THE DIGITAL TRANSFORMATION OF PUBLIC ADMINISTRATION BETWEEN IMPLEMENTED TECHNOLOGIES AND CITIZEN DIGITAL COMPETENCES

Ramona LACUREZEANU[1], ORCID ID:0000-0001-5751-9186

Abstract: *Digital transformation, initially introduced as a technological concept, was envisioned as a means to develop systems and processes that empower public administration to function with the same efficiency as the private sector through digitalization. This vision encompasses the creation of digital solutions aimed at improving public services and enhancing interactions with citizens. Throughout its evolution, digitalization has experienced both positive and negative phases. At present, we are witnessing a new phase of expansion, fueled by rapid technological advancements and the increasing availability of large datasets. This phase has established the foundation for the development of digital tools capable of fundamentally transforming public administration, as demonstrated by recent case studies. As technological progress accelerates, it opens up significant opportunities for greater personalization, interactivity, and efficiency in public services. Within this context, digital competencies have become crucial for public administration personnel, enabling them to effectively implement and manage these digital solutions.*

Keywords: *digital application, digital platforme, public administration***,** *digital competencies*

JEL classification: O33, H83

Introduction

The digital transformation of public administration is one of the most significant phenomena of the 21st century. Governments worldwide are encountering challenges related to efficiency, transparency, and accessibility, making digital solutions essential for modernizing public services.In Romania, adopting digital technologies has become crucial to meeting the demands of an increasingly connected society. Citizens expect a more accessible, faster, and more transparent state. Moreover, in the context of the global crises caused by pandemics and other external challenges, digitalization has proven to be a viable solution for ensuring the continuity of public services.Romania aligns with other countries regarding the digital transformation of public administration. In recent years, public administration has adapted to new realities through digitalization, resulting in the development and implementation of solutions to specific societal problems and needs, as noted by the Authority for the Digitalization of Romania (ADR,2020).

Digital transformation and digitalization are two crucial concepts in modernizing public administration. Their implementation in Romania from 2019 to 2020 represented a significant advancement toward more efficient, transparent, and accessible governance. "Digital transformation" refers to the process by which public institutions adopt advanced technologies to improve their operations and interactions with citizens and each other. These institutions integrate innovative technologies like artificial intelligence, blockchain, and cloud computing into administrative processes to achieve more efficient and responsive governance. (Santos et al., 2022) On the other

[1] FSEGA, UBB, ramona.lacurezeanu@econ.ubbcluj.ro
DOI: 10.29302/oeconomica.2024.2.13

hand, "digitization" refers to converting physical information and documents into digital formats, which enables quick, secure, and efficient access to these resources. (Ricoh, 2023)

Digital technologies comprise electronic systems, tools, and resources that create, store, or process data. These include computers, the internet, social networks, software, mobile applications, and various digital means that enable communication and information management. (Haug et al, 2023)

A digital application is software designed to perform specific tasks on digital devices such as computers, mobile phones, or tablets. These applications allow users to engage in various activities, from text processing and database management to entertainment and communication. A digital platform is an online environment that provides the necessary infrastructure for interactions between providers and users. It facilitates the delivery of goods, services, digital content, and information. These platforms use information and communication technologies to enable such interactions and collect and utilize generated data.

This study, which analyzes scientific literature published in prestigious international journals, contributes to knowledge development in two significant ways. First, it categorizes the implementation patterns of technologies, applications, and digital platforms. Second, it identifies what has been examined in the literature concerning real-world implementations. The study's findings can be helpful to multiple categories of users. Firstly, they are equally relevant to practitioners in public administration, digital solution providers, and the academic community. Secondly, they are also interested in professional and regulatory bodies.

The paper is divided into four sections. The following section provides a brief literature review of fundamental concepts such as digital technologies, applications, and platforms, which are part of digital transformation. Section 2 presents the research methodology, explaining its design and the rationale for the chosen method. It also includes a summary of research findings. Finally, the paper concludes with key insights, and potential future research directions in this field.

