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Using Artificial Intelligence Technologies In Developing E-Government In Algeria

Dr. Djedid Hanane[1]*

[1]University of ghardaia, Algeria. Email: djedid.hanane@univ-ghardaia.edu.dz

ABSTRACT:

The use of artificial intelligence (AI) technologies represents a pivotal step in the development of e-government across various countries, as it contributes to improving the quality of public services and enhancing administrative efficiency. Algeria is among the nations striving to adopt these technologies within its governance systems. The country is currently working on digitizing administrative procedures and integrating intelligent tools that accelerate transactions, reduce costs, and improve communication between citizens and public administration.

However, despite these efforts, several challenges persist, including the weakness of digital infrastructure, the lack of unified and reliable databases required for AI to operate efficiently, and the absence of a clear legal framework regulating the protection of personal data and the use of algorithms. These constitute major obstacles to the widespread adoption of AI technologies.

Keywords: Artificial intelligence, Algeria, E-government

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Introduction

Artificial intelligence is considered one of the most prominent digital challenges of the modern era. It has become an essential component in several sectors, including medicine and education, due to its significant ability to analyze data and extract results that support faster and more effective decision-making. The impact of AI has also extended to the governmental sector, where efforts are underway to integrate it into e-government systems with the aim of enhancing public services and simplifying administrative procedures.

The transition toward e-government has become a necessity imposed by technological developments and the increasing needs of citizens for modern services characterized by speed and transparency. Here, AI plays a central role, serving as a key tool capable of enhancing administrative performance by providing advanced digital solutions that ensure processing accuracy and secure data management.

This topic carries enormousenormous importance, as the integration of AI systems into governmental operations raises numerous legal challenges. Interest in this issue has grown in Algeria in recent years, where several projects have been launched to digitize public administration and promote electronic transactions. However, the integration of AI in this field is still in its early stages and poses several legal questions regarding the ability of these technologies to manage public affairs, as well as the readiness of the communications infrastructure and the adequacy of the legal framework necessary to adopt such a policy. Based on this, we pose the following problem statement:

How Can Artificial Intelligence Technologies Contribute to the Development of E-Government in Algeria in the Absence of a Comprehensive Legal Framework Regulating Their Use?

To answer this research question, we employed the descriptive method to clarify several concepts related to the topic and the analytical method to examine the legal and regulatory texts governing this field. The study is structured around the following axes:

Section One: E-government as a comprehensive introduction to its main objectives
Section Two: The role of artificial intelligence in supporting e-government
Section Three: Legal challenges

Section One: E-Government as a Comprehensive Introduction to the Main Objectives

The concept of e-government began to emerge in the mid-1990s, but its official introduction was marked by the Naples Conference held in Italy in 2000. Since then, the concept has gradually expanded, and e-governments have taken shape worldwide1 (Yahiaou, 2016, p. 18) until reaching their current form.

Electronic transactions are widely recognized for significantly improving the economic, social, and cultural dimensions of societies. Consequently, they are strongly linked to development, as they contribute—directly or indirectly—to reducing bureaucracy and eliminating many structural inefficiencies faced by public administrations. In this way, e-government initiatives play an essential role in promoting development across various sectors. This will be the focus of our analysis in the present study.

First: Definition of E-Government

There are numerous definitions of e-government. The World Bank defines e-government as

"The process by which a government institution uses information technology to transform its relationships with citizens, businesses, and other government agencies. These technologies can serve a wide range of objectives, such as providing better services to citizens, improving interaction and engagement with businesses and the industrial community, enabling citizens to access information—which enhances transparency—or ensuring more efficient management of governmental institutions**."2** (Yahiaou, 2016, p. 19)

The United Nations defines e-government as

"The use of the Internet and the World Wide Web to deliver government information and services to citizens."3 (Ibrahim, 2008, p. 64)

It also defines it as

"The process of transitioning government service delivery from paper-based to electronic format through the use of computers, communication networks, and the necessary software."4 (Al-Qudwa, 2010, p. 17)

Other scholars define e-government as:

"The virtual version of the real—or traditional—government, with the main difference being that the former exists within electronic networks and information systems, while the latter physically exists within state institutions."5 (Badran, 2004, p. 45)

From these definitions, it can be concluded that e-government refers to the use of information and communication technologies within governmental institutions and public transactions in order to achieve political, social, economic, cultural, and even legal objectives. This contributes to enhancing governmental performance, facilitating various services, and ensuring confidentiality and information security

The most important advantages of e-government—which have driven many countries to adopt it—include the speed of service delivery, cost reduction, improved quality of services, increased governmental transparency, the elimination of bureaucratic practices, and the achievement of equality among citizens.

