Digital Transformation and Public Service Delivery in Brazil

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This article analyzes the digital transformation process of public services in the Brazilian federal government. Based on a survey with 85 federal organizations, 1,740 public services are examined according to different factors that explain why a certain public service is digitalized. We discuss the transition from an e-government to a digital policy, listing the limits related to agent preferences in public policies. The article discusses digital transformation in governments as a process of institutional change in public organizations, taking into account the role of agents, the contexts of choices, and the factors that explain the decision to digitize public services.

Este artículo analiza el proceso de transformación digital de los servicios públicos en el gobierno federal brasileño. Sobre la base de una encuesta con 85 organizaciones federales, se examinaron 1,740 servicios públicos en función de diferentes factores que explican por qué se digitaliza un determinado servicio público. Discutimos la transición de un gobierno electrónico a una política pública en materia digital, enumerando los límites relacionados con las preferencias de los agentes en las políticas públicas. El artículo analiza el proceso de transformación digital en los gobiernos como un proceso de cambio institucional de las organizaciones públicas, tomando en cuenta el papel de los agentes, los contextos de elección y los factores que explican la decisión de digitalizar los servicios públicos.

本文分析了巴西联邦政府公共服务的数字转型进程。基于一项针对85个联邦组织的调查，根据用于诠释为何公共服务被数字化的不同因素，检验了1,740项公共服务。我们探讨了电子政府向数字政策的过渡，列出了公共政策中与政府机构偏好相关的限制。本文就政府中数字转型作为公共机构中的制度变化进程进行了探讨，同时考量了政府机构的作用、选择背景、以及用于解释公共服务数字化决策的不同因素。

Key words: e-government, digital transformation, public services, digital governance, digitization

Introduction

The use of information and communication technologies (ICTs) in government is not new. Currently, ICTs are applied in the provision of public services, modifying the relationship between governments and society. The adoption of new technologies implies improving processes aiming at offering user-centered and results-oriented services.

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The use of ICTs changes the way the government relates to society and the way society relates to the government; digitizing public services means reducing users' direct contact with bureaucracy and reviewing processes to create machine-mediated self-services, which is potentially revolutionary for governments. Digital transformation policies allow new forms of mediation and practices that represent a window of opportunity to promote greater inclusion and greater efficiency and effectiveness for service delivery in governments.

At the same time, we must remember that digital transformation takes place during processes of institutional change in which different actors have the chance to choose and make decisions. The process of change may result in coordination problems, due to actors' different priorities, leading to incoherent and unequal processes of change. This article aims to show that digital transformation governance is essential to generate a coherent digital policy that affects directly the redesign and improvement of public services.

The article analyzes the Brazilian government's process of digital transformation of public services, using data from the Census of federal government Attendance Services (ENAP, 2018). The first section of the article offers an analysis of the literature, highlighting the transition from the electronic government approach to the digital transformation process. In the second section, the Brazilian case and the process of institutional change resulting from the adoption of electronic government are addressed. In the third section, the research methodology is presented, and in the fourth, the findings. In the fifth section, these findings are discussed with a focus on the preferences of public managers in the digitization of public services and how this process can result in choices that hinder the conception of government as a platform.

In addition, the article intends to show that the process of digital transformation in services must be understood as a series of organizational changes catalyzed by factors endogenous to organizations.

Digital Transformation, Bureaucratic Reform, and Public Service Delivery

E-government development has been revealed as a block of strategic changes in bureaucracies. One of the fundamental objectives is to promote institutional changes and improve processes so as to provide new modalities of public service delivery to citizens and companies.

An e-government structure can change the service delivery, creating a network structure for interconnectivity (Heeks, 2001), transparency (Ahn & Bretschneider, 2011), and decentralization (La Porte, De Jong, & Demchak, 2001). The concept of e-government was established in the 2000s and has advanced in the perspective of appropriation of new technologies for the provision of services and the use of information. E-government can be defined as the relations between governments and their consumers—citizens, other governments, and companies (Means & Schneider, 2000). It is also the use of technology to deliver services to users in full (Torres, Pina, & Acerete, 2006). Under this perspective, e-government is defined by the use of technologies. For instance, the use of Internet applications can promote access to efficient service delivery (Brown & Brudney, 2003).

E-government takes into account the availability of information technology but neglects the fact that the adoption of technologies and the consequent

changes involves complex political preferences that take into consideration different problems and perspectives for the promotion of public policies and services. Digital transformation processes in governments involve management preferences, which are not always linear or caused by technological factors (El-Haddadeh, Weerakkody, & Al-Shafi, 2013; Janowski, 2015). Preferences occur in complex institutional contexts and involve bounded rationality and multiple uncertainties (Jones, 2002; Simon, 1991), which should not be disregarded in the process of digital transformation.

The development of new ICTs in governments is not explained by the deterministic patterns of available technologies (Fountain, 2001). The availability of ICTs is a necessary but not sufficient condition for the digital transformation process to follow. Moreover, the preferences for digital transformation do not stem from the availability of technologies but from institutional processes that delimit and organize the preferences of agents (Fountain, 2007).

Institutional changes in building digital governments have revolutionized public administrations (Margetts & Naumann, 2017). Digital technologies provide new platforms that change the logic of public services (Dunleavy, Margetts, Bastow, & Tinkler, 2007). The proposed institutional changes construct a new pattern of relationship between government and society through digital public services. Digital public service platforms offer a new standard of the relationship between bureaucracy and society, greater efficiency and effectiveness of services, and the possibility of using data to transform policies, increase transparency, and promote open governments (O'Reilly, 2010; West, 2004).

The idea that the availability of technology explains the adoption of e-government is unsubstantiated, since it disregards institutional factors such as the preferences of agents. Even if an ICT is available, governments will not necessarily choose or adopt it (Balutis, 2001, Bannister & Connolly, 2011). The preferences are driven by broader institutional factors, circumscribed from a public policy perspective. These preferences face some bureaucratic barriers—institutional actors' resistance to change, legislative difficulties, inner characteristics of the services provided, personal preferences, and features of the target audience. Digital transformation is embedded in an institutional perspective, where actor preferences matter when digitizing and reviewing service processes and public policies.

The literature on the use of technologies in government has advanced from an e-government perspective to a digital transformation (Bertot, Estevez, & Janowski, 2016). Addressing the use of technologies in government has advanced to consider institutional factors and the role that relevant actors have in the construction of policies. From this perspective, the adoption of technologies in public services and public policies is a more complex process that considers institutional factors (Tassabehji, Hackney, & Popovic, 2016). The changes promoted in the process of digital transformation need legitimacy and are subjected to changes in routes that can promote institutionalization, deinstitutionalization, and reinstitutionalization. In this sense, the availability of technologies interacts with broader institutional factors that explain the success or failure of digital transformation (Weerakkody, Omar, El-Haddadeh, & Al-Busaidy, 2016).

