

**UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
BUSINESS SCHOOL
GRADUATE PROGRAM IN BUSINESS ADMINISTRATION**

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**BRINGING INSTITUTIONAL ORDERS BACK IN: AN EXPLORATORY
PROPOSITION ON THE ROLE OF TECHNOLOGY IN ORGANIZATIONAL
TRANSFORMATION**

Porto Alegre

2022

CIP - Catalogação na Publicação

Lacerda, Alana
BRINGING INSTITUTIONAL ORDERS BACK IN: AN
EXPLORATORY PROPOSITION ON THE ROLE OF TECHNOLOGY IN
ORGANIZATIONAL TRANSFORMATION / Alana Lacerda. --
2022.
111 f.
Orientador: Fernando Lopes.

Tese (Doutorado) -- Universidade Federal do Rio
Grande do Sul, Escola de Administração, Programa de
Pós-Graduação em Administração, Porto Alegre, BR-RS,
2022.

1. Lógica institucional. 2. Administração Pública.
3. Tecnologia. 4. Blockchain. I. Lopes, Fernando,
orient. II. Título.

Alana Bauer Lacerda

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TRANSFORMATION**

Thesis proposal presented as a partial
requirement for obtaining the Doctoral Degree
at the Graduate Program in Business
Administration of Universidade Federal do Rio
Grande do Sul.

Supervisor: Prof. Dr. Fernando Dias Lopes

Porto Alegre

2022

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
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A banca examinadora, abaixo assinada, aprova a Tese de doutorado intitulada **BRINGING INSTITUTIONAL ORDERS BACK IN: AN EXPLORATORY PROPOSITION ON THE ROLE OF TECHNOLOGY IN ORGANIZATIONAL TRANSFORMATION**, elaborada como requisito parcial para a obtenção do grau de Doutora em Administração no Programa de Pós-Graduação da Universidade Federal do Rio Grande do Sul.

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Porto Alegre, 25 de agosto de 2022.

ACKNOWLEDGEMENTS

To the Federal University of Rio Grande do Sul, the institution in which, with pride, I built my academic career.

To my family, fundamental in each of my achievements.

To my supervisor, Prof. Dr. Fernando Dias Lopes, for the partnership and patience with which he led this work.

To the State Department of Traffic of Rio Grande do Sul, in the figure of all directors, for their encouragement, recognition and availability.

To my co-workers, for the years of friendship and for covering my absence whenever necessary.

To the followers of @a.doutoranda, the Instagram profile I created during my PhD period to talk about academic life. The contribution of each of you to this thesis is enormous.

To Plataforma A, the company I created as a result of this PhD path.

To the canine presence in every working day: Mina, Pepper, Gaia, Vicky (in memorian), Charlotte and Dora.

And to myself. This thesis represents my overcoming and the affirmation of my ability to persist and reinvent myself.

La tecnica, nella sua espressione
moderna, diventa quell'orizzonte
ultimo a partire dal quale si
dischiudono tutti i campi d'esperienza.

Umberto Galimberti

RESUMO

Apesar de a tecnologia estar hoje presente em grande parte dos nossos processos, moldando identidades e construindo estruturas organizacionais, grande parte das pesquisas é voltada a analisar como os atores organizacionais as manipulam, e não se debruçam sobre o significado dessas interações. A presente tese tem como objetivo analisar o papel da tecnologia como ordem institucional na administração pública e as transformações sociais decorrentes de novos arranjos organizacionais. Para que isso seja possível, há lacunas na literatura que precisam ser investigadas. A primeira lacuna surgiu de outros estudos que utilizam a perspectiva da lógica institucional para observar fenômenos organizacionais. Embora a interação das lógicas institucionais seja essencial para explicar os processos de mudança organizacional, as ordens institucionais e as substâncias que compõem essas lógicas geralmente são omitidas do debate, tornando a perspectiva suscetível a críticas. A segunda lacuna refere-se à administração pública e à necessidade de consolidação das ordens institucionais que deram origem às lógicas norteadoras das abordagens administrativas. Por fim, a terceira lacuna diz respeito às implicações sociais da tecnologia na administração pública. Para preencher essas lacunas, desenvolvemos esta tese em três diferentes estudos, todos relacionados pelo mesmo fio condutor. No primeiro estudo, restabelecemos a discussão sobre ordens institucionais e avaliamos teoricamente a pertinência da tecnologia enquanto ordem institucional, propondo um avanço sobre a perspectiva já consolidada. No segundo estudo, nos debruçamos sobre pesquisas já realizadas baseadas na lógica institucional e que tratavam da tecnologia na administração pública. A partir da revisão sistemática narrativa desse estudo, buscamos estabelecer a sistematização das abordagens da administração pública com as respectivas ordens institucionais de onde se originam, o que permite a esta e futuras pesquisas estabelecê-las como recurso analítico. O estudo nos permitiu compreender o papel institucional da tecnologia em tendências pós-gerenciais e iniciativas em e-government. Por fim, o terceiro paper buscou a validação empírica das fases teóricas do estudo, analisando a interação das lógicas no serviço público a partir do estudo de caso do desenvolvimento de um aplicativo baseado na tecnologia blockchain. A pesquisa nos proporcionou a observação de fenômenos como a hibridização e leapfrogging, que significa a implantação de estrutura tecnológica de ponta onde antes não havia nenhuma estrutura. Em ambos os casos, explicamos os fatores que permitiram a estruturação desses fenômenos.

Palavras-chave: lógica institucional, administração pública, tecnologia, blockchain

ABSTRACT

Although technology is now present in many of our processes, shaping identities and building organizational structures, much of the research is focused on analyzing how organizational actors manipulate them, and not focusing on the meaning of these interactions. The present thesis aims to analyze the role of technology as an institutional order in public administration and the social transformations arising from new organizational arrangements. For this to be possible, there are gaps in the literature that need to be investigated. The first gap emerged from other studies that use the perspective of institutional logic to observe organizational phenomena. Although the interplay of institutional logics is essential to explain organizational change processes, institutional orders and substances that make up these logics, are generally omitted from the debate, making the perspective susceptible to criticism. The second gap refers to public administration and the need to consolidate the institutional orders that gave rise to the logics guiding administrative approaches. Furthermore, the third gap concerns the social implications of technology in public administration. To fill these gaps, we developed this thesis in three different studies, all related by the same thread. In the first study, we re-established the discussion on institutional orders and theoretically evaluated the relevance of technology as an institutional order, proposing an advance on the already consolidated perspective. In the second study, we focused on research already carried out based on institutional logic and that dealt with technology in public administration. From the narrative systematic review of this study, we seek to establish the systematization of public administration approaches with the respective institutional orders from which they originate, which allows this and future research to establish them as an analytical resource. The study allowed us to understand the institutional role of technology in post-managerial trends and e-government initiatives. Finally, the third paper sought the empirical validation of the theoretical phases of the study, analyzing the interaction of logics in the public service from the case study of the development of an application based on blockchain technology. The research allowed us to observe phenomena such as hybridization and leapfrogging, which means the implantation of a state-of-the-art technological structure where there was no structure before. In both cases, we explained the factors that allowed the structuring of these phenomena.

Keywords: institutional logic, public administration, technology, blockchain

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1 INTRODUCTION

Administrative reforms in the public sector have been studied for many decades. The functioning of the public sector is a sum of elements that come from civil society, politics, the private sector, management, the international scenario, and the intertwining of all these elements (Pollitt & Bouckaert, 2011). According to the authors, within the management pillar, administrative reforms sought to establish technical rules and procedures within departments, historically in a predominantly local way and gaining a more robust form of movement from the 1970s onwards, when public administration came to be also seen from an economic point of view.

The agenda brought by the New Public Management - NPM, in particular, has English origins and gained strength, especially from the publication of the book "Reinventing Government" by Osborne and Gaebler in 1992. The NPM came to the fore seeking to overcome the bureaucratic-Weberian model of public administration, and was soon recognized as a durable and consistent proposal (Dunleavy & Hood, 1994). Instead of respecting the hierarchy, uniform rules, and procedures of bureaucratic public administration, the reform proposed by the NPM aimed to reduce the differences between the public and private sectors, emulating market practices. In this sense, the NPM pointed to reducing the size of public agencies in search of economic efficiency and the emulation of private-sector practices, with performance indicators, budget transparency, competition between agencies (Dunleavy & Hood, 1994), the vision of the user of public services as a consumer and skepticism about the roles appointed to exercise power (Ferlie, Fitzgerald & Pettigrew, 1996).

For some decades, New Public Management influenced public sector practices worldwide, but there was no complete break from the previous scenario. Bureaucracy continued to be relevant in processes linked to essential government functions (Dunleavy & Hood, 1994). Criticism of the NPM also points to substantial differences in politics and culture between countries as the cause of not completely breaking away from bureaucratic administration, which was not considered when formulating a set of practices that theoretically would easily transfer from one government to another (Mathiasen, 1999).

In many studies on public administration, new practices were observed overlapping old ones, establishing the coexistence, in different models, of different administrative approaches. Hybridization, complexity (Hwang, 2018) (Christensen & Lægreid, 2011), fragmentation, and management of contradictory demands (Fossestøl et al., 2015) have become phenomena debated in the context of public organizations.

In this sense, as a lens to study phenomena related to organizational change, we reckon the perspective of institutional logic as providing sufficient theoretical and methodological elements to develop our interpretation. Institutional logics are the “socially constructed patterns of cultural symbols and material practices, assumptions, values, beliefs and rules by which individuals and organizations produce and reproduce their material subsistence, organize time and space, and provide meaning for their reality” (Thornton & Ocasio, 1999). The logics are derived from the institutional orders that guide society, initially defined by Friedland and Alford (1991) and later refined into ideal types by Thornton and Ocasio with the construction of an inter-institutional system. The inter-institutional system identifies and distinguishes the seven institutional orders that guide Western society: market, state, family, religion, corporate, profession and community (Thornton et al., 2012).

As two approaches with a well-defined set of rules, vocabulary, and procedures, researchers usually clearly identify the origin of the bureaucratic public administration and New Public Management approaches as generated from the state and market orders. Studies on public administration provide an interesting overview of the dynamics of institutional logics, especially concerning hybridization, which is "the ability of organizations to incorporate elements from contradictory institutional logics over time, and thus hybridization as the organizational processes through which this incorporation is managed" (Fossetøl et al., 2015, p. 1).

Added to the complexity of public organizations was the beginning of post-management trends in public administration. Having as a landmark the Open Government Initiative in the government of Barack Obama, post-managerial trends began to be discussed in the literature as New Public Service (Denhardt & Denhardt, 2000), New Public Governance (Osborne, 2006), and other nomenclatures. A striking feature of post-management trends is at their root in the "organizational sociology and network theory and acknowledges the increasingly fragmented and uncertain nature of public management in the twenty-first century" (Osborne, 2006, p.381). This origin makes post-managerial approaches tend to suggest public organizations that are less dominated by questions of authority and that place greater value on the needs of internal and external audiences.

There is also a strong relationship between post-managerial trends and the concept of e-government. Aligned with a view of approximation between government and citizens, electronic practices in government seek to use information and communication technologies, primarily web-based, seeking to increase the quality of service and provide more significant opportunities for citizens to participate in democratic institutions and processes (Fang, 2002).

E-government has come to be in the background of the discussion of new approaches to public governance due to the irreversible adoption of technology by citizens. Transparency, participation, co-creation, information security, and digital transformation have become relevant agendas within public administration discussions.

It is impossible to talk about post-managerial trends, therefore, without mentioning the crucial role of technology in this context. Information technology has been widely seen as an engine of organizational change in the public sector since the beginning of this debate more than two decades ago (Seneviratne, 1999). The democratization of technology acted as a form of pressure on the debate in public administration. As a competence created and expressed in technological entities (Wyk, 2002), technology permeates today the diverse spheres of human life. Technologies are the product of negotiations, human agency, and personal interests, becoming integral to our societies' wide range of institutional processes. They are "understood as part of the complex process through which organizing is accomplished" (Orlikowski & Scott, 2008, p. 446). As well as institutional logics, technology results from an abstract portion and another material.

Research that uses the perspective of institutional logics usually loses by not relating institutional logics to the respective orders from which they are derived. In much of the research that uses institutional logic as a theoretical lens, either these two concepts are confused, or institutional orders are weakly discussed (or even suppressed) in the analysis, even if they are the contents through which of stability or change in an organization take shape (Johansen & Waldorff, 2017). According to Friedland (2013, p.34), institutional orders are unobservable but essential institutional substances. These substances, which are the metaphysical foundation of an institutional logic, much more than sources of legitimation, mean its inner constitution, which provides the basis for its identity and "an ontology of the objects deployed in her practice" (Friedland, 2013, p. 35). The institutional orders that guide Western society are potentially contradictory and produce multiple logics, operating as the values that anchor them, as the guidelines for their practices.

Our research starts from our demonstration of the premise that technology is also an institutional order and observes its behavior, which includes the production of its own logics. This paradigm shift would be capable to explain several phenomena of change observed in organizations. In our study, the context of analysis chosen is that of public administration, primarily because it deals with the professional background of the researcher, but also because it is a context with defined characteristics and sufficiently discussed in the literature so that we can study the interplay of logics and their respective institutional orders in a systematic

way. In addition, in public administration, it is also possible to obtain complete information and data on the results of actions, which meets one of the objectives of this research, which is to observe technology as an agent of social transformation.

For this observation, we chose a case of emerging technology and considered a disruptive innovation of our time. Blockchain has been extensively debated in the literature due to its numerous transformative possibilities in the public sector. Blockchain technically solves problems of transparency, trust between parties to a contract, and allows for the first time, transactions between people, even financial ones, without the need for an intermediary entity. It is a decentralizing and immutable technology. At the same time, we have in the public service a hybrid scenario, with strong influences from logics constituted by State and market orders as we will debate in paper two. This combination of technology and the research scenario provides us with (1) sufficient documentation, since blockchain technology is quite recent, allowing our access to varied records; (2) clarity about the interplay between institutions; (3) abundant observations about the manipulation of technology and its attributes by the actors and (4) the observation about societal changes brought by technology.

1.1 Objectives

This thesis seeks to characterize technology as an institutional order and explore its social implications in public administration.

The specific objectives are:

- Expand the discussion on institutional orders within the perspective of institutional logics.
- Characterize technology as an institutional order.
- Advance in the discussion on approaches to public administration and institutional logic.
- Analyze the influence of technology on post-management trends in public administration.
- Identify elements that demonstrate the interaction of logics produced by technology with logics produced by other orders.
- Analyze how technology acts in societal change.

- Provide insights into research with institutional orders within the perspective of institutional logic.

1.2 Potential Contributions

The first gap in the literature that this thesis proposes to address was observed in other studies that use the perspective of institutional logic to observe organizational phenomena. Research usually focuses on explaining phenomena from institutional logics, mentioning points that demonstrate paths taken by organizations according to the prevailing logic. They also explain hybrid and complex ways of organizing or describing processes in which one dominant logic gave way to another in different dynamics and combinations.

However, what we observe is a missing opportunity to make the perspective of institutional logic develop from deeper analyses, and this depth could emerge from the discussion of the institutional orders that produce these logics. As noted by Johansen and Waldorff (2017), "it is still not clear, though, what is the explanatory power of institutional logics which - as any institutional perspective, should have 'social matter'; it should help us investigate and understand something about the values, norms and developments of our social world". It is with this point that our research seeks to contribute: by having a specific focus on institutional orders, we try to bring up reflections on not only the need for studies based on the perspective of institutional logic to begin to consider them but also propose a review of the inter-institutional system itself, analyzing the configuration of technology as one of the orders that compose it.

The second gap identified concerns public administration, which is the field within which this study is developed. Recognized in the literature for its hybridization in several countries, public administration is the object of several studies that deal with the institutionalization of practices arising from different institutional logics. Most of the studies debate different approaches to public administration, especially the bureaucratic-Weberian approaches and the New Public Management. Since one model did not break with the previous one, a hybrid format became even more evident from the post-managerial trends that brought practices linked to technology and governance.

In our study, we initially sought to consolidate, based on the literature, the institutional orders that gave rise to the logics that guide bureaucratic and managerial approaches and to advance in the investigation of which logics shape post-management trends. In a second

moment, based on the premise that technology is configured as an institutional order, we seek to capture how it interacts with other orders, producing its own logics.

The discussion about technology is still very much focused on how organizational actors manipulate artifacts. Along these lines, we see technology being studied as practice, as a carrier of institutional logics and even affordances, which change the centrality of these logics. When we started to study technology as an institutional order, however, we were able to get to deeper issues such as its power of agency and the materiality of institutions.

The third gap in this study refers to the social implications of technology in public administration. Through a case study, we seek to investigate not only the dynamics of the logics present in the analyzed organization but mainly its social outcomes. This is a way to advance the understanding of how large-scale societal changes are related to materiality (Jones et al., 2017). Furthermore, our analysis helps us explore how the multiplicity of institutional logics can shape and influence the way technologies are used, which goals are attended to, and who becomes more active in the process of societal change (Oborn et al., 2021).

To fill the gaps identified in the literature, this thesis was developed in three papers with the primary goal of analyzing the behavior and social implications of technology in public administration as an institutional order. Next, the three papers will be presented with their respective objectives and research methods.

1.3 Structure of Thesis

This thesis is organized into three papers besides this introduction and conclusion. In the first part, we have the paper “The constitution of technology as an institutional order”. The second part is constituted by the paper “Administrative reforms and institutional orders: how do logics produced by technology permeate public administration?”. And in the third part there is the paper “The social outcomes from the interplay of logics in the public sector: the case of Online Bidding Solution, a blockchain-based application”. The three papers seek to answer this thesis's general and specific objectives and fill the gaps identified in the literature. In the sequence, each paper will be presented.

The first paper, "The constitution of technology as an institutional order", had its first version accepted at the 28th ICE/ITMC & 31st IAMOT Conference IEEE 2022. The paper is a theoretical essay that describes how technology is constituted as an institutional order. This paper is the premise that we use as a basis for our investigation in the following papers.

From the perspective of institutional logic, technology has been the object of investigation under different approaches: as a carrier (Scoot, 2008), as a practice (Smets et al., 2017), as an affordance for other institutional orders (Faik et al., 2020) and as an institution (Gosain, 2004). However, no research until then had focused on technology as an institutional order. For this, we resume the discussion about logics and orders, pointing out their differences and the existing gap, which usually disregards the discussion about institutional orders in empirical research.

Institutional orders are substances that need to act in the individual, organizational and institutional spheres. Authors such as Mutch (2018) claim that institutional orders emerge through time and collective action and different interpretations and meanings attributed to them. Just as the corporate order originated in the 1920s, technology has been consolidating in recent decades. From this theoretical essay, we immerse ourselves in the concept of technology and the texts of authors who discuss its power of agency. This paper also discusses the materiality of technology and the possible shift needed in the concept of institutional orders so that they also encompass a material portion.

The second paper, “Administrative reforms and institutional orders: how do logics produced by technology permeate public administration?” brings a review specifically focused on understanding the influence of institutional logics in the public service. This research intends to fill the gap in equating public administration approaches with institutional orders and how technology interacts with these approaches, and how it is interpreted and manipulated by organizational actors. Our research problem is "how do the logics produced by technology permeate public administration models?".

We carried out a systematic review, initially seeking to consolidate the main approaches to public administration and how their characteristics translate the influence of specific institutional orders. Our search focused on research that used the perspective of institutional logic to explain technology-related phenomena in the public sector. In addition, our research lists the logics produced by technology, showing how they influence post-managerial trends in public administration.

Finally, the third paper, entitled “The social outcomes from the interplay of logics in the public sector: the case of Online Bidding Solution, a blockchain-based application” seeks to demonstrate under the lens of institutional logic how technology is increasingly behaving as an agent of social change, incorporating itself into organizational processes. This paper was accepted at the 38th EGOS Colloquium. In this study, we study the case of SOL - Soluções Online de Licitações, an application developed in the public service in the State of Bahia -

Brazil. We have followed the case since the exploratory phase of the construction of this thesis, from 2019 to 2022.

