ANALYSIS OF THE ELETRONIC GOVERNMENT FACTORS THAT INFLUENCE THE DIGITAL TRANSFORMATION OF THE PUBLIC SERVICE

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RESUMO ESTRUTURADO

Introdução/Problematização: A transformação digital (DT) representa um processo dinâmico em que as tecnologias digitais engendram alterações disruptivas, necessitando de adaptações estratégicas por parte das organizações para fomentar a criação de valor. Neste movimento, encontram-se as ações relacionadas ao governo eletrônico (E-Gov). Estas ações não se restringem apenas à disponibilização de serviços online, mas propõe mudar a forma como o governo interage com os cidadãos e grupos de interesse para a criação de valor. A partir do potencial da TD apresentado para o serviço público, diversos estudos se propuseram a pesquisar sobre a temática de E-Gov. Neste norte, o presente levantamento visa integrar as principais contribuições evidenciadas, de forma a cooperar para o avanço na temática a partir do relacionamento destes dois constructos.

Objetivo/proposta: a presente pesquisa intenciona analisar quais são os fatores capazes de limitar ou impulsionar o processo de TD no serviço público, por meio da implementação do E-Gov.

Procedimentos Metodológicos: A pesquisa baseou-se na metodologia de revisão integrativa de literatura, seguindo procedimentos de Whittemore e Knafl (2005). A técnica foi escolhida por ser adequada para obter uma compreensão holística de uma temática e permitir a geração de novos conhecimentos. Utilizou-se as bases de dados Scopus e Web of Science por serem multidisciplinares e serem revisadas por pares. A partir de uma estratégia de busca e após a aplicação de filtros de inclusão e exclusão, leitura parcial e leitura completa, chegou-se a um portfólio final de 27 artigos. O material foi analisado tematicamente, permitindo a interrelação entre a TD e o E-Gov.

Considerações Finais: Esta revisão aponta evidências de que a TD é impulsionada por um gatilho específico, a tecnologia da informação, e requer a preparação de infraestrutura, disponibilidade, desenvolvimento de aplicações dedicadas e treinamento de funcionários públicos e outros atores envolvidos para que o processo de mudança possa ser bem-sucedido. A construção de serviços públicos digitais não é um processo que depende exclusivamente das tecnologias disponíveis, mas dos próprios processos institucionais. Desta forma, é possível

inferir que a transformação digital não é uma solução técnica, mas sim sociotécnica e sociopolítica.

Contribuições do Trabalho: esta pesquisa contribui para a evolução da discussão do tema, evidenciando drivers e fatores limitantes do E-Gov para os processos de TD. O E-gov segue as perspectivas da TD, envolvendo diversos atores (governos, empresas e cidadãos). A finalidade do E-Gov vai além da modernização tecnológica, direcionando-se para a prestação de serviços públicos mais racionais, otimizados e eficientes para melhorar a interação com a comunidade. Apresenta-se a necessidade de adoção de mecanismos de controle devido às questões éticas envolvidas, uma vez que o uso massivo da tecnologia da informação também pode ter o efeito de restringir liberdades e deve ser objeto de preparo, planejamento e cautela.

Palavras-Chave: Transformação digital; Governo eletrônico; Serviço público.

1. Introdução

Historically, industrial revolutions marked evolutionary traits for humanity in terms of productivity. The first, which took place in the 18th century, used steam power; the second, electrical energy. In the mid-twentieth century, a third revolution occurred, which brought information technology into the realm of automation. The current transformations mark a trend toward the emergence of a new revolution: the digital one.

As defined by the Brazilian Federal Government, digital transformation in government means offering a quality public service, with less time and money spent by the citizen, to improve the lives of those who live and work in the country. (Brasil, 2021). This understanding suggests that digital solutions rise within the public sector with two central social demands: improved service provision and cost reduction.

Also in Brazil, in March 2021, Law n. 14.129 (2021) was enacted, which defines the principles and guidelines of the Digital Government related to the efficiency of public administration (Article 3), linking elements of bureaucracy reduction, innovation, digital transformation, and citizen participation. Linked to this factor is the search for optimized, simplified, and integrated processes, while the development of the digital economy also seems to be understood as a collaborative factor for more open, inclusive, and transparent management.