Institutional changes occur in the contexts of uncertainty, which means that the decision-making processes tend to try to transform policies by incremental

amounts, avoiding abrupt ruptures, and aiming to achieve effective incremental changes in practices and results (Lindblom, 1959; North, 1990). Contexts of institutional change create ambiguity and conflict, which motivate endogenous changes in organizations, taking into account catalysts that can promote displacement, layering, drift, and conversion (Mahoney & Thelen, 2010). The changes brought about by digital transformation are not necessarily disruptive. The adoption of new technologies in governments occurs in the contexts of incremental changes, which are controlled by bureaucratic agents in the context of institutions. The preferences of these agents explain the changes adopted in complex institutional contexts.

This policy has resulted in incremental gains to public organizations but has not brought about changes in broader social outcomes (Brown, 2015; Foley & Alfonso, 2009; Norris & Reddick, 2013; Weerakkody & Dhillon, 2009). Although there have been important changes to adopt and increase digital public services, the effects of e-government on the organizational transformation of public administration are relatively poor and loosely defined (Nograsek & Vintar, 2014).

The digital transformation of public services is neither linear nor determined by the available technologies. Technologies and institutional processes interact to compose a complex framework of digital transformation (Fountain, 2001). Institutional actors with decision-making powers over the process of digital transformation can make preferences about which services will be digitized and which will have the processes reviewed.

These preferences are ambiguous and conflicting because they focus on the resources available to organizations. Thus, to understand the process of digital transformation of public services, it is necessary to take into account what the catalysts of changes in public organizations are that explain the adoption of ICTs in public services. This article aims to explain the catalysts for the change adopted in the digital transformation process of public services in Brazil.

The Case of Brazil: From E-Government to Digital Transformation

Initial efforts to provide informatization in Brazilian public administration began in the mid-1960s. In 1964, the creation of the Federal Government's Data Processing Service (SERPRO) made it possible to build a technological infrastructure that initiated the digital government in Brazil. The pace and direction of informatization varied among different organizations, in a disintegrated and unarticulated manner (Brasil, 1998). In the 1990s, some informatization initiatives were implemented that focused mainly on horizontal systems dedicated to the internal needs of the federal government, such as the system for processing and controlling civil servant payments and the unified registration for government suppliers.

Besides these efforts, the strategy for building a digital government in Brazil began in the 2000s. E-government policies were first motivated by internal changes in the state bureaucracy to adopt the framework of systems. Initially, the strategy for building the digital government faced many difficulties regarding the problem of society's access to digital media (Ruediger, 2002). The digital divide was one of the main challenges, so the main concern was related to the infrastructure availability in the government, and there was no deliberate strategy for digitizing public services and changing policies.

This initial strategy sought to consolidate a pattern of investment in the infrastructure and changes in the legal framework. It was not necessarily aimed at the citizen but at changes in the patterns of public governance and bureaucratic reforms (Cunha & Miranda, 2013). In 2004, the creation of the Department of Electronic Government came to meet needs regarding standards of system interoperability, the creation of communication networks, and the organization of the National Electronic Government Program. These changes began a process of transformation of public governance with the adoption of the mandatory use of electronic public procurement and the creation and diffusion of institutional models of e-government (Medeiros & Guimarães, 2006).

In this context, the strategy was successful, providing improvements in ICT infrastructure in government and creating the first legal frameworks that institutionalized e-government in Brazil. The results obtained improved the infrastructure conditions, but strategies for technology investment have not been accompanied by changes in the structure of public services delivery. Citizen interactions with bureaucracy remained analog, despite high technological availability. Government portals were poorly accessible and rarely used, with no inclusive language. They were far removed from reality and were undemocratic in their concern for citizens (Pinho, 2008).

This process was only modified with the Citizen's Decree of 2009 (Brasil, 2009), a first attempt to modify the processes of interaction between users and the bureaucratic structure of public services. Without necessarily involving technological changes, the Citizen's Decree established that the number of documents and certifications required of public service users should be reduced to a minimum. The Citizen's Decree also established that the government should be the provider of information, and, as such, should use electronic means to share any information needed.

The Citizen's Decree initiated the transition from e-government to a perspective of digital transformation. The National Electronic Government Program was extinguished and, at first, the problem was the constitution of open government. Brazil joined the Open Government Partnership (OGP) in 2011, and began a process of greater availability of open data. At that moment, the effects of the Brazilian electronic government contributed to modify the necessary elements for transparency and accountability (Filgueiras, 2016).

The provision of e-government in Brazil has promoted broader political participation strategies through the Internet. Several experiments were carried out in Brazil, providing new modalities of political participation (Sampaio, Maia, & Marques, 2010). Brazilian e-government has also provided new modalities for public deliberation, such as the constitution of the Participa.br portal. These initiatives of participation and deliberation modified institutional elements of Brazilian democracy, also expanding the margins of political conflict (Mendonça & Ercan, 2016).

Another important innovation was the adoption of the Macro Civil Law of the Internet in 2014 (Brasil, 2014), which seeks to regulate Internet neutrality. It establishes principles and parameters for users, to protect the privacy of individuals, and creates clearer regulatory frameworks for the Internet in Brazil, setting parameters for electronic identity, which has been fundamental to the process of digitizing public services.

The process of digital transformation in Brazil would take shape only after 2015, with the launch of the Federal Government's public services portal. This site brought together all digital services in one entry and has made the language more accessible, making it easier for citizens to search. It moved the government focus from technology availability to a citizen approach.

Along with Portal de Serviços, the *Bem Mais Simples* Program was launched in 2015, to simplify processes and make it easier for citizens to access public services. In addition, in January of 2016, the Digital Governance Policy was published to promote the managerial tools needed to foster service digitization—concepts, objective principles, digital service guidelines, governance structure, operational mechanisms, process coordination, and networks (see Figure 1).

The Digital Governance Policy also established the strategy for digital governance, which set goals, initiatives, indicators, challenges, and opportunities to implement the Digital Governance Policy and orient the Government's investment to promote digital transformation.

As per the Digital Governance Policy, the Civil House[1] was assigned the role of coordinating and offering political support for the digital transformation strategy, and the Ministry of Planning, Development, and Management, of implementing digital transformation programs, and providing the necessary resources. Thus, the implementation of the digital transformation policy was centralized in the Ministry of Planning, Development, and Management to establish greater policy coherence and systems interoperability and to mediate and review digital service processes among the various organizations of the Federal Government.