Our choice for this case regards an application based on blockchain technology. Since its advent, blockchain has been studied due to its disruptive potential in various sectors, including public service. Blockchain would technically solve problems of transparency, trust between parties to a contract and allow, for the first time, transactions between people, even financial ones, without the need for an intermediary entity. More than ten years after its first release, however, there are few active projects based on the technology that we have actually been able to observe. Blockchain was chosen for this study precisely because it challenges institutional arrangements, pointing to a decentralized, transparent government that is no longer necessary on several fronts on which it operates.

In this research, taking advantage of the gap pointed out by Faik et al. (2020), we show how the entry of technology challenges existing institutional arrangements and, more than that, sets the stage for irreversible societal changes. Our study allowed us to analyze how the entry of technology took place in Brazil's hybrid scenario in the public service, with strong influences from bureaucratic and managerial logics and yet with a very centralizing state as an intermediary for transactions.

1.4 Relation Among Papers

The three papers in the thesis seek to answer the thesis's objectives and fill the gaps found in the literature. Table 1 below provides a summarized presentation of each paper.

Table 1: Summarized papers presentation

	Paper 1	Paper 2	Paper 3
Title	The constitution of technology as an institutional order	Administrative reforms and institutional orders: how do logics produced by technology permeate public administration?	The social outcomes from the interplay of logics in the public sector: the case of Online Bidding Solution, a blockchain-based application
Objective	Configure technology as an institutional order, suggesting an advance in the inter-institutional system (Thornton et al., 2012).	Consolidate the institutional orders that influence the main approaches to public administration and analyze the role of technology in forming a new approach.	To analyze the interplay of institutional logics in an application case based on blockchain technology and its social implications.
Methods	Theoretical essay	Systematic review	Case study
Keywords	Information technology, Institutional theory, Institutional logics, Institutional orders	Information technology, institutional logics, administrative reform, New Public Management, Post-managerial trends, e-government	Information technology, Institutional logics, Blockchain, Public service e-government

Analyzing the three papers that make up this thesis, we verified that there is a logical chain necessary for the development of each one. Initially, in order for us to assume that technology is an institutional order, it is necessary to configure it. Then, to discuss the interplay of institutional logics in public administration, it is necessary to review works that have already addressed the topic in search of the consolidation of administrative approaches and the respective orders that influence them. Finally, from this progressive construction, we have sufficient theoretical basis for analyzing a case, understanding how technology challenges or reinforces institutional arrangements, and what societal changes are brought about from its entry into the organization.

The three papers also converge to respond to the specific objectives of this thesis, as shown in Table 2:

Table 2: Relation between specific objectives and papers

	Paper 1	Paper 2	Paper 3
Expand the discussion on institutional orders within the perspective of institutional logic.	x	x	x
To characterize technology as an institutional order.	x	x	
Bring greater definition to the discussion on approaches to public administration and institutional logic.		x	x
To analyze the influence of technology on post-management trends in public administration.		x	x
Identify elements that demonstrate the interaction of logics produced by technology with logics produced by other logics.	x	x	x
Analyze how technology acts in societal change.			x
To propose insights on research with institutional orders within the perspective of institutional logic.	x	x	x

Finally, the results of this thesis are not intended to exhaust the discussion on institutional orders, approaches to public administration, or the social effects of technology. On the contrary, this is a work that introduces these issues into the field, but that focuses especially on the importance of evolving in the perspective of institutional logic, with analyzes that go beyond the application of ideal types in the observation of phenomena. By bringing institutional orders to the discussion, the research makes it possible to analyze other nuances of organizational changes, in addition to the evolution of the theory itself.

In the following chapters, we present in full the three papers that make up this thesis, followed by the conclusion that covers all the work carried out.

2. PAPER I:

THE CONSTITUTION OF TECHNOLOGY AS AN INSTITUTIONAL ORDER

ABSTRACT

Technology and digital transformation are topics in full development in the most diverse areas of knowledge. Technology produces social transformations, new rules, vocabularies, choices, and a sense of identity. Theoretically, technology has already been analyzed as a practice, carrier, affordance, and institution. This theoretical paper draws on institutional logic perspective to propose a review of the Inter-Institutional System, positioning technology on the Y-Axis as an institutional order. Our research contributes to future theoretical and empirical studies by assembling an ideal type that makes it possible to reflect on technology as a producer of institutional logics, explaining phenomena in which non-human agency can be observed.

Keywords: information technology, institutional theory, institutional logics, institutional orders

1. Introduction

As a competence created and expressed in technological entities (Wyk, 2002), technology permeates diverse spheres of human life, translating itself not only in artifacts, devices, and software but also in lifestyles, choices, and recombination of its characteristics in new forms and uses. As a phenomenon or event, technology is studied under different areas and theoretical backgrounds, in which the duality between material and symbolic aspects is usually taken into account. Initially, it is necessary to understand that this duality contains a partial truth. It is not just the material aspects of technology that matter but the way we live in a society in a technological context (Mackenzie & Wajcman, 1999).

Technology has become a source of legitimacy (Gosain, 2004); it is an agent of change and new meanings (Raviola & Norbäck, 2013). Authors also comment on technology under other institutional approaches, such as a carrier (Scott, 2008) or as a practice, facilitating the creation of structures (Barley & Tolbert, 1997). More recently, technology has also been discussed as an affordance, a conceptual link between institutional logics and the technology in use (Faik, Barrett & Oborn, 2020). Under the condition that the social world is made of a material portion, and social action is mediated by materiality (Pinch, 2008), the discussion of technology as an institutional order is necessary to the extent that we review forms of organization through it. Anchored in the perspective of institutional logics, in this theoretical article, we defend that technology is an institutional order, bringing a contribution to the perspective of institutional logic. We develop the concept of technology in the sense of to overcome dualisms between the material and the symbolic, or idealism and materialism (Friedland & Alford, 1991).

Institutions are supra-organizational activity patterns through which humans conduct their material lives and symbolic systems that categorize activity and assign meaning to it. Institutional logics would be, in this context, “the grammars of practices available to practitioners” (Friedland & Arjaliès, 2019, p.9). The institutional logic perspective identifies and distinguishes the five institutional orders that guide Western society: the market, the bureaucratic state, the family, democracy, and religion. The perspective evolved from the work of Thornton and Ocasio (2004) with the creation of the inter-institutional system, an organization of institutional orders into a typology, adding the corporate and profession orders, and, in 2012, the community order (Thornton et al., 2012). The perspective of institutional logic constituted a valid tool to link individual and organizational practices to social phenomena (Faik, Barrett & Oborn, 2020). The notion of the constitution of

institutional orders and the flexibility of this framework also makes it possible to review the categories of the inter-institutional system from new social dynamics.

Given this context, **the objective of this theoretical article is to describe how technology is constituted as an institutional order capable of producing new logics.** We believe that locating technology within the framework of institutional orders fills an essential gap for researchers to explain phenomena related to information technology. In the following sections, we will focus on developing the perspective of institutional logics with particular attention to the formation of institutional orders. Then, we dedicated ourselves to analyzing the formation of the institutional order of technology from the literature that allowed us to identify it. Finally, we propose a review of the inter-institutional system with technology in the x-axis. We conclude by discussing the theoretical implications of this model for future research.

2. Institutional Logics Perspective

Institutions, in the view of the old institutionalism, can be defined as sets of rules and stable roles and their corresponding sets of meanings and interpretations. The development of institutional theory from the seventies onwards makes this approach more dynamic, adopting a focus on the institutionalization process while maintaining an emphasis on rules and roles (Czarniawska, 2008). This new approach came mainly from the research of Meyer and Rowan (1977), Zucker (1977), and, later, DiMaggio and Powell (1983).

Legitimacy, survival, and stability have always been the focus of Institutional Theory: "organizations conform to social expectations because doing so provides legitimacy which, in turn, provides access to material and symbolic resources that support organizational survival" (Smets, Aristidou & Whittington, 2017, p.12). The critical concepts of institutional theory begin to change with the introduction of the institutional logic approach.

After using the term for the first time in 1985, Friedland and Alford (1991) will later develop it. Arguing that neo-institutional theory does not adequately explain the success and failure of institutionalization, the authors propose a new approach that considers boundaries, instruments, and structures of power to vary institutionally. Friedland and Alford (1991) see institutional transformations as material and symbolic dimensions.

In their seminal essay on institutional logic, the authors emphasize that Western society's main institutional orders have a central logic that constitutes their organizational principles. These institutional orders are the market, the bureaucratic state, the family,

democracy, and religion. Their logic is based on a set of material practices and symbolic constructions that individuals can manipulate or reinterpret. In this context, institutional changes will occur from the creation of new social relationships and new symbolic orders. Table 3 describes the central logic of the main institutional orders of Friedland and Alford:

Table 3: Institutional orders and their central logics

Order	Central logic
Capital Market	Accumulation and commodification of human activity.
State	Rationalization and regulation of human activity by legal and bureaucratic hierarchies.
Family	Community and motivation of human activity by unconditional loyalty to its members and their reproductive needs.
Democracy	Participation and extension of popular control of human activity.
Religion/Science	Truth, whether mundane or transcendental and the symbolic construction of reality within which all human activity occurs.

Source: Friedland & Alford (1991, p. 248)

Through concrete social relationships, individuals and organizations strive to achieve their goals, giving meaning to life and reproducing symbolic systems. Individuals, groups, and organizations strive to change relationships within and between institutions. They produce new truths, new models for understanding themselves and society, and new forms of behavior and material practices when they do. The consequences alter the inter-institutional relations that constitute society.

After the work of Friedland and Alford (1991), but also having his empirical research among the precursors of institutional logics, Thornton and Ocasio (1999, p. 804) are the authors of a definition widely used in the literature on institutional logic: "the socially constructed historical pattern of material practices, assumptions, values, beliefs and rules by which individuals produce and reproduce their material subsistence, organize time and space and give meaning to their social reality." Although the approach of Friedland and Alford (1991) is structural and symbolic, the approach of Thornton and Ocasio (1999) is formed by

structural, normative, and symbolic dimensions that act in a necessary and complementary way within the institutions (Thornton & Ocasio, 2008).

Research on institutional logics varies in describing change processes in institutions, but they usually focus on identifying how actors in certain organizations manipulate institutional logics. Thornton and Ocasio (1999) and Reay and Hinings (2005) propose a dominant logic that overlaps an old one. Despite the existent tendency to propose this dynamic, in their research, Dunn and Jones (2010) defend the coexistence of multiple logics in the organizational field in scenarios that operate with several institutional spheres. Dunn and Jones (2010) also cite the research of D'Aunno, Sutton, and Price (1991). They observe the possibility of competing logics being present in the same context, which can make agreement and consensus impossible. In these cases, organizations respond to external pressures by adopting some practices, according to their limitations, but visible enough to guarantee a minimum level of legitimacy in the organizational field (D'Aunno et al., 1991). Finally, the combination of conflicting logics results in the creation of hybrid logics, as described by Thornton, Jones, and Kury (2005) in their research. Table 4 systematizes the observed dynamics of institutional logics in processes of change:

Table 4: Dynamics of institutional logics

Dynamics of institutional logics	Context	Author(s)
Dominant logic that overlaps an old logic	- A historical shift in the dominant institutional order in the higher education publishing industry - Government-led health reform initiative in Alberta, Canada	Thornton and Ocasio (1999) Reay and Hinings (2005)
Coexistence of multiple logics in the organizational field	- Coexistence of plural logics in the medical education sector - Interplay of logics in innovation processes in the public service	Dunn and Jones (2010) Vickers et al. (2017)
Competing logics present in the same context	Conflicting institutional environment concerning drug abuse treatment units	D'Aunno, Sutton, and Price (1991)
Combination of conflicting logics resulting in the creation of hybrid logics	Changes in the accounting, architecture, and higher-education publishing industries, focusing on different changing mechanisms	Thornton, Jones, and Kury (2005)

Source: Author

The literature on institutional logic provides us with sufficient elements to analyze phenomena according to the interplay of logics in different dynamics, to understand the role of agency and the mechanisms of institutional change. The development of the approach has focused on searching for the conditions to change in organizations advancing in institutional analysis, adding typology (Thornton & Ocasio, 1999) and leveraging the use of institutional logic in empirical works. A large part of the literature on institutional logic focuses on the interplay between logics and agency. However, this focus overlooks interesting theoretical possibilities: "the problem with this focus on agency is that it risks losing some of the power of institutionalist approaches, power which lies in the way that institutions provide not only resources for selection but shape the categories of agency that are available to actors" (Mutch, 2018, p.6).

In the same vein, Johansen and Waldorff (2017) argue that the perspective of institutional logic pays little attention to the relationship between logics and orders and that, there, too, a research opportunity to observe phenomena as part of larger social structures is lost. Institutional orders are not necessarily static entities that will not change over time. Therefore, the more detailed observation of institutional orders is fundamental, in our view, to the very analysis of the central logics that they carry and that are manifested in practice. One of the objectives of our research is precisely to expand the discussion on institutional orders, seeking comprehensive definitions, and capturing what is lost in the literature. This discussion will take place in the next section.

3. Institutional Orders

The literature on institutional logics has considerably advanced when using this perspective as an analytical resource. Considering this perspective, logics are produced by institutional orders and play a decisive role in allocating attention and producing decisions, acting as frames of reference that condition choices (Thornton et al., 2012). Institutional orders are potentially contradictory and produce multiple logics that operate at three levels: individual, organizational, and institutional (Friedland & Alford, 1991). According to the authors, it is the content of an institutional order that shapes the mechanisms through which organizations conform or deviate from established standards.

The five first described institutional orders of Western society (market, bureaucratic state, family, democracy, and religion) are supra-organizational patterns of human activity by which individuals and organizations produce and reproduce their material subsistence and organize time and space. Institutional orders provide resources from which actors develop their practices and identities (Mutch, 2018). They are also symbolic systems, ways of ordering reality and giving meaning to experiences. Institutional orders provide vocabulary and a "sense" of oneself. They generate rules and institutional logics. Individuals, groups, and organizations try to use institutional orders for their own benefit.

For example, Friedland and Alford (1991) discuss the market: it is not just a resource allocation mechanism but a cultural system to generate and measure value. The market aggregates identity, performance, social value, status, and gender issues, which are socially structured utilities. The interaction between the actors is not just through an exchange. The same occurs when we think about the State: we understand the State as the dominant organization within the society that accumulates resources, converting them into autonomy or power. This accumulation, however, depends on structures created by society and resultant in rules and meaning attributed to action: "even in war, when the technologies of destruction count more, the categorical construction of us and they matter almost as much" (p. 238).

Given these examples, we can say that institutional orders have different practices, organizational forms, and beliefs in values. They create their own rules, have their own vocabulary, and can occur separately from a conscious process (Mutch, 2018). Friedland and Alford (1991), in the construction of their non-functionalist vision of the society, emphasize the necessary understanding of the autonomy of the individual, organizational and institutional levels. They argue that no institutional order should have a causal primacy over the other and that they are in a system that the authors call "nested," in which "organization and institution specify progressively higher levels of constraint and opportunity for individual action" (p. 242).

In an essential review of the work in institutional logic, Thornton, Ocasio, and Lounsbury (2012) systematized institutional orders, moving away from focusing on seeing them as substances or values, explaining them from the analytical distinction. The authors suggest that the institutional orders of an interinstitutional system compete and cooperate in search of "cultural space and organizational individual attention and patronage" (2012, p.65). They review and systematize institutional orders, describing them as ideal types, each with proper characteristics and sufficient abstraction for its functioning as an analytical resource. To the institutional orders proposed by Friedland and Alford (1991), the market, the

bureaucratic state, the family, democracy, and religion, Thornton et al. (2012) suppress one, democracy ("why wouldn't democracy be a variable of the state or other institutional orders such as corporation?" (Thornton et al., 2012, p. 67)), and add community, profession, and corporation through its empirical and theoretical research.

In the same vein as being potentially contradictory, the review of institutional orders in a theoretical model presupposes that each of the orders "distinguishes unique organizing principles, practices, and symbols that influence individual and organizational behavior" (Thornton et al., 2012, p. 2). Each of the orders of the inter-institutional system (x-axis) represents a governance system that will impact the organizational behavior of actors and condition their choices (p.54). The Y-axis elements represent how the X-axis institutional orders influence actors: "who they are, their logics of action, how they act, their vocabularies of motive, and what language is salient" (Thornton et al., 2012, p. 54).

Table 5: Interinstitutional System

Y-Axis	X-Axis: Institutional Orders						
Categories	Family 1	Community 2	Religion 3	State 4	Market 5	Profession 6	Corporation 7
Root Metaphor 1	Family as firm	Common boundary	Temple as bank	State as redistribution mechanism	Transaction	Profession as relational network	Corporation as hierarchy
Sources of legitimacy 2	Unconditional loyalty	Unity of will; Belief in trust & reciprocity	Importance of faith & sacredness in economy & society	Democratic participation	Share price	Personal expertise	Market position of firm
Sources of authority 3	Patriarchal domination	Commitment to community values & ideology	Priesthood charisma	Bureaucratic domination	Shareholder activism	Professional association	Board of directors; Top management
Sources of identity 4	Family reputation	Emotional connection; ego-satisfaction & reputation	Association with deities	Social & economic class	Faceless	Association with quality of craft; personal reputation	Bureaucratic roles
Basis of norms 5	Membership in household	Group membership	Membership in congregation	Citizenship in nation	Self-interest	Membership in guild & association	Employment in firm
Basis of attention 6	Status in household	Personal investment in group	Relation to supernatural	Status of interest group	Status in market	Status in profession	Status in hierarchy
Basis of strategy 7	Increase family honor	Increase status & honor of members & practices	Increase religious symbolism of natural events	Increase community good	Increase efficiency profit	Increase personal reputation	Increase size and diversification of the firm
Informal control mechanisms 8	Family politics	Visibility of actions	Worship of calling	Backroom politics	Industry analysis	Celebrity professionals	Organization culture
Economic system 9	Family capitalism	Cooperative capitalism	Occidental capitalism	Welfare capitalism	Market capitalism	Personal capitalism	Managerial capitalism

Source: Thornton, Ocasio & Lounsbury, 2012.

In their work, despite the approach of institutional orders as ideal types, the authors introduce the importance of analyzing the context since they initially situate them historically in the construction of their framework. In fact, this statement was already made by Friedland

and Alford (1991), who recognized the variety of findings on phenomena in organizational studies according to the period. (Thornton et al., 2012). Johansen and Waldorff (2017, p. 11) emphasize that the authors propose that further research should "qualify, verify and/or modify the categories, and thus over time help institutional theory strengthen the codes of each institutional order in terms of its logics' composition and associated micro-level expressions".

Following this reasoning, we have the introduction of the context as a relevant factor in institutional analysis. Suddaby (2016) proposes strengthening ties between academics of history and administration, talking about the importance of common assumptions about what institutions¹ are. For the author, historians "see institutions as more substantial social structures than organization theorists in terms of both time and space. Institutions exist and exert social influence over decades, if not centuries, affecting multiple generations" (p. 53). For the author, institutions in the view of history are powerful social structures that deeply immerse themselves in society, being part of what constitutes it. Although more profound, this definition goes in the same direction as the view on institutions in the approach of institutional logics, which places them as synonyms for "collective regularity" (Friedland & Arjaliès, 2019). The authors emphasize that, however, not all regularity will be an institutional logic: "they are constellations of practices, regular, meaningful and co-constitutive relations between persons and objects," in a relationship in which the practice takes precedence over people and positions in the field.

Neo-institutionalism, however, is still limited in dealing with history as one of the primary elements in the constitution of institutional orders. That may be one of the reasons why empirical research tends not to focus on the study of the orders that carry institutional logics. Along these lines, Ocasio, Mauskopf, and Steele (2015) propose a new vision for institutional orders (called by the authors of societal logics) that contrast with the approach of ideal types by Thornton et al. (2012). In this view, "societal logics are historically constituted cultural structures generated through collective memory-making" (p. 4). Ocasio et al. (2015) argue that societal logics are formed when a set of associated meta-narratives "achieves a certain degree of convergence, resilience, and relevance across institutional fields" (p. 22). Societal logics are the result of a historical process, and therefore, its constitution has been modified over time with the accumulation of narratives, documents, and historical processes. Societal logics can change, they can be deleted, and new societal logics can emerge over time.

