.

Academic publications and technical-scientific communications, such as journal articles, book chapters, and seminar papers, were included in the analysis, provided they were consistent with the established axes. Inclusion criteria considered thematic adherence, institutional relevance of the sources, and the capacity for theoretical contribution to understanding the investigated phenomenon.

In addition to the empirical and conceptual delimitation, this study adopted the institutionalist approach as its main theoretical lens, understanding that both innovation and sustainability in the public sector are phenomena mediated by rules, routines, and organizational structures. Adopting this perspective allowed for the interpretation of empirical data in light of analytical categories such as state capacities, path dependence, isomorphism, and institutional learning, articulating different dimensions of public modernization in democratic contexts.

At the end of the selection and analysis process, 24 documents—including scientific articles and seminar papers—were used, which supported both the formulation of the theoretical framework and the triangulation stage with the results.

IV. RESULTS AND DISCUSSION

The adoption of technologies such as Robotic Process Automation (RPA), rule-based systems, and workflow automation has stood out as a strategy to address the shortage of human resources and the need to maintain delivery standards in the public sector. The case of UFAM (Neto et al., 2024) reveals that, even in the face of staff reduction, process automation was able to increase productivity and reduce operational failures, a result that is widely consistent with international studies such as those by Lacity and Willcocks (2021), which associate digitization with increased operational capacity of the State.

This type of organizational response finds support in the institutionalist literature when it is recognized that technological innovations are not introduced in a vacuum, but in contexts regulated by norms, routines, and trajectories that are already consolidated. North (1990) argues that institutional changes are conditioned by historical patterns and that disruptions only take effect when accompanied by transformations in organizational arrangements. Automation, therefore, not only replaces human tasks—it reorganizes

power relations, redefines decision-making flows, and shifts responsibilities, aspects discussed by DiMaggio and Powell (1991) when analyzing the effects of institutional isomorphism.

In addition, authors such as Pinto (2022) demonstrate that automation processes face significant institutional obstacles when they collide with rigid bureaucratic structures and organizational cultures resistant to innovation. This aligns with the critique of Ranerup and Henriksen (2020), who point to the risks of algorithmic opacity and the shift of decision-making agency from employees to systems. Reinforcing this tension, Mergel et al. (2020) highlight that technological innovations fail when there is no adaptive governance or institutional learning to sustain them in the long term.

In contexts of low institutional maturity, such as the Brazilian one, the simple introduction of RPA and digital tools can reproduce old operational patterns under a new technical form, as Oliveira (2024) warns, pointing to the persistence of inefficient practices even after investments in modernization. The case of UFAM illustrates a successful experience, but the literature warns that positive results should not be interpreted as direct effects of technology, but rather as a reflection of an institutional arrangement capable of absorbing and internalizing innovations.

This distinction is fundamental to avoid functionalist readings of innovation in the public sector. The effectiveness of automation lies not only in the technical solution, but in the ability of public organizations to reshape their routines, incorporate new control standards, and align technologies with institutional values. As Kattel and Mazzucato (2018) reinforce, it is the articulation between innovation and the dynamic capabilities of the State that defines whether operational gains will be sustainable or limited to short-term responses.

➤ *Administrative, Fiscal, and Institutional Sustainability*

Recent literature has reinforced the idea that sustainability in the public sector should be understood in its broadest sense, encompassing not only the environmental dimension but also the administrative, fiscal, and institutional spheres. The findings presented indicate that the simple adoption of digital and green technologies only generates lasting results when articulated with consistent norms, metrics, and institutional structures, a perspective already defended by authors such as Pereira and Costa (2023), when addressing sustainability as a product of integrated governance and intersectoral management.

In the fiscal sphere, the study by Silva et al. (2024) points to the relevance of integrating administrative innovation and budgetary instruments, highlighting how the incorporation of cross-cutting agendas can reposition the budget as a strategic mechanism for public coordination. This movement reflects a change in the rationality of public management, approaching the vision defended by Mazzucato (2013), according to which the State needs to assume a proactive role in organizing public missions and aligning economic, social, and environmental policies.

The argument that innovation and sustainability are interdependent finds support in Barbosa (2025), who analyzes the role of sustainable public procurement and shows how its effectiveness depends on the existence of clear rules, control mechanisms, and an organizational culture committed to the long term. This perspective rejects the idea that innovation, by itself, promotes rationalization or fiscal responsibility, and approaches the institutionalist critique of technological determinism. Instead of focusing only on instruments, the focus shifts to organizational capabilities and the institutional frameworks that condition their application.

The risk of “symbolic conformity” described by Viana et al. (2025) when organizations adopt innovative practices only to respond to external pressures, without internalizing them, can be understood in the light of institutional theory. DiMaggio and Powell (1991) warn that normative isomorphism can lead public institutions to adopt certain practices in search of legitimacy, and not out of a real commitment to transformation. In this sense, innovation becomes an organizational ritual, devoid of structural effectiveness.

The phenomenon can also be interpreted through the concept of path dependence, discussed by Mahoney (2000), which demonstrates how institutional practices tend to reproduce themselves even in the face of incentives for change. This helps to understand why many sustainable initiatives in the Brazilian public sector have limited reach: they are implemented in institutional environments where routines, incentives, and accountability systems are still weak or contradictory.

