Competências digitais no contexto da transformação digital da área de gestão de pessoas da Administração Pública Federal: proposta de modelo conceitual

Digital competences in the context of digital transformation in the human resource management area of the public administration: conceptual model proposal

Competencias digitales en el contexto de la transformación digital en el área de gestión de personas de la administración pública: propuesta de modelo conceptual

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PALAVRAS-CHAVE

Gestão de Pessoas (GP), Competências Digitais (CDs), Transformação Digital (TD)

Resumo: Este estudo propõe um modelo conceitual para investigar como as competências digitais (CDs) dos profissionais de Gestão de Pessoas da Administração Pública Federal (APF) afetam a Transformação Digital (TD) da área. A pesquisa se caracteriza como qualitativa, teórica, de objetivos exploratórios, realizada por meio de pesquisa bibliográfica e documental. No modelo observa-se que cinco categorias de CDs - Literacia da Informação, Comunicação e Cidadania, Criação de Conteúdos, Segurança e Privacidade e Desenvolvimento de Soluções - se relacionam com o eixo "Pessoas" no processo de TD, atuando como fatores antecedentes, tanto estruturais como culturais, as

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quais influenciam o sucesso da TD da área de Gestão de Pessoas da APF. Por fim, sinaliza-se a necessidade de novos estudos de ordem teórica e empírica para ampliar a compreensão sobre a temática. Sugere-se, ainda, o modelo como ponto de partida para pesquisas futuras.

Abstract: This study proposes a conceptual model to investigate how the Digital Competencies (DCs) of Public Administration Human Resource Management professionals affect the Digital Transformation (DT) of the field. The research is characterized as qualitative, theoretical, with exploratory objectives, conducted through bibliographical and documentary research. In the model, it is observed that five categories of DCs - Information Literacy, Communication and Citizenship, Content Creation, Security and Privacy and Development of Solutions - are related to the "People" axis in the DT process, acting as antecedent factors, both structural and cultural, which influence the success of the DT of the field of Human Resource Management at the Federal Public Administration. Finally, the need for new theoretical and empirical studies is indicated to broaden the understanding of the subject. The model is also suggested as a starting point for future research.

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Resumen: Este estudio propone un modelo conceptual para investigar cómo las Competencias Digitales (CDs) de los profesionales de Gestión de Personas en la Administración Pública Federal inciden en la Transformación Digital (TD) en el ámbito. La investigación se caracteriza por ser cualitativa, teórica, con objetivos exploratorios, llevada a cabo a través de investigación bibliográfica y documental. En el modelo, se observa que cinco categorías de CDs - Alfabetización Informacional, Comunicación y Ciudadanía, Creación de Contenidos, Seguridad y Privacidad y Desarrollo de Soluciones - están relacionadas con el eje "Personas" en el proceso de TD, actuando como factores antecedentes, tanto estructurales como culturales, que influyen en el éxito de la TD del área de Gestión de Personas de la APF. Finalmente, se indica la necesidad de nuevos estudios teóricos y empíricos para ampliar la comprensión del tema. Se sugiere también el modelo como punto de partida para futuras investigaciones.

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Introduction

Digital Transformation (DT) has been a central topic on government agendas, driven during the COVID-19 pandemic, so that being digital is no longer an option, but a condition for governments to function (Aristovnik et al., 2021). In the area of People Management (PM) of the Federal Government, this process is observed with the increase in the number of innovative technological solutions since 1990 by the Federal Government, especially since 2016, expanding the number of digital tools that professionals need to use in the PM area, as new solutions often do not replace previous ones (Brazil, 2013).

In this context, DT is defined as a holistic change effort facilitated by the adoption of digital technologies, digitalization and the reassessment of public policies, processes, structures and public services (Mergel, Edelmann, & Haug, 2019). This transformation process demands the improvement of institutional capabilities (Thorstensen & Zuchieri, 2020), including the development of digital competencies (DCs), that is, the conjunction of several capabilities that involve operational and behavioral issues associated with the digital environment (Ferrari, 2012).

In terms of People Management (PM) professionals in the Federal Public Administration, DCs are important resources for carrying out the area's taks and contributing to the formulation and implementation of organizational strategies, as well as public policies related to the use of digital technologies (Lopes, 2021), helping to better deal with new technologies in this context of Digital Transformation.

However, it is observed that the literature on DT has focused on the role of Information and Communication Technologies (ICTs) and the perspective of technological determinism, lacking a greater understanding of how individuals transform government and how technologies change the social construction of the State (Mergel et al., 2019). Therefore, it is important to carry out studies that address people's perspectives in this context of DT, notably those from who work in Public Administration, including issues such as the relationship between agents and the digital tools used to perform their work activities.

In this scenario, the question emerges: How do the digital competences of People Management professionals affect the Digital Transformation of the area, within the scope of the Federal Public Administration?

Therefore, the objective of this article is to propose a conceptual model for investigating the relational dynamics between the constructs Digital Transformation (DT) and Digital Competencies (DCs) applied to PM professionals in the Federal Public Administration.

It is expected that this study can contribute to the reflection and discussion about the role of digital competencies within the scope of Digital Transformation in the area of People Management in the public sphere, as digital technologies have been increasingly used in the provision of healthcare services. personal and many others and are constantly evolving.