Literature review

In recent years, the term "digital transformation (DT)" has become increasingly frequent in business-related discussions, with a general consensus that this process is essential and, ultimately, inevitable for companies. However, the concept is vast, raising the question: what does digital transformation actually mean, and what does it entail? (elian-solution.ro) In our analysis, we have agreed that DT involves the integration of digital technologies and solutions into every area of a business. It is just as much a technological shift as it is a cultural one, equally necessary for organizations to make fundamental changes in how they operate and how they provide experiences and benefits to customers. (sap.com)

DT is the final stage of a three-step process that began with digitization, which refers to the conversion of analog information into a digital format. The next step is digitalization, which involves the increasing use of digital technologies to change the way we live, work, and communicate. DT is the high-level decision to become an organization that is fundamentally customer-centric, agile, and open to change—all of which are made possible through digital technologies. (atlascopco.com) The digital transformation of public administration is a crucial process for modernizing government services, facilitating citizens' access to administrative resources, and enhancing the transparency of public institutions. In this context, digital technologies, software applications, and online platforms play a fundamental role in redefining how public administration interacts with citizens and optimizes

internal processes. The adoption of digital technologies has led to extensive workflow automation, a reduction in bureaucracy, and increased operational efficiency. Among the emerging technologies supporting this transformation are artificial intelligence, blockchain, cloud computing, and the Internet of Things, each with concrete applications in the public sector. The United Kingdom, for example, has implemented an artificial intelligence-based system for processing social benefit applications, significantly reducing processing times. Recent studies indicate that such technologies contribute to greater accuracy and efficiency in decision-making (Alshahrani et all, 2024, 2023; Margetts, Dunleavy, 2013).

Blockchain, used by Estonia to secure digital identities and medical records, ensures an enhanced level of data protection and strengthens trust between citizens and the administration. In an article published in *Government Information Quarterly*, Wirtz and his collaborators (2023) argue that the implementation of blockchain in public administration can lead to increased transparency and operational efficiency. Also, highlight the advantages of this technology, including high security and the reduction of administrative fraud.

Another technology with extensive applicability in the public sector is the Internet of Things (IoT), which is used in Singapore to monitor transportation networks and prevent failures. These systems enable real-time data collection and analysis, facilitating prompt interventions and evidence-based decision-making. Cordella and Tempini (2015) emphasize that integrating IoT into urban infrastructure contributes to increased sustainability and operational efficiency. Tomor et all (2019) also explores the impact of these solutions on optimizing public resources.

Digital applications represent a fundamental component of digital transformation in public administration, providing citizens with seamless and rapid access to essential services. A notable example is e-Estonia, a comprehensive digital ecosystem that facilitates online access to key services such as education, healthcare, and taxation. Recent studies indicate that such solutions significantly reduce the time required for bureaucratic interactions (Wirtz et all, 2023). Similarly, the Digital India initiative has accelerated the adoption of e-government, while GovTech Singapore provides a mobile application enabling swift access to official documents (Cordella, Tempini, 2015; Tomor et all 2019).

Digital platforms constitute the foundational infrastructure for the effective administration of public services, allowing integrated access to multiple governmental functions through a unified entry point. A prominent example is Gov.uk, the centralized platform of the United Kingdom, which offers citizens a single portal for accessing public services. Recent research underscores that such platforms contribute to increased administrative efficiency and streamlined workflow processes (Wirtz et all, 2023, Alshahrani et all, 2024). MyGov in Australia and DigiD in the Netherlands are additional relevant examples, recognized in academic literature for their significant role in advancing the digitalization of public administration (Cordella, Tempini, 2015; Tomor et all 2019).
By integrating these technologies, public administration worldwide becomes more efficient, transparent, and accessible to citizens. Recent studies demonstrate that states that strategically adopt digitalization succeed in reducing bureaucracy, optimizing operational costs, and increasing user satisfaction with public services. As technology continues to evolve, governments must remain flexible and innovative to fully leverage the potential of digitalization.