By revisiting North's (1990) discussion, it is noted that institutional sustainability is not an immediate product of innovation, but depends on an organizational ecosystem capable of generating coherence between the means and ends of public action. The rationalization of spending and the inclusion of socio-environmental criteria in public decisions require both stable norms and state capacities for their operationalization, reinforcing the idea that sustainability is, above all, an institutionally mediated phenomenon.

➤ *Governance, Network Innovation, and the Sustainability of Public Modernization*

The results indicate that the sustainability of public modernization depends on governance models capable of articulating diverse actors, aligning interests, and generating coordinating capacity. The literature on open innovation and helix models (Triple, Quadruple, Quintuple) supports this idea by pointing out that more effective and lasting public solutions emerge when government, universities, businesses, civil society, and the environment operate in a network. This understanding is in line with the studies of Nascimento et al. (2025), which highlight network innovation as a strategic vector for institutional transformation.

This dynamic of interorganizational articulation can be interpreted from the perspective of institutionalism, especially in approaches that recognize the State as an actor with its own agency. Mazzucato (2013) argues that, instead of just being a

regulator or funder, the State should be seen as an orchestrator of public missions. This role requires the development of coordination capacities, normative flexibility, and instruments that allow for horizontal articulations, such as innovation labs and collaborative digital platforms, discussed by Mergel et al. (2020) and Saldanha et al. (2022).

However, the literature warns that institutional openness, without a robust governance model, can lead to decisional fragmentation, loss of strategic control, and weak accountability. Balbe (2025) highlights that the creation of public value lies not only in the multiplicity of voices involved, but also in the existence of mechanisms that guarantee coherence and integrity to the process. This requires adaptive governance and institutional mediation capacity, elements that are not always present in peripheral public contexts.

The role of universities in this ecosystem, for example, is frequently strained by conflicts between academic autonomy, pressure for economic results, and political instability. Studies such as those by Matos et al. (2025) show that, despite acting as innovation hubs, public universities face difficulties in sustaining long-term partnerships and projects without stable institutional support. This difficulty reflects the absence of institutional structures capable of integrating research, human capital development, and public policies in a systemic logic.

In light of the new institutionalism, it can be stated that network innovation only generates transformative effects when there is an institutional infrastructure that favors learning, mutual trust, and shared accountability. Pinto (2022) highlights that, in the absence of alignment between institutional logics, even well-intentioned initiatives tend to fail or be captured. Therefore, network governance cannot be seen as the antithesis of public control, but as an alternative model that requires even more regulatory and institutional capacity.

By recovering the notion of dynamic capabilities proposed by Kattel and Mazzucato (2018), it becomes clear that the sustainability of state modernization depends on the articulation between technological innovation, cooperation networks, and reflexive governance structures. Institutional openness, by itself, is not enough; the State needs to develop mechanisms to transform this openness into lasting processes, legitimized and guided by public values.

V. CONCLUSIONS

This study aimed to analyze how innovation and modernization have been understood and operationalized as vectors of sustainability in the public sector. Based on an integrative literature review, three central axes of analysis were systematized: digital innovation and automation; administrative, fiscal, and institutional sustainability; and network governance focused on sustainable modernization. The institutionalist theoretical framework allowed us to understand these processes as phenomena mediated by normative structures, state capacities, and organizational

trajectories, overcoming purely technical readings of public transformation.

In the first axis, we sought to understand how digital innovation and automation have been used as responses to the operational capacity crisis in the public sector. The analysis showed that tools such as RPA and process automation have effectively contributed to increasing productivity and mitigating staff shortages, especially in administrative areas. However, the effects of these innovations are only consolidated in institutional contexts with adaptive governance and organizational learning capacity, being ineffective when implemented as isolated solutions, disconnected from stable institutional arrangements. In the second axis, we analyzed the extent to which administrative, fiscal, and institutional sustainability can be strengthened through innovation. The results show that sustainability is not possible without integration between technological innovation, budgetary planning, and coherent regulatory mechanisms. The literature points out that sustainable initiatives require cross-cutting governance and consolidated state capacities, and approaches that are limited to the adoption of technologies or the replication of models are insufficient. Sustainability, in this case, is built institutionally, based on coherence between means and ends, as demonstrated by authors who discuss path dependence and isomorphism in the public sector.

In the third axis, we sought to understand the role of network governance as a structuring element of sustainable modernization. The evidence analyzed indicates that the articulation between the State, universities, companies, and civil society, when supported by robust collaborative models, can generate public innovation with greater legitimacy and scalability. However, the absence of solid institutional structures transforms network governance into a risk of decisional fragmentation, loss of control, and low accountability. Collaborative governance, therefore, does not replace the role of the State, but requires its coordinating presence, equipped with regulatory instruments and dynamic capabilities.

From this analysis, it is possible to affirm that innovation, modernization, and sustainability in the public sector should not be understood as dissociated or automatic processes, but as interdependent dimensions, mediated by institutions. The results reinforce the centrality of the State not only as an executor of policies, but as an agent capable of articulating public missions, transforming organizational capacities, and guaranteeing the continuity of actions. The sustainability of modernization, therefore, requires more than technological innovation: it requires institutional coherence, adaptive governance, and commitment to public values.

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