

SMART PUBLIC ADMINISTRATION: DIGITAL INNOVATION SCENARIOS IN THE ERA OF ARTIFICIAL INTELLIGENCE

DOI: <https://doi.org/10.53486/dri2026.89>
UDC: 004.8:[35.07:338.465](4-15+4-191.2)

Claudia-Rodica POPA

Constantin Stere University of Political and Economic Studies,
Chişinău, Republic of Moldova
secretar.danesti@yahoo.com
<https://orcid.org/0009-0007-4414-9797>

Abstract: *The accelerated technological transformations of recent decades have led to a profound redefinition of contemporary public administration. This article analyzes the structural transformations generated by artificial intelligence (AI) in the field of public administration, proposing a mapping of digital innovation scenarios applicable in the context of administrations in Central and Eastern Europe. Based on a mixed methodology - comparative analysis of specialized literature, international case studies, and the construction of prospective scenarios - the study identifies four main directions of transformation: the automation of public services, data-driven governance, citizens' digital participation, and the cybersecurity of critical infrastructures. The conclusions highlight the need for an adapted legislative framework, investments in institutional capacity, and an ethical, citizen-centered approach in the implementation of AI solutions in the public sector. Through an interdisciplinary approach, the article proposes a reflection on the future of public administration in the context of global digital transformations.*

Keywords: *digital public administration, artificial intelligence, e-government, innovation scenarios, digital transformation, smart public services.*

JEL: H83, O33, O38

Introduction

The digital transformation of the public sector represents one of the most significant challenges of the third decade of the 21st century. While the first waves of digitalization focused on the computerization of existing administrative procedures, the new frontier- marked by the rise of artificial intelligence - entails a profound reconfiguration of the very logic of governance. It is no longer simply about doing faster what was previously done; it is about rethinking the relationship between the state, the citizen, and public decision-making (Dunleavy et al., 2006).

Artificial intelligence - in its forms of machine learning, natural language processing, expert systems, and robotic process automation - provides public administration with unprecedented tools: the capacity to process massive volumes of data, anticipate service demand, personalize interaction with citizens, and detect fraud and anomalies in real time (Wirtz et al., 2019). These capabilities are not politically and ethically neutral; they raise fundamental questions regarding transparency, accountability, fairness, and data sovereignty.

In the European context, the Artificial Intelligence Strategy (2021) and the European Artificial Intelligence Act (2024) outline the normative framework within which Member States are called upon to integrate AI into public services, with explicit guarantees for citizens' fundamental rights (European Commission, 2021). Romania, as a Member State of the European Union, stands at the intersection between the opportunity to bridge historical gaps in administrative modernization and the risk of adopting technological solutions without the necessary institutional and human infrastructure.

This article proposes a systematic analysis of digital innovation scenarios through AI in public administration, structured around four thematic axes: the automation and efficiency of services, data-driven governance, citizens' digital participation, and the security of public systems. The study aims

to provide both a theoretical contribution to the specialized literature in the field of digital public administration and practical benchmarks for decision-makers involved in public sector digital transformation projects.

Scientific methodology

The present research adopts a mixed methodological approach, combining qualitative and quantitative analysis of sources, in accordance with the paradigm of applied research in administrative sciences (Creswell, 2014).

2.1. Systematic literature review

The first methodological component consists of a systematic review of specialized literature published between 2015 and 2024, using the Scopus, Web of Science, and Google Scholar databases. More than 120 relevant works were identified and analyzed, selected based on thematic relevance, impact factor, and theoretical novelty. The search terms used included combinations of the following concepts: artificial intelligence, public administration, e-government, digital transformation, algorithmic governance, smart government.

2.2. Comparative analysis of case studies

The second component consists of the comparative analysis of twelve case studies regarding the implementation of AI solutions in public administration in European Union Member States (Estonia, Denmark, Finland, the Netherlands, France, Germany), as well as in the United Kingdom, the United States of America, South Korea, and Singapore. The cases were selected to cover a variety of institutional contexts, levels of digital maturity, and types of AI applications (Zuiderwijk et al., 2021).

2.3. Construction of prospective scenarios

The third methodological component employs the scenario method (Schwartz, 1991), adapted for the field of digital public policies. The scenarios were constructed through the identification of key driving forces (degree of digital maturity, legislative framework, level of citizens' trust, institutional capacity) and critical uncertainties, followed by the development of four archetypal scenarios for the 2030 horizon.

