

Digital Governance – A Key Element for a Sustainable and Inclusive Urban Future

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Abstract

While in classical modernity the power of states was underpinned by territory, in digital modernity, power is sustained by information, interoperability, and the capacity to transform technology into a public good. In this context, digital governance represents more than a mere set of technical instruments; it becomes a new paradigm for public administration, a renewed social contract between the state and its citizens, and a novel language through which societies negotiate their future. Starting from these premises, the present study aims to analyze the contribution of digital governance to shaping the administrative, social, and economic future of urban environments. The research is centered on the principle that technology must serve humanity, and not vice versa. The study opens with a presentation of the Estonian e-governance model, built upon infrastructures such as X-Road and an integrated ecosystem of digital public services. In parallel, the situation in Romania is analyzed, focusing on digitalization initiatives and the symbolic significance of hosting the Digital Governance Summit 2025 in Bucharest as a milestone for alignment with global trends. The second part explores diverse smart city models that illustrate various trajectories of technological development. Our findings outline the vision of a "digital social contract," wherein technology acts as a tool for strengthening democracy, transparency, and social cohesion, positioning digital governance as the cornerstone of a sustainable and inclusive urban future.

Keywords: e-governance, smart city, digital services, sustainability, inclusion.

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1. Introduction

The phenomenon of digitization seen from the perspective of public

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administration, concerns three levels of interference³: the digitization of communication between the administration and citizens, the creation of a new mode of administrative, collaborative action, which envisages a greater involvement of the public in the elaboration of the administrative decision, and last but not least, the redefinition of the participation of citizens in the elaboration of the administrative decision, through public consultation.

As public administrations adopt AI-powered solutions, digital ethics is becoming a central pillar of the global debate. Thus, algorithms can bring efficiency, but they pose challenges, and digital ethics implies transparency and accountability, meaning that public institutions remain responsible for decisions made with algorithmic support.

From this perspective, the European Union has established itself as one of the most important architects of an ethical and responsible digital transformation. We can say that the EU legislator has developed in recent years some of the most robust public policies on digitization, placing fundamental rights at the heart of the digital transformation. Thus, frameworks such as the Digital Services Act, the Digital Markets Act, the eIDAS Regulation, GDPR, the IA Regulation or the Declaration on Digital Rights and Principles set the European direction, the direction towards a digitization that protects citizens' freedoms, ensures inclusion and equitable access to services and builds a safe, predictable and democratic digital ecosystem.

Globally, models such as Dubai, Barcelona or Singapore demonstrate that digitization can be adapted to different administrative cultures, outlining distinct, sometimes complementary, sometimes contrasting visions of the digital future⁴.

For Romania, the topic is a current and vital one, with the digital transformation of public institutions becoming a national priority, and recent events, such as the Digital Governance Summit 2025, demonstrate that the discussion about digital governance has moved from the area of intention to the sphere of action and concrete policies.

Digitization is not just a technological process, but a structural metamorphosis, a paradigm shift that affects public administration, the economy, education, health systems, democratic culture, and the way citizens relate to institutions. This transformation encompasses not only technological advancements but also significant social, cultural, and economic implications⁵. Today, cities have become true urban laboratories of the future, where public policies are experimented, artificial intelligence solutions are tested, data ecosystems are built and mechanisms of civic participation are

³ Ramona Duminică, Diana Maria Ilie, *Building a digital future: governance, smart cities and digital rights in a globalized world*, „Journal of Law and Administrative Sciences” no. 24, 2025: 27-42, p. 29, DOI: 10.51865/JOLAS.2025.24.03; Ovidiu Predescu, Ovidiu-Roland Predescu, *Inteligența artificială azi, O perspectivă a dreptului, a drepturilor omului, a eticii și nu numai*, second edition, reviewed, Universul Juridic, Bucharest, Romania 2024, pp. 155-172.

⁴ For developments, see: Arturo Bris, *The Smart City Playbook: Lessons From Urban Pioneers*, IMD, 2025, <https://www.imd.org/research-knowledge/books/the-smart-city-playbook-lessons-from-urban-pioneers/>, accessed on 16.02.2026.

⁵ Filippo Marchesani, *"Introducing and Understanding Smart Cities"*, in Filippo Marchesani, *The Global Smart City: Challenges and Opportunities in the Digital Age*, Emerald Publishing Limited, 2023, <https://doi.org/10.1108/978-1-83797-575-420231001>.

redefined.

At the heart of digital governance are features such as interoperability, representing the ability of institutions to communicate with each other through integrated systems, the existence of open data through free access to public information, resulting in transparency and innovation, automation and artificial intelligence, which optimize administrative processes, digital participation, by involving citizens in decisions through collaborative platforms, but also digital identity, the key to access efficient and personalized services⁶.

As stated by the Organisation for Economic Co-operation and Development (OECD), digital governance explores and supports the development and implementation of strategies and initiatives that bring governments closer to citizens and businesses. It recognises that technology is a strategic factor not only for improving the efficiency of the public sector, but also for increasing the efficiency of policies and for making governments more open, transparent, innovative, participatory, and trustworthy⁷.

According to the OECD, digital governance is becoming the key to transforming government processes and services in ways that improve the responsiveness and reliability of the public sector⁸.

The reality is that governments face significant challenges in an ever-evolving digital environment, shaped by technological advances and the growing expectations of citizens. Thus, by placing digital transformation at the heart of their modernization efforts, governments can streamline processes, increase agility, and create more responsive, transparent, and efficient government functions, including improving policy implementation. Of course, effective digital government policies rely on multiple factors, including strong governance, cohesive government strategies, and resilient digital public infrastructure such as digital identity and data-sharing systems. These foundations are key to promoting an inclusive, long-term transformation and increased efficiency of the public sector⁹.