¹ We emphasize the use of different terms representing institutional orders, such as "institutions" (Sudabby, 2016) and "societal logics" (Ocasio et al., 2015). We did not modify these terms in this study with respect to the original works cited.

Despite the importance of placing institutional orders in a framework such as that established by Thornton et al. (2012) for analytical work, the view of Ocasio et al. (2015), by moving away from the institutional order as a static entity, allows us to understand the elements that act in its formation more clearly. Institutional orders consist of files, documents, practices, and narratives that overlap and are configured in different ways over time. Along this line, Mutch (2008, p.18) suggests that what he calls institutions emerge in society in different ways: "there are those institutions: which arise from the struggle for embodied existence in the natural world (...). There are institutions arising from a desire to make sense of that embodied existence. Finally, human existence is a profoundly social one, albeit emergent from individual engagement with the natural world, and mechanisms have evolved for dealing with social interactions".

We have from all views on institutional orders (or societal logics, or even just institutions), despite the different approaches, that they show absolutely converging paths. Institutions must be simultaneously material and ideals, systems of signs and symbols, rational and transrational (Friedland & Alford, 1991). They provide resources from which organizational actors will develop practices and shape their identities (Mutch, 2018).

Logics are a combination of substance and practice, and institutional transformations are both symbolic and material transformations of the world. When we assume that institutional orders are not static entities and embrace the relevance of context in their construction, we assume the need for a closer look at changes in society in which individuals and organizations engage and find meaning. Institutional logics are configured as observable standards, such as "grammars of meaningful and productive material practice with persistent forms and visible effects" (Friedland, 2017, p. 19). They are the path through which we know the institutions that guide society, and the practice provides the content for the observation of these logics: "the materiality of that practice is located in the corporeality of subjects and in the obdurate quality of things" (Friedland, 2017, p. 19).

In this research, our proposal is to analyze technology as an institutional order, exploring how it is manipulated and interpreted, the meanings attributed to it, and its effects. Our goal is to answer whether we can observe social structures historically built around this element, making it possible to revise institutional orders by adding technology as a category of the interinstitutional system. Our references in defining these dimensions are based on an analysis of the production of the field of institutional logic in relation to previous orders. Most of these studies are empirical, with few elements that show the constitution of an institutional order. Marquis, Lounsbury and Greenwood (2011), however, when discussing how the sense

of community goes beyond geographical barriers, build an important theoretical narrative to explain the community as a source of identity and form of organization, providing "a key source for institutional logics that provide meaning and shape behavior of actors in an institutional field" (p.15).

Besides, far from invalidating the empirical research on institutional logics which in recent decades has predominantly focused on explaining changes, we intend to shed light on the possible reflections lost when these studies retain their attention only in the interplay of logics, being documents and material practices assets that could also provide insights into institutional orders.

4. The Characterization of Technology as an Institutional Order

Technology has become a broad and relevant enough term to become the subject of empirical studies worldwide increasingly. The search for the term "technology" as a "topic" in the Web of Science database quickly brings more than 1.7 million entries.² The map of the knowledge areas in which these studies concentrate shows that most research related to the topic is in electrical and electronic engineering areas, followed by computer science, telecommunications, and materials science. However, technology is also present in all other areas of knowledge: health sciences, social sciences, education, and organizational studies.

However, what exactly is technology? How to define this entity that permeates so many aspects of human life?

At first, we can think that the pioneering definitions of technology fell on its physical aspects. However, one of the oldest definitions of technology found in the literature is by Bigelow (1840). In the book *The Useful Arts, Considered in Connexion with the Applications of Science*, the author defines technology as "understood to consist of principles, processes, and nomenclature of the more conspicuous arts, particularly those which involve applications of science, and which may be considered useful, by promoting the benefit of society, together with the emolument of those who pursue them" (p.5). Despite providing a sufficiently comprehensive density of information capable of meeting various forms of technology in modern times, the definition fails to include, for example, products that meet all requirements but that were not necessarily created by humankind as, for example, insulin (Caroll, 2017).

Sometimes, other definitions for technology that have emerged over the years are confused with "technological development" or only with the instrumental part of material

² Research was made on April 6th, 2020.

artifacts: equipment and tools used in human activity to promote the technology. These studies usually see technology as human work, through which physical inputs are transformed into desired outputs. Technology is a rational choice based on the search for efficiency. It is a matrix that incorporates one or more technologies and their respective products, making organizational action possible (Thompson, 1967).

Technology is not unique, not even tangible. We call technology both the use of the stone by the caveman and a laser-guided missile (Cogan, 2002, p.95). However, in both cases, there is no common element, a single essence. The definition of technology from its essence was already an issue discussed many decades ago. Heidegger (1977) emphasizes that technology is not equivalent to the essence of technology. The author's reasoning involves questioning technology as a term and visiting the term "contrivance," enumerating human inventions and relating them to technology. The technology would be a contrivance, giving rise to its instrumental definition, soon after evolving into a reflection on causality and cause, meaning being responsible for something. At the height of the text, the essence of technology is then suggested as a revelation. Technology, for Heidegger, is not just a means but a way to reveal. What is decisive in technology is not in the manufacture or use of instruments but in revealing the possibility of all production. Detailing the Greek term "*techne*," finally, Heidegger suggests that technology does not only produce instrumental things but has a strong linkage to knowledge. In the end, the author reveals the essence of technology as art, as a qualitative revelation of reality, as something "nothing technological," as he puts it.

Another important definition is that brought by Weick (1990), who describes technology as an equivocal. "Equivocal," for the author, is something that admits several possibilities or interpretations and, therefore, is subject to uncertainty, complexity, and misunderstandings. In the author's view, technology would be an equivocal because it is simultaneously the source of stochastic, continuous, and abstract events (p. 789). The author already discussed the duality of technology in two ways: the first, placing it, at the same time, as a product of lessons learned during the implementation of a technical system and as a source of options for new systems. In a second moment, Weick (1990) confronts the meaning of technology as knowledge and as a technical system: "new technologies are parallel technologies involving technology in the head and technology on the floor. (...) Each corrects the other discontinuously" (p. 801).

More modern and widely used in the literature, the definition that Volti (2009) suggests for technology returns to locating itself in instrumental aspects and the manipulation and organization of inputs in the construction of the desired outputs: "a system created by

humans that uses knowledge and organization to produce objects and techniques for the attainment of specific goals” (p. 6). Among other gaps, the definition, as well as others found in the literature, focuses on the creation of technology in humanity and does not take into account other types of technology, such as those created as a by-product of acquired skills, but which were not necessarily the initial objective.

It is important to emphasize that we will hardly find a definition capable of covering all aspects of technology in the literature. According to Roberts and Grabowski (1999), several definitions of technology belonging to different focuses have added new components over time: knowledge, skills, process, and organizations. This diversity, however, ended up causing difficulty in developing empirical research and conceptual models on technology and organizations. In the same vein, Orlikowski (1992) emphasizes the importance of a definition of technology, taking into account scope and role, as these two aspects can explain previous research and how the technology was used until then. The author stresses the lack of a concept added to its relationship with organizations, which would allow an alternative conceptual basis for future research.

Definitions of Technology differ not only in the scope of components but also in contexts. For studies in information technology, for example, a definition that explains the transformation of inputs into desired outputs may be sufficient, which will not occur for the study of organizations. However, our intention is not to add another definition of technology to the literature for this study. We understand that there is no wrong definition of technology, just as there will be no correct and definitive definition. Instead, we seek a comprehensive definition to include the natural and the created by humankind, to give space to technology as knowledge, artifact, or system while allowing its application to various contexts and times and the most significant possible advance in the discussion of its scope and role.

In this study, therefore, we will use as a definition of technology the one suggested by Wyk (2002, p.19): "Technology is created competence. It is expressed in technological entities consisting of devices, procedures, and acquired human skills". The definition explains the artificiality of technology and the fact that it is built. The definition could also be flawed by not considering products not created by humanity (such as the example of insulin); however, the expression "created competence" emphasizes ways and means for taking action, not necessarily dictating that the production of technology is entirely human work and, above all, not dictating the ends. The third part of this definition, composed of the words "devices, procedures, and acquired human skills" reflects, in the author's view, the elements that constitute technology: "the hardware and software components are clear. Skill requires a

qualification. While a certain type of human skill is included, humans as a whole are not. Humans are not technological entities and not part of the definition of technology” (WYK, 2002).

Research on technology and information systems in the organizational environment has historically reflected how institutional logic influences human behavior and how social processes can shape the effects of technology. This was due to the field's intention to escape technological determinism, for this approach to locate human actors as passive recipients of technological transformations. However, this trend has been adding more passivity to technology in the organizational scenario. Busch (2018) admits the gains of research on technology from the abandonment of deterministic approaches. However, the author also mentions the importance of considering that technology also plays an agent of change.

In this sense, for Leonardi (2011), technologies can act separately from human intervention. It is what the author calls "material agency." Technologies would be carriers of institutional logics, with human agency occurring in response to the material agency. As non-human entities, technologies exercise agency through elements that users cannot control entirely or directly. Leonard and Barley (2008) point out that work involving the use of technologies in organizations was seen in the impasse of favoring determinism or voluntarism, on the one hand, and materialism or idealism, on the other. However, according to the authors, neither materialistic determinism nor voluntarist idealism exhausts the universe of possible views on the use of technology in organizations.

From this angle, Busch's (2018) thesis is that technologies, while being adopted and shaped by society, also shape the way people organize themselves, being the perspective of institutional logic an interesting tool to detect how technology influences organizational settings.

Although not on a large scale, the institutional literature also brought elements to the discussion about technology that started to assume agency power or, at least, a vision not only focused on voluntarist idealism. Discussions about technology in this area are available in four different approaches. In the view of Scott (2008), institutions are transmitted by carriers, which can be symbolic systems, relational systems, routines, or artifacts. In this context, information systems act as carriers, being able to "subscribe" to institutional logics and relay them with new organizational arrangements (Addo, 2017). Carriers are not neutral and affect the institutional burden they transmit (Scott, 2008).

When we turn to the study of practice-driven institutionalism, we observe that new structures, including new technologies, emerge with practice. In line with the work of authors

from Structuration Theory, this line of study makes evident the interconnection between individuals, practices, and structures, a system "by which they generate, re-produce, maintain and change social order" (Smets et al., 2017, p. 7). Through the lens of practice, while people interact with technology, it is possible to analyze how they create structures that shape their use and the development of new technologies.

In a third line, Faik, Barret, e Oborn (2020) conceptualize technology as affordance, referring to the possibilities of action that actors can perceive when focusing their attention on technological artifacts, activating specific institutional logics. IT affordances would be a conceptual link between institutional logics and technology manifested in practice. The authors propose a review of the inter-institutional system, positioning the technology on the Y-Axis, after identifying IT affordances that are typical of each societal level from a systematic review. Technology, in this view, is responsible for the change in the centrality of logics and, consequently, for societal changes.

In a fourth perspective, stating that we could be watching the birth of a new "iron cage" with Technology, Gosain (2004) argues that the prolonged use of an information system can legitimize elements that survive the system's useful life. The author combines the concept of technology as a mistake by Weick (1990) with what he calls "lack of mindfulness," the irrationality in the organizational environment, which would make him vulnerable to institutional forces. Nevertheless, the author admits that, during use, enterprise information systems are institutions "since they embody a specific logic of the organization's activities, enabling certain actions while denying legitimacy to others" (p. 159).

Table 6 summarizes the four lines of thought that debate technology from an institutional perspective.

Table 6: Institutional approaches to technology

Approach	Description
Technology as a carrier	As a carrier, technology edits, modifies, and translates information, transmitting an institutional burden (Scott, 2008, p. 133).
Technology as practice	The use of technology allows the emergence of structures that facilitate the understanding of stability and change in organizations and the development of new technologies.

Approach	Description
Technology as affordance	Technology as affordance refers "to the possibilities of action that users perceive in IT artifacts based on their goal orientation and their use environment" (Faik et al., 2020).
Technology as an institution	Enterprise information systems "pave the way for social action" (Gosain, 2004, p. 159).

Source: author

Although complementary and interconnected by the guiding thread of Institutional Theory, the four approaches present their characteristics, limits, and possibilities:

a) Technology as a carrier: this approach explains the stabilization processes but is unclear about the change processes. The adoption of information technology systems can be a cause of organizational change, but it is not self-explanatory. How to explain, also, systems created with a purpose and used for others? In this approach, a part of the manipulation of technology in the formation of structures seems to be missing.

b) Technology as practice: this approach meets the complementary view between Structuration and Institutional theories (Barley & Tolbert, 1997). Assuming the connection between actions and institutions, looking at technology as a practice allows having a more analytical than philosophical view of the phenomenon. Observing technology as a practice allows going beyond a large part of the empirical works based on Institutional Theory, answering questions that go beyond just the diffusion of practices (Barley & Tolbert, 1997), as technologies carrying institutional logics, the emergence of new technologies, and helps explain why humans use technologies as do. Practice-Driven Institutionalism also increases the importance of Institutional Theory in the managerial scenario (Smets et al., 2017, p. 7).

c) Technology as affordance: this approach explains societal changes, but positioning technology as a link between institutional logic and practice does not explain all instances of social action. It is an approach that places technology as a passive entity manipulated by actors when, in this study, we consider technology to

have a portion of agency in its constitution. As an affordance, it is also not possible to explain cases of technologies created with one purpose and used for another, as well as regulatory processes of institutions that demand technology as part of the legitimacy in the field. This approach also lacks interpretive flexibility, from which actors generate different meanings for a technology.

d) Technology as an institution: literature about technology as an institution comes from the vision of how much information systems "shape social action just as other institutions that depend on subtle, shared beliefs do: by creating classification systems, specifying what is similar and what is different, conferring identities on actors, and determining what is remembered and what is forgotten" (Gosain, 2004, p. 168). Although more comprehensive, however, there is still a need for a deeper understanding of the vision that deals with the institutional portion of technology as a mediator of organizational practices and relations, not only as a specific organizational event or phenomenon: "to the extent that technology is treated as an occasional or separate organizational phenomenon, we lose the possibility of seeing how it is an integral part of all organizing at all times, places, and circumstances" (Orlikowski & Scott, 2008, p.454).

In addition to the approaches mentioned above, the discussion that we bring in this work also needs to consider the Structuration Theory. It is derived mainly from the work of Giddens (1979) and aims to reconceptualize the notion of technology and reformulate its relationship with organizations. Structures, in this case, are understood as rules and resources used by individuals. "These rules and resources mediate human action, while at the same time they are reaffirmed through being used by human actors" (Orlikowski, 1992). Orlikowski (1992) explores the line between social and material aspects of technology and reflects on organizations in the context of information technology.

In this research, we propose to develop an approach to technology as an institutional order based on the perspective of institutional logic. Therefore, our intention is not to refute the approaches presented here but to base ourselves on them to trim the edges that concern the formation of technology as an institution. One of these edges is the discussion about the role of non-human agency in institutional research (Raviola & Norbäck, 2013). The authors demonstrate in their article that the interaction of human actors (journalists) with non-humans (technology) has built a new organizational form. It is important to emphasize that "agency,

and the knowledge that makes agency possible, will vary by institutional order" (Thornton et al., 2012, p. 3). In the case of technology, this agency is non-human. Historically, we have technological artifacts built by humans initiating social changes that have remained in motion precisely because of Technology (Pinch, 2008).

With the care that we are talking about institutions and not institutionalization (Mutch, 2018), technology today incorporates understandings, norms, and rules that serve as guides to legitimize mental models on which individuals and organizations are based for action. It combines with logics produced by other orders and translates into societal changes arising from the multiplicity of logics observed in a given phenomenon or organization. Like the community, the last institutional order to be part of the inter-institutional system, technology "has a significant impact on organizational behavior in a variety of instances" (Thornton et al., 2012, p. 70).

Just as the corporate order emerged in the United States between 1860 and 1920 (Mutch, 2018), the order of technology emerged in more recent decades from collective action and the formation of different interpretations, meanings, and memories. Over time, technologies and their meanings are combined, giving way to a conceptual framework and a mode of practice (Pinch, 2008). This brings us to technology as an institution, as it meets the four fundamental "metatheoretical principles of the institutional logics perspective: the duality of agency and structure, institutions as material and symbolic, institutions as historically contingent, and institutions at multiple levels of analysis" (Thornton et al., 2012, p.6).

The discussion about technology is still predominantly located in the constructions that provide its legitimacy and on how actors make sense of its material and symbolic aspects. However, it is necessary to discuss elements beyond how institutional logics interact in technological institutionalization, which concerns the logics produced by the technology itself, which would largely explain common gaps in the literature. The technical significance of technology is subjective, and legitimacy through tasks forces organizational actors to change (Ren, 2019). Technology does not only act as an affordance for other institutional orders: it causes societal transformations that pressure and modify the State's relations with society, for example. The political power of tech giants has been compared to the power of government, and the relationship with a digitally educated society and widely exposed to the media (Jansma et al., 2020) presses for the modification of norms around Technology (Taylor, 2021).

Therefore, from our literature review that deals with the adoption of technology in the most diverse contexts, and considering the proposition of Thornton, Jones and Kury (2005),

which considers the drivers of institutional and organizational change institutional entrepreneurs, structural overlap and historical sequencing of events, we bring in the following table a suggestion of the technology as an ideal type of the Inter-institutional System:

Table 7: Interinstitutional System - Technology in X-Axis

Y-Axis	X-Axis: Institutional Orders
Categories	Technology 8
Root Metaphor 1	Technology potential efficiency
Sources of legitimacy 2	Adhesion of technologies by major players, media discourse
Sources of authority 3	Specialist
Sources of identity 4	Technological bubbles and adoption of platforms
Basis of norms 5	Digital society
Basis of attention 6	Technological advancement
Basis of strategy 7	Improvement of the organization's performance
Informal control mechanisms 8	Technical significance
Economic system 9	Technological capitalism (knowledge-based)

Source: author

A critical element that allows us to position technology as an institutional order is the perception of how much technological identity influences organizations, creates bases for action, and acts as a resource for negotiations. However, admitting technology as an institution assumes that we are admitting (1) institutions with at least a material portion and (2) the possibility of non-human agency.

5. Conclusion

In this paper, we contribute by describing characteristics that make it possible to reflect on technology as an institutional order. Our model proposes a review of the Inter-Institutional System (Thornton et al., 2012), positioning the technology on the y-axis as an ideal type. This theoretical proposition impacts the performance of empirical studies on

technology since it gives the researcher the possibility to go beyond studies of legitimacy, explaining organizational changes through the lens of technology.

Second, by assuming that technology is an institutional order, we can explain phenomena in which non-human agency can be observed. Technologies created with one purpose and used for another, as well as organizational pressures for the use of technologies not necessarily with economic effect, in addition to those that join existing modes of operation, may require an additional institutional order to those we already have systematized so that the logic interplay is satisfactorily explained.

Institutional orders were a revised topic in the work of Friedland and Alford (1991), with the addition of new orders by Thornton et al. (2012). Later works also discussed the need for constant revision of the institutional logic perspective according to the drivers of institutional change, such as structural overlap, institutional entrepreneurship, and event sequencing (Thornton et al., 2005). The systematization of technology as an ideal type, like the orders of family, religion, community, State, market, profession, and corporation, is only possible, however, by accepting a material portion in institutions (Pinch, 2008). Therefore, our proposal also impacts other discussions on the institutional role of technology, especially those more recent, which consider it an affordance or a practice.

This is an initial study of the formation of technology as an institutional order based on recent literature. From this study, it is recommended to analyze the order of technology and the mapping of its logics in different contexts, topics, and levels of analysis, as well as the review and deepening of our theoretical proposition, from which new insights can be generated. Technology is an area in full theoretical and practical development with profound societal implications. To the same extent that technological innovation gains scale and transforms the functioning of society (Faik et al., 2020), it is necessary to evolve with its theoretical systematization, bringing its technical portion closer to its social portion.