The Digital Competence Framework for Citizens, (DigComp 2.2), provides a standardized language for identifying and delineating the key domains of digital competence. This framework serves as a comprehensive EU-wide instrument designed to elevate the digital proficiency of all citizens. It supports policymakers in formulating strategies that promote the development of digital skills and informs the design of educational and training initiatives aimed at enhancing the digital

competence of individuals, particularly in their interactions with state authorities and in the context of their personal lives (Vuorikari et al, 2022). In this regard, our study aims to contribute to the advancement of knowledge by examining the relationship between digitalization in public administration and the digital competencies required of citizens, as outlined in the DIGCOMP 2.2 framework. Specifically, we seek to answer the following research questions:

1. What digital technologies, applications, and platforms have been effectively implemented in various activities and processes of public administration in Romania?
2. What digital competencies, as defined by the DIGCOMP 2.2 framework, do citizens need to understand and effectively use these technologies?

Our research emphasizes the perspective of citizens rather than public administration employees, focusing on how digitalization impacts their interaction with public services. We argue that the successful implementation of digital public services depends not only on technological advancements but also on citizens' ability to navigate and utilize these services competently. By aligning our analysis with the DIGCOMP 2.2 framework, we aim to highlight the essential digital skills required to ensure that digitalization leads to accessible, non-bureaucratic, transparent, and non-discriminatory public services.

Research methodology

We aimed to conduct a literature review based on a comprehensive analysis of scholarly works addressing the three previously mentioned concepts. To achieve this, we utilized the Web of Science database, selecting seven out of its nine sub-databases: Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI), Conference Proceedings Citation Index – Science (CPCI-S), Conference Proceedings Citation Index – Social Science & Humanities (CPCI-SSH), Book Citation Index – Science (BKCI-S), Book Citation Index – Social Sciences & Humanities (BKCI-SSH), and Emerging Sources Citation Index (ESCI). The choice of Web of Science was motivated by its inclusion of top-tier, peer-reviewed journals and conference proceedings across a wide range of disciplines, as well as its well-structured, coherent database with clear indexing standards and metadata.

We conducted multiple rounds of searches using the following keywords: "digitalisation of public services in Romania," "digital technologies used in public services in Romania," and "digital platform" or "digital application in public services of Romania." Additionally, we employed a combined search query: TS=("Digital platform" OR "applications" OR "technologies") AND TS=("public administration" OR "public sector") AND TS=("Romania") without restricting the search to a predefined time frame.

A total of 100 articles were retrieved, which included the keywords mentioned in the title and abstract. The time frame was set for each article between 2019 and 2024 (the range covered included the years 2024–2007). This time frame was chosen because, prior to the COVID-19 crisis, digital public services were on the rise, demonstrating the advantages of electronic documents and procedures over paper-based ones. The COVID-19 pandemic highlighted the importance of maintaining government operations during periods of social distancing. Although progress has been made, further development is still needed (Radu & Petcu, 2021). Duplicates were then removed, resulting in 44 articles.

The second stage involved downloading and quickly reviewing the articles by searching for the terms "digital technologies," "digital applications," "digital platforms," "public administration," and, of course, "Romania" only.

Inclusion criteria for the remaining articles:

- Public administration in Romania
- Existing technologies, applications, or platforms (not potential ones)
- The necessary digital competence in the context of digitalization, through the lens of DIGICOMP 2.2

So, the final sample includes 11 articles. The articles included in the final sample were thoroughly read and analyzed by the authors in order to formulate answers to the three research questions. The analyzed articles address, either in full or in combination, one or more of the established questions. The results section presents the three elements—digital technologies, digital applications, and digital platforms—effectively used in public administration in Romania, as described by their authors, followed by brief assessments related to digital competences. These are brief descriptions because the literature on this subject is very scarce. It is evident that the lack of digital competences limits the digital transformation of a society, as electronic services cannot be accessed to their full extent due to this limitation. (Radu, Petcu, 2021).

Results

Thus, studies have been identified across several domains, including digital technologies, digital applications, and digital platforms. After reviewing the articles in the selected sample, we identified four categories related to the research questions. For each category, we established a definition and criteria through which we categorized the ideas from the research articles into the specific category. Each table for the respective category (from 1 to 4) is titled after the category it represents, and consists of three columns: the specific name of the technology, application, or platform; the relevant idea extracted from the analyzed article; and the author(s) who articulated it.

a) Digital technologies represent a set of methods, processes, and IT infrastructures that enable the development and operation of digital platforms and applications. Classification criteria used**:** If a system serves as fundamental infrastructure to support other services and applications, it can be regarded as a technology. (https://www.techtarget.com) the identified digital technologies are presented in the table 1 below.