Within this framework, our research adopts an interdisciplinary and transdisciplinary approach, aiming to demonstrate that law provides the necessary norms and safeguards, while technology offers the requisite tools and innovation. Furthermore, sociology evaluates the impact on communities, ethics delineates acceptable boundaries, public administration supplies the implementation mechanisms, and economics highlights financial impact and sustainability. This comprehensive perspective facilitates a holistic overview that mitigates the excesses, imbalances, and

⁶ Ramona Duminićă, Diana Maria Ilie, *Building a digital future: governance, smart cities and digital rights in a globalized world*, p. 29.

⁷ OECD, *Digital government* - <https://www.oecd.org/en/topics/digital-government.html>, accessed on 16.02.2026.

⁸ OECD, *Digital Government in Australia Enhancing Digital Investment Report* - OECD Digital Government Studies, 6 August 2025, https://www.oecd.org/en/publications/digital-government-in-australia_91c22326-en.html, accessed on 16.02.2026.

⁹ OECD, *Digital Government Index Results and key findings*, OECD Public Governance Policy Papers, 30 January 2024 - https://www.oecd.org/en/publications/2023-oecd-digital-government-index_1a89ed5e-en.html, accessed on 16.02.2026.

risks associated with chaotic digitalization. At the core of this analysis lies a fundamental principle: technology must serve humanity, rather than the reverse.

In conclusion, through this research we aim to analyze how digital governance and smart cities can rebuild the administrative, social, and economic future of the European Union and Romania, starting from the successful models and new global trends. We contend that digital governance transcends mere administrative reconfiguration, it serves as a catalyst for societal restructuring and a fundamental redefinition of the social contract between the State and its citizenry.

2. Pillars of Digital Governance: The Estonian Lesson

Estonia is rightly considered the “Silicon Valley of public administrations”, being one of the most digitized societies in the world. Its performance is all the more remarkable as Estonia is a small country with a small population and limited traditional resources.

The famous Estonian formula “state as a platform” best reflects the administrative identity of this country. The key question is: how did Estonia achieve what other states have been trying to do for decades? The answer involves a combination of factors: political, legal, cultural, historical, and technological.

The digitization of Estonia was not a one-year or one-term project, but a long-term national project, launched immediately after regaining independence in 1991. Estonia treated digitization not as a technical project, but as a project of reconstruction of the State’s identity, thus differentiating itself from other post-Soviet States.

Estonia’s success would not have been possible without a sound, modern and digitally adapted legal foundation. Thus, Estonia introduced the electronic identity card (ID-kaart) in 2002, mandatory for all citizens, which allows secure authentication, electronic signature with full legal value and access to all digital public services. In fact, Estonia has been applying the principle of legal recognition of the electronic signature for more than two decades, long before eIDAS. Today, over 95% of citizens use the digital signature for contracts, administrative acts, banking procedures, or electronic voting.

As regards the legislation for interoperability – X-Road, Estonian law obliges institutions to use the common data infrastructure, to avoid duplication of databases and to comply with the “once-only” principle (the citizen provides the data only once, the State reuses it legally).

At the same time, Estonia has integrated digital security into its fundamental legislation, being the first country to be massively cyberattacked in 2007, when it created the NATO-accredited Cooperative Cyber Defence Centre of Excellence (CCDCOE), established in 2008, which introduced strict rules for the protection of IT infrastructures and built an administrative system prepared for attacks (including state backups in the “embassy cloud”). Why is X-Road unique? Because there is no central database, each institution keeps its own database, because the exchange of data is done through secure protocols and each access is recorded, while the citizen can see who accessed their data. This system combines personal data protection, administrative

efficiency, traceability, and transparency. X-Road is the technical-legal skeleton of the Estonian State, without it massive digitization being impossible.

At the same time, Estonia has understood that digitization cannot exist without digital skills, through the “Tiger Leap” program, the country has invested massively since 1997 in digital education in schools, teacher training, equipment of IT laboratories, digital literacy of the population and universities specialized in technology. Result? Estonia is one of the most digitally literate populations in the world. In this regard, the Estonian educational ecosystem includes national e-learning platforms, digital libraries, universities that collaborate with the government in innovation, and start-ups integrated into the public ecosystem. Estonia has created an ecosystem where government, start-ups, universities, and tech companies collaborate directly, and companies such as Skype, Wise (Transferwise), Veriff, Bolt were created in this fertile environment¹⁰.

Thus, Tallinn, the capital of Estonia, is the most representative European example of a smart city based on interoperability, digital identity, and participatory governance, characterized by full integration of digital public services, smart and sustainable public transport, extensive use of urban data, online civic participation, transparent and trust-oriented administration, becoming the “technological heart” of Estonia and a model of responsible digitization and democratic¹¹.

The fact is that Estonia today “exports” e-government solutions, interoperability infrastructures, cyber expertise, as well as digital educational models, this country becoming a global hub of administrative innovation.

Estonia shows us that the success of digitization does not depend on the size of the state or resources, but on coherent political will, a modern legal framework, mandatory interoperability, single digital identity, transparency, social trust, investment in digital education, public-private collaboration, and cyber resilience.

Estonia is, in fact, the achievable projection of the Union’s digital governance model.

3. Romania in the Face of Digital Transformation: Progress, Challenges and Strategic Directions

Until a decade ago, the digitization of the Romanian public administration developed at a fragmented pace, through disparate projects, lacking interoperability and a coherent vision. Many public services were superficially or only partially digitized, and the internal processes of institutions remained dependent on physical procedures and printed documents.

In order to assume the obligations arising from its status as an EU Member State, by transposing the objectives set out in the European program on the Digital

¹⁰ „E-Guvernarea, un model de succes în Estonia”, <https://smartcitymagazine.ro/e-guvernarea/>, accessed on 16.02.2026.

¹¹ Mihaela Iliescu, *Modelul Estoniei: un exemplu de succes în digitalizarea instituțiilor și serviciilor publice*, 20.03.2025, <https://www.romaniacurata.ro/modelul-estoniei-un-exemplu-de-succes-in-digitalizarea-instituțiilor-si-serviciilor-publice/>, accessed on 16.02.2026.