Second: Objectives of E-Government

The objectives of e-government can be summarized as follows:

1-Enhancing transparency by providing highly reliable information while saving time, money, and resources used by governmental departments in their interactions with citizens, entrepreneurs, and investors.6 (Jamal, 2018, p. 103)

2-Supporting administrative and economic reform and development, as e-government can assist businesses—especially small and medium-sized enterprises—in accessing services and requirements easily and quickly.7 (Said, Evaluation of the E-Government System in Algeria, 2015, p. 07)

- Achieving effective communication and reducing administrative complexities.
- Creating a better working environment through the use of information and communication technologies within institutions.8 (Hussein, 2018, p. 244)
- Ensuring higher efficiency and return on investment**.**
- Improving user experience by standardizing procedures across all agencies and providing services 24 hours a day, seven days a week, from any location, with ease and high quality.9 (Qurbati, 2017-2018, p. 40)

From the above, we conclude that the primary objective pursued by countries through the implementation of e-government is to improve governmental performance at all levels, achieved through the use of electronic means characterized by speed and efficiency.

Second: Objectives of E-Government

Section Two: The Role of Artificial Intelligence in Supporting E-Government

Technological advancements around the world have contributed significantly to solving numerous administrative and governmental challenges faced by states. These developments have facilitated many governmental tasks, and, as previously mentioned, the adoption of an e-government system aims to enhance governmental performance across various sectors. With the emergence of artificial intelligence, it has become essential to examine the role of this technology in developing and strengthening e-government systems.

First: Definition of Artificial Intelligence

In recent years, the world has witnessed the emergence of a modern mechanism for development across various fields, represented in a technological tool that enhances efficiency and speed in completing transactions—commonly known as artificial intelligence. It may be defined as follows:

"Computer programs that engage in tasks typically performed by humans, due to the high-level mental processes they require, such as perception, learning, memory organization, and reasoning."10 (Abu -Al-Eid, 2003, p. 5)

Artificial intelligence is also defined as

"An information system endowed with intellectual capabilities similar to those of a human being, or a computer application or machine that performs operations carried out by human intelligence."11 ((Nathalie), 2017, p. 31)

Artificial intelligence is considered the most recent branch of computer science and belongs to the modern technological generation. Its primary aim is to enable computers to simulate the cognitive processes that occur in the human brain, allowing machines to solve problems and make decisions in a logical and structured manner similar to human reasoning. For artificial intelligence to function effectively, several essential components must be available:

- A data system in which information and knowledge are structured and represented;
- Algorithm**s**, responsible for determining how this information is processed;
- A programming language used to represent all information and algorithms.12 (Blilita, 2022)

Artificial intelligence can therefore be described as the most advanced technological development in the field of computing. It operates intelligently through a series of analyses that enable it to make decisions aimed at achieving specific objectives, thus mimicking human thought processes.

AI systems vary according to several criteria. When classified based on the functions they perform, four main types are commonly highlighted—the most significant of which are13 (Ahmed Daqa, 2024, pp. 233-234):

Reactive Machines:
These are the simplest types of artificial intelligence. They are unable to form memories or use past experiences to make decisions.

- **Limited Memory Artificial Intelligence:**
  This type has the ability to store previous data and predictions, particularly when collecting information and weighing potential decisions. It is more complex and more effective than reactive systems.
- **Theory of Mind:**
  This concept refers to the ability of artificial intelligence to understand human emotions, beliefs, feelings, and even intentions. These systems are designed to interact with humans in a more natural and intuitive manner.
- **Self-Aware Artificial Intelligence:**
  This form represents a hypothetical type of AI that would require a machine with consciousness—capable of thinking, perceiving its own existence, and recognizing the existence of others.

As for the types of artificial intelligence classified according to capability, there are three main levels:

Narrow Artificial Intelligence:
Also known as weak AI, it is designed to perform specific functions within a defined environment and cannot operate outside of it. It is highly specialized and limited to tasks such as translation, design, or particular research operations.14 (Khalifa, 2019, p. 42)

Strong Artificial Intelligence: It is characterized by great power, as it closely simulates the human mind due to its ability to solve various problems. It can also interact with individual components in the world and is capable of successfully performing any task.