Table 1: Digital technologies

Name	**Description**	**Author**
Security & Authentication Technologies, Responsibility (Ethics)	• encryption, multi-factor authentication, and the monitoring of user activities are essential for protecting sensitive data. • biometric authentication (for example, fingerprint or facial recognition) is employed to enhance both security and user convenience. • data security issues include the unauthorized access to private information on Internet of Things (IoT)-based devices, potentially compromising data confidentiality. citizens' data may be captured without their consent—for instance, via surveillance cameras or sensors installed on buildings. • from a legal standpoint, the accountability of AI (whether embodied in physical robots or software) must be clarified in the event of incidents, in order to determine which entity should assume responsibility for safety measures. • furthermore, the deployment of AI applications could endanger public safety by presenting challenges stemming	Gaf-Deac et al, 2024 Dumitrache et al, 2023 Pripoaie et al, 2024

Name	**Description**	**Author**
	from faulty robot programming, technical failures, and complications in human-robot interaction.	
Big Data & Analytics	• analyze large volumes of data and improve the efficiency and transparency of public services. • collect and analyze large data volumes to support strategic decision-making.	Gaf-Deac et al, 2024 Vărzaru, 2022
Cloud Computing	• used in various daily activities.	Ogrean et al, 2024
Integration with Other Systems	• public administration platforms integrate with other IT systems for efficient data flows and interoperability. API (Application Programming Interfaces) enables integration of mobile applications and web portals with external services. • weak interoperability is a challenge. • AI-based applications involve multiple technologies, which can cause maintenance and sustainability issues.	Gaf-Deac et al, 2024 Pripoaie et al, 2024 Dumitrache et al, 2023
Responsive Design	• ensures that applications and web portals display correctly across various devices and screen sizes.	Gaf-Deac et al, 2024
Artificial Intelligence (AI)	• a method of teaching a computer, a computer-controlled robot, or software to think intelligently, similar to the human mind. • learning is based on analyzing human brain structures and cognitive processes. • the science and engineering of developing intelligent machines, especially intelligent computer software. • used for process automation and improving administrative efficiency.	Dumitrache et al, 2023 Vărzaru, 2022
Internet of Things (IoT)	• the integration of IoT devices for monitoring and managing public infrastructure.	Dumitrache et al, 2023 Vărzaru, 2022
Electronic Data Interchange (EDI)	• facilitates information exchange between government entities and between the government and citizens via electronic means	Burlacu et al, 2022
e-ID (Electronic Identity)	• an electronic identity used to authenticate users in online services. • it may include personal data (name, surname, date of birth) • often used for accessing public services, online payments, or electronically signing documents.	Radu, Petcu, 2021
e-Signature (Electronic Signature)	• a digital method for signing documents. • used to validate and authenticate an individual's signature on electronic documents.	Radu, Petcu, 2021

Name	Description	Author
	• considered as legally valid as traditional signatures. used for signing contracts, applications, and other online documents.	
Blockchain	• ICI Bucharest established the European Center of Excellence in Blockchain (ECEB) to promote blockchain technology. • ICI Bucharest developed "in vitro" pilot projects demonstrating blockchain use in digital process optimization. • a method of digitally storing information in an ever-growing database. • ensures data integrity and security by preventing unauthorized modifications. • public visibility of blockchain transactions reduces transparency-related risks. • can be used to monitor economic and financial performance transparently. • automates administrative processes, reducing manual errors and manipulations.	Radu, Petcu, 2021 Grigorescu, Bortea, 2020 Moșneanu, 2020
SAF-T (Standard Audit File for Tax)	• implemented through the D406 Declaration system, requiring automatic accounting data reporting to ANAF. • a reporting standard integrated into accounting software.	Pripoaie et al, 2024

b) Digital application represent a software designed to operate on a digital platform and fulfill a specific function for users. Classification criteria used: If a system serves a specific purpose within a platform and offers concrete functionalities (e.g., communication, advertising, user support), it can be classified as an application.(https://www.techtarget.com/) Below in table 2 are presented the digital technolgies debated in the literature.

