

The Drawbacks of E-Government Service Delivery

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Abstract

This study examines the drawbacks of the transition towards electronic public services in Algeria, regarded as a reform-oriented option aimed at modernising public administration, simplifying procedures, and improving the quality of services delivered to citizens. It investigates the implications of digitisation for the fundamental principles governing public utilities, particularly the principles of equality of access, continuity of service, and the protection of personal data. The study also identifies the legal issues arising from deficiencies in the legislative and regulatory framework, alongside the social challenges associated with digital illiteracy and disparities among social groups and geographical regions. Furthermore, it addresses technical obstacles, including inadequate infrastructure, service interruptions, cybersecurity risks, and the lack of interoperability among information systems. The study concludes that the success of digitisation cannot be achieved merely through the provision of electronic platforms; rather, it requires an integrated framework combining appropriate legislation, secure technical infrastructure, continuous human-capacity building, and the guarantee of digital inclusion for all citizens.

Keywords: Public Service; Public Utility; Electronic Administration; Digitisation; Modernization.

Introduction:

Over recent decades, the world has witnessed a profound digital revolution that has transformed virtually all spheres of human activity. This revolution has been marked by an accelerated integration of information and communication technologies into administrative systems. Public administration has been among the sectors most affected by these transformations, giving rise to a new model for managing public facilities and delivering services to citizens: electronic public service, or the digital public service. This model enables citizens and institutions to access administrative services remotely. Proponents have presented this shift as an effective means of simplifying procedures, modernizing administration, rationalizing expenditures, improving service quality, and bringing public services closer to users, in line with the principles of good governance, accountability, transparency, and the fight against bureaucracy.

Algeria, like many other countries, has embarked on the path of e-government and the digitization of public services. This has been achieved through the launch of digital portals and

digital transformation projects across various sectors, including higher education, civil status, taxation, and social security, among others.

However, despite the advantages it offers, this transition has also revealed a range of complex challenges and negative implications affecting multiple dimensions. These raise serious questions about the extent to which electronic public service can uphold the principle of equal access to public services and ensure effective protection of citizens' personal data.

The importance of this topic stems from several considerations. On the one hand, it aligns with the state's strategy of generalizing digitization as a means of reforming public services and enhancing their quality, making the study of the drawbacks of this transformation essential for correcting and safeguarding it against deviation from its original objectives. On the other hand, the research holds legal significance through its analysis of the compatibility of electronic public service with the fundamental principles governing public services—namely equality, continuity, adaptability, and the protection of rights and freedoms, particularly in light of the law on the protection of personal data. Moreover, the social importance of this study cannot be overlooked, given the impact of the digital divide and issues of trust in electronic platforms on social justice and citizens' digital inclusion.

This study seeks to achieve a set of objectives. Foremost among them is an examination of the Algerian experience in adopting e-government and digitising public services. It also aims to identify the principal drawbacks associated with digital public services by assessing their effects on the principle of equality of access to electronic public services and on the protection of personal data, particularly in light of Laws No. 18-07 and No. 25-11. Ultimately, the study seeks to formulate findings and practical recommendations capable of mitigating these drawbacks and strengthening the effectiveness and legitimacy of electronic public services.

Against this background, the following research question arises:

To what extent has the digitisation of public services in Algeria contributed to making access to public services more difficult and to the emergence of drawbacks and challenges affecting service quality, the principles of equality and access, and the protection of personal data?

In order to address this research question, the study primarily adopts an analytical approach. It examines the legal and regulatory texts relevant to electronic public services and personal-data protection, most notably Law No. 18-07 and Law No. 25-11, while drawing, where appropriate, on the comparative method.

Accordingly, and with a view to comprehensively addressing the subject and reaching conclusions that may answer the study's central research question, the paper is divided into two sections. The first examines the legal and social manifestations of the drawbacks of electronically delivered public services. The second addresses the technical manifestations of the drawbacks associated with electronically delivered public services, as set out below.

Section One: Manifestations of the Legal and Social Drawbacks of Electronically Delivered Public Services

Within the context of the digital transformation of public utilities, electronic public services raise a range of legal and social issues that affect the very substance of fundamental rights and freedoms. Foremost among these are the principle of equality of access to public services and

the right to the protection of personal data and private life. Although the electronic public service is, in principle, intended to deliver services remotely to all users without discrimination, practical reality reveals the existence of legal and regulatory constraints, as well as socially rooted digital divides. These factors result in unequal access to such services and expose individuals' sensitive data to increasing risks.⁽¹⁾

Accordingly, the first subsection examines the legal drawbacks of electronically delivered public services, while the second subsection addresses their social drawbacks.

First Subsection: Legal Drawbacks of Electronically Delivered Public Services

In many countries, public administration has shifted towards electronic modes of operation before the legislative framework was fully developed. Consequently, the electronic delivery of services may rely on general or outdated legal provisions that fail to accommodate the specific characteristics of the digital environment, thereby creating legal gaps or ambiguities.⁽²⁾

Notwithstanding the adoption of electronic systems across various public utilities and the considerable advantages they offer, such systems remain associated with a number of legal drawbacks relating to legality, the protection of private life, cybersecurity, and evidentiary matters, equality of access, and administrative liability⁽³⁾. Any failure to adequately address these issues may inevitably result in violations of individual rights, the annulment of administrative decisions by the courts, or a loss of public confidence in public services.⁽⁴⁾

Accordingly, the legal drawbacks arising from electronic public services will be examined in detail in the following subsections.

First Branch: Deficiencies in the Legislative and Regulatory Framework

Over recent decades, the world has undergone rapid digital transformation, leading to the emergence of the concept of the **electronic public service**. This refers to services provided electronically by public institutions through the Internet, with the aim of ensuring speed, accuracy, effectiveness, and transparency in their dealings with citizens.

Nevertheless, these digital transformations have encountered fundamental legal and legislative challenges. In many countries, legislative systems continue to suffer from structural deficiencies that hinder the effective implementation of such services and weaken the protection of citizens' rights. This study identifies the principal areas of legislative inadequacy at both the general level and, more specifically, within Algeria, which is used as a contemporary case study that has recently undergone several significant developments.