Decade 2030, Romania has taken multiple steps, the Authority for Digitization of Romania (ADR) being designated to coordinate the process of developing the National Action Plan on the Digital Decade. In fact, in Romania there are currently 7 digital innovation centers, divided by regions, which play an essential role in achieving the objectives set within the Digital Europe Programme, stimulating the large-scale use of new technologies.

According to the European Commission, “Romania can rely on a well-developed fixed connectivity infrastructure and strengthens its role in key technologies such as semiconductors, but competitiveness in the digital sector is held back by persistent R&D gaps, low innovation among SMEs and start-ups, and low uptake of emerging technologies”¹².

Currently, Romania is in an accelerated process of harmonization with the European digital transformation model, guided by the National Recovery and Resilience Plan (PNRR) – component C7 Digitization, under the responsibility of the Ministry of Research, Innovation and Digitization, with a budget of 1,620 million Euros¹³, also by the National Strategy on the Digital Agenda, which defines four areas of action, as follows: e-Government, Interoperability, Cybersecurity, Cloud Computing and Social Media – a field that aims to increase efficiency and reduce costs in the public sector in Romania by modernizing the administration; ICT in education, culture and health – an area aimed at supporting these technologies at sectoral level; ICT in e-commerce, as well as research, development and innovation in ICT – a field that aims at Romania’s regional comparative advantages and supports economic growth in the private sector; Broadband and digital infrastructure services – a field aimed at ensuring social inclusion¹⁴.

At the same time, by Government Decision no. 1.321 of 30 December 2021, Romania’s Cybersecurity Strategy for the period 2022-2027 was approved, as well as the Action Plan for the implementation of Romania’s Cybersecurity Strategy, establishing requirements to ensure the IT security of the services provided, requirements for notification of incidents occurred, response mechanisms at national level and participation in the common response within the European ecosystem created by the NIS Directive.

It should be noted that the European Union has adopted Directive (EU) 2022/2555 (NIS2), a stricter and more detailed regulation than its predecessor, the NIS Directive of 2016. Romania, in turn, transposed these provisions through GEO no. 155/2024, subsequently consolidated by Law no. 124/2025¹⁵. Law no. 124/2025

¹² Marin Voicu, *Strategia digitală a UE (2020-2030). Jocul de-a suveranitatea europeană – suveranitatea digitală a UE, o doctrină futuristă sub flamura IA?*, <https://www.juridice.ro/essentials/10551/strategia-digitala-a-ue-2020-2030-jocul-de-a-suveranitatea-europeana-suveranitatea-digitala-a-ue-o-doctrina-futurista-sub-flamura-ia>, accessed on 16.02.2026.

¹³ Government of Romania, Component 7 – Digital Transformation - National Recovery and Resilience Plan, <https://oportunitati-ue.gov.ro/program/planul-national-de-redresare-si-rezilienta/componenta-7-transformare-digitala/>, accessed on 16.02.2026.

¹⁴ National Strategy on the Digital Agenda for Romania – 2020 - <https://gov.ro/ro/print?modul=sedinte&link=strategia-nationala-privind-agenda-digitala-pentru-romania-2020>, accessed on 16.02.2026.

¹⁵ Marius Florin Loică, Claudiu Florentin Gânțoi, *Implementarea Directivei NIS2 în România. Aspecte*

strengthens the transposition of the NIS2 Directive in Romania¹⁶, bringing clarifications and strict measures for the protection of networks and information systems, protecting the confidentiality of reports to the National Directorate of Cybersecurity (“DNSC”) and making management responsible through the obligation to train and appoint a CISO.

As strategic digital infrastructures, we mention the *government cloud*, one of the largest digital projects in the history of Romania, financed by PNRR, which is emerging as a national IT platform that centralizes and modernizes the digital services of the public administration, representing a key project for administrative modernization. It enables the storage, processing, and security of government data institutions, facilitating interoperability and providing scalable and efficient IT solutions.

The Authority for the Digitization of Romania (ADR) is responsible for the implementation and coordination of the Government Cloud project as well as for the administration and operation of the Component¹⁷.

We also mention here the Digital Identity System (ROeID), launched in May 2023 by the Ministry of Research, Innovation and Digitization together with the Authority for Digitization of Romania (ADR), this application offering a new way of managing accounts for public services. Thus, through ROeID, all digital services are accessible through a single login, ensuring the digital identity of all Romanian citizens and authentication in all digital platforms that the Romanian State manages, but also connection to other government digital platforms throughout the European Union. A single set of credentials replaces bureaucracy and trips to the counter, giving the citizen quick, single, and modern access to digital administration¹⁸.

We mention that on 06 August 2025, the Authority for the Digitization of Romania (ADR) also announced the start of the project “National Interoperability Platform – PNI” (with a duration of 36 months, respectively 23 July 2025 – 22 July 2028), which aims to create an integrated digital infrastructure to ensure the interoperability of public information systems, facilitating the exchange of data between institutions and efficient access to public services for citizens and the private sector. Specific objectives include the optimization of government operations, the implementation of the “once-only” principle, integration with the EIDAS node and the

legale și tehnice referitoare la înrolarea, identificarea, clasificarea și validarea entităților, evaluări de risc de securitate cibernetică, autoevaluări de maturitate la nivelul entităților înrolate, 12 August 2025, <https://www.juridice.ro/795569/implementarea-directivei-nis2-in-romania-aspecte-legale-si-tehnice-referitoare-la-inrolarea-identificarea-clasificarea-si-validarea-entitatilor-evaluari-de-risc-de-securitate-cibernetica-autoeval.html>, accessed on 16.02.2026.

¹⁶ Law 124/2025 approving Government Emergency Ordinance no. 155/2024 establishing a framework for cyber security of networks and information systems in the national cyberspace, published in the Official Gazette of Romania no. 638 of 07.07.2025.