Theoretical elements of the research

In this section, the concepts of DT and DCs are reviewed. Specifically, the centrality of people in DT in the area of Human Resources Management of the Federal Public Administration is discussed, as well as the conceptual aspects of DCs, also addressing the Dynamic Digital Competence Reference Framework for Portugal (Digicomp Framework) as a starting point in defining categories for analyzing these skills.

Digital Transformation in the area of People Management in the Federal Public

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Administration

To survive and deal with the challenges of DT, many organizations, public or private, have promoted changes, such as reducing hierarchical levels and investing in innovations, impacting work management and demanding the implementation of a new culture to improve management (Mello & Amâncio Filho, 2010).

Digital Transformation (DT) in Government dates back to the 1990s, under different names such as e-gov and Digital Government, however, its focus changed with the advent of emerging technologies, such as Big Data and Artificial Intelligence (AI), also tackling issues such as user experience, engagement and co-creation (Agostino et al., 2021).

In this way, at the governmental level, Digital Transformation is a complex and multifaceted phenomenon (Coutinho & Freitas, 2021), which can be defined as a holistic effort to change and reformulate actions, which involves the entire organization, occurs throughout the time and it is made possible by the adoption of digital technologies and digitalization, as well as the reassessment of public policies, processes, structures and public services (Mergel et al., 2019).

In addition to this perspective, Likhtin (2021) states that DT is the transition from the use of ICTs to support governmental processes in order to achieve their results, that is, a change based on digital technologies which leads to an increase in quality, efficiency and effectiveness of Public Administration, in addition to reducing government intervention.

In turn, Androniceanu et al. (2022) declares that DT is the process of integrating digitalization in which society and organizations adapt to change, being a phenomenon more related to adaptation to the acceptance and use of digital technologies.

Thus, the concept of DT involves digital technologies and significant changes (Gong et al., 2020). Such changes can be radical and/or incremental, including innovations at different stages of services and public policy cycles (Misuraca et al., 2020) up to complete changes in services for the digital environment (Issabayeva et al., 2019), as well as in organizational culture, which affects processes, procedures and behaviors (Hernández et al., 2020), aiming to achieve public objectives and provide services focused on the citizens to increase inclusion and trust in government (Misuraca et al., 2020).

Accordingly, it is not enough to adopt the digital technologies to make it possible (Santos, Capellin, Trentin, Bortoluzzi & Lima, 2022), as addressed by the perspective of technological determinism, which focuses on the role of ICTs as instruments for improving processes, services, capacity for change, among others, in addition to reducing costs and generating contributions to the society (Mergel et al., 2019).

One must also consider organizational, social and cultural factors to understand and deal with the phenomenon of DT (Misuraca et al., 2020), in addition to analyzing how much the technology is capable of meeting government objectives, as well as the effects and consequences of changes and the use of digital tools (Mergel et al., 2019).

Furthermore, any DT project in the Government that does not consider the change in the human factor, the needs of those who perform the services and only addresses technological issues may not be successful, and it is likely that to obtain the necessary technology, to train employees and change the organizational culture, in addition to adapting processes, technologies and people to such changes (Hernández et al., 2020).

From this perspective, Gong, Yang and Shi (2020) created a model to investigate DT in government, based on the combination of two models: the Diamond Structure proposed by Leavitt in 1965, and the TEF (Technology

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Enactment Framework), proposed by Jane Fountain in 2001.

In the first model, organizations are systems with four interdependent elements: people, structure, processes, and technology, with a focus on intra-organizational elements that influence the use of digital technologies. The TEF model addresses environmental elements and how governments adopt new technologies according to their social characteristics, analyzing the effects of institutional structures and arrangements on the implementation of technologies in the public sector.

Therefore, in the model by Gong et al. (2020) DT is composed of four interdependent organizational elements or dimensions: technology, processes, structure and people. Technology refers to IT infrastructure, data and apps, while processes cover aspects such as routines and volume of work, interaction with other areas and users. The structure involves interorganizational elements (network), such as cooperation between bodies/entities, and intra-organizational elements (organizations/bureaucracy) such as hierarchical arrangements, centralization or decentralization of activities and the flow of decision-making (Gong et. al, 2020).

Finally, the "people" element, focus of this article, refers to the roles or functions performed, the way they act and the competences of agents when providing public services, including availability, adaptability and productivity from an individual perspective. Thus, the model makes it possible to investigate internal and environmental elements of the institutions, detail the interrelationships between the four elements, and how they adapt to the DT context of the government (Gong et. al, 2020). Based on the model by Gong et al. (2020), Soares (2023) proposed a framework (Figure 1) to investigate how the DT process has occurred in the area of People Management, which was validated in three Brazilian public institutions, through in-depth interviews with professionals in the PM field. This framework covers the four elements or dimensions of DT by Gong et al. (2020) and presents the main antecedent factors of this process found in the literature, as well as the likely results of this change.

In the model, antecedent factors represent barriers or facilitators to DT, which were grouped into four types, for the purpose of simplifying the framework: contextual, cultural, structural and technological.

