

Artificial Intelligence For Performance Improvement in Moroccan Public Administrations

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Abstract:

Artificial intelligence is emerging as a strategic tool for the modernization of public administrations. This article examines the contribution of artificial intelligence to the optimization of public sector performance. Through a review of the literature, it highlights the potential of artificial intelligence in the automation of administrative processes, predictive analytics, and resource optimization. At the same time, the study highlights the challenges faced by Moroccan public administrations, particularly regarding access to quality data, the development of digital skills, and ethical considerations. Finally, the article offers avenues for reflection to guide the conditions for the effective and responsible integration of AI into the public administration environment.

Keywords: Artificial intelligence, public performance, public administration.

JEL codes: G28, G31, H11

1-Introduction:

In a rapidly changing landscape, artificial intelligence is emerging as one of the key drivers of transformation in public administrations. Globally, public administrations are increasingly being driven to rethink their management approaches by integrating smart technologies capable of meeting the demands for processing, transparency, and data-driven decision-making (Wirtz et al., 2019; OECD, 2023). According to a study by McKinsey & Company (2023), artificial intelligence could generate up to \$4.4 trillion in annual productivity gains in the public sector. A significant portion of these gains would be linked to the automation of administrative tasks and improved predictive analytics.

In 2024, the European Union adopted a regulatory framework for artificial intelligence aimed at governing technological innovations in public services (European Commission, 2024). At the same time, countries such as Canada, Estonia, and Singapore are positioning themselves as pioneers in the application of artificial intelligence to the public sector (UNESCO, 2021).

In Morocco, the digital transformation of public administration is becoming increasingly important, in line with national ambitions to establish an effective e-government. The country has launched several programs, such as “Maroc Digital 2020” and the “Digital Generation 2023–2027” strategy, designed to accelerate the digitization of public services. However,



despite the technological progress made, the integration of artificial intelligence within public administrations remains limited. According to a report by the Economic, Social, and Environmental Council (CESE, 2024), Morocco has promising potential in the field of AI but faces several persistent challenges. (CESE, 2024)

According to a report by the Global AI Adoption Index (2023), A Widening Digital Divide Index, published by Microsoft, only 10.9% of the Moroccan population used generative artificial intelligence tools in 2024, while less than 20% of Moroccan public administrations use advanced analytics tools in their decision-making processes (CESE, 2021) .

This study aims to examine the role of artificial intelligence in optimizing performance and decision-making within Moroccan public administrations.

Thus, the central research question of this study can be formulated as follows: To what extent can artificial intelligence enhance performance and improve decision-making within Moroccan public administrations?

The objectives of the study:

- Analyze the potential of artificial intelligence to optimize decision-making processes and improve the performance of public administrations.
- Identify the drivers and barriers to the integration of AI into public administration governance processes.
- Assess the conditions necessary to ensure the sustainable and effective adoption of artificial intelligence.

2-Artificial Intelligence and Public Administration:

2-1-The Conceptual Foundations of AI:

The idea of endowing machines with intelligent capabilities dates back to antiquity, when Greek myths already referred to automatons such as Talos. However, it was not until the 20th century that this concept took shape as a rigorous scientific field, fueled by advances in mathematics, logic, cybernetics, and computer science.

The British mathematician Alan Turing, in his seminal article “Computing Machinery and Intelligence” (1950), raises the central question: “Can machines think?” (Turing, 1950).

2-2-The Birth of Artificial Intelligence:

The first functional artificial intelligence program was written in 1951 by Christopher Strachey, who later became director of the programming research group at the University of Oxford. His checkers program ran on the Ferranti Mark I computer at the University of Manchester in England. By the summer of 1952, this program was capable of playing a full game of checkers at a reasonable speed. (<https://www.britannica.com>)

The first successful demonstrations of machine learning were published in 1952. The Shopper program, designed by Anthony Oettinger at the University of Cambridge, ran on the EDSAC



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computer. Its simulated environment was a shopping mall consisting of eight stores. When asked to buy an item, Shopper would search for it by visiting stores at random until it found it. During its search, Shopper would memorize a few items available in each store it visited (just as a human customer would). The next time Shopper needed to find the same item, or another item it had previously spotted, it would go directly to the correct shop. This simple form of learning is called rote learning (<https://www.britannica.com>)

The first artificial intelligence program run in the United States was also a checkers program, written in 1952 by Arthur Samuel for the IBM 701 prototype. Samuel drew on the essential elements of Strachey's checkers program and expanded it considerably over the years. In 1955, he added features that allowed the program to learn from experience. Samuel incorporated memorization and generalization mechanisms, improvements that ultimately enabled his program to win a game against a former Connecticut checkers champion in 1962. (<https://www.britannica.com>)

Artificial intelligence was truly born as an independent scientific discipline in 1956, at the Dartmouth College conference organized by John McCarthy, Marvin Minsky, Claude Shannon, and Nathan Rochester. McCarthy first proposed the term "Artificial Intelligence" to describe this new field. The initial goal was to create machines capable of simulating learning, perception, reasoning, and problem-solving, much like human intelligence. The 1950s and 1960s were marked by strong optimism: researchers developed the first programs capable of playing chess, solving logic problems, or proving mathematical theorems. ("The Strategic Role of Artificial Intelligence in Optimizing Performance and Decision-Making in Moroccan Public Administrations in the Era of this New Vision of Digital Transformation of the State: Current Status and Prospects for Future Research" ISSN: 2351-8111)

2-3-Definition of artificial intelligence:

Artificial intelligence (AI) encompasses a set of techniques and methods that enable machines to mimic certain human cognitive functions (Russell & Norvig, 2016). The goal is to design systems capable of making decisions, solving complex problems, and interacting autonomously with humans. According to the European Commission (2020), an operational definition specifies that AI refers to software systems designed by humans that, for a given purpose, perceive their environment, interpret the data collected, reason based on their knowledge, and make decisions to achieve a specific goal.