2.4. Expert consultation

The validation of the results involved consultation with a panel of ten experts from the fields of public administration, applied informatics, European administrative law, and AI ethics, using an adapted Delphi method (Linstone & Turoff, 2002). The experts' feedback was integrated into the final version of the scenarios and public policy recommendations.

Theoretical framework: Public administration in the digital era

Over recent decades, public administration theory has undergone a succession of major paradigms: from traditional Weberian public administration, focused on hierarchy and standardized procedures, to New Public Management (NPM), oriented toward efficiency and market principles, and more recently toward New Public Governance (NPG), which emphasizes networks, co-production, and participation (Osborne, 2010).

In this context, digitalization and AI do not represent mere technical tools superimposed upon existing administrative structures; they generate a new paradigm - Digital Era Governance (Dunleavy et al., 2006) or, in its most recent form, Algorithmic Governance (Danaher et al., 2017) - which reconfigures power relations, accountability mechanisms, and the logic of public service delivery.

The concept of smart public administration integrates three essential dimensions: (1) the use of data and AI to optimize decision-making and services; (2) the interoperability of platforms and information systems; and (3) a proactive orientation toward citizens' needs, anticipating demand rather than merely reacting to it (Mellouli et al., 2014). This triad defines the analytical framework of the present study.

Research conducted by Wirtz et al. (2019) emphasizes that the successful implementation of AI in the public sector depends on three critical factors: technical capacity (digital infrastructure and human expertise), institutional legitimacy (citizens' trust and the legal framework), and political will (the

commitment of administrative leadership to innovation). The absence of any of these factors compromises the success of digital transformation projects.

Digital innovation scenarios through artificial intelligence

Scenario I - Automation of mass public services

The first scenario concerns the use of AI to automate high-volume administrative services: the issuance of documents, request processing, eligibility verification for social benefits, and the payment of taxes and duties. The reference model is Estonia, which implemented the concepts of e-residency and proactive administration - citizens automatically receive the benefits for which they are eligible, without the need to submit applications (Lips, 2020).

The key technologies in this scenario are natural language processing systems (administrative chatbots, virtual assistants), robotic process automation (RPA), and data interoperability platforms. A study by the McKinsey Global Institute (2017) estimates that approximately 30% of public servants' tasks can be automated using existing technologies, generating significant savings and freeing human resources for activities with higher added value.

The challenges of this scenario include the risk of digital exclusion for vulnerable population segments, the need to redesign administrative processes (not merely digitize existing procedures), and change management within public institutions (Janowski, 2015).

Scenario II - Data-driven governance and algorithmic decision-making

The second scenario explores the use of AI to improve the quality of public decision-making through predictive analysis, fraud detection, and optimal resource allocation. Concrete applications include: early warning systems for school dropout risks, predictive policing (with its significant ethical dilemmas), optimization of public transport routes, automatic detection of tax fraud, and anticipation of social care needs.

Denmark implemented an AI-based system for detecting fraud in the social benefits system, achieving remarkable results in reducing improper payments (Veale & Brass, 2019). France uses machine learning algorithms to analyze tax declarations and identify taxpayers with a high risk of tax evasion (OECD, 2019).

The ethical dimension is central to this scenario. Algorithmic decision-making in sensitive areas - such as the allocation of social housing, recidivism risk assessment, and the granting of benefits - can reproduce and amplify existing discrimination if the training data reflects historical inequalities (O'Neil, 2016). The principle of algorithmic explainability (the "right to explanation," established by the GDPR) and the transparency requirements of the European AI Act (2024) define the legal boundaries of this scenario.

Scenario III - Digital participation and deliberative democracy

The third scenario projects the use of AI to revitalize citizen participation in democratic processes: intelligent public consultation platforms, systems for the automatic aggregation and synthesis of citizens' opinions, automatic translation tools for the inclusion of minority communities, and real-time public sentiment analysis for decision-makers.

Finland experimented with digital consultation platforms in which AI automatically synthesizes thousands of citizen comments into main themes, facilitating the participatory legislative process (Aitamurto & Landemore, 2016). Taiwan implemented the vTaiwan platform, an AI-assisted digital consultation system that generated political consensus in controversial areas such as the regulation of the sharing economy (Hsiao et al., 2018).

The specific risks of this scenario include deliberative manipulation through AI-amplified disinformation, filter bubbles, and threats to the decision-making sovereignty of elected representatives. The EU regulatory framework on digital services (Digital Services Act, 2022) establishes specific obligations for platforms that mediate public discourse.