¹⁷ Project related to Investment 1 – Implementation of Government Cloud infrastructure financed through PNRR, Component 7 – Digital Transformation - <https://www.adr.gov.ro/cpg/>, accessed on 16.02.2026.

¹⁸ Launch of the ROeID application – centralization of all public services, accessible with a single digital identity login - <https://www.research.gov.ro/lansarea-aplicatiei-roeid-centralizarea-tuturor-serviciilor-publice-accesibile-cu-un-singur-login-al-identitatii-digitale-11441/>, accessed on 16.02.2026.

Single Digital Gateway portal, as well as the development of the National Registry of Registries¹⁹.

At the same time, the 2025 event, hosted in Bucharest, marks a moment of maturity in the public discourse on digitization, signaling Romania's intention to become a regional hub for digital public innovation and strengthening the dialogue with advanced states such as Estonia, Finland or the United Arab Emirates. Thus, the Digital Governance Summit 2025²⁰ brought together international experts, European officials and representatives of public administrations and addressed topics such as AI in administration, interoperability, cybersecurity, or the digital transformation of public services.

The significance of the event must be seen from a double perspective, a political one, in the sense in which digitization becomes a strategic field, but also an institutional one, in the sense in which a culture of international collaboration in the field of public technology is created.

The summit thus placed Romania in a global network of digital expertise. As the guests and speakers also stated, "at the 2025 Digital Governance Summit, ministers and leaders from the private sector discussed the current fragmentation, the urgent need for coordination at the government level and the importance of a unified strategy that overcomes political cycles... From the "invisible" infrastructure needed to connect databases, to digital education, cybersecurity and public-private collaborations, all participants pointed in the same direction: digitization cannot be an end in itself, but a means to better public services, transparency and a competitive economy. Romania has the resources – technical and human – but success depends on vision, consistency, and leadership"²¹.

Romania currently holds a score of 3.1/10 in terms of digital governance, according to a report by Estonian specialists at the initiative of the Edge Institute. Thus, the main problem remains the absence of a coherent national strategy and a clear decision-making center that imposes standards and responsibilities²². Edge Institute also recently announced the launch of the Digital Governance Framework of Romania, which involves a first-of-its-kind x-ray of digital governance in Romania by Digital Nation, a group of experts and leaders of digital transformation efforts in Estonia.

Compared to the Digital Nation evaluation matrix²³, the level of governmental

¹⁹ ADR launches the national platform project for the digitalization of public services, August 6, 2025 - <https://www.juridice.ro/794976/adr-lanseaza-proiectul-platforma-nationala-pentru-digitalizarea-serviciilor-publice.html>, accessed on 16.02.2026.

²⁰ Digital Governance Summit 2025. A lesson from the Architect of Estonia's digitalization for Romania - <https://zonait.ro/meta-tiktok-amenzi-europa/>, accessed on 16.02.2026.

²¹ Dragoș Stanca - Founder of Upgrade100 and Board Member of Edge Institute, *Summitul pentru guvernare digitală 2025*, <https://edgeinstitute.ro/summit/>, accessed on 17.02.2026.

²² Norel Moise, *De ce stagnează digitalizarea României: scor 3,1/10 la guvernare digitală și lipsă de coordonare centrală. Raportul amplu al unor experți din Estonia vine cu soluții*, 9 October 2025, <https://www.piatafinanciara.ro/de-ce-stagneaza-digitalizarea-romaniei-scor-31-10-la-guvernanta-digitala-si-lipsa-de-coordonare-centrala-raportul-amplu-al-unor-experti-din-estonia-vine-cu-solutii/>, accessed on 16.02.2026.

²³ Digital Nation is a global digital change consultancy company, born in Estonia - the first and most

digital maturity in Romania is low (3.1/10), meaning that the infrastructure exists, but services are fragmented and are not designed around the needs of the citizen, the main problem revolving around the lack of a coherent national strategy in the field of digital transformation and a clear decision-making center that imposes standards, responsibilities and coordination. Although there is a solid legislative foundation and relevant projects, the lack of a unified vision creates bottlenecks and fragmentations in the digital transformation process.

Of course, the Government's programme for 2025-2028 recognises this low level of digital maturity, outlining ambitious targets for the future, including reaching the EU average in terms of the Digital Decade score²⁴, objectives that cannot be achieved without a functioning governance model, with a clear strategic vision and achievable objectives.

The Digital Decade Country Report, which confirms not only that ambitions are low but also that alignment with the EU's digital goals is consistently weak, demonstrates the lack of effective coordination, accountability, leadership and governance. Also, our monitoring, the first of its kind in Romania, indicates that the roadmap has numerous shortcomings in terms of ambition, coherence, governance, monitoring, and accountability mechanisms, but also its credibility, when assessed against the objectives of the EU's Digital Decade²⁵.

The specialists propose as a future perspective a focused national digital strategy, led by a strong central unit, a strategy that should articulate a clear vision of Romania and that should be results-oriented, including some preliminary indicators or "quick successes" to create momentum and ensure political support for deeper reforms in the long term.

As OECD experts state, "a digitally mature government needs clear and legitimate leadership with a strategic mandate and vision for system-wide transformation, as well as whole-of-government coherence and the integration of decisions and activities within and between public sector organisations, while ensuring that relationships with citizens and the business environment are cultivated through policy-centric collaborations and services to increase economic productivity and improve social welfare"²⁶.

It should also be noted that Romania had over 1 billion euros available through the Digital Transformation component, including 100 million euros for equipment and software for city halls, but due to bureaucracy and the defective implementation of the PNRR, dozens of villages and communes in Romania risk bottlenecks and even loss of utilities.

successful digital society in the world - Digital Nation for Edge Institute, October 2025 - chrome-extension://efaidnbmninnibpcapjcgclcfndmkaj/https://edgeinstitute.ro/wp-content/uploads/2025/10/RO-Cadrul-de-guvernanta-digitala-in-Romania-Edge-Institute-x-Digital-Nation.pdf, accessed on 17.02.2026.