Digital transformation (DT) represents a dynamic process wherein digital technologies engender disruptive alterations, necessitating strategic adaptations by organizations to foster value creation, involving management of structural changes, which also include barriers that can affect their results (Vial, 2019). However, DT goes beyond the development of applications in a formal environment. Its implementation can also be used to optimize performance, bringing operational and strategic levels closer together, which requires attention to another potential for change in organizations, more structural: the propensity to innovate.

From the potential of digital transformation presented to the public sector, several studies have proposed research on the topic of electronic government (E-gov). Agostino et al. (2021) explore the adaptation of cultural public services to digital provision in emergency situations, such as those witnessed during the COVID-19 pandemic. Su et al. (2021) investigate a novel business model for a medical information services platform that integrates the interests of all stakeholders, thus forming a new health information ecosystem through value co-creation. In Brazil, Gardenghi et al. (2020) address the transformation of a public service previously offered in person, which was subsequently digitalized using a prototyping approach that can be potentially replicated by other public organizations.

In this direction, the present research aims to integrate, through an integrative review (Whittemore & Knafl, 2005), the main contributions highlighted in order to cooperate with the advancement of the topic based on the relationship between the constructs DT and E-gov. Given this scope, the research question is: what are the factors capable of limiting or boosting

the process of digital transformation in the public service through the implementation of electronic government?

This work is presented in three main sections. In the first, the main concepts raised for the literature review are discussed: 1) Digital transformation, with its relationship with public service as a subtopic, and 2) Electronic government. The next section brings the methodological foundations used in the study and then, in the results and discussions, the main identified contributions in response to the research question are presented by means of texts and tables.

2. Theoretical Framework

The next sections are dedicated to exposing literature references on digital transformation and its application to the public sector, as well as on electronic government.

2.1 Digital Transformation

Digital transformation has always maintained a strong association with the so-called Industry 4.0 and currently boosts change and innovation in both the business sector and public organizations (Reis et al., 2018). It is underpinned by nine pillars: Internet of Things, Big Data, cybersecurity, augmented reality, cloud computing, robotics, horizontal and vertical systems integration, additive manufacturing, and simulation (Lydon, 2016).

Reis et al. (2018), when studying several definitions of DT, characterized the construct according to three elements: (1) technological, with the use of new digital technologies; (2) organizational, requiring changes in organizational processes or the creation of new business models; and (3) social, as a phenomenon that affects all spheres of human life, included in this category the consumer experience. For these authors, DT is defined as the employment of new digital technologies that make it possible to improve business performance and have influences on all aspects of their users' lives.

Digital transformation is a change driven by digital technologies; however, it should not be considered as a synonym for digitization (converting analog information into digital) or digital innovation. As Osmundsen, Iden, and Bygstad (2018) warn, although these are interconnected terms, DT involves a significant change in the way business is conducted, yielding new business models, efficiency, and altered user experience. Digitization may constitute one of the steps; however DT is more comprehensive and there is a change in the logic of value creation (Verhoef et al., 2021).

As a multifaceted and multidisciplinary topic, DT involves not just bringing digital technologies into the organization. It is a process that involves changes in strategy, organizational structure, information and communication technologies, supply chains, and marketing, as well as a deeper understanding of the new roles of each agent (consumers as co-producers, competitors as collaborators, and verticalization with suppliers) and how the

introduced digital technologies change the boundaries of action and can be sources of competitive advantages (Verhoef et al., 2021).

2.1.1 Digital transformation and Public Service

In the public sector, work is briefly characterized by processes whose typical activities are around the tertiary or service sector. Still, with an undefined extension, the public service brings together a great diversity of activities, products, and processes (Pena & Minayo-Gomes, 2010).

The way of understanding the role of each area, added to the complexity inherent to the current reality, brought to public managers the need to obtain a better understanding of the workflow, with a transversal and result-generation look. According to Daglio et al. (2014), new ideas must add public value, that is, they must effectively meet the needs or demands of public interest.

In this sense, digital transformation in public service reflects the transition to more integrated and interconnected workflows with greater operational efficiency. The challenge is very complex, not only because of the volume of information, which requires the interconnection of systems but also because of the growing social demand for more agile and innovative services (Rosa & Almeida, 2018).