¹ Aqeela Jaijaa, Fatima Ben Senoussi, "The Principle of Equality before the Electronic Public Service," *Journal of Law and Human Sciences*, vol. 15, no. 1, University of Ziane Achour, Djelfa, Algeria, 2022, p. 2195.

² John D. Gregory, "Solving Legal Issues in Electronic Government: Jurisdiction, Regulation, Governance," *Canadian Journal of Law and Technology*, vol. 1, no. 3, Canada, 2019, p. 1, available at: [Digital Commons, Schulich School of Law](#) (accessed 14 January 2026, 18:55).

³ Plarent Ruka, "The Legal Challenges Related to the Digitalization of Public Services: A Principles Perspective," *Regional Law Review*, International Scientific Conference, Institute of Comparative Law, Slovenia, 2024, p. 31, available at: [Regional Law Review](#) (accessed 15 January 2026, 11:16).

⁴ Fatima al-Zahraa Ali Abdel Azim, "Legal Challenges of Digital Governance in Public Institutions: An Analytical Study in Light of National and International Legislation," p. 295, available at: [Egyptian Knowledge Bank Journals](#) (accessed 15 January 2026, 11:30).

First: The Absence of Precise Concepts

Public administration has increasingly begun to carry out its legal acts and deliver services through electronic means. In this context, the concept of the **electronic public utility** emerged to denote the reliance of a public utility on electronic means for the purpose of providing its day-to-day services.⁽⁵⁾

The terms “**electronic public utility**” and “**electronic public service**” remain relatively new within the Algerian legal landscape. A review of the legislation in force reveals no precise and binding statutory definition of either concept⁽⁶⁾. Although Municipal Law No. 11-10 and Wilaya Law No. 12-07 constitute the principal legal foundations for local public services, they confine public utilities to a closed and conventional list—such as transport, water supply, education, and health—without referring to, or regulating, the virtual digital public utility.⁽⁷⁾

It should be noted that some scholars define the electronic public utility on the basis of formal and substantive criteria, whereas others rely exclusively on doctrinal definitions.⁽⁸⁾ This legislative vacuum has resulted in a multiplicity of divergent doctrinal approaches. One definition describes the electronic public utility as “an activity carried out through electronic means by the administration itself, or by private persons acting under its supervision, for the purpose of satisfying public needs⁽⁹⁾.” However, this remains a doctrinal definition and therefore lacks binding legal force.

Second: Ambiguity of Legal Terminology

The ambiguity of legal terminology and the lack of legislative precision constitute some of the most persistent issues in the electronic-signature framework. In Algeria, for example, more than nine years after the enactment of Law No. 15-04 concerning the general rules governing electronic signature and certification⁽¹⁰⁾, the system continues to exhibit substantial shortcomings, despite the law’s status as the first principal legal foundation for the digitization of administrative transactions in Algeria.

The law recognizes a certified electronic signature as legally equivalent to a handwritten signature. It also establishes a three-tier certification structure comprising the National Electronic Certification Authority (*Autorité Nationale de Certification Électronique*—ANCE), the Economic Electronic Certification Authority (*Autorité Économique de Certification Électronique*—AECE), and the Governmental Electronic Certification Authority (*Autorité*

⁵ Assia Maouche, Kawthar Berhani, *Electronic Public Utility in Algeria*, Master’s Thesis in Law, Faculty of Law and Political Science, Abbas Laghrour University, Khenchela, Algeria, 2023–2024, p. 7.

⁶ Turkia Mahadi, *The Electronic Public Utility*, Master’s Thesis in Law, Faculty of Law and Political Science, Mohamed Boudiaf University, M’Sila, Algeria, 2018–2019, pp. 25–26.

⁷ Abdelkrim Dardouri, *Local Public Service in Algeria between Legislation and Practice*, Master’s Thesis in Law, Faculty of Law and Political Science, Hamma Lakhdar University, El Oued, Algeria, 2016–2017, pp. 12–14.

⁸ Messika Mohamed El-Saghir, “The Impact of Implementing E-Administration on Public-Utility Activities,” *Journal of Law and Political Science*, vol. 6, no. 2, Faculty of Law, University of Tissemsilt, Algeria, 2021, pp. 3–4.

⁹ Assia Maouche, Kawthar Berhani, *Electronic Public Utility in Algeria*, cited above, p. 7.

¹⁰ Law No. 15-04 of 11 Rabi‘ al-Thani 1436, corresponding to 1 February 2015, laying down the general rules governing electronic signature and electronic certification.

Gouvernementale de Certification Électronique—AGCE⁽¹¹⁾. Nevertheless, legal scholarship has identified significant substantive and procedural deficiencies in Algerian digital legislation. Among the Most notable are the Following:

- **Lack of integration with personal-data protection legislation.** The electronic-signature and certification framework lacks adequate coherence with Personal Data Protection Law No. 18-07⁽¹²⁾, particularly as regards the relationship between certification activities and the processing of personal data. It also fails to establish clear mechanisms for determining civil liability in the event of a breach of certification obligations. In addition, certain statutory definitions remain insufficiently broad to accommodate rapid technological developments.⁽¹³⁾
- **Electronic-commerce legislation and the omission of electronic public services.** Law No. 18-05⁽¹⁴⁾ on electronic commerce is primarily concerned with regulating private commercial transactions. It does not clearly address the legal nature of electronic public service delivery or the legal obligations incumbent upon public authorities when providing public services electronically. This fragmented legislative approach has left digital government services in a legal grey area, outside the scope of a unified legal framework, thereby allowing conflicting interpretations as to whether the provisions of this law apply to transactions between citizens and public administration.⁽¹⁵⁾
- **Law No. 26-02: structural reform or an additional layer of complexity?** The Council of the Nation approved Law No. 26-02⁽¹⁶⁾ concerning trust services for electronic transactions and electronic identification. This law repeals Law No. 15-04 and Law No. 18-05 on electronic commerce.⁽¹⁷⁾ Law No. 26-02 has broadened its conceptual framework to encompass notions such as the electronic seal, electronic time stamp, registered electronic delivery service, electronic identification, and the electronic document. It has also established the National Electronic Certification Authority as a

¹¹ Algerian Ministry of Post and Telecommunications, “Electronic Signature and Certification,” (accessed 17 January 2026), 19:41, [Ministry webpage](#).