Table 2: Digital application

Name	Description	Author
Paid Office Suite	• used in daily activities.	Ogrean et al, 2024
Mobile Applications Tax and Fee Payment Applications	• developed to provide up-to-date information and facilitate citizen access to government services, ensuring transparency and accessibility of public services. • allow citizens to pay taxes and fees online.	Gaf-Deac et al, 2024 Vărzaru, 2022
Teleconferencing and Videoconferencing Systems	• essential for maintaining communication between citizens and public administration, including organizing meetings, consultations, and sessions online, eliminating the need for physical travel.	Gaf-Deac, et all, 2024
Development Frameworks	• frameworks such as React Native, Flutter, and Xamarin are used to develop native and cross-platform mobile applications.	Gaf-Deac, et all, 2024

Name	Description	Author
AI Applications	• AI applications are used to automate services, improve decision-making processes, and facilitate citizen access to government information. • AI can enhance citizen participation in decision-making processes and contribute to eliminating corruption by automating services and ensuring transparency.	Dumitrache et all, 2023
e-Invoicing (Electronic Invoicing)	• involves using technology to manage and process invoices electronically, simplifying financial procedures and reducing paper usage. • e-Invoicing has been regulated at the EU level since 2018 under Directive 2014/55/EU on electronic invoicing in public procurement, significantly simplifying procurement procedures and improving transparency.	Radu, Petcu, 2021
Clujul Meu	• the "Clujul Meu" application allows users to send notifications directly to the City Hall.	Grigorescu, Bortea, 2020

c) Digital Platforms are an online environment that facilitates interaction between users and/or organizations through structured functionalities. It enables users to interact, share information, and access services. Classification criteria used : A system can be considered a platform if it provides an infrastructure for developing and using other digital applications or services.(https://www.techtarget.com) Table 3 include the digital platforms from the analized literature.

Table 3: Digital Platforms

Name	Description	Author
E-Government Platforms	• e-government platforms are developed to facilitate public access to services and information, allowing users to fill out forms and obtain documents. • they enable online access to administrative services such as tax declarations and work permits, simplifying administrative procedures.	Gaf-Deac, et all, 2024 Burlacu et all, 2022
e-guvernare.ro	• centralizes key government platforms, making it easier for citizens and businesses to access various public services. • a major example of digitalization in Romania's public administration.	Dumitrache et all, 2023 Vărzaru, 2022
ANAF Online Platform	• online platform for tax declarations and fiscal administration.	Vărzaru, 2022
INS (National Institute of Statistics)	• a platform that publishes statistical data and research reports.	Vărzaru, 2022
Social Media Platforms	• social media platforms should be used to communicate and interact with citizens, providing faster responses to	Burlacu et all, 2022

Name	**Description**	**Author**
	their needs and improving transparency and public engagement. • However, authors note that they are not widely used for this purpose. • a small number of Romanian citizen use these applications to interact with financial administration. • the engagement of citizens is a weak point in local administration; participatory governance is often reduced to creating an official Facebook, YouTube, or Twitter page for the institution.	Radu, Petcu, 2021 Fulga et all, 2019
E-Procurement	• a platform that integrates various public procurement functionalities and services, ensuring interaction between different entities and facilitating procurement processes. • may include applications such as: - **E-Notification** (electronic notification of procurement procedures) • **E-Access**(electronic access to bidding documents) **E-Submission** (electronic submission of bids)	Radu, Petcu, 2021
www.ghiseul.ro	• an operational and continuously developing platform launched in 2006, allowing citizens to make electronic payments for fines, taxes, and other financial obligations via bank cards. • recently updated with an access point called **E-Delivery**, responsible for interconnecting with other IT systems for data exchange. • as of 2024, the platform has over 1,955,400 active users, representing approximately 10% of Romania's population.	Radu, Petcu, 2021 Pripoaie et all, 2024 Vargas et all, 2022
apullum.ro	• the **Civic Alert** program allows citizens to submit petitions and track the status of their tickets in real time on the City Hall's website.	Grigorescu, Bortea, 2020
primariaclujnapoca.ro	• through the **Virtual Assistant Antonia**, Cluj-Napoca residents can submit 90 types of requests remotely, without physically visiting public institutions.	Grigorescu, Bortea, 2020
E-Invoicing (e-Factura)	• a mandatory electronic invoicing system for B2G transactions (Business-to-Government) and soon for B2B transactions as well. • a digital platform provided by ANAF for invoice processing, offering a centralized infrastructure for this process.	Pripoaie et all, 2024
Integration of Cash Registers with ANAF System	• requires automatic and periodic transmission of fiscal data from electronic fiscal registers (AMEF) to ANAF's servers without manual intervention. • managed centrally by ANAF, the system ensures a continuous data flow.	Pripoaie et all, 2024