Figure 1
Framework: **Digital Transformation in the PM field of Public Administration**
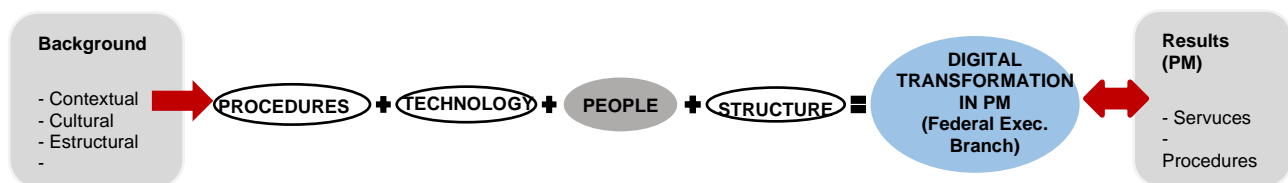
Source: Soares (2023).

These antecedents can be external to the government, representing opportunities and threats, which are more unpredictable and uncontrollable, or internal, which can be strengths or weaknesses and are under greater government control. Table 1 summarizes the main antecedents found to DT in the PM area of Public Administration.

As for the dimensions of DT, although they are all relevant, the "people" element was highlighted in the model due to the fact that the PM area works primarily with the management of people in organizations and the awareness and engagement of actors is

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essential for the success of the DT, it is not enough to just change processes and adopt new digital technologies (Soares, 2023).

Regarding the results of DT in the PM area found in the literature, the author grouped them into the following categories or objects: services (personnel), processes (PM), relationships (with users) and impacts (in process, people and work management and quality of life at work).

Considering the antecedents to DT in the PM area of Soares (2023), presented in Table 1, it stands out the structural and cultural factors, which directly impact the "people" dimension. Such factors can boost the DT process if present and are related, among others, to inclusion and digital literacy, the selection of personnel with digital skills and the training of employees.

Table 1
Antecedents to DT in People Management area in the FPA

Antecedents (drivers and/or barriers)		Authors
Contextual	Internals (physical files and management) and externals (environmental pressure, technological change, citizens, business and politicians).	Mergel *et al.* (2019).
	Information security and cybersecurity.	Issabayeva *et al.* (2019).
	Circumstantial (e.g.: Covid19 pandemic).	Aristovnik *et al.* (2021).
Cultural	Resistance, fear that innovation will harm the robustness of the government and interfere with bureaucratic culture.	Meijer (2015).
	Knowledge management.	Alvarenga *et al.* (2020).
	Innovation.	Escobar, Almeida & Varajão (2022).
	Tension between people and digital tools, arising from resistance to change and infrastructure.	Furr, Ozcan & Eisenhardt (2022).
	Resistance to change, negative attitudes towards technology, lack of skills and staff training; lack of qualifications in collaborative teams.	Jonathan et al. (2022); Santos *et al.* (2022).
	Bureaucracy, rigidity of procedures, stability of the organizational structure and the formal division of labor.	Jonathan *et al.* (2022).
	Cultural change	Santos *et al.* (2022).
	Lack of participation and trust, disinterest, discredit, no perceived usefulness and technological resistance.	Salvodelli *et al.* (2014); Meijer (2015).
	Need for digital literacy; limited digital knowledge and skills.	Meijer (2015); Vasilieva *et al.* (2018); Hofmann & Ogonek (2018); Escobar (2020); Wrede *et al.* (2021).
Structural	Lack of legal bases, management of the public policy cycle, measurement, evaluation and transparency; juridical.	Salvodelli *et al.* (2014); Escobar, Almeida & Varajão (2022).
	Lack of financial resources, shortage of personnel and lack of coordination; economic, administrative and managerial.	Meijer (2015); Androniceanu *et al.* (2022); Santos *et al.* (2022).

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	Digital exclusion and inequalities in access to the digital universe.	Cunha & Miranda (2013); Salvodelli *et al.* (2014); Meijer (2015); Moura *et al.* (2020).
	Lack of structure, inefficiency in providing online services and disconnection between them.	Viana (2021).
	Institutional; institutional arrangements (motivation and pressure; legislation and policies).	Manny et al. (2021); Gong *et al.* (2020).
	Strategy; adequate strategy and consistent roadmap.	Escobar, Almeida & Varajão (2022); Jonathan et al. (2022).
	Organization and ecosystem.	Escobar, Almeida & Varajão (2022).
Technological	Regarding ICTs: legacy, obsolete, non-interoperable and outdated systems; conception, limits and use.	Hernández *et al.* (2020); Aristovnik *et al.* (2021); Viana (2021).
	Lack of: risk management to minimize cyber attacks; understanding and processing data; legal models and data security.	Santos *et al.* (2022).
	IT alignment (appropriate use of ICTs by institutions, according to strategies, objectives and needs).	Jonathan et al. (2022).
	Technology; growth in computing power, connectivity and big data.	Escobar, Almeida & Varajão (2022); Furr, Ozcan & Eisenhardt (2022).

Source: Soares (2023).

These skills can be obtained and developed through clear training and development programs (Jonathan, Rusu, & Perjons, 2022) and actions to improve digital literacy in which employees are encouraged to use emerging technologies (Meijer, 2015). Thorstensen and Zuchieri (2020) also highlight the need to improve institutional capabilities, such as the culture of digital skills development and training of public servants.

The development of a digital culture in institutions demands the recruitment of people with digital skills and a proactive mindset, the encouragement of knowledge sharing, the development of digital skills through continuous training (Escobar, 2020; Jonathan et al., 2022), as well as the direction of the PM area towards the development of public agents (Escobar, 2020).