¹² Law No. 18-07 of 25 Ramadan 1439, corresponding to 10 June 2018, on the protection of natural persons in the processing of personal data, Official Gazette of the Algerian Republic, No. 34, as amended and supplemented by Law No. 25-11, available at: [ARPCE](#) (accessed 17 January 2026, 19:45).

¹³ Yassine Laamiri, Tinhinane Akil, “Electronic Certification Services: A Comparison Between Algerian Law No. 15-04 and Tunisian Law No. 83 of 2000,” *Annals of the University of Algiers 1*, vol. 39, no. 2, University of Algiers 1, June 2025, p. 317.

¹⁴ Law No. 18-05 of 30 Sha‘ban 1439, corresponding to 16 May 2018, concerning electronic commerce, Official Gazette of the Algerian Republic, No. 28, available at: [ARPCE](#) (accessed 17 January 2026, 19:59).

¹⁵ Nafissa Chaima Messagmine, *The Legal Challenges of E-Administration in Algeria*, Master’s Thesis in Law, Faculty of Law, Belhadj Bouchaib University, Ain Temouchent, Algeria, 2024–2025, pp. 37–38.

¹⁶ Law No. 26-02 of 29 Sha‘ban 1447, corresponding to 17 February 2026, laying down the general rules governing trust services for electronic transactions and electronic identification, Official Gazette of the Algerian Republic, No. 14.

¹⁷ See: Council of the Nation, “The Council of the Nation Holds a Plenary Session for the Presentation and Discussion of the Bill Laying Down the General Rules Governing Trust Services for Electronic Transactions and Electronic Identification,” official website, 14 January 2026, available at: [Council of the Nation](#) (accessed 19 January 2026, 22:05).

public institution responsible for harmonizing the management of trust services across both the governmental and economic sectors. Nevertheless, the practical value and effectiveness of this reform will remain contingent upon the timely adoption of the implementing regulatory instruments and the efficiency with which they are enforced. The published legal texts confirm that the law lays down the general framework governing trust services for electronic transactions and electronic identification⁽¹⁸⁾

Second Branch: General Principles of Public Service in the Face of Digitization

The public service constitutes a cornerstone of administrative law. Its centrality is historically associated with the landmark *Blanco* judgment of 1873, which laid the foundations for the public-service theory as a major focus of administrative-law scholarship. According to the jurist Léon Duguit, the distinctive legal principles and theories forming the essence of administrative law are merely instruments intended to facilitate the regular and continuous functioning of public services and to enable them to satisfy public needs to the greatest possible extent.

However, this framework has been fundamentally altered by the rapid advancement of digital transformation. Modern technological developments have demonstrated the limitations of traditional methods of managing public services in responding to contemporary demands. This has made it necessary to reconsider the principles governing such services and adapt them to the digital environment. Some of these principles are examined below.

1. The Principle of Continuity and Digital Disruption

The insufficient availability of appropriate electronic equipment and digital infrastructure creates an unfavorable environment for the development of electronic public administration. Consequently, public administration continues to be affected by the constraints of traditional working methods, obsolete equipment, and weak operational procedures. This, in turn, adversely affects the processing of applications and the timely delivery of public services.

The absence of these essential conditions clearly indicates that the electronic public service has not yet been fully realized in practice, as the traditional system remains predominant. Accordingly, no meaningful progress can be achieved in this field without addressing these deficiencies⁽¹⁹⁾. Algeria must therefore make adequate preparations to overcome the obstacles that hinder the continuous availability of electronic equipment. It must also adopt clear legislative measures requiring the State to provide modern digital infrastructure in a sufficient and regular manner⁽²⁰⁾, thereby ensuring the continuous operational readiness of electronic public services and their capacity to provide services digitally.⁽²¹⁾

¹⁸ Nafissa Chaima Messagmine, op. cit., p. 30.

¹⁹ Nafissa Chaima Messagmine, *The Legal Challenges of E-Administration in Algeria*, op. cit., p. 57.

²⁰ Mohamed Ben Aarab, "The Experience of Electronic Administration in Algeria between the Requirements of Transparency and Service Quality Improvement," *Journal of Social Sciences*, no. 19, 2014, p. 69.

²¹ Nafissa Chaima Messagmine, *The Legal Challenges of E-Administration in Algeria*, op. cit., p. 58.

2. The Principle of Equality and the Digital Divide

The principle of equality is not limited to individuals' right to benefit from services provided by public utilities. Equality must also be observed in the distribution of the burdens and costs associated with those services.⁽²²⁾

Administrative legal scholarship and case law have consistently established that equality before public services does not entail absolute equality; rather, it requires relative or substantive equality. In other words, legal equality must be ensured among persons who are in comparable legal situations and who meet the conditions required to benefit from public services and to bear the costs and burdens arising from such use.⁽²³⁾

Second Subsection: Social Drawbacks of Electronically Delivered Public Services

Digital transformation in the delivery of public services has become an irreversible global phenomenon. Governments increasingly compete to develop electronic public-service platforms in pursuit of greater efficiency, transparency, and reduced bureaucracy. E-government may be defined as the use of information and communication technologies to deliver public services to citizens and businesses more effectively and efficiently.⁽²⁴⁾ Nevertheless, this transformation entails serious social drawbacks that are frequently overlooked in official reports but are clearly identified in empirical academic research. The United Nations *E-Government Survey 2022* highlights the risk that digital public services may leave vulnerable groups behind—including persons living in poverty, older persons, persons with disabilities, women, minorities, and people living in rural or remote areas—where legal frameworks and digital-service design fail to account adequately for affordability, accessibility, and inclusion. More broadly, the Survey found that approximately 45% of the combined population of United Nations Member States—around 3.5 billion people—still lag behind in the digital-government landscape.⁽²⁵⁾

Accordingly, this subsection examines the social barriers that may prevent certain segments of society from accessing electronic public services, as set out in the following branches.