3. PAPER II:

**ADMINISTRATIVE REFORMS AND INSTITUTIONAL
ORDERS: HOW DO LOGICS PRODUCED BY TECHNOLOGY
PERMEATE PUBLIC ADMINISTRATION?**

ABSTRACT

While there has been much work on public administration approaches and administrative reforms that include post-management trends such as e-government, there has been limited research that theorizes administrative reforms as a result of the interaction of institutional logics. This paper draws on the institutional logics perspective to demonstrate how logics produced by technology permeate public administration models. Our approach is based on a view of technology as a new ideal type of institutional order in the inter-institutional system. We advance in post-management trends, bringing elements that identify how this new approach is formed from the logics produced by technology. Finally, we discuss the implications of our theoretical developments for public managers and future research.

Keywords: Information technology, institutional logics, administrative reform, New Public Management, Post-managerial trends, e-government

1. Introduction

Public sector organizations have multiple societal roles and faced numerous administrative reforms over time. These reforms came as administrative trends based on different theories and their own characteristics. Throughout its deployments around the world, to a greater or lesser extent, current models have not surpassed previous models and started to coexist in different measures, which brought a hybrid and complex nature to the public sector organizations (Christensen & Lægreid, 2011). When studied from the perspective of institutional logics, institutional transformations help us understand mechanisms of change and stability and which are the material and symbolic dimensions (Friedland & Alford, 1991) involved in a given context. In this paper, we argue that the logics produced by technology are present in the constitution of a new public administration route with which the old models interact and change their direction.

Authors of classic public administration had some elements in common about their main characteristics, such as the delivery of services through agencies, democratically elected politicians, hierarchy and control of managers, public values such as efficiency and rationality, and limited citizen involvement (Denhardt & Denhardt, 2007). These features formed the fertile ground for one of the main administrative approaches, with the seminal work of Max Weber (1922). The dominant practices of bureaucracy were reflected in following orders and executing scheduled tasks in exchange for a salary.

Years later, the public choice theory emerged and focused on the individual as a decision-maker. Borrowing the characteristics of the economic man, in the public choice, the individual "is rational, self-interested, and seeks to maximize his own 'utilities'" (Denhardt & Denhardt, 2007, p.26). Another idea associated with this theory concerns the different rules and decision situations, leading to different choices. Thus, the public choice provides that the public governance system should act in structuring the decision rules.

The public choice approach presupposes the application of economic models for non-market circumstances, especially government and political science, to provide structures and incentives to guide human behavior (Denhardt & Denhardt, 2007). From this view, we have the theory of public choice as a consolidated beginning of a transition between the classic approach of public administration, operating from Weberian bureaucratic characteristics in a state logic, and that later called New Public Management, in a market logic. The first significant milestone in this new era of public administration discourse came from the book *Reinventing Government* by Osborne and Gaebler (1992). This approach is

based on budget cuts, privatization, competitiveness, and performance measurement, among others (Gruening, 2001).

The New Public Management represented a set of propositions that formed the basis for managerial reforms, with structural changes and redesign of systems and processes in several countries. The democratization of information and communication technologies forced governments to promote adaptations to meet a new positioning of the citizen as a user of government services: closer, informed, and predisposed to dialogue. Concepts such as transparency, participation, co-creation, and openness took over speeches related to public administration. Not necessarily representing a new basis for management reforms, these characteristics point to the micro-improvements observed by Pollitt and Bouckaert (2004), continuous advances in processes and services, which can occur on a greater or lesser scale and meet the local needs observed by the public servants.

Post-New Public Management paradigms are referred to as New Public Service (Denhardt & Denhardt, 2000) and New Public Governance (Polzer et al., 2016). The digital age is an event with the potential to promote a complex system of public administration changes in many dimensions, such as the manipulation of information and the "transition to fully digital modes of operation for many government agencies" (p. 478).

A recognized landmark of this new trend is the Open Government Initiative, an effort by the President Barack Obama administration of the United States to increase participation, collaboration, and transparency through new technologies (The White House, 2009). Recently, governments of countries such as the digital nations are already operating in more advanced governance frameworks to enable greater use of technology. In other countries, such as Brazil, the race is on for regulations that make the use of new technologies viable, with projects and new laws that encourage local governments to at least study technological possibilities.

The discussion about the role of technology in the public sector transformations became inevitable. Initially seen as an enabling tool for improvements within a logic of efficiency - aligned with the New Public Management, the technology started to produce its logic, becoming a source of legitimacy among government organizations. As a result, many management processes today revolve around the technology itself, being technology the end rather than the means.

Assuming that the bureaucratic approach is aligned with the State order, that New Public Management is aligned with market order, and that technology is a new institutional

order able to produce logics, our research question is: **how do the logics produced by technology permeate public administration models?**

To answer it, we produced a systematic literature review to provide an overview of the logics present in public sector organizations and how the logics produced by technology are manifested in this scenario over time. The structure of this article is as follows: section 2 lays the theoretical foundations concerning the institutional logic perspective and its relation to public sector administrative reforms. In the third section, we present our research methodology for the literature review. After that, we present the results, followed by a discussion and conclusions.

2. Administrative reforms from the perspective of institutional logics

The observation of public administration practice demonstrates the orchestration of constitutive elements of different approaches. Public agents make their actions more flexible toward specific social and political guidelines. Depending on the time they occurred, these guidelines were directed to different organizational principles, acting at all levels and allowing actors to manipulate logics and produce their organization in different forms, hybrid or not. The consistency with which new guidelines emerged in the public sector reveals clear structures characteristic of administrative models.

Administrative reforms worldwide took place in similar periods and are usually based on similar content and pre-established change rules. Variations in changes resulting from reforms occur depending on several key factors, such as the political system, administrative styles (Howlett, 2002), or institutional logics (Mzenzi & Gaspar, 2021; Oliveira, Rodrigues & Craig, 2021; Polzer et al., 2016). Reforms are recognized in the literature for increasing hybridization in various dynamics (Berg & Pinheiro, 2016). Public administration paradigms offer central ideas and reference points, defining directions, specific practices, and instruments (Polzer et al., 2016) from which institutional actors promote their own combinations from their own context. In this work, we discuss the origin of the main paradigms from the perspective of institutional logics.

Institutional logics help to understand phenomena from social constructions beyond rationality. Institutional change occurs from the micro and sub-organizational level to the macro societal and global level, pressured by different forces, in different ways, and in different periods (Dacin et al., 2002). Institutional logics are defined by Thornton and Ocasio (2008) as "the socially constructed, historical patterns of cultural symbols and material

practices, including assumptions, values and beliefs, by which individuals and organizations provide meaning to their daily activity, organize time and space, and reproduces their lives and experiences". The patterns formed by the logics come from an inter-institutional system with potentially contradictory institutional orders, with a material and symbolic part and active at the individual, organizational, and societal levels (Friedland & Alford, 1991). Thornton et al. (2013) review the orders proposed by the authors in 1991 and propose seven ideal types of institutional order – the family, religion, state, market, profession, corporation, and community. Orders and logics differ insofar as logics are constituted from categorical elements of different orders, which can give rise to hybrid systems (Thornton, 2015).

In this study, we adopted the premise that technology is also configured as an institutional order, producing observable logics at different levels and sectors of society, including the public service. The public sector is a scenario marked by increasing complexity and hybridization arising from the attempt to meet ideas and sometimes conflicting demands: "The NPM reform wave, seen as a reaction to the challenges and problems of the 'old public administration,' and the post-NPM reform wave, seen partly as a reaction to the negative effects of NPM, are together resulting in a complex sedimentation or layering of structural and cultural features" (Christensen & Lægreid, 2011).

Next, we will discuss the three approaches to public administration most present in the debate on hybridization and reforms and their relationship with institutional orders:

a. Bureaucratic approach and the state order

The theoretical bases of the bureaucratic approach are built in the 1922 work of Max Weber, *Economy and Society*, in which the author describes ideal types of domination, framing bureaucratic organizations in the type whose form of domination is the exercise of rational-legal authority. Secchi (2009, p. 351) comments on the formation of power in the Weberian bureaucratic approach, which stems from guidelines and norms, from formal institutions, and not from charisma or tradition. "From this fundamental axiom, the three main characteristics of the bureaucratic model are derived: formality, impersonality, and professionalism."

Weber (1947) puts as fundamental categories of the ideal type based on legal authority:

- The continuous organization of official functions limited by rules;
- An explicit "sphere of competence," with a clear division of labor and obligations to perform, the means necessary for this performance, and the designation of authorities necessary for this;
- The principle of hierarchy, so that lower work units must obey higher ones;
- Technical rules in conducting work, which ultimately demands technical skills for their performance;
- Members of the administrative team must not have a proprietary relationship with the means of production;
- Administrative acts, decisions, and rules are formulated and subsequently documented in writing.

The objectivity, impersonality, and rationality intrinsic to bureaucratic organizations' administrative acts were a concern for Weber himself when considering their possible consequences for democracy and the individual. Even so, the value of bureaucracy as a facilitator of process efficiency exerted a strong influence on the early 20th century's administrative theories and is still visible today in approaches and practices (Denhardt & Denhardt, 2007). Regarding the perspective of institutional logic, the positioning of the bureaucratic public administration within the order of the state provides for the "rationalization and regulation of human activity by legal and bureaucratic hierarchies" (Friedland & Alford, 1991).

b. New Public Management and the market order

The New Public Management approach as a practice started in the late seventies through the actions of British Prime Minister Margaret Thatcher. It gained more strength in the eighties, emerging as an alternative capable of detaching the public sector from the difficulties that the bureaucratic way of conducting government implied to the managers. The first significant milestone in this new era of public administration discourse came from the book *Reinventing Government* by Osborne and Gaebler (1992), followed by the National Performance Review (Gore, 1993), an initiative of the administration of American President

Bill Clinton aimed at reform the management of the federal government, resulting in a more efficient structure.

The New Public Management approach is based on budget cuts, privatization, competitiveness, and performance measurement, among others (Gruening, 2001). In this vein, Denhardt and Denhardt (2007) argue that the approach suggests that the government should only be involved in activities that cannot be privatized or outsourced. Also, the authors emphasize the administrator's role as one who must seek efficiency and results for citizens. This last statement brings another relevant element that differentiates New Public Management as a managerial approach: as a government that emulates market practices strongly oriented by the economy, we have the paradigm of the vision about the citizen as a client of public services.

Osborne and Gaebler (1994, p. 183) argue that the appropriation of the characteristics of the company x client relationship by public agencies starts to serve a society that is in transformation, which now no longer ignores the government, but rather demands changes in services that suit their way of life. If added to government decentralization and services outsourcing by private entities, this new kind of relationship would result in competitiveness and culminate in the improvement in general in the provision of services to citizens. In short, the approach delegates to the government the responsibility of creating "arenas of options" so that individuals can make choices based on their interests (Denhardt & Denhardt, 2007).

From the perspective of institutional logic, the characteristics that mark the administrative reforms derived from the New Public Management are aligned with the market order, which central logic is the "accumulation and commodification of human activity" (Friedland & Alford, 1991).

c. Post-managerial trends and the technology order

The New Public Management represented a set of propositions that formed the basis for managerial reforms, with structural changes and redesign of systems and processes in several countries. The international dimensions that the movement has taken - including using English as a common language while demonstrating the movement's global strength- help create the impression of uniformity in management reforms and mask deep divergences in the practice of governments (Pollitt & Bouckaert, 2004).

The authors criticize the normative burden of the New Public Management, with its vocabulary - strategy, planning, performance - which constitutes a basic script to which the

administration must adapt. In the same vein, Denhardt and Denhardt (2007, p.26) argue that, despite having emerged as an alternative to the rational model of classical administration, the New Public Administration also presents "a dependence and commitment to models of rational choice."

Cavalcante (2018) observes, from the literature developed from 2007, the paths towards which the public administration shows signs of walking. Among them, the author mentions collaborative processes in multiple forms; formation of networks for the provision of services; integration, promoting the vision of a cohesive, non-fragmented government; accountability and responsiveness; expansion of social participation channels; professionalization and strengthening of teams and incorporation of technology in the processes. This set of characteristics present in post-managerial trends was seen as something in line with the logic produced by the order of democracy (Polzer et al., 2016). Although in the framework developed by Thornton, Ocasio & Lounsbury (2012), the order of democracy is no longer present among the ideal types of the inter-institutional system when we consider the concept of participation and the extension of popular control over human activity (Friedland & Alford, 1991), it is possible to understand that forces external to the established institutional orders act on new paradigms of public administration.

With a firm root in organizational humanism, the New Public Service, a framework developed by Denhardt and Denhardt (2000), proposes to rethink the government's position in society, synthesizing post-managerial tendencies and placing itself as a new public management approach. Despite maintaining a strategic view of the government, the New Public Service discomforts the administrator's view, showing the need for actions based on collaboration and citizen participation. Initially seen as a user of public services and, later, as a customer, the citizen is granted the title of "citizen" by the authors, with characteristics different from the first two. The public servant has the role of helping him identify and address his needs. In this sense, for Denhardt and Denhardt (2000, p. 554), "the public interest is the objective, not the by-product. Administrators must contribute to constructing a collective, of the shared notion of public interest".

Another post-management trend brought by Dunleavy, Margetts, Basow, and Tinkler (2005), although not divergent from the New Public Service, maintains its focus on governance in the digital age. According to the authors, in the current period, information technology systems no longer affect only behind-the-scenes processes, playing an essential role in the relationship between government agencies and civil society. The authors argue that this is the first time a social context allows management changes in governments other than

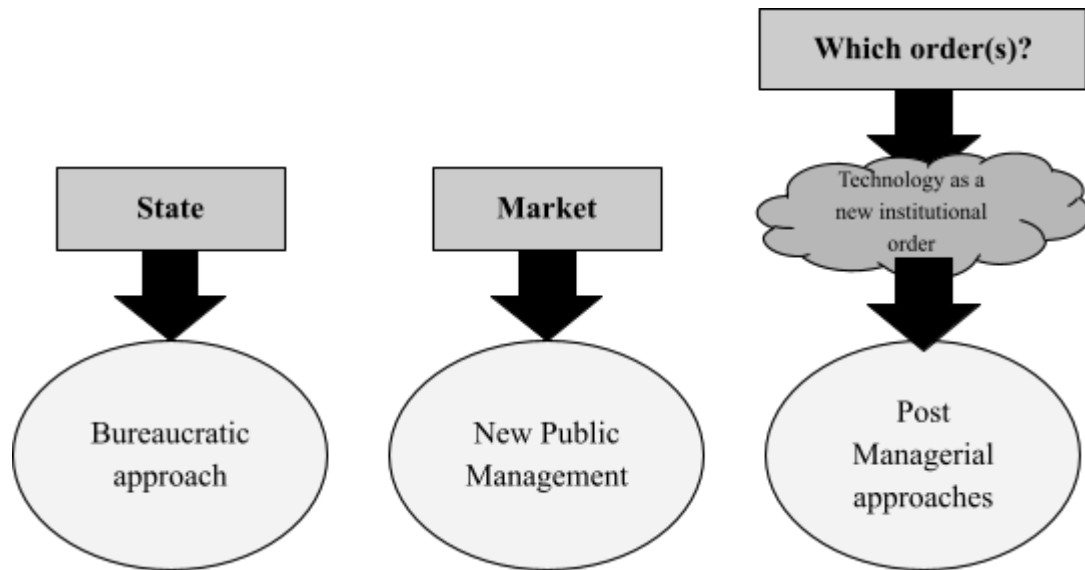
those in more developed countries. The digital age is an event that can promote a complex system of public administration changes in many dimensions, such as the manipulation of information and the "transition to fully digital modes of operation for many government agencies" (p. 478).

In order to explore the potential of governance in the digital age, Dunleavy et al. (2005) enumerate themes of public administration activities, such as fully digital operations and process reengineering focused on needs, in addition to the reintegration of public services within the scope of the government - a portion that the New Public Administration had delegated to private companies and civil society.

In summary, post-management trends do not present themselves as a break from previous approaches but as a reflection that cuts edges and proposes the evolution of public administration to the current social context, reconnecting it to its public. Concerning the perspective of institutional logic, we have studies that align post-management trends to the order of democracy, whose central logic is the "participation and extension of popular control of human activity" (Friedland & Alford, 1991). However, the revision of the inter-institutional system removes the order of democracy from ideal types. Nevertheless, we can still cite other orders that are part of these trends, such as community or profession.

However, post-managerial approaches and trends do not clearly demonstrate what this influence would be. We could be visualizing the formation of a hybrid approach, with elements borrowed from bureaucracy and managerialism, since post-managerial approaches trim many edges but maintain previous practices. However, the strong trends in governance and digital services, which redesign processes and relations between the government and society, and present new sources of legitimacy between institutions, may suggest other orders' performance in forming new practices. It is known that "information technology has long been deployed in developing countries as a means of modernizing bureaucracies by rationalizing their practices" (Addo, 2016, p. 2). Figure 1 demonstrates the administrative approaches and the dominant institutional orders in each paradigm.

Figure 1: How does technology act in the new paradigms of public administration?



Source: author

When we place technology as an institutional order, we can explain the adoption of new behaviors and actions in an environment steeped in information systems. In the following sections, we will demonstrate how the logics produced act in the public administration scenario and interact with the other logics.

3. Methods

To identify how the logics produced by technology permeate public administration models, we conducted a systematic review of the literature. Our literature review took place according to the "Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)" protocol, adopted worldwide for the structuring of systematic reviews and meta-analyses, consisting of a checklist of twenty-seven items and a four-phase flowchart (Moher, Liberati, Tetzlaff, Altman & PRISMA, 2009).

Seeking to identify the presence of discussions involving technology among institutional logics in the public service, in our literature review, we searched for relevant studies between 1991 (which we consider the beginning of discussions on institutional logic) and 2022. The rationale was to include studies that analyzed the entry of technology into public administration from the perspective of institutional logic.

To identify these studies, we used the Scopus database, using the combination of terms "technology" or "e-government" or "digital" and "government" or "public service" and

"institutional logics" in the title, abstract, and keywords. We search articles published in journals filtered by Social Science, Business Management and Accounting, and Computer Sciences. A final list of 58 papers was included in the analysis and is in Appendix A. It is important to emphasize that we search for research exclusively based on the perspective of institutional logic to carry out this search. This limited us in the diversity of terms used in the combination, and some terms related to the topic, when combined with "public administration" or "institutional logic" did not bring results.

Once we ended the research, the studies screening was performed using Rayyan software to validate the papers' relevance to our research. Studies included in the research used the institutional logics as a theoretical lens to assess the entry of technology into the public service scenario. Our research interest is in how organizational actors see, manipulate, and interact with logics produced by technology and what their role is, and its consequences in terms of governance. Thus, studies whose objectives dealt with architecture, geography, social movements, or those aimed at debating factors concerning the private sector were excluded from the screening phase. Therefore, after screening, 29 articles met the criteria and were analyzed.

The coding approach was inductive and started with the entire reading of the articles. Initially, we sought to identify the institutional logics linked to public administration approaches present in the analyzed scenarios and the forms of hybridization perceived. Coding also sought to capture the logics produced by technology and how they interact with others, assuming that technology is configured as an institutional order.

4. Results and discussion

Table 8 summarizes the analyzed articles and shows the result of the coding process. In each article, we seek to identify the association of the current public administration approach with an institutional order. We also extracted keywords that provided us with clues about the interaction of technology with the elements present in each context.