Name	Description	Author
https://aici.gov.ro	• a platform developed by the National Employment Agency for managing technical unemployment cases.	Vargas et all, 2022
stirioficiale.ro	• created during the pandemic to provide verified, official information directly from government sources. • the platform still exists today but is no longer updated.	Vargas et all, 2022

d) Digital competences

The literature concerning citizens digital competences is scarce, only one paper open a discussion about it from the perspective of DIGICOMP.

Table 4.Digital competences

Name	Description	Author
Digital competence or digital literacy	• digital literacy: understanding and using basic digital technologies, such as browsing the internet, using applications, and protecting data security and privacy. use of online public services: ability to access and use e-government platforms and applications for public services, such as tax payments, healthcare access, and filing tax returns. adaptability and continuous learning: capability to continuously learn and adapt to emerging technologies and digital solutions. digital communication skills: effective use of digital communication tools, such as emails, social media, and other online communication platforms.	Vărzaru, 2022

Discussion

In an era where digitalization is transforming the relationship between citizens and public institutions, digital technologies, applications, and platforms play a crucial role in this shift. However, the success of implementing these solutions depends not only on technological infrastructure but also on the digital competencies of users. In Romania, the literature discusses the development and use of these technologies, but there is a lack of an approach that directly correlates them with the digital competencies of citizens. Nevertheless, through a careful analysis, this connection can be highlighted.

Digital technologies are foundational to the digital transformation process, providing innovative solutions that enhance both public and private services. For instance, artificial intelligence applied to fiscal data analysis or blockchain, which ensures transaction transparency, are technologies enabling advanced automation. However, implementing these technologies requires users to be capable of understanding and using them efficiently. For example, processing tax declarations with advanced algorithms necessitates not only a well-established system but also citizens capable of interpreting the results and understanding the implications of automation. (Pripoaie et al., 2024)

Digital applications serve as the interfaces that facilitate citizens' access to these technologies. From virtual payment desks and e-learning platforms to telemedicine applications, digitalization is fundamentally changing how we interact with public services. However, for these applications to be effectively used, citizens must possess the necessary digital competencies, such as navigating digital environments, verifying the authenticity of information, and protecting personal data. Thus, the success of these solutions depends on both the intuitive design of applications and the digital literacy of users. Digital platforms represent another important step in integrating services, providing a central

access point for various resources.(Mosneanu, 2020). E-government platforms, for example, allow access to official documents, submission of administrative requests, and access to fiscal services.(Fulga et all, 2019) These platforms are essential for improving the interaction between citizens and public administration, but to be used correctly, citizens need the required competencies. For example, a citizen who does not understand how to navigate a digital platform or cannot distinguish between an official page and a fraudulent one risks being excluded from the benefits of digitalization.

Therefore, the success of digitalization should not be measured solely by the implementation of advanced technologies or the development of sophisticated applications, but also by the enhancement of citizens' digital competencies. Training programs, digital education, and awareness campaigns are crucial to bridging the digital gap and ensuring an effective transition to a digital society. In conclusion, while the literature in Romania has not yet established a clear link between the technologies used and the digital competencies of citizens, there are sufficient starting points for future research that can integrate these two dimensions into the digitalization of public administration and social services.

Future directions

In the context of Romania’s public administration digitization, a crucial research avenue would involve examining the technologies and platforms currently deployed across various government sectors, while also linking them to the digital competencies required. This approach would provide a thorough understanding of how digital platforms are utilized in public administration and highlight the necessity for continuous citizen training to effectively navigate these digital environments.