First Branch: Digital Illiteracy

Digital illiteracy is among the most serious social drawbacks associated with electronic public services. It is reflected not only in individuals' inability to access digital tools and online services, but also in their limited capacity to use them effectively, securely, and independently.

²² Assia Maouche, Kawthar Borhani, *Electronic Public Utility in Algeria*, op. cit., p. 12.

²³ Issam Ali Al-Dabsi, *Administrative Law: The Nature of Administrative Law*, undated edition, Dar Al-Thaqafa for Publishing and Distribution, Amman, Jordan, 2014, p. 442.

²⁴ See: European Centre for Counterterrorism and Intelligence Studies, Germany and the Netherlands, Research and Reports Unit, "Cybersecurity, E-Government, and Digital Government Services," 23 October 2020, available at: [European Centre for Counterterrorism and Intelligence Studies](https://www.ecicis.europa.eu/en/research-reports/cybersecurity-e-government-and-digital-government-services) (accessed 22 January 2026, 20:26).

²⁵ J. Lee, K. Kelley-James, "E-Government and Social Exclusion: An Empirical Study," *International Journal of Public Sector Management*, IGI Global, pp. 134–135. See also the United Nations E-Government Survey 2022, which specifically addresses inclusive digital government and the risks of exclusion affecting vulnerable and geographically remote populations: <https://www.igi-global.com/article/government-social-exclusion/3417>, (accessed 26 January 2026, at: 19:28).

Studies indicate, for example, that fewer than 40% of Internet users send emails.⁽²⁶⁾ Other research demonstrates that unfamiliarity with modern communication technologies deprives many older persons of opportunities to access digital services designed to meet their needs.⁽²⁷⁾

Digital illiteracy is not confined to a lack of access. It extends to disparities in individuals' capacity for digital civic participation. A considerable number of citizens have not had sufficient educational opportunities or adequate communication resources to enable them to become effective digital citizens or to participate meaningfully in civic and political life online⁽²⁸⁾.

Furthermore, linguistic dominance in cyberspace and on digital public-service platforms constitutes a significant social and cultural barrier. A limited number of languages dominate Internet content, thereby restricting access for persons whose languages are not supported by digital services.⁽²⁹⁾ This phenomenon is commonly described as the **content divide**, and it reinforces the cultural exclusion of linguistic minorities and other marginalized groups from the electronic public-service system.

Second Branch: Erosion of Direct Human Interaction and Declining Trust Between Citizens and the State

The loss of direct human interaction constitutes one of the most significant social and psychological drawbacks of electronic services. Interpersonal communication is an essential component of meaningful human interaction, and the full-scale transition to electronic service delivery may, in some instances, undermine this dimension of public-service provision.⁽³⁰⁾ The Algerian e-government report further indicates that this transformation has led to a perceptible decline in the administration's capacity to respond effectively to citizens' needs and has weakened the human relationship between service providers and service recipients.⁽³¹⁾

As communication increasingly shifts to the digital sphere, many individuals may become immersed in virtual environments at the expense of direct interpersonal interaction, potentially generating feelings of isolation and detachment from their social surroundings. Researchers have emphasized that screen-based interaction cannot fully substitute for live, face-to-face

²⁶ J. Lee, K. Kelley-James, op. cit., pp. 141–144.

²⁷ Hindfayeh Al-Shahrani, "Challenges Facing Older Persons in Light of Digital Transformation in Saudi Society: A Descriptive Study from the Perspective of Older Persons in Riyadh," *Journal of the Faculty of Social Work for Studies and Social Research*, no. 28, Fayoum University, p. 546.

²⁸ Nadia Naami, Abdelkader Khraibech, "Obstacles to E-Administration and Their Impact on Local Development: A Socio-Cultural Approach," *Journal of Legal and Social Sciences*, vol. 9, no. 2, Ziane Achour University, Djelfa, Algeria, 2024, pp. 1157–1158.

²⁹ See: "The Digital Divide and Its Impact on Economies and Societies," published 22 March 2025, available at :[Holistique Training](#) (accessed 26 January 2026, 22:24).

³⁰ Doha Nasser, "Advantages and Disadvantages of E-Government," *Mawdoo3 Tech*, 18 May 2023, available at: [Mawdoo3 Tech](#) (accessed 26 January 2026, 22:45).

³¹ Amer Hani and Nouredine Dekhan, "E-Government and Public Service in Algeria: Between Challenges and Stakes," *Journal of Social and Human Sciences*, vol. 7, no. 14, Mohamed Boudiaf University, M'Sila, Algeria, 2018, pp. 557–559.

communication, which involves non-verbal cues, emotional presence, and interpersonal reassurance.⁽³²⁾

Moreover, a complete transition to electronic services without adequate social support may intensify citizens' concerns regarding privacy and security, thereby reducing their trust in government. These concerns may be compounded by weak mechanisms of social oversight and the practical difficulty of challenging electronic administrative decisions, particularly where citizens are deprived of the personal channels of communication to which they were accustomed in their dealings with traditional public administrations. One Algerian study concluded that the adoption of a **digital-by-default** approach may contribute to distancing the administration from citizens and eroding public trust in public institutions and their services.⁽³³⁾

Section Two: Technical Drawbacks of Electronically Delivered Public Services

The transition towards the electronic delivery of public services constitutes a central pillar of contemporary digital governance. It promises improved efficiency, reduced bureaucracy, and easier access to State services. Nevertheless, this system is not without substantial technical limitations and drawbacks affecting infrastructure,⁽³⁴⁾ cybersecurity, digital inclusion, and service continuity. These limitations constitute genuine barriers to fully benefiting from digital transformation, particularly in developing countries. The United Nations has similarly observed that the digital divide remains a major challenge, especially in developing regions, and that expanding affordable high-speed infrastructure and digital-literacy programs is essential to ensure equitable access and participation.⁽³⁵⁾

Accordingly, the first subsection addresses the challenges relating to technical infrastructure and the digital divide, whereas the second subsection examines cybersecurity risks and weak technical interoperability, as explained below.