Super Artificial Intelligence: This type is more complex and has the ability to surpass the human mind through the experiments applied to it. It can simulate and interact with human behaviors and actions within society, attempting to understand human thoughts and the emotions that influence their behavior. However, its social interaction is limited—this is the first pattern. The second pattern is a model based on **the theory of mind**, where it can express its internal state and predict the emotions of others.15 (Ahmed Daqa, 2024, p. 235)

2. Contribution of Artificial Intelligence to the Development of E-Government

Given the various and multiple characteristics of artificial intelligence, it contributes to the development of e-government through the following:

A. Simplifying Administrative Procedures
The philosophy of smart administration is based on using applications and technologies to manage data and information, providing means to access and analyze them.16 (Bukhit, 2023, p. 3428) The task does not stop at merely collecting data but also includes assisting in

classification and analysis. Additionally, by using AI technologies such as chatbots, citizens' inquiries can be responded to instantly and around the clock without needing to visit administrative offices. This greatly facilitates citizens' interaction with government departments and enhances administrative work.

B. Improving Decision-Making

AI technologies enable administrations to analyze vast amounts of data across financial, health, and educational sectors. This empowers decision-makers to adopt more accurate and effective policies while avoiding many critical errors typical of traditional administrations. Decisions can be made objectively and rationally, free from emotional influence. Moreover, AI ensures speed and precision in administrative processes, allowing tasks to be completed efficiently and helping to resolve numerous administrative challenges.

C. Promoting Transparency and Combating Corruption

AI systems help detect suspicious transactions and irregularities within government institutions, thereby enhancing transparency. They also reduce favoritism and nepotism, which are major threats to administrative integrity. AI can identify sudden spikes in spending, repeated transactions with the same supplier, or conflicts of interest in contracts, alerting supervisory authorities to potential irregularities. Consequently, AI contributes to reducing corruption and can automatically verify documents and contracts against official databases, detecting forgery if present.

For instance, North Korea employs AI to monitor public contracts, while some banks use AI to analyze customer accounts, assess creditworthiness before granting loans, and monitor repayment—practices that increase transparency and reliability in financial dealings.

D. Transition to Smart Administration

Smart administration leverages advanced technologies, algorithms, and AI-powered tools—such as cloud-based robots, machine learning, and natural language processing—to collect and process large datasets. These tools allow governments to utilize data to improve the quality and efficiency of public services.17 (Abderrahmane Abdallah, 2024, p. 41) Integrating AI facilitates the transformation of e-government into **smart government**, which is defined as

*"Providing electronic services and various information applications on smart devices, allowing smart government services to be delivered from anywhere, at any time, with maximum speed and precision, through a unified platform for mobile applications."*18 (Abdelghani Al-Aqel, 2021, p. 47)

C. Contribution to Cybersecurity

One of the key features of AI systems is the electronic exchange of transactions and data between government and private entities, which facilitates their operations and services. This strengthens public trust in smart services and enhances the performance and productivity of institutions by completing processes that would otherwise require significant human labor. AI systems also contribute to **information security19** (Bukhit, 2023, p. 3440), as they assist in the early detection of cyberattacks and protect citizens' sensitive data.

D. Economic Development

AI systems can be leveraged by governments to promote **national economic growth**. For example, in retail, these technologies help merchants better meet customer needs and collect

and analyze customer data to understand their preferences and purchasing behaviors. This enables the personalization of offers and products. Numerous examples exist of how AI contributes, directly or indirectly, to the development of a country's economy.

Conclusion on AI and E-Government
From the above, it is clear that AI, in its various types and applications, plays a significant role in developing e-government and transforming it into smart government. However, this transformation is only possible with a **comprehensive legal framework** that regulates the use of AI in government operations.

Section Three: Legal Challenges

The rapid proliferation of AI systems raises many **legal issues**. Like other countries, Algeria seeks to adopt legal solutions to keep pace with contemporary digital developments as part of its digital transformation strategy. However, to date, there is no comprehensive law governing the use of these technologies, which poses several challenges to implementing this strategy.

1. Legal Liability in Case of Errors Caused by AI Technologies
The use of AI systems may result in various harms due to their decision-making capabilities without human intervention. This could lead to risks such as the commission of crimes, which would trigger **civil and criminal liability**.

1. Civil Liability

Civil liability arises from any **error or damage caused by a natural or legal person** and may be contractual or tortious. Actions performed by AI systems can also result in harm. For example, if a robot breaches the obligations stipulated in a contract, can the robot itself be held liable?

- If the contract is between natural or legal persons, contractual liability applies, and compensation is due.
- In the case of AI, some argue that the **"human proxy theory"** should be applied. Under this principle, a human acts as a proxy for the robot and is legally responsible for compensating any harm caused by operational errors.

The human proxy could be:

- The **manufacturer** or company responsible for defects in the machine due to poor manufacturing.
- The **owner/user** who employs the robot for personal use or to serve clients (e.g., a doctor).