Decree 8638 of 2016 (Brasil, 2016) created public funds for the process of digital transformation, not only to ensure the system infrastructure but also to strengthen the Federal Government's open data policy and to support a centralized digital citizenship platform, entitled *Portal de Serviços* (www.servicos.gov.br) (Brasil, 2016). *Portal de Serviços* has mapped out the public services delivered by the Federal Government and has established simpler processes to facilitate citizen access to these services.

Furthermore, Decree 9094/2017 (Brasil, 2017a) was published to redesign public service processes and make them citizen oriented. In the same year, the Brazilian government issued Law 13.460/2017 (Brasil, 2017b) to set principles and rules for the participation, defense, and protection of the rights of users of public services in Brazil.

This legislation urged the various organizations of the Federal Government of Brazil to promote changes in service processes. In addition, the economic austerity imposed in recent years required changes to promote cost cuts and staff reductions. Although the digitization of public services was seen as an austere solution that led to conflict among various agents, it was catalyzed by organizational change, leading to a new service framework. An austerity policy is a catalyst factor that encompasses the digitization of public services (Dunleavy & Margetts, 2013).

Law 13.460/2017 (Brasil, 2017b) also brought up an important public innovation framework, not only for strengthening the policy of digital transformation of the Brazilian government but also for establishing citizen-oriented governance. The focus of digital transformation shifted from e-government to the citizen, the common people who need comprehensive and focused content, citizen friendly

2000	2001	2002	2003	2004	2005
- E-GOV Policy - Executive Committee of Electronic Government (CEGE) - Information Society Program - Government Network Portal	- Electronic Government Portal - Public Access Infrastructure - ICP Brazil - Comprasnet Portal - Subcommittee of the Brazil Gov Network within CEGE	- ICT Resource Inventory - Digital Certification and Integration Subcommittees of administrative systems - Rules and guidelines for Federal Public Administration sites	- Restructuring of CEGE Technical Committees and attribution to the Ministry of Planning for administrative support to the forum	- New guidelines for the e-GOV program - Department of Electronic Government - Standards of Interoperability in Electronic Government (e-PING) - Communications Network Infovia - Transparency Portal	- Electronic Government Accessibility Model (eMag) - Mandatory use of electronic procurement - Institutionalized e-PING - National Program for Public Management and Debureaucratization
2006	**2007**	**2008**	**2009**	**2010**	**2011**
- Digital Inclusion Portal - Evaluation Survey of Services with the Methodology of Indicators and Metrics of Electronic Government Services	- Brazilian Public Software Portal - eMAG required for all public organizations - Evaluator and Simulator for Site Accessibility (ASES)	- Web Standards (ePWG) - Portal of Federal Government Agreements (SINCOV) - National Spatial Data Infrastructure (INDE) - IN SLTI 04 - IT contracting - General Information Technology Strategy (EGTI) - National Agenda for Public Management - INFOVIA Brasil Project	- Citizen Decree	• - National Program of Broadband • - First Research of Electronic Government	• - Public Software Model • - Interministerial Committee and National Open Government Action Plan • - Evaluation of E-Services and E-Gov
2012	**2013**	**2014**	**2015**	**2016**	**2017**
• - Freedom of Information Act • - National Infrastructure of Open Data (INDA) • - Brazilian Portal of Open Data • - Methodology and Management of Software Process Project	• - Data communication in public administration • - Digital Cities • - Digital Identity of Government (IDG)	• - Internet Civil Law (Marco Civil da Internet) • - Participa.br Portal	• - Public Services Portal • - More Simple Program • - National Electronic Process • - Electronic Information System (SEI) • - National Strategy of Digital Governance (EGD)	• - Decree n ° 8.638 / 2016 - Digital Governance Policy • - Decree No. 8.777 / 2016 - Open Data Policy of the Executive Branch • - Decree n ° 8.789 / 2016 - Data Sharing • - Decree n ° 8.936 / 2016 - Digital Citizenship Platform	• - Decree No. 9,094 / 2017 - Simplification of the service provided to the user of public services • - Law n ° 13.460 / 2017 - Public Services Law

Figure 1. Timeline of Digital Transformation in Brazil, 2009–2017
Source: Authors' elaboration.

language, quick and easy-to-follow processes, accessible design, auditory and visual alternatives, and assistive technology.

Digital transformation in Brazil is now a problem of public policy rather than a discussion of ICT availability. The governance structure defined for coordination and the centralized implementation of the digital transformation policy augmented the scale, reach, and speed of this process. The Brazilian federal government's first step for digital transformation was to carry out a survey of all public services, mapping out responsibilities, the target audience, the touchpoints of each service in the interaction between users and bureaucracy, costs, processes, and types of deliveries.

Different factors influence the decision as to which public services are to be digital, such as the policy area, the types of deliveries made, and the target public. Preferences inevitably lead to unequal results of digital transformation. Certain policy areas, or factors related to the types of delivery, may favor service transformation, reducing digital transformation policy coherence.

The next section of this article offers the findings regarding 1,740 public services provided by the Brazilian federal government through 85 organizations. The strategy is to delineate the factors that lead to digitization of public service, to understand institutional choices during the process of digital transformation. The goal is to explain the catalysts of change for the digital transformation of public services in Brazil.

To explain these catalysts of change, we address four basic questions, (1) do differences in institutional capacity and autonomy of public organizations affect the digital transformation of public services?; (2) is the digital transformation of public services affected by the policy area to which the service refers?; (3) do delivery categories affect the preference of agents to digitize a public service?; and (4) do service users' payment of fees, time of service delivery, and need for systemic integration of organizations influence managers' decisions to digitize public services? These first four research problems concern the process of digitizing public services and inform questions related to how digital transformation occurs. A fifth question is theoretical—(5) why does the process of digitizing public services produce differentiated and unequal results regarding the possibility of understanding government as a platform?

Methodology

The research census of Federal Government Attendance Services, implemented by the National School of Public Administration (ENAP, 2018), is based on a survey of public managers responsible for the implementation of each of the public services provided by the Brazilian federal government and focused on public services delivered to citizens and companies. It is an unprecedented survey of the universe of 1,740 public services provided by 85 organizations within the Brazilian federal government.[2] First, it is necessary to understand the concept of public service adopted to specify next the selection criteria of the public services that would compose the survey.

Decree 8936/2016 (Brasil, 2016) which establishes the *Plataforma de Cidadania Digital* and the concepts and guidelines for the digital public services offer, defines a public service as an "action of the organizations and entities of the federal public administration to meet, directly or indirectly, the demands of the citizens and companies regarding the exercise of rights or the fulfillment of duty".

It is understood that the delimitation of the field searched did not contemplate the totality of the public services provided by the Federal Government but only those related to the "exercise of right or the accomplishment of duty." This expression specified in Decree 8.936 means that public services must be citizen or user centered because they must guarantee rights or be necessary for the user to fulfill his duties with the community. The services mapped in this research are individualized, meaning that they generate a benefit to a citizen or an organization.