First Subsection: Challenges of Technical Infrastructure and the Digital Divide

Political will alone is insufficient to ensure the successful transition to electronic public services. Such a transition requires a robust technical foundation capable of delivering these services to every segment of society without exclusion. In practice, however, many countries encounter a dual structural deficiency.

On the one hand, there may be inadequate physical infrastructure, including communication networks, equipment, and information systems. On the other hand, substantial

³² Abdallah Muthanna, "Social Media and Its Impact on Our Relationships and Lives," Al Jazeera Blogs, 14 July 2024, available at: [Al Jazeera](#) (accessed 18 February 2026, 15:00).

³³ Majda Abdel Shafi Mohamed, "Digitization as a Mechanism for Re-engineering Public Utilities to Reduce Administrative Corruption," Journal of Legal and Economic Studies, vol. 9, no. 1, Faculty of Law, Benha University, p. 1241. See also Vincent Lim, "Advantages and Disadvantages of E-Government: Exploring the Pros and Cons of Digital Government Services," 15 February 2026, available at: [e-Spincorp](#) (accessed 18 February 2026, 15:11).

³⁴ Sukron Makmun, Agus Suharsono, Rohim, and M. Z. Muttaqin, "Transforming Public Services Towards Smart Cities from the Perspective of E-Government in Indonesia," Reforming: Social and Political, vol. 12, no. 1, University of Jember, 2025, p. 56.

³⁵ Mohamed Abada, "Overcoming the Digital Governance Challenges in Developing Countries," 6 July 2024, available at: [LinkedIn](#) (accessed 05 February 2026, 13:30).

inequalities may persist in citizens' ability to access and effectively use digital services. These inequalities give rise to what is commonly termed the **digital divide**, which risks deepening social inequality rather than reducing it. The United Nations' 2024 assessment likewise stresses that, despite global progress in digital government, significant disparities remain between countries and regions, especially in Africa and other developing contexts.

First Branch: Weaknesses in Technical Infrastructure

Technical infrastructure constitutes the fundamental foundation of any electronic public-service system. The efficient delivery of such services cannot be envisaged in the absence of advanced communication networks, reliable information systems, and appropriate hardware.⁽³⁶⁾ Deficiencies in this infrastructure manifest themselves at several interconnected levels, which collectively hinder the effective realization of administrative digitization. These levels may be examined as follows.

First: Communication Networks

A substantial gap continues to exist between urban and rural areas in most developing countries. While major cities generally benefit from relatively adequate Internet coverage, remote areas often lack even the minimum requirements for digital connectivity. This excludes a wide segment of citizens from accessing electronic government services.⁽³⁷⁾

Moreover, connection speeds may remain inadequate even in covered areas, thereby impeding the use of government electronic platforms that require sufficient bandwidth to process applications, upload documents, and receive electronic communications. The United Nations has likewise identified persistent disparities in digital-government development, particularly in developing regions, and emphasized the continuing need to bridge these gaps through targeted digital-inclusion policies.⁽³⁸⁾

Second: Information Systems

Many public institutions continue to rely on outdated **legacy systems**, designed in earlier technological contexts and incompatible with the requirements of contemporary digital transformation. In addition to being difficult and costly to maintain, such systems impede interoperability with newly developed digital platforms. Integrating them into modern systems often requires complex intermediary layers, which consume resources and increase costs.⁽³⁹⁾

Algerian case studies have found that digital transformation projects may, in many instances, amount only to preliminary or superficial digitization, without entailing a genuine reform of the back-end systems through which public administration operates. Effective interoperability frameworks are essential because they establish standards and guidelines that

³⁶ Mohamed Abada, "Overcoming the Digital Governance Challenges in Developing Countries," 6 July 2024, available at: [LinkedIn](#). op. cit.

³⁷ Abdelmoumen Khalif, E-Government, Master's Thesis in Law, Faculty of Law and Political Science, University of Ghardaïa, Algeria, 2018–2019, pp. 36–37.

³⁸ Abdelmoumen Ben Sghir, "The Challenges of Implementing E-Government in Algeria: Obstacles and Prospects," Arab Democratic Center, 5 October 2016, available at: [Arab Democratic Center](#) (accessed 08 February 2026, 07:22).

³⁹ Naif Al Mudawi, Natalia Beloff, and Martin White, "Issues and Challenges: Cloud Computing E-Government in Developing Countries," International Journal of Advanced Computer Science and Applications, vol. 11, no. 4, 2020, pp. 8–9.

enable government systems to exchange information and communicate seamlessly across institutional boundaries.⁽⁴⁰⁾

Third: Service Continuity

An exclusive reliance on technical infrastructure creates a serious form of structural vulnerability. A server failure, network interruption, or power outage may result in the simultaneous and total suspension of the service for all users. This differs from traditional public-service delivery, which may retain a degree of flexibility in the face of partial disruptions.⁽⁴¹⁾

The situation is further aggravated where public institutions lack effective disaster-recovery plans and fail to implement regular, tested data-backup policies. Sound digital-resilience practices require, among other measures, redundant architectures, automatic failover mechanisms, frequent and recoverable backups, backup power supplies, real-time availability monitoring, and tested business-continuity and disaster-recovery plans.

Fourth: Cost

Building and maintaining adequate technical infrastructure requires substantial and continuing investment, which may exceed the financial capacity of certain government bodies. This challenge is particularly acute given the rapid pace of technological development, which exposes technical systems to swift obsolescence.