Scenario IV - Cybersecurity of critical infrastructures

The fourth scenario addresses the use of AI to protect the state’s critical infrastructures - energy, financial, public health, and communication systems - against increasingly sophisticated cyber threats. AI provides superior capabilities for anomaly detection, network traffic analysis, and automated incident response, which are essential in the context of the proliferation of cyberattacks sponsored by state actors (ENISA, 2023).

The European Union Agency for Cybersecurity (ENISA) reports a 150% increase in cyberattacks targeting European public institutions between 2020 and 2023, emphasizing the urgency of investments in AI-based defensive capabilities. The Baltic states - Estonia, Latvia, and Lithuania - have developed some of the most advanced cybersecurity architectures in the EU, combining human expertise with AI-powered real-time monitoring systems (Lim & Tang, 2021).

Table 1. Summary of Digital Innovation Scenarios through AI in Public Administration

Scenario	Main applications	International examples	Horizon
I. Automatizare servicii	Chatboți administrativi, RPA, documente automate	Estonia, Singapore	2025-2027
II. Guvernanță algoritmică	Analiză predictivă, detecție fraude, alocare resurse	Danemarca, Franța, Olanda	2026-2028
III. Participare digitală	Consultare publică IA, sinteză opinii cetățeni	Finland, Taiwan	2027-2030
IV Securitate cibernetică	Detecție anomalii, răsouns automat la incidente	Estonia, Lithuania, Israel	2024-2026

Source: Data processing by the author.

Regulatory framework and implementation challenges

The implementation of AI solutions in public administration cannot be separated from the regulatory framework within which it operates. At the European level, three major legislative instruments define the scope of action for public administrations: the General Data Protection Regulation (GDPR, 2018), the European Artificial Intelligence Act (AI Act, 2024), and the Open Data Directive (2019/1024). Together, these establish a framework based on the principles of transparency, explainability, data minimization, and algorithmic accountability (European Commission, 2021).

The European AI Act classifies AI systems used in the public sector according to their level of risk, imposing strict requirements for high-risk applications - those affecting citizens’ fundamental rights, access to essential public services, or the evaluation of individuals by public authorities. Public administrations implementing such systems are required to conduct fundamental rights impact assessments, ensure human oversight, and maintain transparency registers (Regulation EU 2024/1689).

At the national level, Romania adopted the National Artificial Intelligence Strategy 2024–2027, which establishes the priority investment directions and the institutional framework for coordinating AI implementation in the public sector. Nevertheless, the gap compared to advanced EU Member States remains significant, both in terms of digital infrastructure and institutional capacity, as well as in terms of an organizational culture oriented toward innovation (Radu, 2021).

In many cases, implementation challenges go beyond the purely technological dimension. Resistance to change within public organizations, the lack of digital skills among public servants, the fragmentation of existing information systems, the absence of coherent open data policies, and uncertainties regarding accountability in cases of erroneous algorithmic decisions constitute structural obstacles that require systemic solutions (Mergel et al., 2019).

Conclusions

The analysis conducted in the present study leads to a series of conclusions with both theoretical and practical implications for the field of digital public administration.

From a theoretical perspective, the research confirms that artificial intelligence does not represent a mere extension of digitalization, but rather a vector of paradigmatic transformation in governance, with profound effects on the state–citizen relationship, mechanisms of democratic legitimacy, and institutional accountability. The analytical framework of smart public administration, structured around three dimensions - data optimization, system interoperability, and proactive citizen orientation - provides a useful theoretical instrument for assessing the digital maturity of public organizations (Dunleavy et al., 2006; Wirtz et al., 2019).

The four scenarios analyzed reveal a broad spectrum of opportunities, ranging from the automation of mass services - with the shortest implementation horizon and the highest degree of technological maturity - to deliberative digital participation, which requires deeper reconfigurations of democratic processes. Each scenario comes with a specific risk profile and particular institutional capacity requirements, which calls for differentiated approaches depending on the national and local context (Zuiderwijk et al., 2021).

A transversal conclusion of the study is that the success of public administration's digital transformation depends less on technological sophistication and more on institutional, human, and political factors: sustained political will, investments in digital skills, the redesign of administrative processes, and the construction of a solid ethical framework centered on citizens' rights. Technology is a catalyst; change is, in its essence, institutional and cultural (Mergel et al., 2019).