For this reason, the survey did not include services rendered internally in federal agencies, which relate for example to the management and operation of the

public administration, such as maintenance of computer equipment, personal department routines, procurement processes, and others.

For the mapping of services to be effective, it was necessary to identify the interaction stages between the final user and the administration, as well as the standard procedures involved. For this reason, this research does not cover public services of fundamental importance to Brazilian society such as free visitation to museums or other cultural and environmental spaces that do not require scheduling or prior registration. It was considered that their nature constitutes the delivery of goods, and, despite being essential, they are not of an individualizable nature.

It is also important to clarify the category of public services and their attributes. Public services can be understood as actions of the public administration to meet the demands of society, regarding the exercise of rights or the fulfillment of duties. For research purposes, public services are, "standardized processes that carry out the delivery of a product or benefit to a user, directly or through intermediaries, from one or more interactions between public authority and users" (Brasil, 2016).

For the purposes of this research, public services should meet the following requirements, specified in Table 1. The public services in this research must have seven attributes. Failure to comply with one of the attributes would, in principle, make it impossible to include a service in this survey. Protocols and queries can be cited as examples; although there are relevant activities and involve several of the attributes listed, they do not have the attribute of sufficiency to be considered public service in this research. They constitute stages of a service, but not the public service in its entirety, according to the conceptual delimitation adopted in this research.

All public managers responsible for the implementation of public services received and responded to the standardized survey collection instrument. The data were collected and revised with the institutional support from the government. The collection was done between March 16 and November 30, 2017.

The unit of analysis in each service was performed by federal government organizations to generate rights or fulfill duties for citizens and companies

Table 1. Criteria for the Selection of Public Services in Survey

Standard and governance	Obedience to a normative process to serve the user; prior definition of the rules and procedures of the service process by a responsible body, even if it does not perform it directly
Individualization	Service to an individual user that may be a citizen or companies
Effects	Change between the situation before and after the provision of the service to the user
Competence	Relationship between the provision of the service and the main activity of the institution
Interaction	Involvement of the public institution with the user, or his or her representative, through a service channel, in person or not
Sufficiency	The activity concludes with the provision of a service or delivery of a product to the user and does not require the subsequent processes
Purpose	Guarantee of a right or the provision of a duty to the user

Source: Authors' elaboration.

(see Table 2). The results were examined in relation to the factors that explain the process of digital transformation of services, seeking to discover what factors explain public managers choosing to digitize a public service. The following section presents the research findings.

Findings

The results derive from the use of a logistic regression model; see Tables 3–6.[3] Based on the descriptive data listed above, the dependent variable is the digitization stage of the public services provided by the Brazilian federal government organizations.

Dependent Variable

Within the 1,740 public services provided by the Brazilian federal government, the stages of digitization are varied. Of this total, 15.6% present no digitization, with all touchpoints between users and bureaucracy performed personally without machine use; 8.8% present only one informational stage of digitization, meaning that there is a portal with information about the service, but touchpoints are made in person; 44.1% of the public services present partial digitalization, meaning that they have some touchpoints with the support of a digital medium, but they are delivered in person. Of 1,740 services, 24% are digital services, where touchpoints and bureaucracy are carried out digitally. Finally, 7.4% of public services are self-service, which means that that the citizen or organization may use the service without any touchpoint mediated by the bureaucracy, depending only on the digital medium.

The digitization stage composes the dependent variable of this study. In the findings reported below, through a logistic regression, this dependent variable was reduced to a binary variable. When the digitization stage is self-service or digital, it is considered as digital, receiving the value 1. When the digitization stage is none, partial or informative, the assigned value is 0.

Independent Variables

The independent variables comprise a set of characteristics of public services. They characterize whether public managers prefer a public service to be digital, making it possible to identify which factors explain the process of digital transformation of public services.

Do the implementation of the service, areas of activity, type of delivery, collection of fees, average time for service delivery, type of user identification, and organization capacity and autonomy affect the preferences of managers when digitizing public services? The estimated effects make it possible to identify the preferences of agents that inform the process of institutional change.

Considering the 1,740 services pointed out by the managers of the 85 organizations in the Brazilian federal government, 74.6% of these services are executed by the organization itself. In 21.8% of cases, 1,740 services are executed in partnership with other organizations, which may be public or civil society organizations. Finally, 3.6% of these services are fully implemented by other organizations.

Another question raised in the survey was the framework of services in different policy areas. The services were categorized according to the product of the service to the user and to understand the diversity of the organizations'

Table 2. Federal Organizations by Government Area

Economy and Environment (18 organizations)	Ministry of Finance
	Securities Commission
	Private Insurance Superintendence
	Ministry of the Environment
	Brazilian Institute of Environment and Renewable Natural Resources
	Chico Mendes Institute for Biodiversity Conservation
	National Water Agency
	Botanical Garden Research Institute of Rio de Janeiro
	Ministry of Tourism
	Brazilian Institute of Tourism
	Ministry of Industry, Foreign Trade and Services
	National Institute of Metrology, Quality and Technology
	National Institute of Industrial Property
	Ministry of National Integration
	Superintendence for Central West Development
	Superintendence for the Development of the Amazon
	Superintendence for Northeast Development
	Ministry of Agriculture, Livestock and Supply
State (22 organizations)	Ministry of Planning, Development, and Management
	National School of Public Administration
	Foundation Brazilian Institute of Geography and Statistics
	Institute of Applied Economic Research
	Ministry of Defense
	Osorio Foundation
	Ministry of Justice
	Administrative Council for Economic Defense
	Ministry of Foreign Affairs
	Alexandre de Gusmão Foundation
	Civil House
	National Institute of Information Technology
	National Press
	Secretary of Government
	Ministry of Transparency, Inspection and Comptroller General
	Advocacy-General of the Union
	Central Bank
	Secretariat of the Patrimony of the Union
	Navy Command
	Army Command
	Department of Federal Police
	Department of Federal Highway Police
Infrastructure (21 organizations)	Ministry of Science, Technology, Innovation, and Communications
	National Commission of Nuclear Energy
	National Telecommunications Agency
	Brazilian Space Agency
	National Council for Scientific and Technological Development
	Ministry of Mines and Energy
	National Agency of Petroleum, Natural Gas and Biofuels
	National Department of Mineral Production
	National Electric Energy Agency
	Ministry of Transport, Ports and Civil Aviation
	National Civil Aviation Agency