Consequently, neglected systems may accumulate vulnerabilities, while considerable disparities in infrastructure quality emerge among different governmental sectors within the same State. The World Bank identifies interoperable government architectures, data-hosting solutions, and streamlined processes as essential components of digital public infrastructure capable of supporting improved public services.⁽⁴²⁾

Second Branch: The Digital Divide and Service Disruption

The digital divide is among the most prominent technical challenges in discussions concerning electronic public services⁽⁴³⁾. It may be defined as the structural disparity between different social groups in their ability to access and use information and communication technologies. The seriousness of this issue lies in the fact that it is not confined to the material dimension of owning devices or having access to a network. It also encompasses the digital competencies and skills required to navigate electronic public-service platforms—an aspect commonly described as the **second-level digital divide**.

First: Excluded Groups

Empirical studies show that the transition to electronic public services may result in the unintended exclusion of broad social groups. Older persons who did not grow up in a digital

⁴⁰ Rania Heddar, *The Role of E-Administration in Rationalizing Public Service in Algeria*, Doctoral Dissertation in Political Science, Faculty of Law and Political Science, University of Batna 1, Algeria, 2017–2018, pp. 171–174.

⁴¹ Qadi Anis Saleh Jomaan, “E-Government,” Judge Anis Jomaan Blog, 23 July 2020, available at: [Facebook](#) (accessed 08 February 2026, 09:05).

⁴² Sukron Makmun, Agus Suharsono, Rohim, and M. Z. Muttaqin, “Transforming Public Services Towards Smart Cities from the Perspective of E-Government in Indonesia,” *Reforming: Social and Political*, vol. 12, no. 1, University of Jember, 2025, p. 57.

⁴³ Abdelmoumen Khalif, *E-Government*, op. cit., p. 6.

environment frequently encounter considerable difficulties in navigating complex electronic-platform interfaces. Rural populations may face weak infrastructure and inadequate network coverage, while low-income persons may be unable to afford devices or Internet subscriptions.

These are often the very groups most dependent on public services. This creates a profound social paradox: digitization, which is intended to facilitate service delivery, may become an additional barrier for those who need public services most urgently. Research similarly finds that low digital skills can impede older adults' full participation in a digital society and heighten their risk of social exclusion⁽⁴⁴⁾

Second: Geographic Disparities

The digital divide is reinforced between urban centers and rural or remote areas. This disparity both reflects and deepens existing social and economic inequalities. In Algeria, for example, studies have recorded significant variations among wilayas in Internet penetration and quality, leaving citizens in some remote areas unable to access electronic government services even where those services formally exist⁽⁴⁵⁾.

Third: Disruption of Electronic Public Services

Electronic public services are inherently vulnerable because their operation depends simultaneously on the availability of electricity and network connectivity. Any technical malfunction—whether a power outage, a failure of government servers, or a breakdown in telecommunications networks—may bring the service to a complete and immediate halt for all users. This differs fundamentally from conventional public-service delivery, where disruption may be more gradual or localized.

Such disruptions may prevent citizens from meeting critical administrative deadlines, including filing appeals or completing registration procedures before prescribed closing dates. The resulting harm may be substantive and, in certain cases, difficult to remedy⁽⁴⁶⁾

Fourth: Data Security During Network Interruptions

Sudden service interruption raises an additional technical concern relating to data integrity. Electronic transactions that remain incomplete at the time of an outage may result in lost, corrupted, or inconsistently recorded data, especially in the absence of automatic-save mechanisms and regular, tested backup policies.

Studies indicate that excessive reliance on electronic systems without maintaining appropriate contingency arrangements weakens the resilience of public administration in the face of technical emergencies and threatens the continuity of service delivery during critical periods. The World Bank accordingly recommends regular recoverable backups, redundant

⁴⁴ Arnold Bertrand, "How Governments in Developing Countries Can Close the Digital Gap," EY, 4 October 2022, available at: [EY](#) (accessed 11 February 2026, 08:05).

⁴⁵ Abdelrahman Khoukhi, "Challenges of E-Government in Algeria: A Study of the Digital Services Index," *Journal of Research and Development Studies*, vol. 10, no. 2, University of Bordj Bou Arréridj, Algeria, 2023, pp. 233–234.

⁴⁶ Qadi Anis Saleh Jomaan, "E-Government," *op. cit.*

power infrastructure, continuous monitoring, and regularly tested recovery and restoration plans to mitigate availability and data-loss risks.⁽⁴⁷⁾

Second Subsection: Cybersecurity Risks and Weak Technical Integration

Whereas infrastructure constitutes the material prerequisite for the establishment of electronic public services, cybersecurity and systems integration represent the functional and continuity-related prerequisites for their effective operation. The opening of public administration to the digital sphere exposes it to diverse threats affecting citizens' data, the integrity of information, and trust in the system as a whole.

Furthermore, the absence of coordination and interoperability among the information systems of different government bodies produces technological fragmentation. This fragmentation reproduces bureaucracy in a digital form and, consequently, deprives administrative-modernization initiatives of much of their substantive value. International digital-government frameworks similarly regard interoperability as a central enabler of holistic, user-centered public services and more coherent public-sector action.⁽⁴⁸⁾

Accordingly, the following branches examine the principal security-related and technical risks confronting the electronic delivery of public services.

First Branch: Cybersecurity Risks

Cybersecurity constitutes one of the most pressing technical challenges within the electronic public-service ecosystem. Administrative digital transformation transfers vast volumes of sensitive data into the digital environment, making government systems strategic targets for both hostile actors and cybercriminals. The risks in this domain are multifaceted and mutually reinforcing.⁽⁴⁹⁾

First: Nature of Cyber Threats

The electronic public-service sector faces a broad range of sophisticated attacks. These include **phishing attacks**, in which malicious actors impersonate government authorities to obtain citizens' data; **ransomware attacks**, which disable critical systems and hold their data hostage; and **distributed denial-of-service (DDoS) attacks**, which disrupt government platforms and render them inaccessible.⁽⁵⁰⁾

This range of risks is compounded by insider threats arising from employee negligence or the misuse of authorized access to sensitive systems. The NIST Cybersecurity Framework 2.0 provides guidance for governmental and other organizations to manage such risks through governance, identification, protection, detection, response, and recovery measures. NIST's

⁴⁷ Naif Al Mudawi, Natalia Beloff, and Martin White, "Issues and Challenges: Cloud Computing E-Government in Developing Countries," *op. cit.*, p. 8.