In this subject, the development of solutions related to the digital environment and security receives attention from the government. The transformation process is linked to a change in culture and management, with technology possibly being a great ally as a tool to generate more transparency, communication, data connection, citizen participation, and innovation in the provision of services and, as the basis of this transition, greater process flow efficiency.

2.2 Electronic Government

Understood as a set of modernization actions linked to public administration (Abranson & Means, 2001; Agune & Carlos, 2005), the term "electronic government" is directly related to the use of information technologies (Barbosa et al., 2004; Grant & Chau, 2005; Prado & Loureiro, 2005), but it is not restricted to it, since it aims to better serve society (Sobreira Netto et al, 2004). Therefore, is not restricted only to the availability of online services, but proposes to change how the government interacts with citizens and their environment (Abranson & Means, 2001).

E-Gov is intricately linked to innovation. With the widespread accessibility of the internet to citizens and the proliferation of mobile technologies, the public sector is compelled to adapt to these transformations and address the requirements of its stakeholders and interest groups (Manoharan & Ingrams, 2018). This extends beyond the mere availability of information or services online, creating opportunities for enhancing democratic processes themselves. These

opportunities manifest through increased popular participation and greater transparency in governance.

In this sense, legislation and public policies are being created or adapted with the aim of regulating or encouraging actions aimed at E-Gov. In 2018, the United Nations (UN) launched a study aiming at "gearing E-Government to support transformation towards sustainable and resilient societies (ONU, 2018, p. 25), highlighting opportunities in its use for building resilient societies, supporting development and improvement of quality of life. In Brazil, the Electronic Government Program started in mid-2000, with the creation of an e-Gov. executive committee and a management committee for the internet and public key infrastructure, through the Civil Rights Framework for the Internet (Law n. 12.965, 2014), data protection (Law n. 13.709, 2018), digital governance, and the launch of a strategy for the period from 2020 to 2022, which deals with simplification and approximation with the citizen (Brazil, 2020). Law n. 14.129 (2021) is intended to expand the supply of public services through the internet and regulates that all information and documents should be centralized in a single platform, also dealing with open innovation and social participation.

E-Gov is a complex phenomenon and is an intersection of several dimensions such as electronic information, electronic transactions, and electronic participation (Manoharan & Ingram, 2018). The evolution of E-Gov necessitates a shift in the competency profile of public institutions. This transformation calls for holistic management approaches tailored to the specific requirements of various stakeholders and interest groups, along with the establishment of a value creation system that spans all facets of E-Gov and its interfaces (Wirtz & Daiser, 2018).

The next section discusses the methodological procedures that will guide this research.

3. Methodological Procedures

The research was based on the integrative review methodology, a technique appropriate for the holistic understanding of topics of interest because it includes several sources of data (Whittemore & Knafl, 2005) and enables a synthesis of the knowledge already generated (Botelho et al., 2011). An integrative review requires rigorous procedures. To this end, the steps indicated by Whittemore and Knafl (2005) were applied, as follows: (1) problem identification, (2) literature search, (3) data evaluation, (4) data analysis, and (5) presentation.

With the research problem delimited: “what are the factors capable of limiting or boosting the process of digital transformation in the public service through the implementation of electronic government?” the following sets of keywords were defined for the literature search (Step 2): "*digital transformation*" and "*public service*", "*electronic government*" and "*public service*", using the Boolean operator "AND". The searches were conducted between September and October 2021, using as a filter the title, the abstract, and the keywords in the *Web of Science* and *Scopus* databases, as they are multidisciplinary and international.

In the data evaluation (Step 3), the inclusion criteria were established as follows: a) the affinity with the research topic, whose first selection was made by reading the title and keywords and, subsequently, by reading the abstracts and results of the prioritized researches; b) researches published from 2016 to May 2021, in view of the preeminence of more current studies and considering the emergence of the regulation of the themes in recent years. As exclusion criteria, articles were eliminated that: a) did not present the descriptors in the title, abstract, or keywords; b) were without full access to the material; c) did not deal with the object of study or only touched on the theme.