Table 2. Continued

	National Waterway Transportation Agency
	National Land Transportation Agency
	Ministry of Cities
	Brazilian Center for Physical Research
	Center for Strategic Technologies of the Northeast
	National Institute of the Atlantic Forest
	National Institute of Technology
	National Institute of Semi-Arid
	National Laboratory of Astrophysics
	Mineral Technology Center
Social (24 organizations)	Ministry of Culture
	National Library Foundation
	Casa de Rui Barbosa Foundation
	Palmares Cultural Foundation
	National Arts Foundation
	National Film Agency
	Brazilian Institute of Museums
	Institute of National Historical and Artistic Heritage
	Ministry of Education
	Coordination of Improvement of Higher Education Personnel
	Joaquim Nabuco Foundation
	National Institute of Educational Studies and Research Anísio Teixeira
	Ministry of Health
	Oswaldo Cruz Foundation
	National Health Surveillance Agency
	National Agency of Supplementary Health
	National Health Foundation
	Ministry of Labor and Social Security
	Jorge Duprat Figueiredo Foundation of Safety and Occupational Medicine
	Ministry of Social Development
	National Institute of Social Security
	Ministry of Human Rights
	Sport Ministry
	National Institute of Education of the Deaf

Source: Authors' elaboration.

performances in deliveries to society. According to Figure 2, the main area of activity concerns education, which represents 8.5% of public services, followed by administration and public management, with 8.3%. It is important to stress that public administration includes the issuance of documents, certifications, and authorizations, making up essential services rendered to citizens, companies, and the public administration itself.

Another point to understand public service supply is the type of delivery the different organizations of the public sector carry out. These types of delivery seek to frame the different types of services that the Brazilian federal government renders in the different areas of activity. Figure 3 shows that the main delivery performed by the Brazilian Federal Government is the issuance of permits and licenses, which are approximately one-third of the public services provided.

Of the total of 1,740 public services, 28.9% charge fees. Service delivery times vary widely and have been aggregated into categories that specify a range of

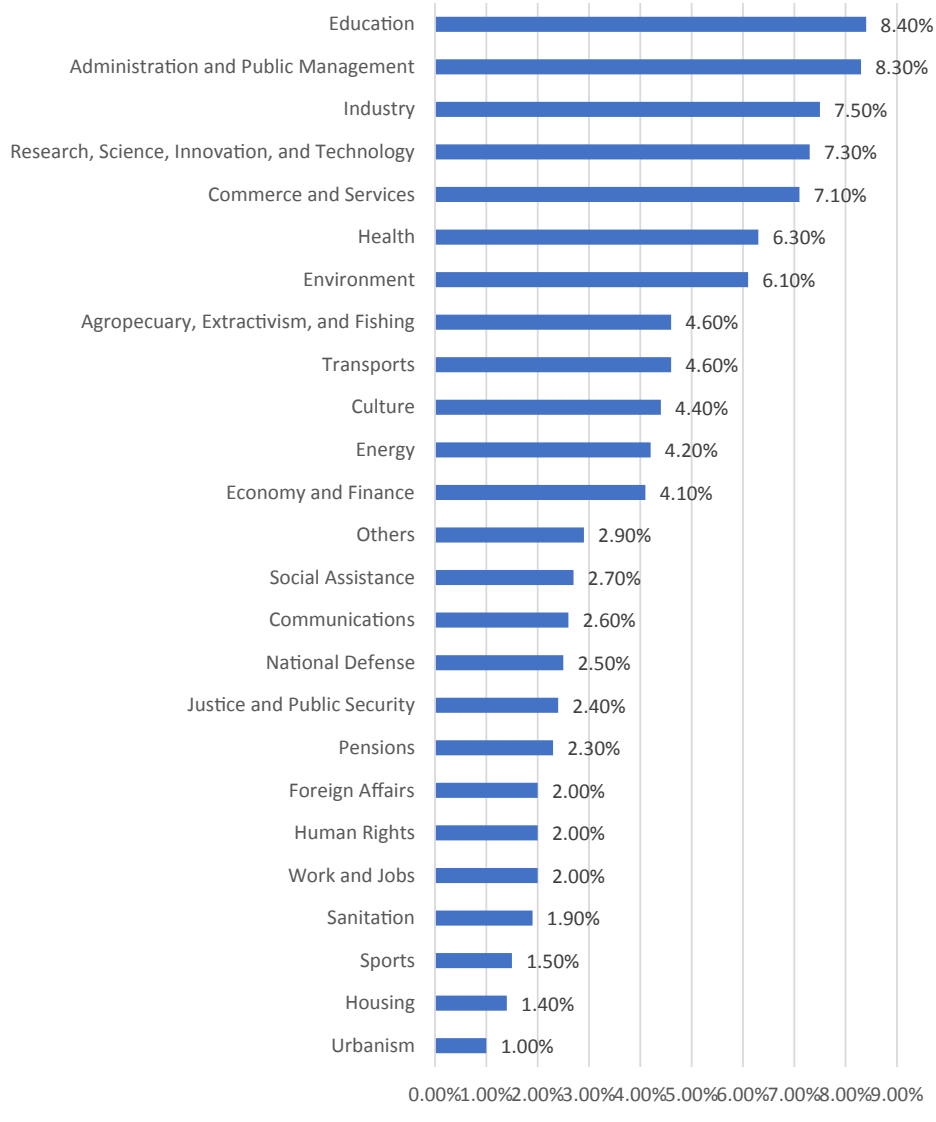

Figure 2. Policy Area of Public Services
Source: ENAP (2018).

time. Of the services surveyed, 29.3% take from 1 to 15 days to be delivered, 22.8% take from 16 to 60 days to be delivered, 9.2% take from 60 to 120 days, and 15.2% of services require more than 120 days to be delivered to the user. In addition, 73.7% of these services require some sort of systemic integration. Finally, public services require different forms of user identification. For 9% of the services, no user identification is required, for 44.8%, self-declaration is required, for 38.1%, an original document has to be presented by the user, for 7.7%, a digital signature is required, and for 0.4%, biometric identification is used.