⁴⁸ Hassania Ouchetto, Ouail Ouchetto, and Ounsa Roudiès, "Ontology-Oriented E-Government Services Retrieval," available at: [arXiv](https://arxiv.org/abs/2602.08400) (accessed 23 February 2026, 08:40).

⁴⁹ Mela Firdini Azzahra, Ardhan Aghsal Dwi Purta, Jingga Mustika Putri, Maulana Aditya, and Risqy Siwi Pradini, "Systematic Literature Review on Data Security and Privacy for E-Government," *Journal of Enhanced Studies in Informatics and Computer Applications*, vol. 3, no. 1, February 2026, pp. 1–5, available at: [JESICA](https://www.jesica.org/) (accessed 23 February 2026, 09:21).

⁵⁰ Shawkat Qanbar, "Digital Government Guide to Protecting Sensitive Data from Cyberattacks," *MIT Technology Review Arabia*, 20 February 2023, available at: [MIT Technology Review Arabia](https://www.mitr.org/arabia/) (accessed 23 February 2026, 09:30).

updated ransomware guidance specifically stresses the need for multi-factor authentication, least-privilege access, and capabilities to identify, protect against, detect, respond to, and recover from ransomware incidents.⁽⁵¹⁾

Second: Sensitivity of Government Data

Government electronic platforms retain some of the most sensitive categories of data in citizens' lives, including national identification numbers, civil-status records, health data, tax files, and property transactions. This concentration of information means that a successful breach may have consequences extending far beyond technical loss; it may undermine citizens' trust in the State and damage the credibility of public institutions as a whole.

A comprehensive international study on information security in e-government services has found that numerous government platforms contain exploitable security vulnerabilities that remain unremedied. This demonstrates the importance of adopting a proactive, risk-based cybersecurity approach rather than responding only after security incidents have occurred⁽⁵²⁾.

Third: Emerging Technological Threats

Generative artificial intelligence has become a growing source of concern, as it can be used to produce forged documents and impersonate citizens with a high degree of apparent authenticity before digital government-verification systems. This emerging threat calls for specialized technical safeguards combining biometric verification, liveness detection, behavioral analysis, and defensive artificial intelligence.

Relevant official guidance identifies deepfake attacks—including manipulated photographs, replayed videos, three-dimensional masks, and AI-generated deepfakes—as threats to remote identity-proofing systems. Authorities have also observed the use of generative AI to create or alter identity documents, photographs, and videos in order to circumvent identity-verification procedures; countermeasures include phishing-resistant multi-factor authentication and live audio or video verification.

The growing use of blockchain technologies in government systems also presents both opportunities and challenges. In principle, blockchain may help secure transactions and enhance their traceability and transparency. However, its deployment remains subject to unresolved legal, regulatory, technical, and governance considerations⁽⁵³⁾.

Fourth: Deficiencies in Implementing Information-Security Standards

Studies indicate that the implementation of information-security standards in public institutions remains uneven and inconsistent. Three recurring shortcomings may be identified:

- The absence of a unified and binding security policy for the public sector as a whole.
- Inadequate cybersecurity awareness among public employees, who often constitute the weakest link in the information-security chain.
- Delayed responses to emerging threats as a result of slow mechanisms for updating systems and conducting periodic security reviews.

⁵¹ Mela Firdini Azzahra et al., op. cit., p. 4.

⁵² Shawkat Qanbar, op. cit.

⁵³ Nader Bakir, Kholoud Samrouth, Ezzeddine Abu Zahr, and Eli Hanna, "A Technical Framework for Combating Deepfake Identity Fraud in E-Government Services," Fourteenth International Conference on Digital Forensics and Security, undated, available at: [IEEE Xplore](https://ieeexplore.ieee.org/abstract/document/9782441) (accessed 28 February 2026, 09:53).

In the Algerian context, research stresses the need to establish an integrated cybersecurity system that precedes, or at least accompanies, the digital transformation of public administration, rather than one that is introduced only after damage has occurred ⁽⁵⁴⁾.

Second Branch: Weak Integration and Inadequate Human Resources

The success of electronic public services is not confined to the provision of digital platforms or the protection of infrastructure. It also requires genuine functional integration among the various government systems, together with the availability of human resources capable of managing, maintaining, and developing this ecosystem. In the absence of these two requirements, digitization may cease to be an instrument of administrative simplification and instead become an additional layer of complexity for both citizens and public employees ⁽⁵⁵⁾.

First: Lack of Systems Integration

Public administrations in many countries suffer from the phenomenon of **information silos**: independent and isolated information systems operating within each ministry or public body without effective mechanisms for interoperability, data exchange, or coordinated access. As a result, a citizen seeking to complete an administrative procedure involving multiple public bodies may be forced to navigate several electronic platforms and submit the same documents repeatedly.

This situation defeats the promise of procedural simplification. Studies concerning the quality of electronic public services have found that such fragmentation generates heightened frustration among citizens: instead of receiving a faster and more accessible service, they encounter a new form of administrative complexity. Interoperability frameworks are therefore essential to reduce institutional boundaries and permit secure, governed exchange among government systems ⁽⁵⁶⁾.

Second: Absence of a One-Stop Shop

The lack of a unified electronic public-services portal—or **one-stop shop**—is among the clearest manifestations of weak technical integration. Rather than accessing all public services through a single digital gateway, regardless of the service-providing authority, citizens must contend with a proliferation of platforms and portals that differ in user interfaces, registration requirements, and accepted document formats.

This issue is further aggravated by the absence of a unified and secure electronic-authentication system through which a citizen can establish their identity once and access multiple public services. This arrangement is commonly referred to as **single sign-on (SSO)** ⁽⁵⁷⁾.

⁵⁴ Bouzid Hadjira Soumia, *Cybersecurity as a Prerequisite for the Success of the E-Government Project: The Case of Algeria*, Doctoral Dissertation in Management Sciences, Faculty of Economic, Commercial and Management Sciences, University of Algiers 3, Algeria, 2017–2018, p. 132.