Research could focus on the integration of cloud technologies and digital document management systems within governmental platforms, with an emphasis on competencies related to information retrieval, personal data protection, and online navigation. In terms of modernizing the digital infrastructure of public administration, studies could explore the adoption of cloud solutions and interoperable systems, as well as their role in transforming legacy systems. This would involve investigating the digital competencies needed by citizens to actively participate in managing this digital ecosystem, including the skills to use cloud technologies and integrate diverse institutional platforms.

Another potential area of research could examine the use of Big Data management systems within tax administration, particularly those employed by ANAF, and their link to competencies such as data analysis, processing, and cybersecurity, which are essential for safeguarding sensitive data. An interesting topic would also be the analysis of online public participation and consultation platforms, which play a critical role in advancing e-democracy. This research could explore how these platforms encourage citizen involvement in decision-making processes, with a focus on the digital competencies needed, such as collaboration skills and the ability to critically assess information shared on these platforms.

Lastly, research could focus on the implementation of cybersecurity and data protection technologies within public administration. This would include exploring platforms that utilize advanced cybersecurity protocols and data encryption technologies to protect sensitive information. Relevant digital competencies in this context would involve understanding the principles of cybersecurity and personal data protection, which are vital for the secure use of digital platforms.

These research directions, centered on the integration of digital technologies within Romania's public administration, would contribute to a deeper understanding of the digitization process and the skills required for their efficient and secure use. They would offer not only a comprehensive analysis of digital platforms and applications but also a framework for the continuous development of citizens' digital competencies, thereby facilitating the transition toward a more accessible and digitally advanced public administration.

Conclusion

By analyzing the ideas extracted from the studied articles and correlating them with the data cataloged in the previous tables, we summarize several conclusions: following the analysis conducted, a limited number of relevant articles on the chosen topic were identified, and those available do not adequately reflect the full complexity of the current realities. Furthermore, there is no integrated approach between the digital competencies outlined in the DIGICOMP 2.2 framework and the existing digital technologies, applications, and platforms. This separation between the two areas suggests a lack of focus in current research on addressing them in a correlated manner. Coordinating DIGICOMP 2.2 with the digital skills necessary for using the applications and digital platforms of public administration would contribute to a more effective implementation of digital technologies. This would not only facilitate a smoother transition to digitalization but also ensure a more accessible and functional use of public services for citizens.

References

1. Alshahrani, A, Griva, A, Dennehy, D, Mäntymäki, M, (2024). Artificial intelligence and decision-making in government functions: opportunities, challenges and future research, Transforming Government: People, Process and Policy, Vol. 18, 4, 678-698, https://doi.org/10.1108/TG-06-2024-0131
2. Burlacu, S, Pargaru, I, Iacob, OC, Gombos, SP, (2022). Digital public administration and the perspectives of sustainable development in Romania, European Journal of Sustainable development, http://dx.doi.org/10.14207/ejsd.2022.v11n4p230
3. Cordella, A, Tempini, N, (2015). E-government and organizational change: reappraising the role of ICT and bureaucracy in public service delivery, Government Information Quarterly, https://doi.org/10.1016/j.giq.2015.03.005.
4. Dumitrache, M, Stanescu, AC, Paraschiv, EA, (2023). Digitalization and artificial intelligence in e-Government applications, Romanian Journal of Information Technology and Automatic Control, http://dx.doi.org/10.33436/v33i3y202304
5. Margetts, H, Dunleavy, P, (2013). The second wave of digital-era governance: a quasi-paradigm for government on the Web. Philosophical Transactions. Series A, Mathematical, Physical, and Engineering Sciences, 371. 20120382. 10.1098/rsta.2012.0382.
6. Fulga, TM, Profiroiu, CM, (2019). Do local government websites meet the minimum criteria to serve their purpose?, Management Research and Practice, 11,2, pp. 45-63
7. Gaf-Deac, I, Radulescu, CV, Burlacu, S, Dima, C, (2024). Professional training in public administration in Romania during the covid-19, Proceedings of the International Conference on Business Excellence, http://dx.doi.org/10.2478/picbe-2024-0072
8. Grigorescu, A, Bortea, AN, (2020). Global digital economy. Blockchain technology and public administrations, Basiq International Conference: New Trends in Sustainable Business and Consumptione, Italy
9. Haug, N, Dan, S, Mergel, I, (2023). Schimbarea indusă digital în sectorul public: o revizuire sistematică și o agendă de cercetare. Public Management Review, https://doi.org/10.1080/14719037.2023.2234917