Table 8: Summary of analyzed articles

Title	Elements that link public administration approaches with institutional orders	Elements that give clues about the role of technology in the context
Competing logics in a hybrid organization: ICT service provision in the Italian health care sector	The research talks about the hybrid format of management and the compatibility of logics, in which the regulatory/bureaucratic logic comes from the State, the New Public Management comes from the market order and the New Public Governance comes from the service logic.	Level of service quality Accountability Service usefulness
Transforming urban democracy through social movements: the experience of Ahora Madrid	-	-
Accounting and statecraft in China: Accrual accounting for effective government rather than efficient market	The New Public Management leads to privatization and the minimization of the State within a market logic.	The entry of technology can reinforce elements such as state control and presence.
Examining the predictive relevance of security, privacy risk factors, and institutional logics for e-government service adoption	The article uses the concept of institutional logic as socio-economic characteristics.	The entry of technology needs to deal with conflicts such as privacy, security, age and cultural background of the population.
Institutional logics at play in a mobility-as-a-service ecosystem	Legitimacy in the logic of the state comes from bureaucratic and democratic practices, with individuals acting in accordance with political objectives; market logic is rooted in economics and related to private sector management methods.	The technology enters within a logic of experimentation, with innovation and design aimed at solving problems.
Rethinking the digital democratic affordance and its impact on political representation: Toward a new framework	-	-
E-government through the lens of trading zones: A case of e-government implementation in Dubai	New Public Management comes from market practices applied to the public sector.	E-government solutions are often introduced in contexts with managerial practices. ICT solutions come from a collective meaning, with enactment by actors inserted in organizational and institutional arrangements.
Cloud computing and ERP assimilation in the public sector: institutional perspectives	There are no elements that mention public administration approaches and their relationship with institutional logics.	Technology is linked to logics regarding business processes reengineering. The ERP logic can promote profound changes in organizational culture.

Applications of blockchain technology in the Brazilian government	The bureaucratic public administration derives from the state order, and the practices linked to New Public Management come from the market order. Yet, post-managerial trends go back to the order of democracy.	The technology is in line with post-management trends, enabling transparency, accountability and decentralization.
Social bureaucracy? The integration of social media into government communication	Although the study does not mention public administration approaches, the flexibilization of the use of conventional media for social networks demonstrates alignment with trends of transparency and proximity to the citizen.	Social networks as a technology aligned with transparency and proximity to the citizen.
The Negative Effects of Institutional Logic Multiplicity on Service Platforms in Intermodal Mobility Ecosystems	The maintenance of mandatory services for taxpayers was framed in a State logic. Charging for the efficiency of means of transport is framed in a market logic. When the focus is on social participation and meeting the needs of the population, the authors speak of a civil society logic.	Technology aligned with a service logic focused on social objectives.
The role of institutions in achieving radical innovation	There are no elements that mention public administration approaches and their relationship with institutional logics.	Technology linked to innovation.
Duos and Duels in Field Evolution: How Governments and Interorganizational Networks Relate	The bureaucratic practice comes from the State and the practices linked to New Public Management come from the market order.	Technology as innovation, encouraged or blocked by networks.
Changes in the social work profession as responses to institutional multiplicity	The orders of the state and the market are present in organizations, as well as the order of professions, which regulates the practices to be absorbed or not.	Technologies in government have a hybrid nature.
Institutional logic and performed connectivity: A thematic analysis of web messages of Canadian federal agencies	A recent line of governance takes into account the interactivity and active involvement of citizens.	Technology promotes connectivity.
Embedding occupational health and safety in the procurement and management of infrastructure projects: institutional logics at play in the context of new public management	NPM represented a paradigmatic break from the traditional bureaucratic model of public administration and emulates market practices.	Technology reduces costs and improves quality.

Searching for the real sustainable smart city?	E-government tends to focus on a logic of services rather than promoting citizen engagement.	Technology is a supporting factor for modern and sustainable cities.
Opportunities and challenges of digitized discretionary practices: a public service worker perspective	In digitized street-level bureaucracies, the institutional logics of state-professionalism and market-managerialism are salient.	Technology enables more efficient and fair decision-making.
Institutionalization to internationalization: The transformational dynamics and outward foreign direct investment of state-owned enterprises	The study links the bureaucratic approach to the state order and the managerial approach to the market order.	Technology is seen as a competitive advantage in a country.
The digital society and provision of welfare services	The study suggests that a new model of service provision for citizens will emerge from the development of a digital society.	The digital society drives technology in the field with real-time information, algorithms, data-driven decisions, among others. A new model based on digital society shifts the power relationship between state and society.
Institutional basis for research boom: From catch-up development to advanced economy	-	-
Determining the importance of Hospital Information System adoption factors using Fuzzy Analytic Network Process (ANP)	There are no elements that mention public administration approaches and their relationship with institutional logics.	Technology as innovation.
Imbrications of institutional logics: The case of an e-government initiative in Greece	The article adopts the bureaucratic approach as a result of the state order, and e-government solutions as a result of other logics, centered on the citizen.	E-government initiatives represent a shift from a bureaucratic to a citizen-centric institutional logic.
Institutional entrepreneurs: The driving force in institutionalization of public systems in developing countries	There are no elements that mention public administration approaches and their relationship with institutional logics.	Technology as a way to improve transparency and accountability. Technology is pushed onto the scene by institutional entrepreneurs.
Government driven model of institutional change through adoption of new technology: A case study of the failed pharmaceutical bidding and procurement platforms in China	The order of the State is expressed by centralization.	Technology seen as problem-solving. Regulation prepares the entry of technology.
For appropriateness or consequences? Explaining organizational change in English local government	There is a concern with performance in local government resulting from the marketization of public services.	Technology enters the scene under micro-processes.

The role of institutional logics in the design of E-governance systems	There are no elements that mention public administration approaches and their relationship with institutional logics.	Technology is pushed to the institutional scene by e-champions (institutional entrepreneurs). Technology as a social construction. Technology linked to governance, transparency, accountability and citizen participation.
Conflicting institutional logics: A national programme for IT in the organisational field of healthcare	State order is expressed by control. The research also alludes to the Professional order.	Technology produces mixed results. Technology promotes efficiency and reduces costs.
Organizational fields and the diffusion of information technologies within and across the nonprofit and public sectors: A preliminary theory	State logic is related to bureaucracy and red tape.	The article mentions conflicts between logics for the adoption of technologies in the public and non-profit sectors. The authors talk about "incompatible, and sometimes contradictory information systems and expectations" (p.441).
The Process Of Change In Public Organizations	Scientific management and technical progress are seen as a logic of conflict with the dominant public administration, which is political and institutional.	Technology linked to managerialism.

Of the 29 articles analyzed, three did not deal with technology permeating public administration. The results show that the bureaucratic public administration and New Public Management approaches are consistently associated, respectively, with the institutional orders of the State and the Market. Hybridization is also a consistent observation across the studies performed. Bureaucratic and managerial approaches have always conflicted, the first claiming order and hierarchy, the second efficiency and profit. Although most of the narratives suggest that the NPM would overcome the bureaucratic model, due to the interplay of market and state logics, in all analyses, we find forms of hybridization and complexity without a new model surpassing a previous model.

A single study places technology as an affordance within the context of New Public Management, which is an efficient mechanism of control and accountability. In the other studies, technology enters the public sphere with a more emblematic role. It comes as a result of social demand, in a context considered to be the "digital society," in which not only public agents who decide on public administration are included, but also citizens who demand services. From this perspective, we see that, even within a bureaucratic order, technology also

came in, relieving the tensions between the two management models or even merging and strengthening the bureaucratic logic, adding to the latter a greater capacity for control and domination.

Another piece of data that demonstrates that technology is not included in the market order, constituting its own logic, is the name given to e-government. In itself, the digitalization of government processes is seen as administrative reform. The vocabulary employed in these three approaches to public administration is also clearly demarcated by their differences: when it comes to naming the act of managing the public institution, it is a recurrent term in the language of bureaucratic administration "State," NPM "Management" and actions within the context of e-government "governance."

We find a robust citizen participation agenda within the concept of governance, from micro-participations, such as voting, to maximizing this concept, such as citizen collaboration in government actions and direct exchanges between citizens, companies, and public institutions. Technology is cited as a logic produced by democracy order in some of the studies, statement that we consider for analysis purposes. However, we reinforce that it is no longer part of the inter-institutional system from the work of Thornton, Ocasio, and Lounsbury (2012). The very entry of technological projects into the public arena stems from a social demand, which demonstrates a link between national culture and the adoption of e-government (Bayaga, 2022). In some cases, technology has become a political and ideological agenda, and the role of the social entrepreneur is often cited in the studies analyzed.

When referring to technology-based projects, the logic of services is also cited in the studies. A weakness of most of these studies resides in the fact that they do not refer to which institutional order the logic of services belongs. They refer to a logic that makes the public service citizen-centered, allowing high connectivity and easy problem-solving. This approach also reflects on the labor practice of the street-level bureaucrat, who reports transformations in decision-making arising from the assertiveness promoted by digital tools (Busch, Henriksen, & Sæbø, 2018).

The difference between digitization and digitalization also comes into play, the former meaning the simple transposition of existing work tools into digital tools but keeping the same *modus operandi*, which Busch et al. (2018) call "encoding practice." Digitalization embraces new work practices, emphasizing the dual character of technology: how it influences and is influenced by humans. Within the practice of e-government, new forms of social organization and less hierarchical and structured relationships around public services are expected.

In the papers analyzed, we have consistent and clear reports on the presence of bureaucratic administration, New Public Management, and post-management trends in which reports on technological processes are constant.

The allusion made to technology as a characteristic of New Public Management is related mainly to efficiency, public-private partnerships, and cost reduction. The suggested proposition is not incorrect insofar as we speak of hybridization, in which logics combine to form new practices. As in NPM, in the bureaucratic approach, we also see the presence of technology. As far as market logic is concerned, however, cost reduction is not always true when we talk about technology: experimentation is a crucial part of technological logic, and it will not always result in the best investment. Likewise, a technology designed with a purpose will not always be used in this way. Technologies change rapidly, become obsolete, and impact services, professionals, and citizens in unexpected ways. Even concerning public-private partnerships, we argue that they come from a centrality other than privatization, but the provision of better services to the citizen. Rethinking public governance for a digital logic, within an ideal type, therefore, would be aligned neither with bureaucracy nor with New Public Management. When we talk about post-managerial trends such as the New Public Governance or the New Public Service, we find fertile ground for the development of e-government. Table 9 compiles these approaches, core logic, command, and observed characteristics:

Table 9: Technology as a producer of institutional logics in Public Administration

Approach	Bureaucratic administration	New Public Management	Post-managerial approach
Logics	State	Market	Service/Digital/Experimental/Democracy/Professional/Governance/Citizen Centered
Command definition	State	Management	Governance

Characteristics	Dominance Control Hierarchy Digitization	Efficiency Privatization Minimization of state presence Cost reduction	Accountability Service logic Participation Non-structured relations Progress Automating decision-making Reducing uncertainty Digitalization Public-private partnership
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Our results also point, to a greater or lesser degree, and with the predominance of one or more logics, to hybridization in public administration. All models of administrative reforms came imbued with opportunities and challenges for organizations. In New Public Management, the proposal to the public service was to emulate practices of the corporate world, abandoning the image of the voting citizen and addressing him as a client. On the other hand, within a logic of digital governance, we have the return of the citizen as such, being the center of the services and from whom active participation is expected. From all the material analyzed, we observed that organizations adopted practices that improved processes and performance in their adaptation to digital logics, but without abandoning previous models. The most common forms of hybridization in this scenario were layering, blending, and imbrication.

The interplay of the logics also shifted the direction the public administration was looking. There has been a shift from control and efficiency to transparency and accountability, a perspective located within the spectrum of e-government. The use of information systems by governments, as well as by any other organizations, "are inscribed with implicit or explicit values that have a bearing on how and for what purposes they are used" (Mundkur & Venkatesh, 2009). Recent research in institutional logic categorizes technology as an affordance, showing how it changes the focus of attention of institutional logics. From our analysis, we were not able to find the technology inscribed in the other institutional orders but producing its own logics, as in the case of the implementation of the e-procurement system in the city of Yogyakarta in Indonesia, in which the institutionalization of technology produced the logic dominant of the best processes (Wahid & Sein, 2013). When information systems enter the public organization, we have essential disruptions in work processes and micro and macro objectives and conflict with existing logics.

5. Conclusion

For many years, the New Public Management approach was predominant in the discussion of administrative reforms. It included all the issues that sought to bring efficiency to the government, overcoming bureaucratic administration. From its entry into the institutional scenario until the present day, whenever we mention cost reduction and modernization, the reform brought about by the managerial model seems to be the model in question. At the same time, public organizations worldwide are under pressure for better processes and services, for the active participation of society, and the centralization of their focus on the figure of the citizen. These are some characteristics of post-management trends, which increasingly take the discussion of public administration and the very perspective of e-government and issues such as transparency and accountability.

Post-managerial trends, among them the New Public Service and the New Public Governance, trimmed the edges of previous approaches and aligned themselves with society's demands for more active participation in decisions and, mainly, for the support of information technology, which irrevocably permeates the way society changes and organizes itself. Our findings point to the likelihood of hybridization in public administration. In this research, we started from the definition of Christensen and Lægreid (2011) that "hybrid organizations are multifunctional entities combining different tasks, values and organizational forms" (p.5). We found that organizations adopted practices that improved their processes and performance when adapting to digital logics, but they didn't abandon their previous models. Hybridization most commonly took the form of layering, blending, and imbrication.

In this research, we seek to promote reflection on these trends, especially concerning the role of technology. As an institutional order, our review showed that information systems permeate the public sphere, producing logics different from the market and the state. There is recognition of technology as a vital agent of services and as a space provider for experimentation, even if this does not mean reducing costs. In line with the perspective of institutional logic, technology meets two requirements when entering the field: the first concerns its constitution as an institutional order. Our study shows how technology creates its own rules and vocabulary, juxtaposing itself with other orders. Second, we observe technology acting at the individual, organizational and individual levels, guiding actions at the micro and macro levels.

In the practical sphere of public administration, this paper explains the direction of organizational change at the managerial and street-level levels. It helps public managers to

conduct meaningful and effective public services and policies. Our focus on explaining e-government actions as derived from the logics produced by technology also collaborates with the perspective of institutional logic, helping other scholars to promote analyzes of social phenomena from institutional orders as broader social structures than the logics they produce.

Within organizational studies, our research contributes by bringing a new possibility of analysis lens to technological innovations. How organizational actors manipulate the logics produced by technology shows that information systems are not just the result of market logic and rationality. Profit maximization is sometimes seen as the macro objective of organizational reconfigurations brought about by technology. However, in many cases, technology-related phenomena do not fit into this category, such as when a technology is developed for one purpose and used for another. In this sense, when we position technology as an institutional order, we can assess phenomena that involve digitization as a result of the attempt to reconcile different demands and pressures.

In this research, we had the limitation of a very narrow review due to the total focus on institutional logics, public administration and technology. This research also did not consider local characteristics of countries or states, which can cause important variations in these paradigms. We suggest that future research delve into the theme, bringing reviews of other themes that verify the performance of technology as an institutional order. Future studies can also empirically analyze the different public administration approaches to validate the technology in the inter-institutional system.

Appendix A: list of identified articles

Title	Year	Journal	Authors
Competing logics in a hybrid organization: ICT service provision in the Italian health care sector	2022	Accounting, Auditing and Accountability Journal	Maran, L. and Lowe, A.
The production of ignorance about medication abortion in Tunisia: between state policies, medical opposition, patriarchal logics and Islamic revival*	2022	Reproductive Biomedicine and Society Online	Maffi, I.
Transforming the construction sector: an institutional complexity perspective*	2022	Construction Innovation	Oti-Sarpong, K. and Pärn, E.A. and Burgess, G. and Zaki, M.
Transforming urban democracy through social movements: the experience of Ahora Madrid	2022	Social Movement Studies	Mota Consejero, F. and Janoschka, M.
Accounting and statecraft in China: Accrual accounting for effective government rather than efficient market	2022	Critical Perspectives on Accounting	Zhang, E.
Examining the predictive relevance of security, privacy risk factors, and institutional logics for e-government service adoption	2022	Electronic Journal of Information Systems in Developing Countries	Bayaga, A.
Institutional logics at play in a mobility-as-a-service ecosystem	2021	Sustainability (Switzerland)	Guyader, H. and Nansubuga, B. and Skill, K.
“We ‘said her name’ and got zucked”: Black Women Calling-out the Carceral Logics of Digital Platforms*	2021	Gender and Society	Gray, K.L. and Stein, K.
Rethinking the digital democratic affordance and its impact on political representation: Toward a new framework	2021	New Media and Society	Deseriis, M.
E-government through the lens of trading zones: A case of e-government implementation in Dubai	2021	Electronic Journal of Information Systems in Developing Countries	Alghatam, N.H.
Cloud computing and ERP assimilation in the public sector: institutional perspectives	2022	Transforming Government: People, Process and Policy	Alsharari, N.M.
Symbolic representations of cultural industries at content trade fairs: Bourdieu's “economic world reversed” revisited*	2021	Poetics	Gebesmair, A. and Ebner-Zarl, A. and Musik, C.
Applications of blockchain technology in the Brazilian government	2021	International Journal of Electronic Governance	Lacerda, A.B. and Dias Lopes, F.
Social bureaucracy? The integration of social media into government communication	2020	Communications	Figenschou, T.U.
The Negative Effects of Institutional Logic Multiplicity on Service Platforms in Intermodal Mobility Ecosystems	2020	Business and Information Systems Engineering	Schulz, T. and Böhm, M. and Gewald, H. and Celik, Z. and Krcmar, H.
Decentering Responsibilization: Towards a Nomos of Governmentality in Mexico*	2020	International Political Sociology	Emerson, R.G.
The role of institutions in achieving radical innovation	2020	Marketing Intelligence and Planning	Ventura, R. and Quero, M.J. and Díaz-Méndez, M.

Duos and Duels in Field Evolution: How Governments and Interorganizational Networks Relate	2020	Organization Studies	Mountford, N. and Geiger, S.
Changes in the social work profession as responses to institutional multiplicity	2020	International Journal of Sociology and Social Policy	Lyneborg, A.O.
Anticipatory witnessing: military bases and the politics of pre-empting access*	2020	Information Communication and Society	McCammon, M.
Gendered labour process: Exploration in an information technology services organization in India*	2019	International Journal of Sociology and Social Policy	Reddy, R. and Sharma, A.K. and Jha, M.
Institutional logic and performed connectivity: A thematic analysis of web messages of Canadian federal agencies	2019	Communiqer	Ivanov, I.E.
Embedding occupational health and safety in the procurement and management of infrastructure projects: institutional logics at play in the context of new public management	2019	Construction Management and Economics	Lingard, H. and Oswald, D. and Le, T.
Searching for the real sustainable smart city?	2019	Information Polity	Webster, C.W.R. and Leleux, C.
Opportunities and challenges of digitized discretionary practices: a public service worker perspective	2018	Government Information Quarterly	Busch, P.A. and Henriksen, H.Z. and Sæbø, Ø.
Teaching and research in Colombia from the perspective of academic capitalism*	2018	Education Policy Analysis Archives	Montes, I.C. and Mendoza, P.
Growth acceleration program in the state of Bahia and its contribution to face the basic sanitation universalization challenges*	2018	Urbe	Cunha, M.A. and Borja, P.C.
Institutionalization to internationalization: The transformational dynamics and outward foreign direct investment of state-owned enterprises	2018	International Journal of Public Sector Management	Redding, K.S. and Xie, E. and Tang, Q.
The digital society and provision of welfare services	2018	International Journal of Sociology and Social Policy	Pedersen, J.S. and Wilkinson, A.
The role of accounting in transforming public tertiary institutions in New Zealand*	2018	Accounting, Auditing and Accountability Journal	Narayan, A. and Stittle, J.
Institutional basis for research boom: From catch-up development to advanced economy	2017	Technological Forecasting and Social Change	Ahn, S.-J.
Argentinean electronic arts in the hallway of the international scene: Modernisation imaginaries and oscillating institutional developments*	2017	Artnodes	Adler, J.
How to Green the red Dragon: A Start-ups' Little Helper for Sustainable Development in China*	2016	Business Strategy and the Environment	Steinz, H.J. and Van Rijnsoever, F.J. and Nauta, F.
Determining the importance of Hospital Information System adoption factors using Fuzzy Analytic Network Process (ANP)	2016	Technological Forecasting and Social Change	Nilashi, M. and Ahmadi, H. and Ahani, A. and Ravangard, R. and Ibrahim, O.B.
Nuevas y viejas máscaras de la subcontratación en el capitalismo contemporáneo*	2016	Cuadernos del Cendes	Salas, C.