⁵⁵ Hassania Ouchetto, Ouail Ouchetto, and Ounsa Roudiès, op. cit.

⁵⁶ Fadila Boutoura, Noufel Smaili, “The Quality of Electronic Public Service Between the Requirements of E-Administration and Public-Service Problems,” *International Conference on Resource Management*, Koya University, Kurdistan Region, Iraq, 2020; paper published January 2022, available at: [Koya University Conferences](#) (accessed 28 February 2026, 10:07).

⁵⁷ Houari Mansouri, Samia Badoui, “Implications of Implementing E-Government for the Development of Local Administrative Services in Algeria,” *National Symposium on Service Quality under Digital Transformation and*

Third: Shortage of Technical Human Resources

Public administrations face a structural shortage of human resources specializing in information and communication technologies. Highly skilled technical professionals frequently gravitate towards the private sector, which may offer higher remuneration and more innovative working environments. The public sector is consequently left with an acute shortage of engineers, software developers, and information-systems analysts capable of leading and managing digital transformation.⁽⁵⁸⁾

This may lead public bodies to rely on external companies to build electronic public systems. While outsourcing may address immediate capacity gaps, it can create technological dependency that limits public authorities' independent ability to maintain, develop, audit, and control their own systems. The OECD's public-sector digital-talent framework similarly emphasizes the need to create appropriate work environments, secure the necessary skills, and develop a workforce capable of moving from e-government towards mature digital government.

The shortage of digital competence is not limited to specialized staff; it also affects ordinary public employees responsible for operating electronic platforms and assisting citizens in their use. Algerian field studies have found that many administrative departments adopt electronic services in a merely formal manner, without adequately training their staff to address technical faults or guide citizens through the relevant procedures. In the absence of continuous training programs and periodic skills upgrading, public employees themselves may become a weak link in the digital ecosystem, unable to use the available electronic tools with the expected level of competence⁽⁵⁹⁾.

Conclusion:

In conclusion, the transition towards electronic public services has become an inevitable response to the requirements of the digital age and to the need to overcome the shortcomings of traditional bureaucratic administration, notably long queues, complex procedures, and the prevalence of administrative corruption. Many States, including Algeria, have adopted ambitious e-administration projects aimed at bringing public administration closer to citizens and improving the quality of public services.

Nevertheless, practical experience has shown that this transformation has not always produced the expected outcomes. Electronic public services have encountered a range of structural, technical, legal, and human obstacles that have limited their effectiveness and adversely affected citizens' satisfaction. The United Nations has similarly noted that digital-government progress requires resilient infrastructure, inclusive service design, and the capacity to address continuing disparities in access and digital capability.

Academic studies on e-administration in developing countries, including Algeria, further demonstrate that the partial implementation of digital-transformation projects may generate a form of **electrocracy**, or digital bureaucracy. This concept refers to a system that combines the

E-Administration in Algerian Institutions: Stakes, Challenges, Assessment, and Prospects, undated, available at: [University of Ghardaïa Repository](#) (accessed 16 February 2026, 17:15).

⁵⁸ Fadila Boutoura, Noufel Smaïli, op. cit.

⁵⁹ Rania Heddar, The Role of E-Administration in Rationalizing Public Service in Algeria, cited above, p. 175.

disadvantages of traditional administration with the additional complexities created by modern digital technologies.

Accordingly, this study has reached the following principal findings:

- Technical infrastructure remains inadequate, while the digital divide continues to widen.
- Cybersecurity safeguards remain insufficient, and the protection of personal data is inadequate.
- The level of digital competence among both public employees and citizens remains limited.
- Trust in electronic transactions remains weak, owing to obstacles that undermine the credibility of digital platforms and hinder their ease of use and accessibility. Accessing a specific public service may thus become a source of difficulty separating the citizen from the administration, reflecting deficiencies in the quality of electronic platforms and applications.

Recommendations:

In light of these findings, identifying these drawbacks and formulating scientific proposals to address them constitute both a research necessity and a practical imperative. The following recommendations are therefore proposed:

- **Invest in inclusive digital infrastructure** by expanding broadband Internet networks, establishing public digital-access center's in remote areas, and adopting multi-channel service-delivery models that combine electronic and paper-based services during a sufficiently long transitional period. Such measures should ensure that no social group is excluded from access to public services.
- **Strengthen cybersecurity and personal-data protection** by establishing a strict legal framework for protecting citizens' personal data and requiring public institutions to apply international security standards across all their electronic platforms, including smart applications. This should be accompanied by the establishment of independent cybersecurity oversight bodies and the conduct of periodic audits to identify and promptly remedy security vulnerabilities. A risk-management approach to digital security and privacy is recognized as essential to increasing public confidence in government services.
- **Provide continuous training and capacity-building for human resources** through comprehensive national programs that train public employees in the use of modern technologies and in the principles of effective digital public-service delivery. Equal importance should be given to digital-literacy programs for citizens, particularly those most vulnerable to exclusion, such as older persons and women living in rural areas. The OECD framework for digital talent and skills stresses that public-sector digital maturity depends on building appropriate capabilities, work environments, and skills across the administration.
- **Reform the legal and institutional framework** by enacting or consolidating specific rules governing electronic signatures, digital evidence, privacy protection, and electronic administrative transactions. It is also necessary to establish coordination mechanisms among governmental sectors in order to ensure interoperability and

networking among electronic platforms, while avoiding fragmentation and duplication of services.

- **Draw on leading international experiences** by establishing cooperative partnerships in the field of e-government—such as those developed by Bahrain—and adapting their relevant components to local conditions. Bahrain’s digital-transformation approach has incorporated cooperation with the United Nations, benchmarking against leading digital-government systems, adherence to international standards, and participation in the Digital Cooperation Organization. Such partnerships can offer practical pathways for accelerating digital transformation at lower cost and with reduced institutional effort, while providing access to necessary financing and technical expertise and helping to narrow the digital gap between developed and developing countries.

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