Finally, we include data on the capacity and autonomy of the organizations that implement the services. Capacity is the degree of professionalization of the

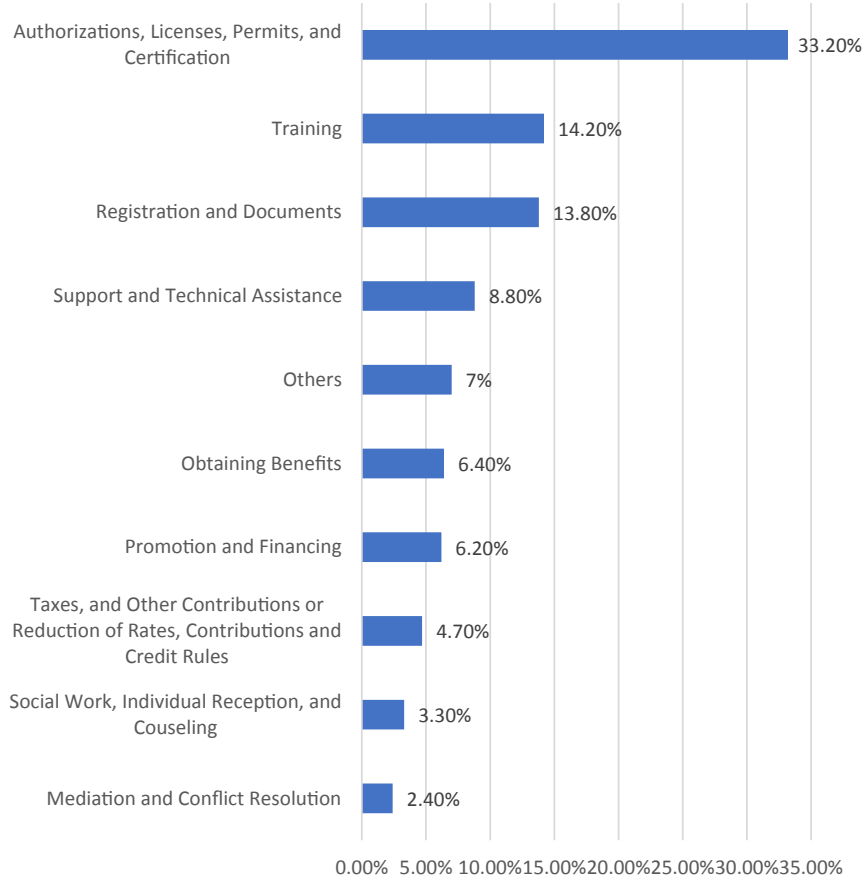

Figure 3. Types of Delivery of Public Services
Source: ENAP (2018).

bureaucracy that implements the services. Autonomy is the degree of freedom of the organization with respect to the possibility of political interference and forms of patronage and clientelism in the implementation of public policies and services (Bersch, Praça, & Taylor, 2016). The data on the capacity and autonomy of the organizations were extracted from the research conducted by Bersch et al. (2016).

The model was consistent and coherent, with a Nagelkerke R-squared of 0.474. This consistency makes the logistic regression model predictions robust, with a high degree of explanation.[4] The procedures adopted make it possible to understand the preferences of agents that explain whether a service is digital. Do organizational capabilities, autonomy, area, types of deliveries, whether fees are charged, the average service delivery time, and identification processes affect whether a public service is digital? (see Table 3).

The results show that the factors are a part of the governance of the digital transformation of public services, due to the centrality of process changes and the adoption of technologies that are centered on the user.

Table 3. Logistical Regression—Determinants of Digitization of Public Services

Variables	B	S.E.	Wald	df	Sig	Exp (B)	
Capacity	−0.064	0.122	0.277	1	0.599	0.938	−0.062
Autonomy	0.017	0.123	0.02	1	0.887	1.018	0.018
Own execution	−0.272	0.176	2.393	1	0.122	0.762	−0.238
Area—Social work	−0.728	0.392	3.452	1	0.063	0.483	−0.517
Area—Administration and public management	0.57	0.185	9.531	1	0.002	1.768	0.768
Area—Agropecuary, extractivism, and fishing	−0.372	0.261	2.025	1	0.155	0.689	−0.311
Area—Commerce and business	0.578	0.23	6.316	1	0.012	1.783	0.783
Area—Communications	0.12	0.357	0.112	1	0.737	1.127	0.127
Area—Culture	−0.387	0.279	1.933	1	0.164	0.679	−0.321
Area—National defense	−0.076	0.382	0.04	1	0.841	0.926	−0.074
Area—Human rights	−1.092	0.51	4.588	1	0.032	0.336	−0.664
Area—Economy and finance	0.541	0.263	4.245	1	0.039	1.718	0.718
Area—Education	0.269	0.237	1.295	1	0.255	1.309	0.309
Area—Energy	−0.716	0.317	5.108	1	0.024	0.489	−0.511
Area—Sports	−0.102	0.46	0.049	1	0.824	0.903	−0.097
Area—Housing	0.861	0.499	2.974	1	0.085	2.365	1.365
Area—Industry	−1.126	0.268	17.72	1	0	0.324	−0.676
Area—Justice and public security	1.108	0.395	7.847	1	0.005	3.028	2.028
Area—Environment	0.002	0.256	0	1	0.992	1.002	0.002
Area—Research, science, and innovation	−0.392	0.232	2.865	1	0.091	0.675	−0.325
Area—Pensions	−1.034	0.374	7.625	1	0.006	0.356	−0.644
Area—Foreign affairs	−0.085	0.347	0.06	1	0.807	0.919	−0.081
Area—Sanitation	−0.641	0.5	1.641	1	0.2	0.527	−0.473
Area—Health	0.708	0.233	9.261	1	0.002	2.029	1.029
Area—Work and jobs	0.461	0.359	1.651	1	0.199	1.586	0.586
Area—Transportation	0.719	0.248	8.396	1	0.004	2.052	1.052
Area—Urbanism	−0.276	0.568	0.235	1	0.628	0.759	−0.241
Delivery—Support and assistance	−0.603	0.253	5.696	1	0.017	0.547	−0.453
Delivery—Assistance, individual reception, and counseling	−1.655	0.489	11.476	1	0.001	0.191	−0.809
Delivery—Registration and issuance of document	−0.348	0.204	2.904	1	0.088	0.706	−0.294

Table 3. Continued

Variables	B	S.E.	Wald	df	Sig	Exp (B)	
Delivery—Promotion and financing	0.217	0.282	0.593	1	0.441	1.242	0.242
Delivery—Training	−0.743	0.251	8.742	1	0.003	0.476	−0.524
Delivery—Mediation and conflict resolution	−0.1	0.408	0.06	1	0.807	0.905	−0.095
Delivery—Obtaining authorizations, licenses, certifications, and qualifications	−0.677	0.189	12.788	1	0.000	0.508	−0.492
Delivery—Obtaining benefits	−0.643	0.29	4.918	1	0.027	0.526	−0.474
Delivery—Taxes and other contributions, or reduction of rates, contributions and credit rates	1.216	0.267	20.779	1	0.000	3.374	2.374
Are there any user charges?	−0.82	0.183	20.109	1	0.000	0.441	−0.559
How long, on average, does the user need to wait to receive the service after the moment of the first interaction?	−0.038	0.026	2.133	1	0.144	0.963	−0.037
Identification [Identification not performed]	1.432	0.255	31.541	1	0.000	4.187	3.187
Identification [Identification by means of self-declaration]	0.949	0.156	36.949	1	0.000	2.582	1.582
Identification [Identification by original document]	1.7	0.112	231.96	1	0.000	5.476	4.476
Identification [Identification by digital signature]	−0.729	0.123	35.021	1	0.000	0.482	−0.518
Identification [Identification via biometric conference]	−19.702	15231.87	0	1	0.999	0	−1
Integration [Yes, the service requires integration with Federal Executive Branch systems]	−0.161	0.163	0.974	1	0.324	0.851	−0.149
Constant	−1.456	0.325	20.047	1	0	0.233	−0.767

Source: ENAP (2018).