In a first consultation of the databases, 557 articles with open access were obtained, published from 2016 to May 2021 (Table 1). After reading the titles, keywords, and abstracts and applying the inclusion and exclusion criteria, 51 articles were considered relevant for complete reading. Of this amount, five were eliminated for being duplicates. After the complete reading of the articles, and applying the same inclusion and exclusion criteria, 27 articles remained, which comprised the corpus of analysis

Table 1 – Survey results by base in the period 2016-2021

Descriptors	*Scopus*	*Web of Science*
"digital transformation" and "public service"	294	13
"electronic government" and "public service"	214	36
Subtotal	508	49
Total articles with open access	557	
Total articles for full reading	51	
Final portfolio	27	

Source: Prepared by the authors (2021).

In Step 4, the analysis stage, the results of the research were exported to a spreadsheet. Support of a synthesis matrix, we extracted information such as the title, authors, source, research context, objectives, methodology, digital transformation, electronic government, and results. During the analysis, we identified similarities, patterns, and interrelations between the two constructs with the identification of the influencing drivers factors and limiting influencing factors.

In Step 5, we incorporated references to Torracos (2016) research to inform our work. Subsequently, we conducted the conclusive phase of article writing culminating in an integrative perspective on digital transformation, e-government, and public service constructs. This perspective facilitated the identification of their respective contributions in response to the research question.

4. Results and Discussions

The chronology of publications included for the analysis shows relative homogenization in the period 2016-2019, with a range of three to four articles annually. In 2020, the highest number of publications occurred (9) with stabilization in 2021, again with four articles.

In this portfolio, three articles consist of theoretical literature research and 24 articles are empirical, with a predominance of qualitative methods (14). The field research of the publications took place in the context of different e-government and DT experiences and different countries, with emphasis, in larger amounts, for Brazilian cases (6 publications). Countries with at least two publications include China, Indonesia, and Italy. China, Indonésia, and Itália have two publications.

In the Brazilian scenario, the articles focus on the electronic government of the state of São Paulo (De Moraes et al., 2016) and of the city of Limeira, located in the same state (Conejo & De Moraes, 2016), tax administration in the state of Bahia (Carvalho et al., 2017), Brazilian Labor Justice (Sousa & Guimarães, 2018), Information Access Law on websites of municipalities in the state of Rio Grande do Norte (Salgado & Aires, 2017), digitalization of physical service by the federal government (Gardenghi et al., 2020), and smart government (Melati & Janissek-Muniz, 2020).

In analyzing the authors' understanding of DT, considering the result of the research carried out and what is exposed in the analysis matrix (Table 2), DT is perceived as a process of organizational change that makes use of information technology resources and communication to improve the organization's performance and the customer/user experience, generating value for the citizen (Alvarenga et al., 2021; Lincaru et al., 2018; Su et al., 2021). This process goes beyond mere digitization (Mergel et al., 2019) and involves a culture change, as well as the way in which public authorities relate to society.

Table 2 – Digital transformation and its relationship with the public service

Authors	**Digital Transformation and its relationship with the public service**
Su et al. (2021)	The essential demand for innovation in public service is digital transformation, aiming to achieve co-creation of value (through interaction and sharing) rather than mere service provision.
Hensmans (2021)	DT aimed at renewing the ethos needs a change in the public paradigm of complementary investments in: i) politics: increasing participation in public decision-making via the internet; ii) media: private (social) media with a public journalism ethos to counter-balance the profit-driven one; iii) identity: emotional belonging to a moral digital community in the face of globalization and the individual; iv) education: with internet users resilient to post-truth phenomena in social media, and v) markets: DT at the service of a common data algorithmic, aimed at a digital common good.
Giang et al. (2021)	DT is a long process that requires resources from universities, support from regulatory agencies and political institutions, and, beforehand, an assessment of readiness to the changes required for the typical digital university model.