²⁴European Commission, Country report for Romania on the Digital Decade 2024, <https://digital-strategy.ec.europa.eu/en/factpages/digital-decade-2024-report-country-fact-pages>, accessed on 16.02.2026.

²⁵ Romania's Digital Decade Roadmap 12 Nov. 2025 - <https://www.crpe.ro/ro/foaia-de-parcurs-a-romaniei-privind-decenul-digital/>, accessed on 17.02.2026.

²⁶ OECD, *The E-Leaders Handbook on the Governance of Digital Government*, OECD Digital Government Studies, OECD Publishing, Paris, 2021, <https://doi.org/10.1787/ac7f2531-en>, accessed on 16.02.2026.

Beyond these aspects, we must point out that cities in Romania have made progress, becoming more and more active in carrying out smart projects. Among the cities with smart city initiatives are Cluj-Napoca, which benefits from smart mobility, urban digital platforms, Oradea, which benefits from modern urban infrastructure, administrative digitization, or Iasi, which benefits from the digitization of transport and public services.

These cities have become true local digital governance laboratories, and the common directions of smart cities in Romania are especially aimed at traffic monitoring systems, digital payments, municipal applications for reporting problems, digitization of schools and hospitals, transparency, or the implementation of IoT in lighting, parking lots, energy.

Although progress is visible, local projects sometimes remain fragmented and dependent on local political will. Thus, Romania's digitization is a process in full evolution, but it faces structural challenges such as the lack of interoperability, meaning that institutions operate with separate databases, difficult to connect, obsolete IT infrastructures, shortage of digital skills at the level of both public servants and citizens, institutional bureaucracy and procedures, flows and mentalities still anchored in the pre-digital era due to resistance to change, public institutions being, by their nature, prudent and slow in adopting innovation.

The digital transformation represents an extraordinary opportunity for the modernization of the state and the increase in the quality of public services, but this process also brings to the surface a series of risks and challenges that must be carefully managed. In this regard, it was asserted that "smart cities are complex blends of community governance institutions, social dilemmas that cities face, and dynamic relationships among information and data, technology, and human lives"²⁷. Romania is at a stage where these dilemmas can decisively influence the pace and global success of digitization.

With the digitization of public services, Romania is becoming more and more dependent on complex IT infrastructures. Any cyber vulnerability can lead to disruption of the functioning of institutions, blocking of medical or educational services, unauthorized access to sensitive data, damage to national security systems and loss of citizens' trust.

In the context of the NIS2 Directive, Romania must implement modern security architectures, early detection systems, national specialist training programs, and periodic audits. As public administration adopts AI-based solutions, however, there is also a risk that administrative decisions will be influenced by opaque algorithms, introduce discrimination, cannot be effectively challenged and limit the role of the human official. We believe that in Romania, where the administrative digital culture is in formation, the risk of premature automation is real. Moreover, trust is the foundation of any digital state, and Romania still faces distrust in institutions, reluctance to use

²⁷ Michael J. Madison, Madelyn Rose Sanfilippo, Brett M. Frischmann, *Smart Cities and Knowledge Commons*, in Brett M. Frischmann, Michael J. Madison, Madelyn Rose Sanfilippo (eds.), *Governing Smart Cities as Knowledge Commons*, Cambridge University Press, Cambridge, 2023, chapter 1, 6–26, p. 6, <https://doi.org/10.1017/9781108938532.002>.

digital services, fears about data security and negative perceptions about the quality of public services.

As Estonia has shown us through its example, success is not only technological or legislative, but moral, based on balance, transparency, awareness, and trust.

An extremely important step is the signing on 18 November 2025 of the Declaration for European Digital Sovereignty, a Declaration signed at the European Digital Sovereignty Summit in Berlin, by Dragoș-Cristian Vlad, President of the Authority for the Digitization of Romania²⁸. According to the Declaration, Member States will act responsibly and in line with European democratic values in terms of digital infrastructure, data protection, emerging technologies, artificial intelligence, sovereign cloud, and cybersecurity.

Of course, we cannot speak of “a future of artificial intelligence without an artificial intelligence race” and “without global wisdom for the age of artificial intelligence” whose creative but also disruptive forces are felt around the world²⁹.

4. Smart Cities and New Forms of Public Administration

According to the International Institute for Management Development (IMD), a smart city is defined as “an urban environment that applies technology to enhance the benefits and lessen the shortcomings of urbanization for its citizens”. The IMD annually produces a Smart Cities Index, which provides a balanced focus on the economic and technological aspects of smart cities, on the one hand, and on the “human dimensions” of smart cities (quality of life, environment and inclusion), on the other hand³⁰.

In the 21st century, cities are becoming true “digital ecosystems”, spaces where technology, infrastructure, data and communities interact in a profoundly different way than traditional urbanism. Globally, smart cities are the most visible expression of digital governance, implementing integrated solutions for mobility, energy, health, education, public administration, safety, and sustainability³¹.

From advances in artificial intelligence to autonomous cars and green energy, innovation is accelerating at an increasingly rapid pace. New patents and inventions appear around the world every day, but only a few regions are ahead of the rest, according to Interesting Engineering. Also, the Global Innovation Index (GII), published by the World Intellectual Property Organization (WIPO), ranks the top

²⁸ Romania signed the Declaration for European Digital Sovereignty, December 2, 2025, <https://www.juridice.ro/808085/romania-a-semnat-declaratia-pentru-suveranitatea-digitala-europeana.html>, accessed on 17.02.2026.

²⁹ Kai-Fu Lee, *Superputerile Inteligenței Artificiale, China, Silicon Valley și noua ordine mondială*, Bestseller New York Times, translation from the English language: George Chiriță, Corint Future, 2018, pp. 316-320.

³⁰ IMD, *Smart City Index What makes a city the most livable, in 2025?*, 2025 Report https://imd.widen.net/s/psdrsvpbk7/imd_smart_city_2025_report, accessed on 17.02.2026.