Table 4. Model Summary

Step	–2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1341.984[a]	.335	.474

Source: ENAP (2018).
Note: Estimation terminated at iteration number 20 because maximum iterations have been reached. The final solution cannot be found.

Table 5. Omnibus Tests of Model Coefficients

Step	Chi-square	Degrees of freedom	Sig.
Step	324,771	40	0.000
Block	324,771	40	0.000
Model	324,771	40	0.000

Source: ENAP (2018).
Note: Estimation terminated at iteration number 20 because maximum iterations have been reached. The final solution cannot be found.

Table 6. Classification Table[a]

			Predicted		
			Digitization		
Observed			0.00	1.00	Percentage correct
Step 1	Digitalization	0.00	1045	97	91.5
		1.00	180	317	63.8
	Overall percentage				83.1

Source: ENAP (2018).
Note: The cut value is 0.500.

Capacities and autonomy. The logistic model presented above did not find a significant effect from institutional capacities and autonomy to explain public service digitization in the Brazilian federal government. Capacities have little influence if we consider that in the Brazilian government an organization has a political delegation to carry out the process of digital transformation of services. Capacities and institutional autonomy may be key factors in the process of accelerating digital transformation, but they do not necessarily imply efficiency gains and service centricity from the citizens' perspective.

In the case of Brazil, capacity is not decisive for a service to be digital. Preferences for digital transformation depend on institutional processes of change, which can include or exclude services according to a set of preferences of public managers. The process of prioritizing the digital transformation of public services can

address different questions without necessarily referring to the greater or lesser capacity of the organization.

Policy area. Digital transformation of services varies according to the policy area, presenting different dynamics based on whether services will be digital. The best performance found, with significant results, was related to the policy areas of justice and public safety, health, transportation, public administration and management, commerce and business, economy, and finance. Public services in these policy areas are more likely to be digitalized, so they presented the best performance in the digital transformation process.

Moreover, some areas presented an inverse performance. The policy areas of human rights, energy, industry sectors, and welfare are less likely to become digital. The policy areas presented variations regarding the adoption or not of digital transformation strategies. Policy areas can have a distinct effect on service digitization strategies.

Type of delivery. The types of deliveries can positively or negatively affect the likelihood that a public service will be digital. When service delivery is related to taxes and other contributions, reduction of rates, contributions, and credit rules, public services are 2.37 times more likely to go digital. Moreover, support and assistance services, counseling, authorizations, licenses, certifications, qualifications, training, and benefits present inversely proportional indicators. The probability of these services becoming digital is lower.

Timing, fees, provision, and identification. Some characteristics of public service processes affect digital transformation. When the service delivery is conditioned by the payment of a fee, the effect on the probability of becoming digital is negative. It is explained by the fact that the fees charged for the delivery of the service represent the revenue of the organization, so public managers prefer to digitize free-of-charge services.

Regarding how public services are provided, whether it is directly by the organization or in partnership with other organizations, the model did not show any statistically significant difference. Providing the service by itself or in partnership does not affect the digitalization process.

Likewise, the average time of the service delivery does not significantly affect the public managers' decision to turn a public service digital.

Moreover, user identification is an important factor to define the preference of agents for the digital transformation process. User identification is required in most public service processes, but when identification is not needed, it is more likely a public service will be increased.

Finally, it has been concluded that having integrated systems is not very significant when deciding whether to digitize a public service.

Discussion

This study contributes to the literature on digital transformation by addressing public managers' decision-making processes for public service digitization. The case of Brazil shows that digital transformation does not necessarily result in unified government platforms.

Developing digital public services depends much more on institutional processes of change that relate to the service delivery process than to the available technology. Public policy area, types of delivery, timing, fees, provision, and user identification processes may affect the preferences of the agents for a digitized public service.

The type of delivery can be a catalyst for the change that affects the results of digitization of public services. Digital transformation, which modifies the value chain of public services, faces greater barriers in social public services. Factors that motivate digitization affect digital governance. The structure and design of public services may imply veto points and barriers to public service digitization. The explanation for this finding is that a government's preference to digitize these services is motivated to improve tax collection, to ensure data use that enables the collection and processing of debts of citizens and companies. This type of delivery is usually a priority for digital transformation in Brazil.

Digital transformation governance implies that service digitization processes can be accelerated at critical junctures that catalyze change (Dunleavy & Margetts, 2013). Contexts that present fiscal crises can serve as catalysts for a change that allow for the adoption of digital transformation. The value chain becomes the reengineering of services and the reduction of their costs, providing disintermediation toward do-it-yourself public services.

This process influences institutional change, which is catalyzed by ambiguous and conflicting preferences on the part of agents. Austerity contexts provide conjunctures that facilitate the adoption of technologies. This conflict provides the opening of new interpretations and narratives that promote change. In this sense, the digital transformation of public services must be understood as a process of change undertaken in layers, through conversion, displacement, and drift.

The findings of this article reveal that agents' preferences for simply maintaining the status quo define the scope of the digital transformation process. In addition, digital transformation depends on change catalysts, considering that agents feel the need to have control of the organizational change process.

There is a tendency for digital technologies of public services to replicate complex bureaucratic procedures, which does not bring disruption. The disruption does not come with the process of digitizing services but with the possibility of using the data in a more comprehensive process of digital governance.

Digital transformation of public services depends on institutional preferences for digitization. These preferences denote choices for certain services to be digitized whereas others are not, which may be linked to the fact that institutional processes carry informal rules that may affect public service digital transformation. Analyzing the case of Brazil, the predictors for digitizing public services vary according to institutional preferences.

An organization's capacities and autonomy do not explain why a public service is digital. In the case of Brazil, despite the fact that it was decided that a governance structure composed of a centralized implementation unit and a high political authority coordination board would be created, digitization has occurred in a variety of ways among federal government organizations. During this process, institutional choices were made to digitize services that related to tax collection or that conditioned delivery to the payment of fees. In addition, policy areas have driven the preferences of the agents during the digitization process.

Digital government in Brazil means the possibility of qualifying the concept of government as a platform, which does not posit public service offer and delivery the same way. The government's choice of services to be digitized reflects the production of inequality. As Dunleavy and Margetts (2013) note, elements such as austerity policies can promote processes of digital transformation in an unequal way, privileging the process of tax collection at the expense of social policies aimed at inclusion. Platforms can replicate inequalities and differences in user access—citizens and businesses—resulting in inconsistencies in the policy of digital transformation. Digital transformation is not a linear process of platform decision and implementation; it can be ambiguous and inconsistent.