Alvarenga et al. (2020)	The term TD consists of organizational change that uses digital technologies and business models to improve organizational performance and customer experience.
Furjan et al. (2020)	It is an inevitable path to survival in today's marketplace, although digital transformation initiatives range from using digital technologies to improve a process, product, or service to changing the entire logic of how organizations work and how they create value for their customers.
Datta et al. (2020)	DT is not a technical solution, but a socio-technical and socio-political solution.
Pittaway & Montazemi (2020)	For the DT journey, local governments need to lead the implementation and Execution of integrated business systems, exploring changes in organizational strategy, IT, and organizational structure.
Agostino et al. (2020)	They examined the acceleration of DT in the provision of public services caused, albeit involuntarily, by the COVID-19 pandemic, verifying that social media acted not only in the provision of information but also in the provision of services to users.
Melati & Janissek-Muniz (2020)	They indicate the existence of studies that explore the potential of ICTs to boost transformative change in government and governance.
Mergel et al. (2019)	DT goes beyond digitization to include the entire organization and focuses on the holistic process of changing products and culture. The transition should focus on process changes beyond mere digitization of formularies and emphasize cultural, organizational, and relational changes.
Filgueiras et al. (2019)	Building digital public services is not a process dependent on the available technologies, but on institutional processes that relate more to the service process than to the available technology itself.
Lincaru et al. (2018)	DT in public services is not just new solutions for the community, but an engine of social, economic, and environmental development.
Souza & Guimarães (2018)	The organization's formal and informal context-specific information processing systems have the potential to create a sustainable competitive advantage.

Source: Prepared by the authors (2021).

Regarding the authors' view on electronic government, it is observed that there are interrelationships with the DT construct, especially when addressing the use of ICTs to improve the quality of public services with deliveries of greater value to the citizen (Achmad et al., 2021; Lindgren et al., 2019; Sutopo et al., 2017; Witarsyah et al., 2020;) and efficiently apply government resources (Carvalho et al., 2017). Filgueiras et al. (2019) also note that there is an advance in research on the use of technology in government, indicating that the perspective of e-government is moving towards the perspective of digital transformation.

Although the use of ICTs is a striking feature in e-government, Ming et al. (2018) infer that face-to-face services cannot simply be replaced by electronic systems. In this sense, Van De Walle et al. (2018) point to the use of face-to-face service to support e-government.

According to these authors, such an offering indicates a desired point to make a transition from offline to online, guaranteeing support for reluctant users.

Table 3 shows a detailing of the authors' view regarding electronic government and the use of ICTs.

Table 3 – References for E-government

Authors	Electronic government
Achmad et al. (2021)	They work on e-government implementation from the standpoint of public policy implementation (communication, provisions, resources, and bureaucratic structure). They state that the implementation of e-government is predominantly aimed at improving the quality of public services, presenting indicators to measure it.
Alvarenga et al. (2020)	They refer to "digital government" claiming to be related to the quality of knowledge management in organizations, with significant improvements in the public sector. The view of e-government as a resource rationalizer seems to be linked to an older, more generalist conception of what digital government is today. From a knowledge management perspective, digital government can be considered an essential aspect of innovation, coproduction, transparency, and public value creation.
Witarsyah et al. (2020)	E-government is the use of information and communication technology as a process of interaction between government and citizens to increase the service provided.
Lindgren et al. (2019)	They use the terms "e-government" and "digital government", stating that while technology has the potential to improve service provision and bring citizens closer together (thus fostering democracy), it can also be applied to restrict, control, and monitor citizens. Therefore, this is a process that requires trust and reinterpretation in the relationship between citizens and public servants, thus requiring new skills from these officials.
Carvalho, Castro & Silva (2017)	The offer of electronic public services is related to a context of modernization of the State, aimed at optimizing resources and improving the interaction between government and society. Their research indicates that the use of IT in tax administration should occur systematically, aiming at agility, security, efficiency, specialization, and continuous adaptation to the business regulation.
Sutopo et al. (2017)	They emphasize the importance of e-government for improving the quality of public services provided to the population.
Conejo & De Moraes (2016)	Electronic government represents a strategic role for information and communication technology, encompassing three institutional relationships: G2G (Government to Government), G2B (Government to Business), and G2C (Government to Citizen). According to these authors, the adopted e-government initiatives have consolidated the approximation of the government with the citizen.
De Moraes, Meirelles & Cappellozza (2016)	To understand the role of IT in the implementation of an e-gov, an understanding of its development phases is required, since the stage of development is linked to the technological demand for service.