³¹ Oliver Gassmann, Jonas Böhm, Maximilian Palmié, “*The Future of Cities and the Concept of Smart Cities*”, in Oliver Gassmann, Jonas Böhm, Maximilian Palmié, *Smart Cities: Introducing Digital Innovation to Cities*, Emerald Publishing Limited, 2019, 3-4, <https://doi.org/10.1108/978-1-78769-613-620191007>.

countries and urban agglomerations that drive technological innovation and progress, being evaluated based on factors such as investment, adoption, and socioeconomic impact. Since its launch in 2007, GII has become the leading global benchmark for measuring and comparing innovation performance. It is recognized by the UN General Assembly as an authoritative reference for science, technology, and innovation (STI) policies.

The Global Innovation Index 2025 report, published by the World Intellectual Property Organization, placed the Shenzhen-Hong Kong-Guangzhou region at the top of the global rankings, with the area hosting more than 24 innovation clusters³². If we refer to the most innovative economies, in 2025 Switzerland, Sweden, the United States of America, the Republic of Korea, Singapore, the United Kingdom, Finland, the Netherlands (the Kingdom), Denmark and China stood out³³.

IoT solutions will be one of the main strengths of smart cities, as they will be part of the optimization of public services offered to citizens³⁴. Cities will focus on the creation of local data centers that will be the foundation of the city's resilience and performance strategies and that will allow the creation of an ICT (Information and Communication Technology) network that has the capacity to support the provision of digital services, with city administrations being able to easily manage such services in the context of the constant growth of the urban population.

Also, "green" initiatives and environmental protection will be key objectives, with more and more renewable energy being produced, the environment being protected both locally and at macro level.

However, the concept of "smart cities" is no longer limited to the implementation of technologies, but involves a complex, multifaceted transformation, which aims to create comfortable, sustainable and human-centered cities³⁵. In this sense, there is a tendency to create a space that maintains the physical and mental well-being of the inhabitants, and IoT sensors are the ones that allow, for example, the monitoring of air quality, noise levels, and water quality. At the same time, we are talking about a friendly infrastructure for walking and cycling, accessible green spaces, remote medicine, and AI-assisted diagnosis.

Another important direction is that of smart mobility, such as the implementation of digital duplications, although expensive, already working in Singapore, being also developed in Barcelona. We are talking about the concept of the "15-minute city", an approach in the field of urban planning that aims to ensure that all the basic needs of the residents (workplace, shops, facilities for education/studies,

³² World Intellectual Property Organization (WIPO) (2024), *Global Innovation Index 2025: Innovation at a Crossroads*, Geneva: WIPO. DOI: 10.34667/tind.58864.

³³ Ibid.

³⁴ Abdulaziz I. Almulhim, Tan Yigitcanlar, „Understanding Smart Governance of Sustainable Cities: A Review and Multidimensional Framework”, *Smart Cities* vol. 8, issue 4, 2025: 113, <https://doi.org/10.3390/smartcities8040113>.

³⁵ Gerardo Bosco, Vincenzo Riccardi, Alessia Sciarrone, Raffaele D'Amore, Anna Visvizi, „AI-driven innovation in smart city governance: achieving human-centric and sustainable outcomes”, *Transforming Government: People, Process and Policy*, vol. 20, issue 1, 2026: 98–123, <https://doi.org/10.1108/TG-04-2024-0096>.

health and recreation) are within a distance that can be traveled from home to the place in no more than 15 minutes, on foot or by bicycle.

Countries with emerging economies have become outstanding examples of the implementation of artificial intelligence and digital technologies in urban governance. For example, a unique AI-based platform for integrated real-world transport, utilities and ecosystem services management has been implemented in Shanghai. At the same time, in the city of Pune in India, AI is used for intelligent planning of public transport, i.e. analyzing passenger flows, optimizing routes and bus schedules.

Dubai is probably the most visible example of accelerated urban transformation in the world. In just a few decades, it has evolved from a regional city into a global metropolis, becoming an urban technological laboratory. In fact, Dubai has made a spectacular jump in the Smart City Index 2025, climbing from 12th place to 4th place, the biggest climb in the ranking. Its goal is to become “the happiest and smartest city on Earth”, driven by advanced technology and artificial intelligence. Thus, the Smart E-Gov system in Dubai, also known as Smart Dubai Gov or SDG, represents the technological “arm” of Smart Dubai, which aims to transform Dubai into the smartest and happiest city in the world. Smart Data Gov officially leads and oversees the implementation of electronic and smart transformation in the Government of Dubai³⁶.

The Smart Dubai Program started in 2014 and aims to transform the city into a fully digital, efficient and connected metropolis. The targets aimed 100% digitized public services, 100% paperless government transactions, the integration of AI into administrative processes, fully intelligent mobility, decongested traffic, as well as smart and sustainable energy infrastructures. Thus, Dubai officially announced that its administration is “paperless Government”, which has become a global first.

Dubai also launched one of the world’s first Blockchain Strategies, integrated into the public administration, with the aim of reducing bureaucracy, eliminating data duplication, ensuring transparency and speeding up administrative transactions. The “UAE Pass” digital identity allows access to hundreds of public and private services through a single application.

At the same time, Dubai is developing advanced mobility solutions, through autonomous vehicles, digitally integrated public transport, intelligent traffic management, IoT systems in infrastructure and smart highways. Its vision is that of a city capable of managing mobility in real time, through data and algorithmic analysis.

Dubai is also focusing on sustainability and innovation, developing projects such as DEWA Smart Grid and Dubai Silicon Oasis, which emphasize energy efficiency and support the UAE’s goal of achieving 75% clean energy by 2050.

Although spectacular, the Dubai model also raises questions such as the lack of a robust data protection framework, extensive surveillance, limits on civic participation, major emphasis on efficiency and less on rights, but also dependence on the centralized political-administrative model³⁷.