However, there are public organizations that do not have a consistent and formal skill development arrangement to support digitalization, and there is also a lack of investment in skills development (Jonathan et al., 2022). Therefore, in a context of PM's Digital Transformation of the Federal Government, it is essential that professionals in this area have and acquire new learning, which is one of the conditions for the area to act with greater efficiency and effectiveness, responding to the challenges of its integration into the organizational strategy (Moura & Souza, 2016; Cascaes & Juliani, 2021).

Given the importance of DCs as structural and cultural antecedent factors of Digital Transformation, some conceptual aspects related to the construct are discussed below.

Digital skills: conceptual aspects and analysis categories

At the same time that digital technologies change, new needs arise related to the skills that people need to develop to use them in an efficient, responsible, and safe way. In the literature, there is a diversity of terms and components that seek to explain them, which

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is inherent to technological development, which generates new needs, according to the particularities of the time in which it was conceived (Silva & Behar, 2019).

Some of the existing terms emerged in the 1980s, such as "Computer Literacy", which is the level of experience and affinity with the computer and computer applications, while others emerged in the 1990s, such as "Information Literacy" which focused on the needs to identify, locate, evaluate and create information, as well as use critical thinking (Silva & Behar, 2019).

The term "Digital Competence" appeared in 2006, in a recommendation issued by the European Parliament and the Council of the European Union, in which they present it as one of the eight essential skills to be developed throughout life (EP and Council of the EU, 2006).

In this way, the term was defined by the Council of the European Union as:

> [...] the confident and critical use of Information Society Technologies (IST) for work, leisure and communication. It is underpinned by basic ICT skills: the use of computers to retrieve, evaluate, store, produce, present and exchange information, and communicate and participate in collaborative networks via the Internet." (EP and Council of the EU, 2006)

In the review of this recommendation carried out in 2018, the Council of the European Union maintained DCs among those considered essential, defining them as:

> [...]the uptake and confident, critical and responsible use of digital technologies in learning, work and participation in society" (Council of the EU, 2018, p. 9, our translation).

Along these lines, after the recommendation, the topic of digital skills remained on the European Commission's debate agenda, mainly with the aim of building a consensus on the topic and formulating policies to eliminate deficiencies that could hinder the exercise of citizenship, the employability of individuals and the economic development of countries (Ferrari, 2013; Lucas & Moreira, 2017).

In this context, the European Digital Competence Framework for Citizens (DigComp) was developed, structured on the work of Ferrari (2013) entitled "A Framework for Developing and Understanding Digital Competence in Europe". DigComp covers a set of broad skills and levels, serving as a starting point in the conceptions and interpretations of DCs and practices in digital environments for the population or for different target groups (Ferrari, 2013; Lucas & Moreira, 2017).

A simple version of the third edition of the DigComp Table (version 2.1), released in 2017, was carried out by the government of Portugal in 2019 with the aim of training the population in DCs. As a result, the Dynamic Digital Competence Reference Framework for Portugal (QDRCD) was released, (INCoDe, 2019). In Table 2 are presented descriptions of the 5 (five) areas in which the skills are grouped.

Although the term "digital competence" is not directly used for PM professionals in the literature, studies identify their importance and the results they can get, such as: increasing the efficiency of PM processes - recruitment, development, appreciation and retention (Ulrich, Younger, Brockbank, & Ulrich, 2011; Berman, 2015); assistance in establishing effective communication with different PM target audiences (Brewster, 2004; Som, 2007), more strategic action, through the collection and analysis of data in digital tools to improve decision-making (Brewster, 2004; Bruno-Faria & Brandão, 2003; Ribeiro, 2019).

Table 2
The five areas of Competencies referenced in

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the QDRCD

Areas	Description
Information Literacy	Skills to articulate information needs, locate and retrieve data and digital content, assess the relevance of the source, store, manage and organize information.
Communication and Citizenship	Skills to interact, communicate and collaborate through digital technologies, participate in society through digital services, manage digital identity and promote participatory citizenship.
Content Creation	Skills to create and edit digital content, integrate information into existing knowledge, consider copyright, and provide instructions for computing systems.
Security and Privacy	Skills to protect devices, content and personal data in digital environments, as well as being aware of the environmental impact and social well-being of digital technologies.
Development of solution	Skills to identify problems, resolve situations in digital environments, innovate processes and products with tools and monitor digital evolution.

Source: adapted from INCoDe (2019).

From this perspective, a study carried out by Lopes (2021) highlights 20 Digital Competencies (DCs) applicable to the PM area, validated in three FPA institutions that are part of SIPEC. The model proposed by Lopes (2021) was based on the DCs listed in the Dynamic Digital Competence Reference Framework for Portugal (QDRCD), on skills inherent to the digital environment mentioned in the literature that focus on PM professionals and on documentary research, in which located standards and information directed to the FPA and PM units of SIPEC bodies. As can be seen in Table 3, they were grouped into the five areas of the QDRCD.

Although the study by Lopes (2021) was applied in three federal public institutions, it is believed that the model presented contributed with reference parameters and insights into the DCs demanded from PM professionals in Public Administration in general, since there is affinity between the policies and digital tools used by them, which are proposed by the central body of SIPEC.