'Modeling' youth work: logic models, neoliberalism, and community praxis*	2016	International Studies in Sociology of Education	Carpenter, S.
Who Takes You to the Dance? How Partners' Institutional Logics Influence Innovation in Young Firms*	2015	Administrative Science Quarterly	Pahnke, E.C. and Katila, R. and Eisenhardt, K.M.
The European Union and neoliberal governmentality: Twinning in Tunisia and Egypt*	2015	European Journal of International Relations	İşleyen, B.
Cross-border mergers and acquisitions by emerging market firms: A comparative investigation*	2015	International Business Review	Deng, P. and Yang, M.
Implications of institutional logics: The case of an e-government initiative in Greece	2014	New Technology, Work and Employment	Hayes, N. and Introna, L. and Petrakaki, D.
Institutional entrepreneurs: The driving force in institutionalization of public systems in developing countries	2013	Transforming Government: People, Process and Policy	Wahid, F. and Sein, M.K.
The challenge of building effective hybrid organizations in Brazil*	2013	Journal on Chain and Network Science	De Britto Pires, A.M. and Lima Cruz Teixeira, F. and Hastenreiter Filho, H.N. and Góes Oliveira, S.R.
Competing for a citizen: "Visible" and "invisible" forms of state identity in Russia*	2012	Journal of Eurasian Studies	Sanina, A.
Government driven model of institutional change through adoption of new technology: A case study of the failed pharmaceutical bidding and procurement platforms in China	2012	Chinese Management Studies	Li, M. and Reimers, K.
Designed for impact: Widescreen and 360-degree cinematic interiors at the postwar world's fair*	2012	Interiors: Design, Architecture, Culture	Trafas, Z.
For appropriateness or consequences? Explaining organizational change in English local government	2011	Public Administration	Entwistle, T.
Diversity management and gender mainstreaming as technologies of government*	2011	Politics and Gender	Prügl, E.
The role of institutional logics in the design of E-governance systems	2009	Journal of Information Technology and Politics	Mundkur, A. and Venkatesh, M.
The Policies and Politics of Industrial Upgrading in Thailand during the Thaksin Era (2001-2006)*	2009	Asian Politics and Policy	Lauridsen, L.S.
Tourism, race and the state of nature: On the bio-poetics of government*	2008	Cultural Studies	Werry, M.
Conflicting institutional logics: A national programme for IT in the organisational field of healthcare	2007	Journal of Information Technology	Currie, W.L. and Guah, M.W.
Developing the Learning Door: A case study in youth participatory program planning*	2007	Evaluation and Program Planning	Randolph, J.J. and Eronen, P.J.
Organizational fields and the diffusion of information technologies within and across the nonprofit and public sectors: A preliminary theory	2006	American Review of Public Administration	Thatcher, J.B. and Brower, R.S. and Mason, R.M.

The role of management accounting in a company in transition from command to market economy*	2003	Journal of Small Business and Enterprise Development	Vamosi, T.
Global city formation in a capitalist developmental state: Tokyo and the waterfront sub-centre project*	2003	Urban Studies	Saito, A.
State building and capitalism: The rise of the Swedish bureaucracy*	1998	Scandinavian Political Studies	Rothstein, B.
The Roepke lecture in economic geography. The collective order of flexible production agglomerations: lessons for local economic development policy and strategic choice*	1992	Economic Geography	Scott, A.J.
The Process Of Change In Public Organizations	1989	Sociological Quarterly	Baxter, V.

**Papers excluded from the review*

4. PAPER III:

THE SOCIAL OUTCOMES FROM THE INTERPLAY OF LOGICS IN THE PUBLIC SECTOR: THE CASE OF ONLINE BIDDING SOLUTION, A BLOCKCHAIN-BASED APPLICATION

ABSTRACT

Public administration deals with numerous institutional orders that have been shaping administrative approaches for decades. Today, the public sector worldwide operates based on the complexity and hybridization of its processes within a logic that takes elements from the bureaucratic approach, New Public Management, and post-management trends. In this scenario, this research seeks to delve into these trends and the role of technology in influencing new institutional arrangements and obtaining different societal outcomes. For this, we conducted a case study on the application SOL - Online Bidding Solution, implemented by the government of Bahia. The application is based on blockchain technology and intends to serve cooperatives in municipalities in the State's interior, allowing them to make purchases through tenders. As a result, we identified several elements demonstrating that technology was institutionalized in a hybrid way in the organization and produced social results such as the empowerment of the population, economic development, the involvement of other actors in the community, and changes in organizational relationships.

Keywords: Information technology, institutional logics, administrative reform, blockchain, e-government

1. Introduction

Public sector organizations worldwide face a scarcity of financial resources combined with growing demand (Vickers et al., 2017). Digital innovation and electronic services are increasing in government institutions, resulting from social pressure, isomorphism, the reconfiguration of practices, and new organizational patterns. Today, the same sector that typically faces budget cuts, lack of incentives, and has long-career public servants needs to be aware of cutting-edge technologies, such as artificial intelligence, big data, and blockchain.

The multiple logics in public administration characterize the sector for its high levels of complexity and hibrydity. In the history of public administration, we have seen the logic produced by the order of the State come into conflict with the logic produced by the Market order, with the New Public Management approach and, later, come into conflict with the logics produced by post-managerial trends, closely linked to e-government and, consequently, the entry of the logics produced by technology in the field.

As a new institutional order that shapes organizational practices, we see technology generating new logics and being a factor capable of broadly explaining change and innovation. Today's adoption of technologies is related to social, cultural, and symbolic aspects, being an element of legitimacy that leads to organizational change (Hinings, Gegenhuber & Greenwood, 2018) and societal change (Faik et al., 2020). Technology, as a competence created and expressed in technological entities (Wyk, 2002), permeates the diverse spheres of human life, translating itself not only in artifacts, devices, and software but also in lifestyles, choices, and recombination of its characteristics in new forms and uses.

In this scenario of intense use and search for technologies, we have witnessed blockchain technology being born as the engine of Bitcoin, giving rise to a new era with cryptocurrencies and positioning itself as an evolution as symbolic as the internet itself, decentralizing transactions, bringing transparency and immutability to systems. Moreover, its disruptive potential distributed in a vast set of characteristics allows us to observe phenomena linked to institutional transformation in cases of the adoption of blockchain technology.

Since blockchain technology's advent, the literature has investigated its barriers and possibilities in several sectors, in addition to the financial industry. In the public sector, Ølnes et al. (2017) point out that blockchain technology can be used for any transaction or exchange of government information. Furthermore, much of the public sector's literature on handling

blockchain technology examines opportunities for implementing technologies. However, even in the most recent literature, its social impact on organizations and societal changes are not discussed. In this research, we aim to analyze the social transformation caused by the institutionalization of technology in the public sector through a case study of Online Bidding Solution, a blockchain-based application developed and made available by Bahia and Rio Grande do Norte states - in Brazil. Our view of societal change reproduces that of Faik et al. (2020) "as shifts in the multiplicity of logics that constitute the inter-institutional system" (p.5). Therefore, our research question is: **How does the interaction of logics in the public sector with those produced by technology affect societal outcomes?**

Our research shows that technology works at the individual, organizational and institutional levels. Once it enters the field through the interplay of other logics, technology promotes new business models, and the digital transformation occurs, although not at the disruptive speed theoretically advertised. First, we will give a brief overview of institutional logics in the public sector, followed by a discussion based on the transformative character of technology as an institution among the administrative approaches. Second, we will describe blockchain technology, its applications in public service, and its disruptive potential. Third, we will use the Online Bidding Solution case to explore social implications generated from the logics produced by technology. Finally, we draw some of our main findings.

2. Theoretical background

The institutional logics research produced a wide range of typologies useful to the study of different organizational and inter-organizational arrangements, such as public accountability (Hathaway & Askvik, 2021), governance (Franco-Torres, Kvålshaugen & Ugarelli, 2021), sustainability and new forms of consumption (Wittmayer et al., 2021). However, the perspective of institutional logic is recognized and criticized for being a theoretical lens that allows us to call "logic" from the operation of a computer to the change of a style (Alvesson & Spicer, 2017). According to the authors, research in institutional logic questions whether we should call it a theoretical lens or the phenomenon itself.

In this line, we believe that resuming the discussion on institutional orders as elements that precede the production of logics can go back to deepening the analytical possibilities of institutional logic. In this chapter, we will discuss the institutional orders present in public administration and how, when we consider technology as an institutional order, it is possible to analyze the paths of new trends in this sector more assertively. After this discussion, we

will explain the functioning and possibilities of blockchain technology for the public service, which will allow us to know our case study.

2.1. Institutional orders and logics in the public administration

The evolution of public administration has made its nature complex and hybrid, as it is an environment in which multiple structural and symbolic characteristics come into conflict and fragment, forming a new logic arising from these tensions (Christensen & Lægreid, 2010). The concept of institutional logic is specially adequate to deal with the complexity of public administration since it focuses on analyzing mechanisms of stability and change in organizations. After using the term for the first time in 1985, Friedland and Alford (1991) proposed a new approach that considers boundaries, instruments, and power structures to vary institutionally. Institutions are supra organizational patterns of activity through which humans conduct their material lives and symbolic systems to categorize activity and assign meaning to it. Institutional logics would be, in this context, "the grammars of practices available to practitioners" (Friedland & Arjaliès, 2019, p.9).

Western society's main institutional orders have a central logic that constitutes their organizational principles. These institutional orders are the market, the bureaucratic State, the family, democracy, and religion (Friedland & Alford, 1991). Their logic is based on a set of material practices and symbolic constructions. According to the authors, individuals can manipulate or reinterpret symbols and practices. In this context, institutional changes will occur by creating new social relationships and symbolic orders. In 2012, Thornton, Ocasio, and Lounsbury consolidated the review on institutional logics and proposed the systematization of institutional orders based on Weber's ideal types. The authors established an inter-institutional system built so that it can later be used as an analytical tool for organizational studies.

Family, Community, Religion, State, Market, Profession, and Corporation are considered institutional orders in this system. Community was the last category to integrate the inter-institutional system, before seen as a category arising from family, as a vision of meaningful relationships. According to Marquis, Lounsbury, and Greenwood (2016), however, this concept has been eroded with modernity. The authors describe the trajectory of community so that we can perceive its effects at different levels of society as a source of identity and structure in organizations.

In our research, we similarly assess that technology goes through a similar trajectory. Having already been evaluated as a carrier (Scott, 2008), a practice (Smets et al., 2017), and even an affordance that acts in other institutional orders (Faik et al., 2020), technology has changed its meaning for society, being today a source of legitimacy, construction of identities and acting in multilevel dimensions.

From a previous literature review that deals with the adoption of technology in the most diverse contexts, and considering the proposition of Thornton, Jones, and Kury (2005), which considers the drivers of institutional and organizational change institutional entrepreneurs, structural overlap, and historical sequencing of events, we bring in the following table a suggestion of the technology as an ideal type of the Inter-institutional System:

Table 10: Interinstitutional System - Technology in X-Axis

Y-Axis	X-Axis: Institutional Orders
Categories	Technology 8
Root Metaphor 1	Technology potential efficiency
Sources of legitimacy 2	Adhesion of technologies by major players, media discourse
Sources of authority 3	Specialist
Sources of identity 4	Technological bubbles and adoption of platforms
Basis of norms 5	Digital society
Basis of attention 6	Technological advancement
Basis of strategy 7	Improvement of the organization's performance
Informal control mechanisms 8	Technical significance
Economic system 9	Technological capitalism (knowledge-based)

Source: author

Conceptualizing Technology as an Institutional Order provides a useful analytical tool to explain organizational phenomena. Our research is conducted in the Brazilian public administration scenario as a cut that allows us to observe the interference of institutional logics produced by technology.

The main approaches to public administration have well-defined characteristics, resulting from the predominance of institutional logics from different orders. Especially concerning the bureaucratic and managerial approaches, the literature is unanimous in making

its connection to the orders of the State and the Market. However, post-managerial trends in public administration are still debated as arising from logics of service, community, and participation, among others. By assuming technology as an institutional order, however, we can explain phenomena of this new approach, such as e-government initiatives.

a. Bureaucratic approach and the state order

The theoretical bases of the bureaucratic approach are built in the 1922 work of Max Weber, *Economy and Society*. The author frames bureaucratic organizations as the type whose form of domination is the exercise of rational-legal authority. The objectivity, impersonality, and rationality intrinsic to bureaucratic organizations' administrative acts were a concern for Weber himself when considering their possible consequences for democracy and the individual. Even so, the value of bureaucracy as a facilitator of process efficiency strongly influenced the early 20th century's administrative theories and is still visible today in approaches and practices (Denhardt & Denhardt, 2007). When we confront these characteristics with the institutional orders established by Friedland and Alford (1991), we verify the state order acting in the bureaucratic approach to public administration.

b. New Public Management and the market order

The New Public Management approach is based on budget cuts, privatization, competitiveness, and performance measurement. In this vein, Denhardt and Denhardt (2007) argue that the approach suggests that the government should only be involved in activities that cannot be privatized or outsourced. Also, the authors emphasize the administrator's role as one who must seek efficiency and results for citizens. This last statement brings another relevant element that differentiates New Public Management as a managerial approach: as a government that emulates market practices strongly oriented by the economy, we have the paradigm of the vision about the citizen as a client of public services. The characteristics of this approach go back to logics deriving from the market order.

c. Post-managerial trends and the technology order

The democratization of information and communication technologies forced governments to promote adaptations to meet a new positioning of the citizen as a user of government services: closer, informed, and predisposed to dialogue. Concepts such as

transparency, participation, co-creation, and openness took over speeches related to public administration. Information technology systems no longer affect only behind-the-scenes processes, playing an essential role in the relationship between government agencies and civil society. E-government is also born in this context, with governments at different paces creating structures and adapting their services to serve citizens at speed demanded by society immersed in technology (Evas & Yen, 2005). E-government provides for government functions improved by another system in relationships that serve citizens, businesses, other public agencies, and the government itself internally.

Post-managerial trends do not present as a break with previous approaches but as a reflection that cuts edges and proposes the evolution of public administration to the current social context, reconnecting it to its public. Democracy may be an institutional order present in this context (or a logic present in other orders, according to the review proposed by Thornton et al. (2012)). However, where does this material and symbolic portion come from, placing technology as a source of legitimacy for public agencies? Our premise is that when we see technology as an institutional order, its logics explains the digital transformation in public administration.

More than serving as a theoretical lens to explain the adoption or not of specific technology in an organization, we argue that technology acts as an institutional force that pressures existing arrangements to change. Next, to continue with our case study, we will look at blockchain technology and its possibilities in public service.

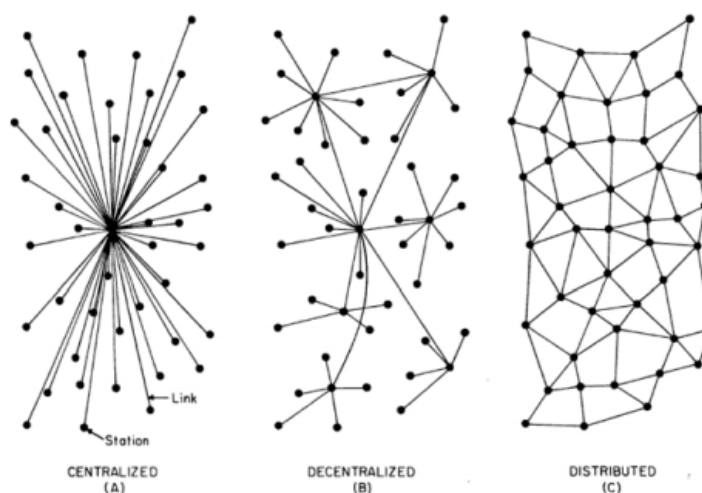
2.2 Blockchain Basics

Blockchain means "a chain of blocks," "each containing a unique set of transactions, each containing a cryptographic fingerprint called 'hash'" (Berryhill, Bourgerly & Hanson, 2018, p. 15). Each block will contain information about some or all of the most recent transactions not previously entered in the previous blocks. Thus, a block works like a real-time ledger. Within each block, records of previous transactions are permanently stored. Every time a block is completed, it gives way to the next block. These blocks are joined in a linked chain (Fanning & Centers, 2016, p. 55).

Traditional information systems require centralized servers for data storage, usually maintained by an authority. In this type of system, a client-server relationship is established (Ray, 2017). The blockchain contrasts with this system in that its main features are distribution and sharing. Distribution means that all copies of a document are created equal

and are updated in the same way simultaneously; sharing means that there is perfect and complete information in all actors of the system (Berryhill et al., 2018). Figure 2 compares the types of networks, ending in the "distributed" network, a diagram used to explain blockchain-based systems.

Figure 2: Comparing centralized, decentralized and distributed networks



Source: (BARAN, 1964, p. 2)

Another essential feature of this technology is its immutability. Once a transaction is added, it cannot be undone by any participants (Berryhill et al., 2018). Wright and De Filippi (2015, p. 2) summarize this technology as a distributed, shared, and encrypted database that serves as a public repository of irreversible and incorruptible information. It allows, for the first time, unrelated individuals to reach a consensus on the occurrence of a particular event or transaction without the need for a controlling authority. Shermin (2017) complements this statement by stating that this distributed and shared database is subject to inspection by any users, but none of them is authorized to control it.

An expression widely used to illustrate how blockchain technology works is a smart contract. Smart contracts will be those in which the agreements between the parties that define the rules, obligations, and penalties are imposed digitally. An address will identify a smart contract, and its code resides on the blockchain. Its correct execution requires agreement, that is, validation by all parts of the network. If a new transaction is accepted and sent to the address of this smart contract, all participants in the mining network must agree to the following status of the contract through a consensus protocol (Luu, Chu, Olickel, Saxena & Hobor, 2016).

For many theorists, blockchain solves old trust problems, allowing them to trust the outputs of a system without any intermediary or mediating entity (Shermin, 2017). In addition to trust, an ecosystem based on blockchain technology promotes transformations in two other strategic areas for the organizational environment: governance and openness (Riasanow, Burckhardt, Setzke, Böhm & Kremer, 2018). These three pillars provide sufficient support for creating new business models in different sectors of society. In the next chapter, we will explore the applications and possibilities of this technology in the public sector.

2.2.1 Blockchain in public administration: possibilities and barriers

Today, daily transactions are those in which people interact with the government to prove their identity or a status change with their property. They need to bring their documents in person and request a stamp from the appropriate agency (Potter, 2017). Blockchain technology would make this step unnecessary and provide greater security, interoperability, and transparency. Moreover, blockchain is cited as a supporting factor against corruption, given its high degree of transparency and inability to manipulate data.

Ølnes et al. (2017) point out that blockchain technology can be used for any transaction or exchange of information that involves the government. According to the authors, the fundamental characteristics of this technology allow implementation in a wide range of processes: registration, inventory, and exchange of information, which would work both in tangible (physical properties) and intangible (votes, patents, ideas, reputation, intention), health and information) (p.357).

Atzori (2015) describes the transformative potential of blockchain in creating a hyperconnected society that conducts transactions in a decentralized manner and its implications for politics, demanding new ways of thinking about governance and citizen participation. According to the author, organizations based on centralization may be more vulnerable to risks such as lack of transparency, corruption, and misuse of power due to their concentration on a few points in the network. Ultimately, the distributed consensus mechanism would have the potential to allow civil society to self-organize and protect its interests without the State, disempowering it and changing the direction of the hierarchy from vertical to horizontal (Atzori, 2015).

Paquet and Wilson (2015) emphasize the high complexity that modern society has reached, with issues and dynamics that are difficult to solve through bureaucracy and hierarchy. According to the authors, even from the administrative reforms that defend public

management that emulates market practices, few social problems can be solved, as there is no provision for interaction between the actors or collective innovation. Decentralization, in this case, would solve the complex issue of collectivity, placing several points in the network in contact with each other and culminating in consensus.