³⁶ Smart Dubai or how Smart City is (re)invented - <https://smartcitymagazine.ro/smart-dubai-sau-cum-smart-city-este-reinventat/>, accessed on 16.02.2026.

³⁷ Fangzhu Zhang, Jessica Fern, Bae-Gyoon Park, Lin-Fang Hsu & Jung Won Sonn, *Governing the smart city and smart governance: re-examining digital urban infrastructure*, „International Journal of Urban

Thus, Dubai does not follow the European model of “human-centered digitization”, but the technology model as a strategic driver of development.

We could say that the most advanced level of institutionalization of AI is reached in the small federal monarchy of the United Arab Emirates (UAE), where the Government is motivated to build the best performing national AI ecosystem in just 14 years (2017-2031). In this regard, Sheikh Mohammed bin Rashid Al Maktoum, who holds the triple position of Vice President and Prime Minister of the UAE, respectively constitutional monarch of the Emirate of Dubai, launched in October 2017 the UAE Strategy for Artificial Intelligence 2031, the initiative representing a pioneering act in the region.

This Strategy marks a new stage of innovation built on the principles of smart government, the approach being continued by developing an entire National Program for AI: Building a Responsive AI Nation. Its purpose is to plan investments in the latest technologies and digital tools to improve government performance and efficiency. All these actions are subsumed to the UAE Centennial 2071 – The World’s Leading Nation project. In this regard, the Government has developed no less than 40 strategies targeting all sectors of society, and in each of them an important part is dedicated to new technology (Government AE, Federal governments’ strategies and plans)³⁸.

We mention that in December 2025 the UAE Global Summit on Digital Trade and Digital Platforms³⁹ was also organized by the Ministry of Economy and Tourism of the United Arab Emirates in collaboration with UNCITRAL, this being the first in a series of events organized by the UNCITRAL secretariat to advance the exploratory work on digital platforms and private law, requested by the Commission at its 58th session (Vienna, 7-23 July 2025). The UAE Ministry of Economy and Tourism, together with Spain, presented to the Commission a proposal on possible future work on the legal aspects of digital commerce, with a particular focus on digital platforms, bringing together representatives of the government and platform operators from across the industry, as well as legal practitioners, academics, and other stakeholders.

Abu Dhabi also climbed from tenth to fifth place in the Smart City Index 2025, marking important progress for the Middle East. Thus, the UAE capital is developing smart projects to improve infrastructure, sustainability, and public services, such as the Zayed Smart City project, launched in 2024, a five-year plan based on AI and IoT technology that tests smart systems for traffic, lighting, and parking, before being expanded to the entire city.

At the same time, the city’s TAMM platform brings together hundreds of government services in a single digital hub, reducing paper use by more than 90%. Abu Dhabi is also encouraging the use of electric and hybrid vehicles, building smart charging networks as part of the Sustainable Energy Strategy, which supports the goal of net-zero emissions by 2050.

Sciences”, vol. 29, issue sup.1, 2025: 1–8. <https://doi.org/10.1080/12265934.2025.2567097>.

³⁸ The United Arab Emirates, a model of high-tech governance - <https://intelligence.sri.ro/emiratele-arabe-unite-model-de-guvernare-high-tech/>, accessed on 17.02.2026.

³⁹ UNCITRAL–UAE Global Summit on Digital Trade and Digital Platforms, 8–9 December 2025, Dubai - <https://uncitral.un.org/fr/global-summit-on-digital-trade-and-digital-platforms>, accessed on 17.03.2026.

We cannot fail to mention Singapore, which represents an extremely high-performance Asian model, characterized by the digitization of the administration, the “Smart Nation Programme”, IoT networks at the level of the entire city-state, advanced cybersecurity solutions and firm, centralized policies for the implementation of technology⁴⁰.

Barcelona is also recognized for its orientation towards digital rights, the “Decidim” platform for civic participation, smart green infrastructures, prioritization of sustainable mobility and the ethical use of urban data.

New York and Los Angeles are examples of smart cities that emphasize public-private collaborations with tech giants, autonomous mobility, and crime reduction through AI and data analytics. The lack of a strict legal framework like GDPR allows for rapid experimentation, but it generates privacy risks.

In this context, we cannot fail to mention Saudi Arabia’s The Line project, which was designed as an unusual smart city: no cars, no streets in the traditional sense, no carbon emissions. The designed form was unique: a linear city about 170 km long, with a width of about 200 m and a height of 500 m, basically two parallel structures (buildings) with an “open” space between them, where there would be green areas, outdoors, nature. The concept included the idea that everything a resident needs: work, shopping, school, health, agreement, should be accessible within a maximum of 5 minutes of walking.

The plan included ideas for a “smart city”: digital infrastructure, automation, integration of modern technologies, a “vertical” urban environment, and not horizontal expansion like traditional cities. On paper and architectural projects, The Line seemed like a radical urban experiment, a utopia of the city of tomorrow, a response to the crises related to urbanization, pollution, mobility, environment, housing density, etc. What is certain is that there were enormous costs: for the proposed expansion would require huge quantities of materials (steel, cement, etc.), and the initially estimated budget was exceeded, the real cost indicated at a given time was many times higher than the country’s annual budget.

Officially, the Saudi authorities say that The Line has not been completely abandoned and that the “first central segment” could be ready by 2030, but certain external opinions (experts, journalists, analysts) consider the project “unrealistic”, invoking the fact that the “Laws of physics and finance” contradict the “mirage” of The Line. Moreover, investors have become reluctant due to costs, geopolitical risks, and strategic sustainability. In fact, the relocation of some local communities has generated criticism of human rights.

The concept for The Line was unveiled in 2021, and hiring gradually began. Thousands of architects, engineers, construction managers, designers, and others have taken on roles at Neom. Many were asked to settle right in the desert, where Neom workers lived in small cottages and ate in a communal dining room. Some were attracted by generous salaries, others by the chance to work on a project of unprecedented

⁴⁰ Yu-Min Joo, *Developmentalist smart cities? The cases of Singapore and Seoul*, „International Journal of Urban Sciences”, vol. 27, issue sup1, 2023: 164–182. <https://doi.org/10.1080/12265934.2021.1925143>.

magnitude.