Sheryazdanova et al. (2016)	They reinforce the importance of e-government creating transparent communications, indicating that several resources are required for this to happen, such as transparency and public control, through communication between citizens and government.

Source: Prepared by the authors (2021).

In the following sections, analyses regarding the influencing factors capable of driving or limiting DT in the public service will be addressed.

4.1 Driving Influencing Factors

According to Su et al. (2021), digital technology is what enables digital transformation, from the perspective of service ecosystems. However, the implementation of the digital transformation process does not depend exclusively on technology, and there are equally relevant factors that must be considered for its success. Pepulim et al. (2017) insert technology as the result of a study conducted regarding the main factors that influence knowledge sharing in organizations, these being individuals, culture, technology, and organizational barriers. Technology, according to the study presented, appears as the main tool for knowledge sharing. In the same sense, Mergel et al. (2019) point out important internal conditions for implementing digital transformation, in addition to culture, individual skills, and people's mindset.

Furjan et al. (2020) state that digital transformation as a paradigm is widely recognized in the academic community and industry as a digital technology-based improvement for doing business. They add that it is an inevitable path to survival in today's market, although digital transformation initiatives range from using digital technologies to improve a process, product, or service to changing the entire work logic and the way organizations create value for their customers.

As presented, therefore, factors related to customer needs or wishes could be considered drivers of the digital transformation process. Similarly, digital transformation could also be driven by technology, that is, when considering the very factors arising from the properties of technology (drivers that include the influence of social media, mobility, need for analytics, cloud, and internet of things, among others), and also be oriented to organizational development originated from ideas generally aimed at profit increase, cost reduction, efficiency, or other customer-focused improvements (Corejová et al, 2016, Furjan et al., 2020).

The changes discussed above cause transformations in organizational processes themselves, so Filgueiras et al. (2019) point out that building digital public services is not a process dependent on available technologies, but on institutional processes that relate more to the service process than to the available technology itself.

Giang et al. (2021) address the topic by working on concepts related to university 4.0 and, following the line of reasoning presented above, they demonstrate the fundamental role of human resources in the process of implementing digital transformation.

When summarizing the subject, Lincaru et al. (2018) present an important consideration, by stating that the digital transformation in public services constitutes not only

new solutions to the community but a driver of social, economic, and environmental development.

The above constructs lead to the implementation of e-government, fostered by structuring five dimensions, as pointed out in the research conducted by Sutopo et al. (2014), namely: policy, institutions, infrastructure, applications, and planning.

Grindle (2017) states that content and context determine policy effectiveness; such content would include the interests affected, the types of benefits to be generated, the degree of change desired, the positioning of the policy maker, the program implementer, and the resources deployed; on the other hand, the implementation context would encompass the power, interests, and strategies of the actors involved, the characteristics of institutions, and compliance and responsiveness.

In addition to the idea of structuring influencing factors into dimensions, as recorded above, it is also important to resume the existence of endogenous variables proposed by Munyoka (2019) as factors apt to influence citizen behavior in the intention to use e-gov systems, these being: (i) awareness of electronic government; (ii) price (internet access package); (iii) facilitating conditions (technical support from the government); (iv) privacy, security, and trust; (vi) self-efficacy and political influence (government involvement with the population before implementing the system), (vi) education level, and (vii) perceived ease of use.

The research by Munyoka (2019) also concluded, interestingly, that among the factors mentioned above, price, self-efficacy, political influence, and enabling conditions were identified as conditions that deserve more attention in the process of implementing e-government. On the other hand, perceived ease of use was the least considered variable, according to the study, due to the possibility of association with the level of familiarity of respondents with cell phones, which reinforces that technology is an inherent element of the process itself.

It should also be noted that the government engagement with the population, even before the implementation, was registered by Munyoka (2019) as crucial for e-gov results, and Lincaru et al. (2018) correlated the available broadband infrastructure and the level of human capital of the public administration to factors that can assist in the development of e-government.

Regarding the aspects discussed above, the authors suggest prioritizing broadband, especially in places where there is a lack of high human capital; about raising local skills, they point out possible solutions for the personalized development of smart public services adapted to the local context, as well as the granting of opportunities to develop skills according to the profile of civil servants, coordinated synchronously with the expansion plan of the band.