Furthermore, the aforementioned study highlights the relevance of DCs for PM professionals at SIPEC to use digital technologies and web-based channels to: provide services to users, act collaboratively with other users, collect, analyze and transform data into knowledge and strategic information, contribute to the IT sectors to build solutions that meet needs and provide improvements to the area. Finally, it demonstrates that the QDRCD can be a starting point in defining categories for analyzing the DCs of PM professionals.

Table 3
Digital Skills adapted to Public Administration PM units

Categories	Skills and practical examples
Information Literacy	1. Carry out data or information research of interest to the PM area in digital environments (internet, electronic systems). E.g.: searching registration data in the SIAPE system
	2. Analyze the authenticity of information on PM matters propagated by unofficial sources. E.g.: analyzing in official databases, such as SIGEPE Legis, the veracity of information on PM matters disclosed by unofficial sources.
	3. Organize, store and retrieve data and information in digital environments. E.g.: extracting data from PM systems and organizing them in a spreadsheet to carry out analyses.

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Communication and Citizenship	4. Interact through a variety of digital technologies to obtain or provide information. E.g.: using Government service channels, such as the SIPEC Center, to answer PM questions.
	5. Share data, information and digital content through various digital media. E.g.: publishing news and instructions related to the PM area on the institutional website.
	6. Using digital technologies to facilitate the exercise of citizenship. E.g.: respond to requests in a timely manner received through electronic systems, such as e-OUV and e-SIC.
	7.Develop collaborative work using digital technologies that allow documents to be edited by more than one user. E.g. using platforms for online and simultaneous editing of content, such as Google Drive.
	8. Use different communication strategies that are compatible with the target audiences. For example, using technical language and summarizing data to comply with court orders or those of control bodies such as CGU and TCU.
	9. Apply guidelines and criteria defined in institutional policies relating to the processing of personal data. E.g. recognizing personal information that can identify people and follow guidelines to protect data, such as the LGPD.
Content Creation	10. Creating simple content using digital programs or applications. E.g. creating presentations using Microsoft Powerpoint or drawing up graphs in Microsoft Excel.
	11. Modify, adapt and integrate data and information to create relevant content. E.g. creating dashboards for data analysis, using tools such as Microsoft Power BI.
	12. Respect copyright and usage licenses and understand how they apply to data, information and digital content. E.g. use reference notes when using third-party texts.

	13. Recording data and information in information systems or digital applications. E.g. approving the granting of rights provided by law, such as licenses, by means of PM systems.
Security and Privacy	14. Apply measures to protect devices, data and information in a digital environment. E.g. making backups to prevent loss or improper alteration of data and information.
	15. Apply measures to prevent health risks and threats to physical and psychological well-being while using digital technologies. E.g. adjusting the brightness of the computer screen.
	16. Evaluate the use of digital technologies as an alternative for reducing costs and promoting environmental sustainability. E.g. taking distance learning courses to reduce costs.
Development of solution	17. Identifying and finding solutions to simple problems with equipment (hardware or software). E.g. looking at network cables when identifying internet access problems.
	18. Identify the needs of the PM area and the possible digital tools that exist to solve them. E.g. using digital technologies to collect data, such as Google Forms, for PM surveys.
	19. Identify situations or problems in the PM area that can be improved or solved through the use of digital tools. E.g. identify legal provisions for contracting digital solutions.
	20. Identify your digital competence needs and look for opportunities to develop them. E.g. choosing an e-learning course to learn the functionalities of tools such as SEI.

Source: adapted from Lopes (2021).

Methodological elements of the research

This section presents the methodological orientation of the research, classified as qualitative, theoretical, with exploratory

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objects. It also used bibliographical and documentary research techniques. The next three subtopics show the choices made regarding the research universe, the means of collecting information and the methods used to analyze the data.

Research universe: the People Management area in the Federal Public Administration

Gemelli and Filippim (2010) point out the importance of understanding the peculiarities of public sector management, which must comply with principles such as legality, equality and continuity of services. In addition, public sector management differs from the private sector, particularly in terms of its social function, organizational culture, legislation, norms and traditions (Santos & Corrêa, 2022).

From this perspective, the study focused on the area of Personnel Management in the Federal Public Administration. This area is made up of the Civilian Personnel System of the Federal Administration (SIPEC), established by Decree No. 67.326 (1970) to deal with matters related to People Management, such as: recruitment and selection, registration and assignment, improvement and personnel legislation.

This system is made up of three levels: the central body, the sectoral bodies, and the sectional bodies. The central body of SIPEC, represented by the Secretariat for People Management and Labor Relations, linked to the Ministry of Management and Innovation in Public Services, is responsible for studying, formulating guidelines, normative orientation, coordination, supervision, control and specific inspection of matters concerning the FPA (Ministry of Management and Innovation in Public Services [MGI], 2023). According to Decree No. 67.326 of 1970, the sectoral bodies (PM units of the Ministries) and sectional bodies (PM units of bodies or entities linked to the Ministries) are responsible for management and execution activities.

Currently, around 14,000 (fourteen thousand) professionals from 200 (two hundred) institutions work in the people management units that make up the SIPEC (MGI, 2023). In this context, the actions of the sectional (executing) units are subordinate to the policies, norms and procedures and electronic systems instituted by the central body, as well as by the sectoral bodies to which they are administratively linked.

Methods used for collecting information

The information for this study was collected through bibliographic and documentary research. The bibliographic research was used to provide a theoretical foundation and justify the limits of the research, as well as to identify associations between the themes of digital competences and digital transformation, especially when applied to the context of SIPEC.