Saudi Arabia's Neom dream, The Line, this utopian city of Mohammed bin Salman, has been virtually destroyed by the laws of physics and finance. When construction began three years ago, The Line was meant to be a symbol of the unstoppable drive, which projected a transformative urban life, without traditional streets or cars, powered by renewable sources, stretching uninterruptedly from the Gulf of Aqaba to the Hejaz Mountains. It would be the centerpiece of Neom, the futuristic metropolis through which Prince Mohammed intended to demonstrate the magnitude of his ambition, while Saudi Arabia aimed to move from oil to a digital economy.

Although Neom employees say that much of the Southern Line could still be technically buildable, they are not convinced that anyone is willing to pay for it. Construction work in Neom has slowed down, with the desert ski resort of Trojena, the planned location for the 2029 Asian Winter Olympics, being one of the few sites still advancing at a rapid pace. Currently, Saudi Arabia has announced that it will only complete a small segment of The Line, not the entire 170km structure.

The foundations of the construction of The Line can already be seen from space, but the work has slowed down. Satellite images show excavation and tunneling work for the rail system, the "backbone" that connects the Line to Neom International Airport, stretching for 150 km, from the coast to the Hejaz Mountains. Neom's deputy chief executive, Rayan Fayeze, acknowledged that the project's budget "evolves every day", adding that it is a good time to "reassess what worked and what didn't". In fact, an urban planning expert working in Saudi Arabia said that The Line, as a thought experiment, is great, but you can't build thought experiments"⁴¹.

The Line - NEOM remains an excellent case study, from an interdisciplinary perspective, and represents one of the most ambitious and controversial urban and digital transformation experiments of the 21st century. Conceptually built as a vertical, fully digitized, car-free, and emission-free city, The Line illustrates the ability of technology to reshape urban space, but also the legal and ethical risks involved in such a vision.

At the same time, it can be analyzed as a laboratory of digitization, smart-city, AI-assisted governance, with serious challenges of privacy, freedoms, social control and urban identity, but also as a lesson in structural limitations, meaning in which architectural, technological and ecological ideals can be crushed by economic, financial, climatic or demographic realities.

Beyond its spectacular architecture, The Line is also an instrument of soft-power. Saudi Arabia uses it to build a global image of modernity and innovation, framing it in the Vision 2030 strategy. However, the reduction of the project in 2024–2025, exorbitant costs, lack of investors and social problems show that innovation cannot ignore the legal, economic, and human limits of governance.

Smart cities are not simple technological projects, but the expression of an

⁴¹ Alison Killing, *End of The Line: how Saudi Arabia's Neom dream unravelled Mohammed bin Salman's utopian city was undone by the laws of physics and finance*, London November 6, 2025 - <https://ig.ft.com/saudi-neom-line/>, accessed on 16.02.2026.

administrative and legal vision.

The digital transformation represents one of the most profound paradigm shifts of the 21st century and is not just a technological process, but a structural one, which redefines the way states function, the way public decisions are made, the way information circulates and citizens participate in the life of society.

Digitization cannot exist without strong legislation, and the European Union shows that rules are essential to protect citizens from technology. Interoperability is also key to success, with Estonia demonstrating that a modern state is a connected state.

Let's not forget the essential contribution of artificial intelligence (AI) in digital governance and in building smart cities. In smart cities, AI works as a silent architect, through which cities become spaces that "think", react and adapt in real time. Thus, through AI, the State can quickly analyze social trends, prevent risks, automate repetitive tasks, respond quickly to citizens' requests, detect irregularities in real time, and make more informed decisions.

We must be realistic and aware that smart cities and digitized administrations are still vulnerable, infrastructures becoming the target of attacks, and systems disrupted. AI thus becomes a digital guardian, capable of constant vigilance by detecting attacks, vulnerabilities, stopping suspicious flows and protecting personal data.

5. Conclusions. Towards a New "Social Contract" in the Era of Digital Governance

Digital governance is not just about technologies, databases, or applications, but it is about how the State rethinks its relationship with the citizen in the 21st century. The new digital social contract entails transparency, trust, protection, security, participation, equal access, and accountability.

Smart cities become the "laboratories" of this contract, and digital administrations are the means by which it materializes. In the end, digital transformation is not a destination, but a common path. A path in which technology must always remain a tool, not an end. A path that can transform Romania into a modern, European, connected and future-oriented state.

A world opens up in front of us in which cities are no longer just agglomerations of buildings, streets, and institutions, but "living organisms", pulsating to the rhythm of data, breathing through networks and learning through algorithms.

Digital governance thus becomes a new architecture of trust, a bridge between people and institutions, between the everyday and the possible, between the present and the future. Digital governance doesn't just involve technology and infrastructure, but rules, fairness, and principles.

We live in times when the administration is no longer just an archive of papers, but becomes a living network, a mechanism that learns, self-regulates, and opens up to people. Artificial intelligence has not come to replace us, but to remind us of the potential we can reach when we free ourselves from routine and dedicate ourselves to creation, understanding and responsibility. It does not take our place, but gives us time.

The governance of the future will be neither exclusively human nor exclusively technological. It will be a hybrid governance, an encounter between algorithm accuracy and human sensitivity, between precision and compassion, between data quality and empathy, because an algorithm can calculate, but it cannot feel.

That is why man must remain at the center of this digital world, with his ethics, his questions, his vulnerabilities, and his wonder. Because only man can decide what is good. Only he can draw the line between useful and dangerous, between efficiency and abuse, between progress and loss.

Certainly, digital governance will not be just an administrative progress, but an evolution of humanity towards a more balanced, more open and, paradoxically, more profoundly human world.

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