10. Mosneanu, D, (2020). Corporate governance in the digital world, Proceedings of the International Conference on Business Excellence, http://dx.doi.org/10.2478/picbe-2020-0032
11. Ogrean, C, Pirvu, BC, Herciu, M, (2024). Exploring digital needs in the centru region, Romania: a comparative cross-sectoral study, Studies in Business and Economics, http://dx.doi.org/10.2478/sbe-2024-0060
12. Pripoaie, R, Schin, GC, Matic, AE, (2024). Post-pandemic exploratory analysis of the Romanian public administration digitalization level in comparison to the most digitally developed states of the EU, Sustainability, http://dx.doi.org/10.3390/su16114652
13. Radu, AF, Petcu, I, (2021). Intrinsic aspects of e-government consolidation across the UE. Case Romania, Romanian Journal of Information Technology and Automatic Control, http://dx.doi.org/10.33436/v31i4y202107
14. Ricoh,(2023),https://www.pfu-us.ricoh.com/blog/digitization-vs-digitalization?srsltid=AfmBOoqrW1JIupuMvg6TB0bcM-.....com
15. Santos, SB, Capellin, F, Trentin, M, Bortoluzzi, SC., de Lima, EP, (2022). Digital transformation in the public sector: enabling technologies and their impacts, Industrial Engineering and Operations Management, vol 400, Springer, https://doi.org/10.1007/978-3-031-14763-0_9
16. Tomor, Z, Meijer, A, Michels, A. Geertman, S, (2019). Smart governance for sustainable cities: findings from a systematic literature review, Journal of Urban Technology, 26(4), 3–27, https://doi.org/10.1080/10630732.2019.1651178
17. Vargas,VM, Oancea, M, Saftiuc, B, Vrana, N, Teodorescu, CA, (2022). Analiza platformelor digitale dezvoltate de autoritățile române în perioada pandemiei de COVID-19, Proceedings of the 16th International Conference on Business Excellence 2022, pp. 1329-1339, doi: 10.2478/picbe-2022-0121
18. Varzaru, AA, (2023). Assessing digital transformation acceptance in public organizations'marketing, Sustainability, 15 (1), 265, http://dx.doi.org/10.3390/su15010265
19. Vuorikari, R, Kluzer, S, Punie, Y, (2022). DigComp 2.2: the digital competence framework for citizens, European Commission: Joint Research Centre, Publications office of the European Union, 2022, https://data.europa.eu/doi/10.2760/115376
20. https://www.elian-solutions.ro/ce-este-transformarea-digitala/
21. Autoritatea pentru Digitalizarea României. (2020). Exemple de bună practică în utilizarea instrumentelor de tip e-guvernare pentru furnizarea de servicii publice (pp. 07-15). București. https://www.adr.gov.ro/stabilirea-cadrului-de-dezvoltare-a-instrumentelor-de-e-guvernare-egov/
22. https://www.globalgovernmentforum.com/events/how-governments-can-boost-productivity-with-ai-moving-from-hype-to-real-world-results/
23. How AI is helping governments drive digital transformation, www.weforum.org/stories/2025/01/rewire-governments-ai-in-the-intelligent-age-meta
24. https://www.atlascopco.com
25. https://www.sap.com/
26. https://www.techtarget.com
27. Singapore-Smartcities-the-sustainable-program-six-leading-cities-soreport-2021-3.pdf
28. Transformarea pentru un viitor digital: foaia de parcurs 2022-2025 pentru digital și date - actualizată în septembrie 2023, www.gov.uk/government/publications/roadmap-for-digital-and-data-2022-to-2025/transforming-for-a-digital-future-2022-to-2025-roadmap-for-digital-and-data