However, many questions remain regarding the government's adherence to this technology. Analyzing its benefits and balancing existing solutions and structures is a step the public sector will experience in the coming years. The deployment of new blockchain-based solutions may require changes to other technologies, and their adoption should be in line with control issues. According to Ølnes et al. (2017, p.360), research on government blockchain initiatives will have to be concerned "with the evolutionary character of technology, with its institutional and social incorporation." Peer-to-peer functionality, for example, can be a target of resistance by governments, as it means decentralization (Al-Saqaf & Seidler, 2017).

Radical innovations are often seen as a managerial challenge in established organizations because they involve high uncertainty and unpredictability. They also mean the need for greater openness and permeability, so that knowledge from outside the organization can be absorbed (Beck & Müller-Bloch, 2017). Besides, the birth of technology with high transformational power may require a great learning curve and technological adaptations. On an experimental basis, it can incrementally enter established processes. Blockchain is also cited in the literature for its potential to promote technological leapfrogging, allowing developing states to create a state-of-the-art technology structure without the need to establish previous stages of technology, equaling more developed nations (Franz, 2022).

The literature shows that initial barriers to adopting blockchain technology are mainly related to ignorance, lack of regulation, concerns about privacy and security, costs for adoption, the complexity of use, and technological immaturity (Sadhya & Sadhya, 2018). Beck and Müller-Bloch (2017) emphasize the need for organizations to develop capabilities to benefit from blockchain technology's disruptive potential. The possibility of reducing transaction costs, for example, demands new inter and intra-organizational cooperation arrangements, may require changes in other technologies of use, and their adoption must be aligned with issues such as control, governance, and policy. Administrative reforms provoked by a technological component usually carry with them several intangible variables to be considered (Kassen, 2022). Usually, this is when regulations are created and placed as an initial obstacle to the implementation of technologies.

It is important to note that many empirical studies on technology, such as blockchain research in public administration, focus on the characteristics of systems, their possibilities,

and barriers to implementation, and not on social interactions with information systems. Along these lines, DeSanctis and Poole (1994) claim that "the effects of advanced technologies are less a function of the technologies themselves than of how they are used by people" (p.122).

In this research, starting from the premise that technology is an institutional order, we intend to investigate the social impacts resulting from the introduction of blockchain technology in the field. What are the results of the interaction of existing logics in organizations with those produced by technology? How does the institutionalization of technology create societal impacts? We will turn to the case study explained in the next chapter to answer these questions.

3. Method

For this phase of the study, we conducted a case study in which the cases play a supporting role in understanding a particular subject. For this case study, we followed the protocol suggested by (Rashid et al., 2019), aiming at credibility, transferability, and compliance (Lincoln & Guba, 1985). In this research, we assume relativistic ontology and subjectivist epistemology, in which the construction of responses depends on the researcher's and the respondents' interaction. As a philosophical paradigm, this research assumes interpretivism, given that the answer to our research questions comes from interpreting the respondents' views. The case is not our primary object of interest, but it can later be recognized in other cases as well (Stake, 2005, p. 445).

Research study protocols:

a) Research questions:

Our primary research question is: **how does the interaction of logics in the public sector with those produced by technology affect societal outcomes?**

Sub-research questions were formulated aiming to answer our primary question:

- Subquestion A: in what context did blockchain technology enter the agenda?

- Subquestion B: How are the logics of the State, Market, and Democracy manifested?
- Subquestion C: what conflicts are observable between the logics produced in the participating organizations?
- Subquestion D: How do the inter-institutional and regulatory scenarios interfere with the institutionalization of technology?
- Subquestion E: What characteristics of blockchain technology were responsible for transformations?

b) Research techniques:

We conducted a case study whose empirical materials focused on the institutional scenario in which the technology was inserted, the actors' experiences in manipulating the logics produced by it, and the social effects of project implementation. We collected material for the case study using the two techniques in Table 11:

Table 11: Data collection techniques

Technique	Description
Document collection:	The document material of our analysis consists of (1) internal documents of the institutions (memos, letters, reports, projects); (2) news content about the project and (3) what we call "context documents": laws, decrees, and regulations that came into discussion or were in force at the same time as the project.
In-depth interviews:	The teams involved in the cases are heterogeneous, with technology and project management professionals, workers from private companies, and public servants. We conducted in-depth interviews with, at least (1) one or more employees involved with the project; (2) one or more managers of the public institution;

	<p>(3) one or more managers of the companies hired to the project development, and</p> <p>(4) one or more stakeholders that characterize the target population benefited by the project.</p> <p>The questionnaire was semi-structured and pre-tested before the actual application. The interviews were transcribed and later sent to the respondents for validation before the analysis.</p>
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c) Case seeking:

Context justification:

The public sector is already characterized by its complexity and hybridization. This context makes it possible to observe the interplay of multiple logics that act in organizational forms with the input of logics produced by technology. This context also provides us with a broader view of the path of technology: from its conception, through disputes and conflicts with other institutional logics, to its implementation and results that can be measured in society.

Projects based on the blockchain technology of executive power entities were chosen to compose the object of this study because they are responsible for elaborating and executing public policies. However, this study was also based on documents from other powers, such as laws encouraging and enabling public sector entities to promote studies and projects based on blockchain technology.

Case selection:

In Brazil, the regulatory scenario in recent years has encouraged technological experimentation. In the exploratory phase of this research, in the first survey in 2018, we investigated at least five cases of pilot projects based on blockchain technology in the public service. Changes in government and the Covid-19 pandemic changed priorities, and most of these cases either remained in a study/pilot nature or were discontinued.

For this phase of the study, we rescanned blockchain technology use cases at the federal and State levels of the Brazilian executive branch, with applications that have passed the

study or pilot project phase and are actually in operation. We also seek acceptance by the institutions to participate in the research through interviews and opening of documents.

This search was based on identical contact with the ombudsman-general of the federal government and all twenty-seven ombudsmen-general of the Brazilian states. From this contact, we obtained answers on two cases:

1. SOL (Online Bidding Solution) - Bahia and the Rio Grande do Norte governments who had already participated in the exploratory phase of the study.
2. Harpia Project - government of Paraná

We sought contact with both cases, and due to the difficulty of contacting, our initial decision to be a multiple case study changed to a single case study.

d) Permission seeking

The case (Online Bidding Solution) had already been part of the exploratory phase of this research, in which we sought to recognize the field. A new contact was made by e-mail for the second phase of the study, directly with the public servant responsible for the project, from which we obtained the connections of the other stakeholders involved. All stakeholders were approached with an invitation to participate, explaining the purpose of the research and their role, and informed about the data collection procedures. Right after the agreement, we schedule meetings via the internet or telephone.

e) Ethical considerations

For the protection of participants and institutions, even if they are public institutions with open data, everyone was informed about the objectives and steps of the research. In addition, participants received information consent forms, use of job title, and use of institution name.

The names of the participants were protected, with only their positions being described in the case. To answer the research questions, information about organizations, positions, and

the interplay between stakeholders is sufficient. Therefore, the participants received codes that we used in our analysis in place of their names.

f) Criteria for assessment

This research intends not to seek generalization but to interpret a phenomenon. Thus, our approach is in line with that proposed by Guba and Lincoln (1985), with activities that make research findings and interpretations more reliable, seeking credibility, dependability, transferability and confirmability. In our study, we sought long-term engagement with our research objects. The case of the Online Bidding Solution, for example, was part of the exploratory phase of this research, having been in contact with the researcher for more than two years. The triangulation resulted not only from a multiple case study but also from the care in collecting data with participants from various roles and positions, in addition to documents and content external to the cases. Auditability was sought by recording and archiving the interviews, followed by their transcription and review by the respondents.

g) Interpretation process

The units of analysis for this study are the social outcomes produced by technology. Our observation units are the points of contact between institutional logics in organizations. These points of contact are expressed in the activities described by the interviewees, in the phases and intentions that motivated the projects, in the end users' perception, and not necessarily in the organizations themselves. In this study, the social processes and results produced are our focus.

The interviews were later transcribed with the help of an artificial intelligence tool from the Telegram application. Finally, transcripts were sent to the Google Docs processor, reviewed by the researcher, and sent to respondents for review and feedback. After this step, we start coding the material.

We established a flexible coding model proposed by Deterding and Waters (2018). The creation of the questionnaire for the semi-structured interviews was based on the researcher's previous knowledge, the construction of her theoretical basis, and the exploratory phase of the research. The questions in the applied questionnaire reflect our own research questions, so from the questions, we have already produced an initial base of codes, which were analyzed and added to other emerging codes according to the conduct of the interviews.

The researcher's notes were also made during the data collection period, so the analysis took place throughout the process.

Researchers should get to know their data by indexing transcripts with broad codes that reflect the questions they asked in their interviews and the concepts they sought to examine as they went into the field. By writing analytic memos during this process, they can generate conceptual themes that appear across cases. Then, capitalizing on the existing index for data reduction, they can apply more fine-grained codes to subsections of the interviews. Finally, analytic coding can be examined across respondent attributes to document the depth of textual evidence for the claims about key relationships the analyst makes. (Deterding & Waters, 2018, p. 8).

The transcribed material, already organized in macro codes and contemplating emerging encodings, was once again examined for the refinement of the encoding. The initial codes were kept as macro-categories, followed by the refined codes. Our coding scheme is expressed in the table below:

Table 12: Codification process

Code	Codes after refining
Bureaucratic administration	Hierarchy Centralization Control
New Public Management	Outsourcing Efficiency Cost reduction
Post-managerial	Performance increase Service improvement Automating decision-making Reducing uncertainty Public-private partnership
Social outcomes	Empowerment Decreased rural exodus Economic development Inclusion in work processes

h) Data Collection

The interviews took place remotely, using the Zoom software, between 2020 and 2022. The SOL application was developed from hiring a private company by CAR - Companhia de Desenvolvimento e Ação Regional within the scope of the Bahia Productive project. The

World Bank financed the contract. Since these are the stakeholders involved in the project, in our research, we seek respondents from all these fronts, most interviewed from the public directly benefited by the project. The interviews had an average duration of 43 minutes and 02 seconds.

The table below shows the profile of the interviewees:

Table 13: Profile of interviewees

Code of interviewee	Institution	Role
Interviewee 1	CAR (Government)	Coordinator of the Information Technology Department
Interviewee 2	CAR (Government)	Developer
Interviewee 3	CAR (Government)	Territorial assistant
Interviewee 4	CAR (Government)	Acquisitions advisor
Interviewee 5	CAR (Government)	Technician
Interviewee 6	World Bank	Senior Procurement Specialist
Interviewee 7	Caiena Tecnologia	Director
Interviewee 8	Caiena Tecnologia	Developer
Interviewee 9	Community Association	Rural Community Assistant
Interviewee 10	Community Association	Rural Community Assistant

The documents analyzed are listed below:

- SOL app website
- Website of the Regional Development and Action Company - CAR
- Blog of the company Cayenne Tecnologia, developer of the application
- Presentation with motivations and usage data about the application sent by the Regional Development and Action Company - CAR
- News from the Bahia state government portal
- Questionnaire answered in text by a research participant
- Youtube Channel "Citizen Government"

- News from the newspaper Grande Bahia
- News from Bitcoin Portal
- News from the Coin Telegraph portal
- News from EasyCoop magazine focused on issues about cooperativism.

The documents and transcripts of the interviews were analyzed given the "pattern matching" technique by Reay and Jones (2005), who discuss how to capture institutional logics qualitatively. In summary, "this technique requires researchers first to identify and explain the pattern of behaviors associated with the ideal type of a particular logic and then evaluate their data to determine how well it matches with the ideal type" (p.446). Inductively, we construct the ideal type of technology as an institutional order. In previous research, we discussed ideal types that represent the orders of the State and the Market in public administration. In this research, we intend to capture the logics produced by technology in post-management trends and their effects on social transformation.

4. Results and discussion

SOL, Online Bidding Solution, is a shopping application developed and made available by the states of Bahia and Rio Grande do Norte for beneficiary organizations of the Bahia Productive (BA) and Citizen Government (RN) Projects (cooperatives and family farming associations) can carry out tenders with more security and practicality. The application was financed by the World Bank in an initiative dedicated to financing projects to reduce poverty and improve the quality of life in developing countries. SOL was designed for associations and cooperatives to buy in a safer, more transparent, and faster way.

The focus of our research is on the State of Bahia. The Bahia Productive Project is the result of a Loan Agreement signed between the Government of the State of Bahia and the International Bank for Reconstruction and Development (BIRD), whose execution is under the responsibility of CAR - Companhia de Desenvolvimento e Ação Regional, a company public service linked to the Secretariat of Rural Development (SDR).

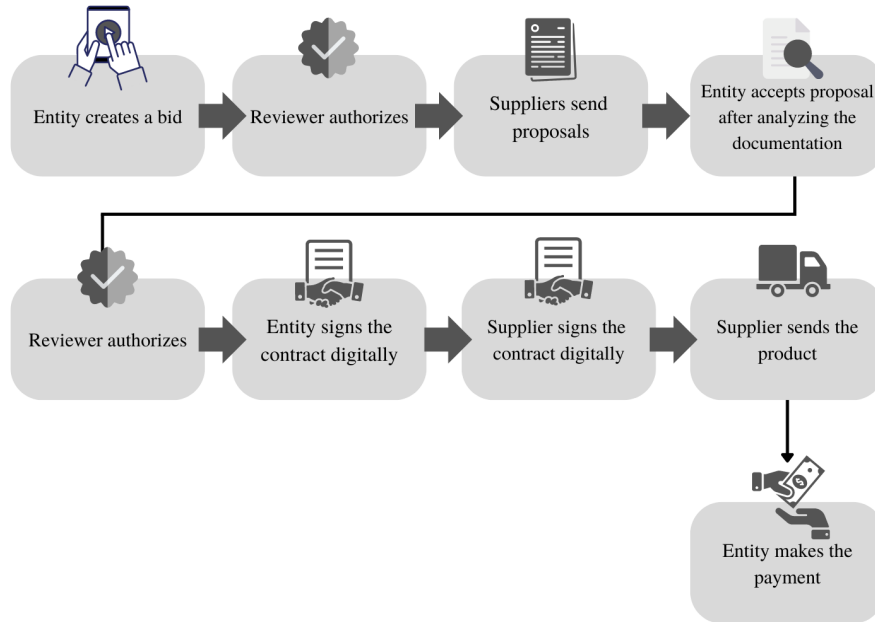
The initial motivations for its development came from the analysis of the bidding process due to the great difficulty of entities in writing documents (invitation letters and contracts). These entities are rural community associations, which represent local cooperatives. Most of the cooperatives produce food, and the Bahia Productive Project, in

addition to promoting basic subsidies for these communities, such as the provision of water and sanitation, promotes socio-productive inclusion subprojects. Associations can thus acquire items that will facilitate the enrichment of their production, transforming fruits into pulp, or milk into cheese, for example, and developing economically. The acquisition of these items, in order to comply with the law, needs to be done by bidding, a process known in the Brazilian public sector and characterized by being highly bureaucratic.

The bidding processes started with the search for suppliers that could meet the demand. Then it was necessary to issue letters of invitation to all of them. In all bids, the presence of a Territorial Assistant was required at the time of bidding, and most bids were deserted due to the difficulty of expanding invitations to suppliers. In this context, practical issues such as the difficulty of publicizing bids and the need for face-to-face meetings meant that few suppliers competed in the processes. This jeopardized service to these communities at critical points such as access to water, basic sanitation, healthy food, medical care, and education.

SOL is a solution to this problem. It takes all the processes and information necessary for a bidding process to the digital environment, eliminating the need for face-to-face meetings and mailings. With it, even contract signings happen online. Thanks to this, suppliers from all over the country have the same conditions of participation. They can register in the system, access ongoing opportunities and fill out their proposals within minutes. With the registration, they become part of a database that can be accessed by the associations and cooperatives of the projects and used to send invitations. Furthermore, invited suppliers receive a notification, so bidding information is not lost in the process.

Figure 3: Bidding process through SOL application



SOL uses Blockchain technology to ensure transparency and security for bids, which works as a decentralized database. All application information resides in the States infrastructure and is protected from changes. In addition, any attempt to corrupt the data is noticed and reported, making auditing purchases more efficient.

Figure 4: SOL Application

The image shows two side-by-side screenshots of the SOL application interface. The left screenshot is titled 'Nova licitação' and displays a form for creating a new bid. The fields include: 'Descrição (Objeto)*' with the value 'AQUISIÇÃO DE EQUIPAMENTOS DE INFORMÁTICA'; 'Convênio*' with '008216 - APOIO A APICULTURA E MELIPONIC - CUST'; 'Classificação*' with 'BENS'; 'Data de início*' with '11/12/2019'; 'Data de encerramento*' with '18/12/2019'; 'Dias corridos para desempate*' with '2'; 'Prazo para entrega/execução em dias*' with '20'; 'Local de entrega' with 'AVENIDA BRUMADO, Nº 115, CAETITÉ-BA'; 'Tipo de licitação*' with 'Preço por lote'; and 'Modalidade*' with 'Aberta/Pública'. The right screenshot is also titled 'Nova licitação' and shows the 'Configurações do lote' section. It includes fields for 'Nome do lote' (AQUISIÇÃO DE COMPUTADOR E IMPRESSORA), 'Prazo para entrega (dias)' (1), and 'Local de entrega'. Below these are sections for 'Itens do lote' (with an 'ADICIONAR ITEM' button) and 'Arquivos do lote' (with an 'ADICIONAR ARQUIVO' button). At the bottom, there is a green 'CRIAR LOTE' button.

Furthermore, the code developed for the application is open source. In practice, this means that the system can be universally redistributed without having to pay commercial licenses. The design and layout that compose it can be consulted, examined, and modified freely by anyone who wants to replicate it.

4.1 The logics in the field

At the time of the entry of technology in the field, the scenario studied resembles the hybrid and complex panorama typical of public administration, in which processes seek market efficiency, but the institution still follows bureaucratic and hierarchical rites. In the Brazilian public service, public servants are expected to have a career, so you usually find people working in the same place for ten, twenty, or thirty years. This is a favorable scenario for building a solid organizational culture. The interviewees raised traces of this culture as factors present in the field: "it is the view I have of the state executive, not to say that it is all over Brazil, we invest in technology, create systems, and the systems continue to obey the same bureaucracy. So, if you continue with the same steps, step by step, the same thing, then they continue lengthy processes", said Interviewee 1.

The presence of bureaucratic logic was noticeable in the interviewees' discourse. For the hiring of technological projects, the interviewees highlighted existing bureaucratic rites for hiring and rendering accounts. The construction of a term of reference for the development of the SOL application was on the agenda, as well as the rendering of accounts to the control bodies intrinsic to each of these contracts. According to Interviewee 1, "all the time here, we are trying to provide clarification, whether through the systems, through reports, or management tools."

But bureaucratic logic never acts alone. Other institutional forces were observed by the research participants, evidencing the hybrid scenario. The excerpt below comes from one of the representatives of the private entity, contracted for the development of the software (Interviewee 7):

So, specifically for the public service, we have this search, maybe not so structured, with mechanisms to search in general, on the portals, for bids, but we have some policies, many public policies that we are a little more directed, and the we are always on the lookout. So we end up going to education, health, mobility, we have some experiences and it turns out that we also become a reference. For the success cases we had in the public sector. The public power

aims to reduce costs, improve internal processes, improve services to citizens, be aligned with government policies. And there's the improvement of internal processes, right? So technology helps in the bureaucracy itself, right? We know the state well there, so there is always this motivation to improve the internal process.

We also sought to understand the link between contracting technology projects and institutional orders, especially if they were aligned with the market order, which recent literature usually refers to. When asked about the reasons for the entry of technology in the field, the majority of respondents referred to the Bahia Produtiva Project and the World Bank. As a result, technology was referred to as a constant attempt to "improve" services. This improvement, however, is not necessarily about cost reduction and financial efficiency. This is one of the elements that evidences the distance of technological projects from market logics. In the interviewees' discourse and the documents analyzed, technology was thought of as a promoter of local, internal and external transformations in the institution.