Thus, the topics of Digital Competencies and Digital Transformation in the area of People Management at SIPEC were researched on the national academic database SPELL. As no articles were found that directly associated these themes with the specific context, new searches were carried out using the terms "Digital Competence", "Digital Transformation", "public servants", "people management" and "SIPEC", including searches for these terms in English and Spanish.

Documentary research was carried out with the aim of identifying standards or technological solutions established within SIPEC since 1990, the application of which requires digital skills on the part of the executing civil servants and which have an impact on the Digital Transformation sector. To do this, we mainly used information available on the *Gov.Br* portal and legislation published by the Government .

Methods used for data analysis

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Thus, based on an analysis of the theoretical framework which grounds this study, as well as the selected documents, we sought to identify the elements of DT that relate to DCs. The works by Lopes (2021) and Soares (2023) were used as a reference to identify the elements of analysis, as they addressed, respectively, with the themes of Digital Competences and Digital Transformation with a focus on SIPEC's PM units.

In the first study, Lopes (2021) identified and adapted 20 Digital Competencies for People Management professionals, grouped into five areas or categories, based on the Dynamic Digital Competence Reference Framework for Portugal (QDRDC) and literature related to DCs, applying it in SIPEC PM units of three federal public institutions.

The study by Soares (2023) meanwhile proposed a framework for investigating how the DT process has occurred in the area of PM in Public Administration, summarizing the main antecedent factors and results of this change for the actors involved, which was also applied in three SIPEC PM units from federal public institutions.

So, a relationship was observed between the elements listed as antecedent factors to DT in the study by Soares (2023) and the DCs proposed by Lopes (2021). In this sense, it was identified that the relationship occurred over the "People" element with the 5 categories of DCs proposed by Lopes (2021). Once this was done, based on all the bibliographic and documentary references located, the results that DCs could bring to the DT process in relation to the people element were identified.

Based on such findings, a conceptual model was suggested in which DCs were considered antecedents to DT in the area of People Management, which act on the people element and generate results such as changes in the way PM professionals work, contributing to the success of the transformation and promoting improvements in deliveries in the area.

Presentation and discussion of results

This section presents the context of the DT of the People Management area in the Federal Public Administration, as well as the DCs of professionals in the area and concludes with the proposition of a conceptual model to investigate how the Digital Competencies (DCs) of People Management professionals in the Federal Public Administration affect the Digital Transformation (DT) of the area.

The area of People Management in the Federal Public Administration

Similarly to other administrative sectors of the public service, the People Management area of Public Administration has faced challenges related to Digital Transformation (Gil, 2007; Moura & Souza, 2016). As digital technologies became accessible, tools and systems were developed and made available to SIPEC PM units. These measures were implemented aiming, for example, at the unification and standardization of data and activities to improve control and management carried out within the scope of the executing units and the central body (Pires et al., 2005).

In this way, technologies supported the implementation of web platforms, encompassing various PM processes, such as: the creation of positions and jobs, selection of people, server entry, functional management (vacation, movement, progression), management of benefits such as bonuses, retirement and payroll (Brazil, 2013).

In this context, Table 4 highlights the main technological actions and solutions implemented by the federal government since 1990. The table shows an increase in the number of solutions made available, especially since 2016, and the number of digital tools that professionals need to use in the PM area, since

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new solutions often don't replace previous ones.

Thus, the implementation of DT in the PM area, through the implementation and use of such digital tools in the execution of routines, provides safer action, following legal criteria, more effective and efficient in the area, integrated into SIPEC's organizational strategy.

Table 4
FPA's main technological actions and solutions aimed at PM units since 1990

Year / Period	Legal provision or technological solution
In 1990	SIAPE System (Decree. No. 99,328/1990) and Siapenet, Data Warehouse (DW) and Extractor modules.
2007	CONLEGIS portal for consultations on FPA personnel legislation.
2009	SIAPE HEALTH Module (SIASS).
2013	SIGEPE System .
From 2016 to 2019	SIGEPE Modules: Servant and Pensioner, Legal Action, Consignment, Housing, Alimony and AFD (2016); WEB Holidays, Application, Performance Assessment, Workplace and Learning (2017); Publication (BGP), Message Center, People Selection and new AFD (2018); Publication (SIGEPE Legis), Manager and E-siape (2019).
2018	SIPEC Central to answer questions from PM professionals, civil servants and pensioners.
2019	Competence-based management was intensified in the FPA, through Decree No. 9,991/2019 and ConectaGente was established to integrate the units that make up SIPEC.
2021	Decree No. 99,328/1990 was revoked and PM Structuring Systems were listed and conceptualized through Decree No. 10,715/2021.
2021	SOUGOV.br (PM services platform for civil servants and pensioners) and SOUGOV Líder module (with PM services aimed at managers).

Source: Drawn up by the authors.

Digital Skills of professionals in the PM area of the Federal Public Administration

Given the PM's Digital Transformation of the federal government addressed, it is essential to investigate the digital skills required of professionals working in this area to implement DT policies.