Thus, the human proxy is responsible for the robot's contractual actions.20 (Rafaf Lakhdar, 2023, pp. 573-574)

If the robot independently engages in contractual acts without the involvement of its human proxy, holding the robot liable for breaches is insufficient to address the resulting damage. Liability is therefore directed toward a natural person, not AI, because AI cannot legally be a party to a contract. Even if individuals include clauses describing the AI's capabilities, the

contract only imposes a duty of care, not a guarantee of results. Proving contractual negligence for AI is challenging due to its complex structure, making it difficult to establish **fault or lack of caution** in fulfilling contractual obligations.21 (Rafaf Lakhdar, 2023, p. 574)

Conclusion: There is currently a **legislative gap in Algeria** regarding civil liability arising from damages caused by AI.

2. Criminal Liability for AI-Related Offenses

Criminal liability requires the presence of three elements: **material, moral, and legal**. If any of these elements are absent, establishing criminal responsibility becomes difficult.

- While the **material element** (actus reus) may occur due to an AI error, the **moral element** (mens rea) is lacking because AI does not have legal personality and cannot intend to commit a crime.

Two approaches have been proposed:

1. **Recognizing AI legal personality:** This approach allows AI to be held accountable for its actions, with a dedicated financial estate used to compensate for damages caused by its acts.
2. **Human-only liability:** Criminal liability applies solely to natural persons. AI cannot be criminally liable because most penalties cannot be enforced against it, and the goals of punishment—general and specific deterrence—cannot be applied to AI systems.22 (Fatiha, 2024, p. 1188)

2. Respect for the Right to Privacy

AI systems rely on the collection and analysis of **massive amounts of data**, which may include sensitive information such as criminal records, customer data, and confidential legal documents. This large volume of information raises serious concerns regarding the protection of personal and confidential data, as well as compliance with internationally recognized data protection regulations, such as the **General Data Protection Regulation (GDPR)** in the European Union.

The risk of data leaks, misuse outside intended purposes, or cyberattacks increases with greater reliance on AI systems. 23 (European Commissio, 2020)To date, Algeria has not yet reached the level of data protection established in the European Union.

3. Transparency and the Ability to Interpret Government Decisions

Government systems may rely on **complex algorithms (Black-box AI)**, which can lead to several challenges:

- Difficulty in understanding the basis of administrative decisions (e.g., application rejection, classification, grants, or support).
- Difficulty in appealing decisions because citizens do not know how they were made.
- Issues concerning the principle of transparency and the citizen's right to information.

This lack of transparency creates serious problems in the context of justice, as judicial decisions must be **explainable and appealable** to ensure fairness—a requirement that AI systems may fail to meet.24 (Mohamed Aboud Hamed Mohamed, , 2025, p. 224)

4. Algorithmic Discrimination and Bias

Algorithms may produce **discriminatory outcomes** against certain population groups, specific geographic areas, or particular age or social categories. Such bias can result from:

- Biased training data
- Lack of human oversight
- Unfair algorithmic design

This threatens core legal principles, including **equality before the law, equal opportunity, and non-discrimination**. It requires the state to have strong capabilities for **independent auditing of algorithms**.

Conclusion

From the above, it is clear that **leveraging AI technologies in the development of e-government** represents a crucial step toward modernizing public administration and improving the quality of services provided to citizens. Integrating AI solutions—such as automation, natural language processing, predictive analytics, and other advanced tools—helps accelerate administrative procedures, enhance transparency, increase decision-making accuracy, and enable administrations to manage resources more efficiently.

However, achieving these benefits depends on addressing a set of **legal challenges**, foremost among them being the establishment of a clear legislative framework to regulate AI usage and define legal responsibilities in the event of errors or misuse. True success in digital transformation relies not only on adopting technology but also on creating a **supportive legal and institutional environment**, developing human capabilities, and fostering trust between citizens and the administration.

With these measures, AI can evolve from being merely a technical tool into a **strategic lever** for achieving more efficient, effective, and equitable public administration.

Key Findings:

- AI contributes to e-government development by improving the quality of electronic services.
- It enhances administrative performance through the use of predictive and analytical algorithms, facilitating decision-making and resource planning.
- AI strengthens transparency by recording processes and reducing human intervention, which limits bureaucracy and corruption.
- Clear standards are necessary to protect personal data.
- There is a lack of precise definition of **legal liability** in cases of errors caused by AI systems.

Recommendations

- Develop **digital infrastructure** that supports the integration of AI with existing government systems.
- Establish **unified platforms for government data** to facilitate the use of big data and intelligent analytics applications.
- Enact a **comprehensive AI law** that sets regulations and defines legal responsibilities.
- Create a **national AI regulatory authority** to oversee development and monitoring.
- Promote **partnerships between government, universities, and startups** to develop innovative solutions.
- Develop a **national AI strategy** aligned with the broader e-government strategy.

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