For Romania and, more broadly, for the states of Central and Eastern Europe, the historical opportunity lies in the possibility of bypassing stages of traditional administrative modernization and directly implementing next-generation solutions. This opportunity is not without risks: the hasty adoption of technologies without the necessary institutional infrastructure may generate opaque, inequitable, and vulnerable systems that erode rather than strengthen citizens' trust in public administration.

References

1. Aitamurto, T.; Landemore, H. (2016). *Crowdsourced Deliberation: The Case of the Law on Off-Road Traffic in Finland. Policy and Internet*, 8(2), pp. 174-196.
2. European Commission (2021). *Proposal for a Regulation on a European Approach for Artificial Intelligence*. COM(2021) 206 final. Brussels: European Commission.
3. Creswell, J.W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 4th ed. Sage Publications: Thousand Oaks.
4. Danaher, J.; Hogan, M.J.; Noone, C.; Kennedy, R.; Behan, A. (2017). *Algorithmic Governance: Developing a Research Agenda through the Power of Collective Intelligence. Big Data & Society*, 4(2), pp. 1–21.
5. Dunleavy, P.; Margetts, H.; Bastow, S.; Tinkler, J. (2006). *Digital Era Governance: IT Corporations, the State, and E-Government*. Oxford University Press: Oxford.
6. ENISA - European Union Agency for Cybersecurity (2023). *ENISA Threat Landscape 2023*. Publications Office of the European Union: Luxembourg.
7. Hsiao, Y.; Lin, C.; Liu, T.; Cheng, H.L. (2018). *vTaiwan: An Empirical Study of Open Consultation Process on Digital Governance in Taiwan. Proceedings of the 11th International Conference on Theory and Practice of Electronic Governance*, pp. 423-432.
8. Janowski, T. (2015). *Digital Government Evolution: From Transformation to Contextualization. Government Information Quarterly*, 32(3), pp. 221–236.
9. Lim, E.T.K.; Tang, M. (2021). *Cybersecurity Governance in the Age of Artificial Intelligence: Lessons from the Baltic States. Journal of Information Security and Applications*, 58, art. 102766.
10. Linstone, H.A.; Turoff, M. (2002). *The Delphi Method: Techniques and Applications*. New Jersey Institute of Technology: Newark.
11. Lips, M. (2020). *Digital Government: Managing Public Sector Reform in the Digital Era*. Routledge: London.
12. McKinsey Global Institute (2017). *A Future That Works: Automation, Employment, and Productivity*. McKinsey & Company: New York.

13. Mellouli, S.; Luna-Reyes, L.F.; Zhang, J. (2014). *Smart Government, Citizen Participation and Open Data. Information Polity*, 19(1–2), pp. 1–4.
14. Mergel, I.; Edelmann, N.; Haug, N. (2019). *Defining Digital Transformation: Results from Expert Interviews. Government Information Quarterly*, 36(4), art. 101385.
15. O’Neil, C. (2016). *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*. Crown Publishing: New York.
16. OECD (2019). *Artificial Intelligence in Society*. OECD Publishing: Paris.
17. Osborne, S.P. (2010). *The New Public Governance?: Emerging Perspectives on the Theory and Practice of Public Governance*. Routledge: London.
18. Radu, R. (2021). *Steering the Governance of Artificial Intelligence: National Strategies in Perspective. Policy and Society*, 40(2), pp. 178–193.
19. Regulation EU 2024/1689 of the European Parliament and of the Council of 13 June 2024 Laying Down Harmonised Rules on Artificial Intelligence. *Official Journal of the European Union*: Brussels.
20. Schwartz, P. (1991). *The Art of the Long View: Planning for the Future in an Uncertain World*. Doubleday: New York.
21. Veale, M.; Brass, I. (2019). *Administration by Algorithm? Public Management Meets Public Sector Machine Learning*. In: Yeung, K.; Lodge, M. (eds.), *Algorithmic Regulation*. Oxford University Press: Oxford, pp. 121–149.
22. Wirtz, B.W.; Weyerer, J.C.; Geyer, C. (2019). *Artificial Intelligence and the Public Sector - Applications and Challenges. International Journal of Public Administration*, 42(7), pp. 596–615.
23. Zuiderwijk, A.; Chen, Y.C.; Salem, F. (2021). *Implications of the Use of Artificial Intelligence in Public Governance: A Systematic Literature Review and a Research Agenda. Government Information Quarterly*, 38(3), art. 101577.