Among the policies undertaken by the Brazilian government, no actions similar to those practiced in the European Union were identified for citizens. However, the issue has been addressed by the National School of Public Administration (ENAP) and the Federal Government in a broader way for civil servants, defining seven transversal competences for the public sector, namely: collaborative problem solving, learning to learn, continuing to learn, digital mindset and independent thinking, resilience, adaptability, cultural awareness and expression (ENAP, 2021; Brasil, 2021).

It can be seen that all of these can be applied in digital environments, with emphasis on the digital mindset, which consists of "the ability to integrate digital technologies with management models, decision-making processes and the generation of products and services, and the means of internal and external communication and relationship with users" (Brasil, 2021).

Therefore, considering the structure and organization of SIPEC's PM units, the specificities of the area and the quantity and diversity of personnel systems and digital tools they use, as demonstrated in Table 4, it is understood that the identification and development of DCs by professionals in the

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area is an antecedent to DT in People Management at FPA, which contributes to the success of this transformation.

Digital Competencies for Digital Transformation in the People Management area of the FPA: a conceptual model

Considering the DT of the People Management in the federal government analysed, DCs are considered fundamental in this process as they provide people with the conditions to understand and use the digital tools implemented in the area. With this in mind, we seek to understand how the conjunction of various capabilities that involve operational and behavioral issues of people, associated with the digital environment, affect the DT process in the PM area.

In this scenario, a relationship was observed between the constructs Digital Competences (DCs) and Digital Transformation (DT), identifying that the relationship occurred on the "People " element of DT with the 5 categories of DCs mentioned in the theoretical foundation. Considering this, Figure 2 proposes a conceptual model for investigating this relational dynamic, applied to the PM of the Federal Public Administration.

The model shows that the five categories of DCs presented in Table 3 in the previous section are related to the "people" axis of the DT process as structural and cultural antecedent factors. This implies that the digital competences of People Management professionals, grouped into the categories Information Literacy, Communication and Citizenship, Content Creation, Security and
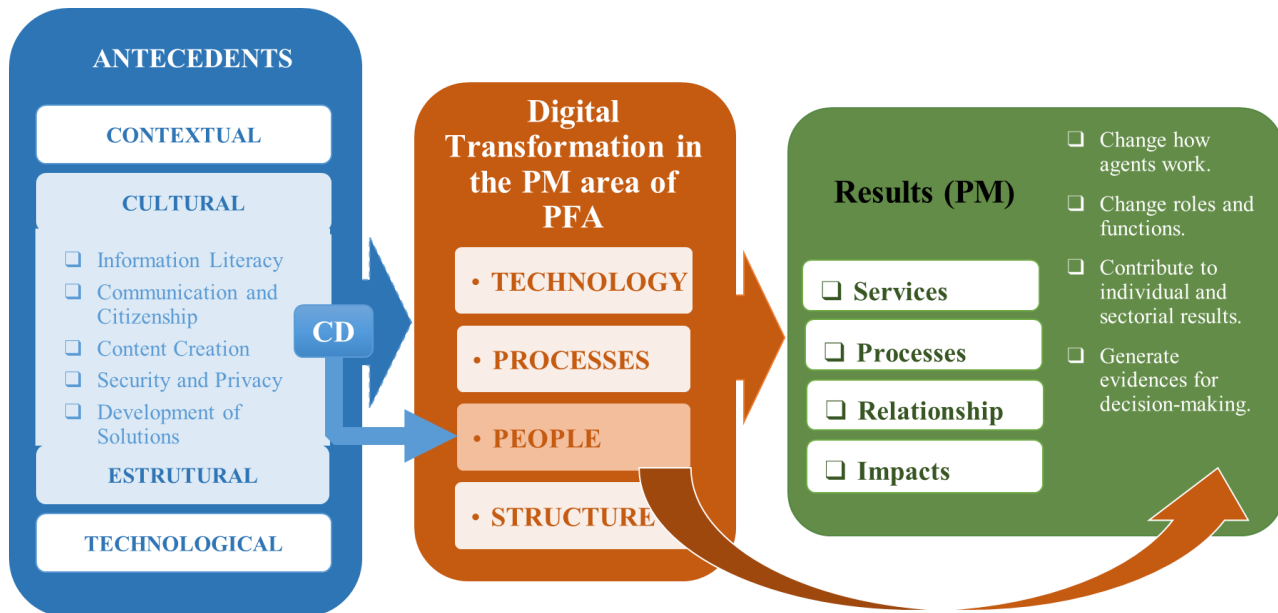
Privacy and Development of Solution, when present, positively influence the DM process in the People Management area, pushing it forward.

The skills related to the "Information Literacy" category play an important role in improving the efficiency of People Management processes. By applying these competences and using the tools made available by the SIPEC Central Body, PM professionals can carry out research more quickly and safely, contributing to the promotion of efficiency (Ulrich et al., 2011; Berman, 2015). Furthermore, the unification of controls and legal parameters promotes faster and safer service to clients in the PM area.

Skills in "Communication and Citizenship" can promote different results in terms of DT. For example, when using Government service channels, such as the SIPEC Center, they can present suggestions for formulating new DT policies or improving existing ones. Furthermore, by using different digital media to share government data, information and digital content related to PM, they can contribute to greater dissemination and better understanding of this information by different target audiences in the area (Brewster, 2004; Som, 2007).

Regarding to the impacts on DT resulting from the competencies categorized as "Security and Privacy", initially, they are necessary to access the systems' functionalities, to process the information and make it available to third parties and propose solutions, observing policies such as General Data Protection Law (GDPL) and the Access to Information Law (Lopes, 2021).