So, in the specific case of SOL, the agility of the process was already a gain. There is also the saving of paper, savings, for example, the agent has to go to the municipality, to do the meeting to open the envelopes, that there are a lot, a lot of expenses that they are already saving. In addition, there is, there is the indirect cost, which is the cost of making the bidding happen. So, we see from the first objectives, the biddings did not happen, what is the cost of this? I give the money to the institution, to make a cheese factory there in Rio Grande do Norte, which would benefit the families, and I can't execute this bidding for several reasons. So, there is this cost that is a little more difficult to measure, but when you bring the technology, this return, it is very significant, right? It is a return on investment, which is the return that society has. (Interviewee 7)

The institutional environment, especially in terms of the World Bank financier, is also crucial for understanding technology entry into the field. The World Bank works to finance projects that increase the productive capacity of underserved regions. The SOL project was the result of an incentive to use disruptive technologies to solve social issues. Therefore, blockchain, according to Interviewee 8, a representative of the software manufacturer hired by the institution, was a demand.

The bureaucratic rite was maintained in most processes, such as registering suppliers, even when using the application. But some functions were modified, especially those related to usability for the population served. Blockchain technology has ensured that the bidding process is inviolable, allowing for a transparent and inviolable process, implying the reduction of uncertainty and the prevention of possible vices that previously occurred in bidding

processes in the face-to-face modality. In this way, the community agent received autonomy to carry out the bidding, initiate the process, and generate and sign contracts via the application. The institutional scenario at the time of the technology entry in the field had bureaucratic, managerial, and post-management elements, the latter closely linked to improving services. The interplay of existing logics with those brought by technology changed the scenario. We see technology being absorbed within the scope of a post-management trend and becoming hybrid in conjunction with other logics.

It is important to note that the technology implementation did not emerge from the existing organizational arrangement. There was already the debate and the need, but it was from the performance of an external member that technology entered the field. In the next topic, we will list and discuss points that demonstrate the social implications of this new institutional arrangement.

4.2 Technology as social transformation

In this chapter, we will list and explain elements present in the research data that demonstrate the production of logics by technology, acting at the individual, organizational and institutional levels, and how when an order acts in a multilevel way, it is possible to observe the social transformation. Finally, interviewee number 6 explains the situation at the field level that motivated the demand for a high-tech project.

In Brazil, we financed a lot and continue to fund a huge demand for rural electrification, water, electricity, access, and rural roads. So, today we are investing a lot in improving production capacity. So, this ranges from production techniques to installing an industrial plant on the property to transform, benefit the products and gain value, add value to the product, to rural production, right? So, the transformation of fruit into pulp, the transformation of milk into yogurt, cheese, and so on. So, imagine a community of farmers, family members, in the interior of Bahia, as an example, which is a gigantic State accessed by poorly maintained dirt roads. I visited a community once in Maranhão. It wasn't Bahia, but Maranhão. But the way these communities live is standard, and I only arrived in a 4x4 vehicle. There was no other way to arrive. The community had to walk four kilometers to get water. And now imagine how a community like that accesses the market that supplies equipment that helps transform milk into yogurt. [...] The project (Bahia Produtiva) says that they had to make a bid to spend the money, a situation of the Brazilian law, of bidding, processes that are highly complex even for us who work with this, read, work, study, have access to training, imagine for them.

The bidding processes had as prerequisites the identification of companies and the completion of a term of reference in the form of an invitation letter. In addition, for each community, it was necessary to send a territorial assistant to monitor the bidding process at the time of bidding. Interviewee 3 explains what the procedure was like before the application was developed.

We have a social issue. Organizations also had difficulty filling in the invitation letter templates, right? When filling out the term of reference. Which are basic fillings, but many are the school education level of the directors, right? It is sometimes a little low for the people who are there at the head of the association, right? So they ended up having difficulty in the community being able to help him. There was no one to give him this support in the filling. So this was also an aggravating factor in the face-to-face modality and required the presence of territorial assistants, CAR technicians, as inspectors, right? We would have to schedule an appointment, even the community, even the place to be able to participate in person, which is in the sense of inspecting the conduct of the process, if it is complying with the norms and guidelines established by the operational manual, valuing transparency, economy, huh?

The implementation of the technology significantly reduced the bidding time. The cooperative itself can open the process via application in a process that takes a few minutes. The bidding is open for a few days, and the application selects the winning company by the price. The Rural Community Agent contacts the company via e-mail and requests the documents and certificates necessary for the continuity of the purchase process.

The second difficulty in face-to-face bidding processes was finding suppliers. The community association needed to identify companies and invite them. The lack of access, as we saw in the speech of Interviewee 6, meant that the search for companies commonly occurred only within the municipality itself. Due to the low availability of companies, many bids were deserted or failed, which posed an obstacle to acquiring simpler supplies and larger machines and equipment that would benefit the local community.

The emergence of the SOL application began by transforming the institutional environment in the municipalities served, positioning itself as a channel with greater reach for suppliers located outside these limits, according to Interviewee 10:

We had a small dimension. That, for example, we could not be going to other municipalities to ask them to participate in a bid to deliver, like a printer, a computer, firstly because the suppliers were not very interested in the feasibility. And we, as an association, also don't have the leg to go to other municipalities to be inviting companies, right? So we had a limit that

would only be within the city, right? So that was very limiting. So this emergence of this application is making life easier for the ACR and the life of the association. Because that way, we can look for suppliers beyond our municipality, right?

At the organizational level, the role of the territorial assistant was modified from the use of the application, moving from monitoring to guidance and support. Intra-organizational relations were horizontalized, despite the heterogeneity of the actors. Implementing the technological solution went beyond the practical and economic benefits in the regions served, creating new roles within the associations served. The fact that the cooperative started to deal with technology reduced the age group of those involved, bringing important implications for the rural exodus, and acting at the individual level of the actors, according to Interviewee 10:

What changed was the incentive. Because we had a massive exodus in the countryside, right? Young people went to the cities a lot. And then today, we see so many young people engaged in the cooperative. And we see the empowerment of women. Huh? For example, me, right? A young woman that is working in the community. And having super important training to handle such an application. So people feel important, right? Which is one more piece of knowledge that we take with us. And so, for ours, for my community speaking as its own, right? It's recognition and development. In our entity, most members are of advanced age and have to bring young people into our association, giving continuity to our work.

The interviewees' speeches and the documents analyzed also give us evidence about the economic development of the regions served by the application. Until February 2022, more than 8,500 bids had been made through the application, moving more than BRL 57 million.

4.3 The role of blockchain technology

At the beginning of this research, the choice for a phenomenon linked to blockchain technology was due to the disruptive potential found in the literature and operating characteristics that would allow significant transformations in the public service scenario. Therefore, most of the analyzed news documents highlight blockchain technology as the main argument. This came in addition to the use of the SOL application by rural communities, which allowed us to observe whether there was a leapfrogging phenomenon.

As previously mentioned, blockchain technology was a demand from the project financier within the scope of the Bahia Productiva program. All technical interviewees stated that the development of the application with blockchain technology was due to the need for transparency, security, and immutability. Within the script of the in-depth interviews, however, we made room for questioning about blockchain technology itself. Would other technologies be capable of technically providing the same characteristics observed in the SOL application? Respondents said yes, and that initially, there was some insecurity when adopting the blockchain, primarily due to the high cost: "We may have just created a problem, but I really come back to this issue of data immutability. I need long-term immutability. Okay, it really is an expensive technology, but in the long term, I see a lot of benefits", says Interviewee 6.

We observed that one of the biggest effects of blockchain technology in the institutional environment was its symbolic power. Despite being inserted in a hybrid context, in which state and market forces continue to be part of and guide processes, the symbolic force of blockchain technology, as an important break with previous standards, even in the case of other technologies, has brought with it the strength needed to enter the organizational field and fix important features of post-management trends, such as the automation of decision-making and the reduction of uncertainty.

For the end user of the application, the result was an easy-to-use solution, similar to a social network application, and its proximity to the public power, not necessarily in decentralization, a possibility posed by the blockchain, but in the proximity and transformation of relationships and papers. The technological engine behind the application, for the end user, is not a relevant attribute. Still, it makes the maintenance and reliability of contracts possible in a scenario where before, the structure forced Rural Community Agents to work with bids in a physical, with invitation letters, the opening of envelopes, and displacement of a territorial assistant to the place.

The SOL application, in this scenario, added cutting-edge technology in a remote location where previously there was no technological structure. Therefore, the phenomenon of leapfrogging was observed as technology entered the field where there was only a procedural structure based on bureaucracy, without transparency or efficiency. Institutionally, however, we observe the phenomenon of hybridization of logics brought by technology with those already existing in the field from the alignment with the current political system. Blockchain reaffirmed and highlighted characteristics of post-managerial trends, but it is necessary to

emphasize that the State, in this case, was a crucial actor in this process, as well as the international scenario, in the figure of the World Bank.

5. Conclusion

When e-government initiatives begin to be seen as a technological administrative reform, researchers manage to shift the focus of their analysis, shifting from issues concerning the adoption or not of technologies and their characteristics to the social structures behind this adoption. Therefore, it is essential to understand the administrative aspect of e-government initiatives and what paths they suggest (Kassen, 2022).

The study of the Online Bidding Solution allowed us to observe how technology communicates administratively with the other aspects that make up the scenario of public administration in Brazil. As one of the pillars of post-managerial trends, technology merges with existing institutional arrangements, bringing new elements to hybridization, such as the transformation of relationships and approximation with private entities, not for economic efficiency but for the development of solutions.

The case showed us that automation and decentralization could be achieved with other technologies and different types of systems and platforms. However, we note the importance of technology having entered the scenario from the blockchain due to the pressure of the institutional environment, which had already made it legitimate. With international and political support, blockchain promoted the entry of institutional logics of technology without many barriers. Second, the alignment of the SOL application proposal with the Bahia Produtiva Project, a government project, was crucial for the success of the digital transformation, which reinforces the importance of the political role above all administrative approaches in the public service.

Theoretically, our research initially contributes to the literature on administrative reforms, locating the role of technology, which until then was little debated or linked to New Public Management, as a fundamental element of post-management trends. Secondly, our research also contributes with the perspective of institutional logic, bringing back institutional orders and their interplay so that the resulting logics that actors manipulate in organizations can then be debated. From this research, we were able to observe the social transformation through the "shifts in the multiplicity of logics that constitute the inter-institutional system" (Faik et al., 2020, p.5).

Our study also demonstrated how technology works at the individual, organizational and institutional levels and the social results produced from this action, which provide the possibility of implementing cutting-edge solutions in previously neglected places and bringing local populations closer to public administration. In the practical sphere, this research helps administrators and policymakers to think about e-government solutions from a vision focused on the solution and digital transformation, supported by a new administrative approach and seeking the support of the institutional environment, especially concerning to the political scene.

Although generalization is not the objective of this research, we had as a limitation a single case study, which narrows our debate, especially concerning the objectives of the application and the sphere of power to which this debate belongs. We must locate our research in the Brazilian executive branch and with an application that uses blockchain technology to ensure data transparency and immutability. We suggest future studies that expand this research, analyzing other cases that employ blockchain technology and others, also in the spheres of the legislature and judiciary. We recommend, however, that these researches start from an administrative and structural look at e-government, seeking to understand and expand the understanding of the meaning of technology in public administration as an institutional logic.

Acknowledgments

We thank CAR collaborators, Companhia de Desenvolvimento e Ação Regional, Caiena Tecnologia, and Rural Community Assistants. They kindly made themselves available to participate in interviews and provide all the material used in this research for more than two years.

5 CONCLUSIONS

Information technologies have become increasingly entangled with social processes. Technology is a source of legitimacy and identity and has been increasingly acting in the structuring of organizational life in recent years. Consequently, technology is also strongly linked to the main processes of social change (Faik et al., 2020). This tangle is evident in the public sector's redesign of technology-based government services, directly affecting the organizations' internal and external audiences.

The present thesis aimed to analyze the role of technology as an institutional order in public administration and the social transformations arising from new organizational arrangements. We have identified three main theoretical gaps that relate to this topic. The first gap emerged from other studies that use the perspective of institutional logic to observe organizational phenomena. Although the interplay of institutional logics is essential to explain organizational change processes, institutional orders and substances that make up these logics, are generally omitted from the debate, making the perspective susceptible to criticism.

The second gap refers to public administration and the need to consolidate the institutional orders that gave rise to the logics guiding administrative approaches. Furthermore, the third gap concerns the social implications of technology in public administration. Therefore, we developed three papers to fill in these gaps, answer the thesis objectives and contribute to the literature as we will describe next.

In the first paper, our objective was to describe the trajectory of technology as an institutional order. This was a theoretical paper whose objective was to advance the perspective of institutional logic, proposing a review of the inter-institutional system by Thornton et al. (2012). This paper argues that technology produces social transformations, new rules, vocabularies, choices, and a sense of identity. We seek in this study to equate the formation of technology as an ideal type with those that already appear in the inter-institutional system, configuring itself as an important analytical tool for organizational phenomena.

The second paper sought to delve deeper into the scenario in which our empirical research would later occur: public administration. Public administration approaches are mentioned in several surveys, but never in a systematic way. Complexity and hybridization are known consequences of the coexistence of different logics in the public sector (Christensen & Læg Reid, 2011). However, the progress of our research still needed a more in-depth debate, with two elements brought from the first paper: what are the orders that guide

public administration approaches? Moreover, since technology is an institutional order, how does it behave in this environment, and what results are produced in public administration? To find these answers, we resorted to a systematic review focused specifically on other studies that used institutional logic as a theoretical perspective to analyze phenomena linked to technology in public administration. The research allowed us to verify how other studies linked public administration approaches to institutional orders and, mainly, to validate the position of technology as a factor that underpins post-management trends.

In the third paper, we seek to apply our theoretical construction in empirical research, analyzing how the logics of technology interact with the other logics present in the public service and what are the social results of this interaction. To this end, we started with an exploratory phase of the construction of this thesis. From this, we sought Brazilian cases of developing solutions in the public service based on blockchain technology. The choice of technology was due, especially, to the voluminous debate on the transformative potential of this technology, going beyond platforms and systems and reaching the form of organization of society. From the exploratory phase, we got two use cases and chose one of them to conduct our study. The research allowed us to evaluate the influence of technology at the individual, organizational and institutional levels, as well as its hybridization process with other logics. An important observation of this study was the importance of the political and institutional scenarios as a support for the entry of technology in the field. Another important observation was the pressure promoted by blockchain technology itself, which did not emerge from the field but entered as an external factor, which accelerated the process of technological hybridization with other organizational logics.

The three papers were built in an intertwined way so that they represent important pillars of single research. Each paper represents an important theoretical milestone that had to be overcome to allow the research to proceed. Without the development of technology as an institutional order, it would not be possible to discuss its role in public service approaches; without the systematization of public administration approaches with their respective institutional orders, we would not be able to apply the qualitative analysis of institutional logics and capture the social results of the interaction of logics.

5.1 Theoretical contributions

Our studies bring contributions from the perspective of institutional logic in two instances: the first one resumes the discussion by Johansen and Waldorff (2017) when they

mention that institutional orders are misused in research based on this perspective. Both the authors and creators of the inter-institutional system that divides orders into ideal types emphasize the importance of revisiting and revising this topic frequently. We delve deeper into the subject and emphasize the importance of institutional orders being on the agenda of empirical research as sources that produce the logics manipulated by the authors.

The second instance we contribute within this perspective concerns the study of technology as an institutional order. Technology has been the focus of this survey for over a decade, being studied as a phenomenon, carrier (Scott, 2008), practice (Smets et al., 2017), or affordance (Faik et al., 2020). Our theoretical contribution advances in the field of institutional orders and demonstrates how, by placing technology among institutional orders, we are able to explain better phenomena related to organizational changes. In addition, our research brings the notion of materiality to institutions, an attribute that makes us advance in the field, but also brings new possibilities for research and debate.

Our research also contributes to research on public administration, especially that which uses institutional logic as a theoretical perspective. Much of the research used the order and logic of the State to refer to bureaucratic processes, as well as the order and logic of the market to refer to the New Public Management. Our research consolidates these references through a literature review and goes a step further, showing how e-government actions, influenced by the institution of technology, shape the post-management approach to public administration, in many empirical research considered to be the result of a service logic or New Public Management itself.

Finally, our research contributes to social thinking about technology and the implications that occur when the interaction of institutional logics allow technology to enter the organizational field. We talk about important factors for this to happen, such as the orchestration of factors and the support of the institutional and political environment.

5.2 Managerial contributions

In the studies developed, we debate issues that, at first glance, may seem entirely theoretical and focus more on the debate of their respective fields of knowledge than on managerial practice. However, the researcher's experience in public administration, which was one of the motivations for studying this topic, contributes to the discussion of the managerial implications of this study.

Public administration is usually orchestrated around the dichotomy of politics and administration (Denhardt & Denhardt, 2007). The political pillar represents the choices of governments and managements that will influence programs and processes. Administrators, normally career civil servants hired through a public tender, have the role of respecting the public interest and the regulations and regulations in force. Understanding trends in public administration and the paths the public sector takes administratively has essential implications for aligning processes with government guidelines.

The case of the SOL application is a clear example of the alignment of the public manager with the technical administrators and the institutional environment. The organizational arrangement provided the institutionalization of technology in a hybrid way, but even so, advancing significantly on post-managerial trends and promoting practical and social implications from the development of services.

The study of technologies and their respective applications, as well as the update on the approaches of public administration prevailing in the local, national and global spheres, also allows the public administrator to assist in the development of his institution, inserting the country into the international scenario and opening the door to phenomena such as leapfrogging, deploying high-tech structures where none existed before. According to Kassen (2022), the literature about technological leapfrogging in developing countries usually does not focus on organizational arrangements and the figure of the intra-organizational entrepreneur for the phenomenon to occur. For the author, the alignment of public administration to allow technological advancement is one of the premises for leapfrogging.

5.3 Limitations and further research

This thesis deals with broad themes, and our research choices made it possible for us to contribute to the field within our geographical and temporal possibilities and during a health crisis that shook the world. Especially concerning empirical research, our main research limitation was a single case study. Despite the researcher's prolonged exposure to the field, the single case does not favor triangulation. Anyway, we believe that with our studies, we were able to bring reflections and significant advances within this theme, leaving gaps for future researchers.

In short, this thesis studied three well-defined axes:

- The perspective of institutional logic and the resumption of the discussion on institutional orders;
- The deepening of public administration approaches and the pacification of the debate on its relationship with institutional orders;
- The establishment of technology as an institutional order, which has implications both for the perspective of institutional logic and for thinking about trends in public administration.

For each of these axes, our choices brought advances that still leave gaps to be filled by future researchers, as shown in the table below:

Table 14: Potential research topics

Topic	Propositions that extend current understanding of the topic	Potential Research Topics
Institutional logics perspective	There is a need to revisit the concept of institutional orders to improve research that uses this perspective.	<ol style="list-style-type: none"> 1. Systematic reviews debating the employment of institutional logics and orders in recent research. 2. Theoretical research expanding the concept of institutional order and how orders are constituted.
Public Administration Approaches	Post-management trends are influenced by the order of technology.	<ol style="list-style-type: none"> 3. Research of other theoretical bases that discuss post-managerial trends. 4. Systematization of the characteristics that form an administrative reform based on technology. 5. Advances in research about the characteristics of specific countries, such Brazil.
Technology as an institutional order	The technology must be allocated in the inter-institutional system, placing itself as a new analytical tool to explain phenomena.	<ol style="list-style-type: none"> 6. New theoretical and empirical studies that debate the role of technology as an institutional order. 7. Advances in research on the social effects of technologies. 8. The theoretical discussion about other elements that can also be among institutional orders, shaping identity and creating structures.

The perspective of institutional logics is quite broad and allows future researchers to go beyond technology and public administration guidelines. We hope that the conceptual and practical developments suggested by our research provide the first step toward future work in institutional logic, public administration, and social change through technology.

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