4.2 Limiting Influencing Factors

Regarding the analysis of factors capable of limiting the development or implementation of digital transformation, it should be noted that crises of trust and governance

mechanisms mentioned by Su et al. (2021) deserve special attention. The same is true about the lack of training and user support pointed out by Pepulim et al. (2017), factors that can lead to low usability.

However, research also records important limiting factors, such as the lack of sufficient know-how to lead DT, pointed out by Pittaway and Montazemi (2020): according to these authors, there are barriers encountered by managers for knowledge acquisition such as managerial learning capacity, shared vision, inter-organizational trust, and incentive schemes, issues that should also be considered.

In the same sense, Marks et al. (2020) state that a lower degree of maturity for digital transformation can hinder its implementation process (lack of holistic vision, competence for digital transformation, and data structure). According to these authors, higher maturity requires digital transformation vision, leadership, strategy, plan, processes, controls, approach, communication, and adequate return on investment.

Finally, Agostino et al. (2020), in conclusion to the issues discussed, indicate three dilemmas in the provision of services, which organizations will have to face in the future: user engagement, planning and control, and costs (paid or free digital services).

It should be noted that the issues discussed above may constitute important factors capable of limiting or delaying the implementation of electronic government, based on changes caused by the processes of digital transformation; thus, they must be carefully analyzed to minimize negative aspects that may be perceived by stakeholders during the course of implementation. Table 5 shows driving factors and limiting factors e-gov for the digital transformation in the public service.

Table 5 –Summary of the factors influencing digital transformation in the public service

Driving factors	**Limiting factors**
• Technology • Internal conditions in organizations (culture, individual skills, people's mentality) • Customer needs or wishes • Awareness of electronic government • Privacy, security, and trust • Self-efficacy (government involvement with the population) • Perceived ease of use • Political influence • Price	• Crisis of trust • Low institutional maturity (holistic view, competence for digital transformation, and data structure) • Requires user engagement • Lack of user training and support • Poor governance mechanisms • Lack of sufficient know-how to lead TD (barriers to knowledge acquisition) • Insufficient planning and cost control (paid or free digital services)

Source: prepared by the authors (2021).

5. Final Considerations

This review points to evidence that digital transformation is driven by a specific trigger, information technology, and requires the preparation of infrastructure, availability, development of dedicated applications, and training of civil servants and other actors involved so that the process of change can be successfully carried out. However, it was shown that the construction of digital public services is not a process that depends exclusively on available technologies, but on the institutional processes themselves.

In this way, it is possible to infer that digital transformation is not a technical solution, but a socio-technical and socio-political one, and must simultaneously address the technocratic and rational aspects of technology, education and labor supply, fiscal control, and socio-political aspects of culture, psychology, and tradition. For its success, it is necessary to develop the desired competencies to increase the degree of maturity, such as holistic vision, leadership, strategy, processes, controls, and communication.

On the other hand, the use of information and communication technology in government, to improve the interaction processes between government and citizens to increase efficiency, leads to what is called electronic government or digital government. Thus, the adoption of more efficient public services that are less costly and have a high social impact requires a process of institutional maturation, supported not only by technological evolution but mainly by endogenous changes caused by the internalization of this new routine and cultural reality.

The electronic government follows the perspectives of digital transformation, involving various actors (governments, companies, and the citizen). Inserted in a technological modernization process, it should be noted that the purpose of electronic government goes beyond this objective, being directed to the provision of more rational, optimized, and efficient public services, to improve the interaction with the community and allow the adoption of audit and control mechanisms by citizens (transparency, control, and information sharing).

Finally, it is discussed need to adopt control mechanisms due to the ethical issues involved, since the massive use of information technology can also have the effect of restricting freedoms, and for this reason, it should be the object of preparation, planning, and caution.

As suggestions for future research, it is worthwhile to study these themes in specific governmental contexts – considering that the environment influences and is influenced by the implementation of digital transformation and electronic government –, as well as the search for mechanisms that can examine ethical aspects related to the information technology mechanisms used in the public sector. Furthermore, it is interesting to deepen the mechanisms capable of optimizing the application of information technology and e-government to leverage efficiency and effectiveness in the provision of public services.

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7. References

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