Figure 2

Conceptual model: Digital Competencies for Digital Transformation in the FPA PM area

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Source: Drawn by the authors.

Furthermore, the impacts on DT resulting from DCs in the "Development of Solution" category can be seen. They are necessary to propose their own solutions for the area based on the identification of problems or situations in digital environments that can be improved. Furthermore, they impact the innovation of processes and products with digital tools and following digital evolution through collaborative action with IT sectors to develop solutions that meet needs and promote improvements in the area (Bell et al., 2006).

Therefore, the presence of DCs is understood as a driving factor that promotes the success of DT in the PM area, to achieve institutional objectives, so that the area acts effectively and efficiently, responding to the challenges of the organizational strategy (Moura & Souza , 2016; Cascaes & Juliani, 2021). While the absence of DCs is understood as a barrier to Digital Transformation in the area of People Management in the Federal Public Administration.

In relation to Digital Transformation, it is observed that although the four dimensions are present, the People axis stands out, since this process does not occur without them and it's necessary to take care to improve the relationship between people and digital technologies (Jonathan et al., 2022).

From this perspective, it is necessary to act to minimize resistance to the changes caused by this transformation and to acquire the necessary digital competences: demonstrating the benefits to the actors involved (Bergue, 2020); adopting clear training programs that promote the development of appropriate skills (Jonathan et al., 2022), and encouraging a culture of developing digital competences through employee training (Thorstensen & Zuchieri, 2020; Escobar, 2020), combined with the recruitment of professionals with digital skills and a proactive mindset, as well as encouraging knowledge sharing (Escobar , 2020).

In relation to the area of People Management in the Federal Public Administration, it is noteworthy that Digital Transformation has been occurring for around 20 years, intensified in the recent years, and new systems have been launched frequently,

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as can be seen in the Table 4, which contains the main tools applicable to SIPEC units. Therefore, the broad and effective use of these digital tools developed by the Federal Government demands that professionals working in the PM area have at least one of the five categories of skills mentioned.

Furthermore, professionals who work in PM units that have such DCs will be able to create new tools or update other digital solutions existing in their institutions, or even propose improvements to the systems developed by the Federal Government.

In this sense, the PM area and managers have a fundamental role in promoting and implementing training actions aimed at developing the digital skills of employees, both PM professionals and other public agents, since Digital Transformation is a phenomenon that is expected to intensify in the coming years in different government sectors.

It is also worth noting that there are many antecedents for Digital Transformation to occur, including external factors, generally unpredictable and uncontrollable, representing opportunities and threats, as well as internal aspects related to bureaucracy beyond the "people" axis. However, the presence of people as one of the main axes of DT, which can enable or hinder its effectiveness, needs to be understood, considering its impact on professionals and users of PM services.

Thus, based on the analysis carried out, it appears that DCs correlated to DT can promote more strategic action in the area by supporting the formulation and implementation of strategies and policies related to technologies, the basis of evidence for decision-making, greater effectiveness in the provision of services, in addition to greater connection and better interaction between professionals and their stakeholders through digital tools, in addition to enabling professionals to take on new activities and improve their performance.

It must be pointed out that this list found in the studies is not intended to be exhaustive, and, in addition to the positive results mentioned, resulting from the acquisition or improvement of DCs by professionals, negative impacts may arise, which must be known and managed, aiming at the success of DT in People Management area.

Final Considerations

Using the proposed model, we seek to relate five categories of digital competences of PM professionals from FPA to the success of the Digital Transformation sector process. In the model, the digital skills of People Management professionals, grouped into the categories Information Literacy, Communication and Citizenship, Content Creation, Security and Privacy and Development of Solution, are antecedent, structural and cultural factors, which act on the people and influence the DT process. Therefore, their presence can have maximizing effects, boosting DT, while the lack of DCs can be a barrier that can make it difficult.

Although DT is composed of four interdependent organizational dimensions: technology, processes, structure and people, the "people" axis was highlighted as a counterpoint to technological determinism, given the protagonism of people in DT and the importance of taking care of the relationship between people and digital technologies in this process.

Therefore, the need to minimize resistance to change and encourage the acquisition of DCs with the following actions stands out: demonstrate the benefits of DT and the acquisition of new skills, adopt training programs, encourage the culture of digital competences, recruit professionals with digital skills and a proactive mindset, in addition to encouraging knowledge sharing.

Besides that, the proposition of a model that addresses and relates two constructs applied to the area of People Management of the Federal Government aims to contribute to

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the debate and expansion of interdisciplinary knowledge about Digital Competences and Digital Transformation in the area of People Management.

As a limitation of this study, we can mention the fact that the adequacy of digital competences is restricted to a specific professional segment (PM professionals), which can, however, be useful in the development of other models for analyzing the needs of other segments. Secondly, the model lacks validation, aiming to provide its applicability and making the necessary adjustments. From this perspective, it is suggested as an opportunity for future research to validate the model, as well as its adaptation and application in PM areas in other spheres of government (state and communal) and in other spheres (legislative and judiciary).

Finally, it is expected that the discussions held here will stimulate new research perspectives and themes to be further explored, considering the needs of actors working in different functions or hierarchical levels in the area or in other sectors, in a Digital Government context.

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