Digital transformation governance may have a significant effect on the structure of public services, but it is necessary to understand the preferences of the agents and the prioritization with regards to citizen- or user-oriented services. In the case of Brazil, digital transformation has shown clear preferences for certain policy areas and types of delivery.

Conclusion and Policy Consequences

We can conclude that a comprehensive and homogeneous digital transformation strategy is not feasible. Factors related to preferences of agents interfere in the inclusion of specific public services in the digitization strategy. The process of digital transformation is heterogeneous and is affected by different factors of choice. It is also fragmented and inconsistent and does not depend directly on organizational capacity.

The use of technology promotes changes in the structure of services delivered by the government, so it can result in unequal, inconsistent, and incomplete processes that can promote citizens' inclusion or exclusion. Although there is a political structure to coordinate the digital transformation policy in Brasil, the digitization process has been fragmented and highly unequal.

Theoretically, further reflection is needed on the process of digital transformation. It is vital to design policies that may allow for coherent, coordinated, and homogeneous digitization of public services. For full and coherent digital transformation, the policy design and process must promote greater integration and institutional arrangements with a theoretical discussion.

The Robustness of Service Delivery Requires Digital Transformation

The policy of digital transformation implies changes in the provision of public services. For institutions to be able to transform public services, they must have the capacity to deal with external shocks, conditions of uncertainty, and imperfect rules. The robustness of a public policy means that the actors are able to maintain the objectives and expected outcomes in a context of structural or procedural change (Capano & Woo, 2018; Goodin, 1998; Ostrom, 1990). The robustness of the policy should not be confused with resilience. Robustness is a property of politics with respect to the performance of its different functions and objectives, while resilience means a return to a normal state of public policy (Berkes & Folke, 2000).

The robustness of the digital transformation policy points to organizations maintaining their functions and results in a context of permanent change. It suggests that the digital transformation policy will be robust enough to prevent the

"normal" state of the public service from returning and to maintain the public service delivery structure, since digital transformation will be taken as the goal and the result of the policy.

The robustness of the digital transformation policy must break the resilience of bureaucracy by improving the provision of services deliberately to fulfill its functions. Policymakers must be prepared to deal with the shocks that digital transformation policy can cause by maintaining the initiative in a dynamic ownership of the policy. Robustness is not static; it entails the adaptability of policymakers to fulfill their functions and policy objectives.

The Coordination of Digital Transformation

Another challenge to digital transformation is the need for coordination. Policy coordination is required because several organizations with diverse objectives and procedures set in different institutional realities carry out the provision of public services. The problems and challenges in the delivery of services by different organizations are varied, involving multiple deliveries and actors.

Coordinating digital transformation requires political conditions that ensure the legitimacy for deliveries to be made in a manner that is coherent and adherent to the organizations' priorities. Coordination requires agreement and negotiation among various organizations, since they are autonomous in choosing the form and structure in which the service delivery will be provided. Coordinating the digital transformation policy involves not only the coordination of the services but also of the objectives that guide the agencies (Peters, 2005).

The coordination of the digital transformation policy should be based not only on the service delivery process but also on a clear and objective vision of the future of public policy and government. Digital transformation must rely on a widely known vision of the future, with well-established goals, to facilitate coordination work.

Collaborative Governance of Services and Production of Public Value

The need for greater empathy and adherence to the public service users' interests, perspectives, and opinions is embedded in the policy of digital transformation. That is, digital transformation offers the opportunity to revise service processes aimed at improving the quality of government deliveries.

This window of opportunity requires collaborative governance. Thus, governments should be able to build different forums with the intention of involving citizens and users in such a way that they are engaged in the policy objectives to review and strengthen processes and to address in critical times. Improving the quality of public service delivery depends on a collaborative structure that is capable of providing new modalities of institutional arrangements aimed at facilitating services for users (Ansell & Gash, 2008; Imperial, 2005).

Collaborative governance of digital transformation can improve the public value of services by modifying the channels of interaction between the state and society to improve the quality of deliveries and facilitate processes for the user (Bovaird, Stoker, Jones, Loeffler, & Pinilla-Rocancio, 2015). In addition, it provides leadership to promote transformation in more consensual terms. It is capable of breaking political inertia, facilitating coordination processes, and promoting policy robustness.

The center of the government should functionally perform the policy of digital transformation of public services, with the aim of ensuring coherence and adhesion, in a context of political legitimacy that supports the decision-making process and ensures society adherence. Coordination of the digital transformation policy will be vital for government performance in a new public service delivery structure, with ongoing monitoring of costs, processes, and deliveries to society.

Creating digital public services will require a robust design of the digital transformation policy, with clear objectives and well-defined procedures that should also be adaptable in a context of ambiguities, uncertainties, and limited rationality.

These challenges to digital transformation policy circumscribe a process still under development, subjected to a trajectory of ambiguities and controversies. The policy of digital transformation of services offers the opportunity for improving service delivery, establishing collaborative mechanisms with the society, and enhancing the quality of the government. To address ambiguities, the policy must have a robust design and refined coordination processes linked to a democratic strategy based on the principle of autonomy of organizations and with the intention of providing a public service that is more coherent and adherent to the needs of users.

Future research should address the qualitative aspects of the digital transformation of public services from the perspective of the user. In addition, comparative studies of public service digital transformation processes are necessary to explain different policy trajectories. Finally, it is important to highlight once again that managers' preferences affect greatly digital transformation policy, favoring or creating barriers to the digitization of public services.

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Notes

[1]Civil House is an organization within the Presidency, dedicated to advisory, coordination, and monitoring strategic policies for the president's agenda.

[2]During the data collection phase, 16 services were not completed by the organizations' survey and 106 were excluded upon request; 14 organizations did not complete the survey. Federal universities, federal institutes of education, and state-owned enterprises were not surveyed.

[3]The multinomial model was tested but not used for two reasons. First, the small percentage of the extreme variables (15.6% for no digitalization and 7.4% for the self-service categories) increased the standard errors of the significance tests, due to the small size of the sample, of 1,740 cases. In addition, the lack of a more accurate variable to measure the digitalization stage led us to choose a more explainable and simple binary response variable.

[4]The Nagelkerke's Pseudo R-squared is a measure of adjustment based on the ratio between the baseline model and the saturated model used in the paper (Nagelkerke, 1991). In this case, since Nagelkerke's Pseudo R-squared is an adjustment in the scale of the Cox and Snell Pseudo R-squared, it is accurate to say that the model fits in almost 50% of the explaining power of the model. Most binary models explain less than one-third of the variance, a standard fit in the article's field.

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