2-4-Components of artificial intelligence:

Artificial intelligence is not a single technology, but an ecosystem of subfields, each with distinct purposes and applications. Here are the main components:

- Machine learning:

This is one of the most widely used branches of artificial intelligence, enabling systems to learn from data without being explicitly programmed. Using statistical algorithms, the system detects patterns, identifies trends, and improves its performance over time (Jordan & Mitchell, 2015).

- Deep Learning:



This is a subcategory of Machine Learning based on artificial neural networks, enabling the processing of unstructured data (images, speech, text). This technology is particularly powerful for facial recognition, machine translation, and image classification (LeCun, Bengio & Hinton, 2015).

- Natural Language Processing (NLP):

It enables machines to understand, generate, and interact using human language. NLP systems are used in chatbots, voice assistants, and tools for automatically reading administrative documents.

- Robotic Process Automation (RPA):

It involves automating repetitive and structured administrative tasks. ARTIFICIAL INTELLIGENCE makes these robots “smarter” through decision-making capabilities based on rules or data analysis.

- Expert systems and decision logic:

These systems simulate human decision-making based on logical rules and are often used in decision support or diagnostic processes.

2.5 - Theoretical Frameworks for Innovation in the Public Sector

Beyond generic definitions of AI, the adoption of these technologies in public administration falls within theoretical frameworks specific to public management. Public value theory (Moore, 1995) posits that the legitimacy of a technological innovation in the public sector is measured not only by its efficiency but also by its ability to create collective value recognized by citizens and elected officials—a central criterion for evaluating Moroccan administrative AI beyond mere productivity gains. At the same time, New Public Governance (Osborne, 2006) emphasizes interorganizational networks and the co-production of services, offering a relevant framework for analyzing the fragmentation of data among Moroccan ministries identified in Section 6. Finally, organizational technology readiness models (Technology Readiness, Parasuraman, 2000; TOE Framework, Tornatzky & Fleischer, 1990) make it possible to structure the analysis of Moroccan barriers (digital skills, infrastructure, data governance) not as a simple list of constraints, but as the dimensions of an institutional maturity model.

3-Public Performance in the Age of Artificial Intelligence:

3-1-Definition of performance:

In the age of artificial intelligence, the performance of a public administration is not limited to traditional efficiency. It is also measured by the ability to integrate, utilize, and leverage smart technologies to improve decision-making, optimize processes, and anticipate needs. Performance in the age of AI combines the speed, quality, and accuracy of public services. In this context, performance is no longer merely an indicator of results but also a reflection of technological mastery and organizational agility, enabling institutions to remain competitive and responsive in the face of digital transformation. (Davenport & Ronanki, 2018; OECD, 2025)



3-2-Types of performance within public administrations:

The literature distinguishes several forms of performance, which apply to both the private sector and public institutions (Politt & Bouckaert, 2011; Behn, 2003):

- Economic performance: resource optimization, cost control.
- Social performance: citizen satisfaction, equity, accessibility of services.
- Organizational performance: smooth processes, collaboration between departments.
- Environmental performance: sustainable management of public resources.
- Democratic performance: transparency, accountability, citizen participation.
- Digital performance (recent): the administration's ability to integrate and use digital tools to create value.

3-3-Public sector performance:

According to Bouckaert & Halligan (2008), public performance can be defined as: "the ability of a public administration to produce results that are beneficial to society, by responding effectively and equitably to citizens' expectations, while adhering to the principles of transparency, accountability, and value for money."

The public performance approach is thus based on (Bouckaert & Halligan (2008)):

- The public service mission,
- A focus on the public interest,
- The pursuit of legitimacy and social impact, beyond mere accounting results.

4-The experience of other countries in integrating artificial intelligence into their public administrations:

AI has the potential to profoundly transform the organization and management of the public sector. As in other areas of public policy, AI tools could be used to better target and personalize human resources (HR) services, to accelerate and improve HR management processes in order to reduce administrative burdens, and to increase employee productivity. Some countries have already begun experimenting with the application of AI to specific HR functions, such as recruitment, employee learning, and development (e.g., training). (OECD, 2025)

- Countries such as France, however, have taken a coherent and strategic approach to exploring the benefits of AI in the context of public service reform, acknowledging potential negative effects and implementing safeguards to address them. France has developed a structured strategy to integrate AI into human resources management across its entire public administration. This strategy focuses on three key areas: AI integration, workforce planning, and civil servant training. Its aim is to ensure the responsible, ethical, and effective use of AI, boost productivity, and support complex decision-making processes. (OECD, 2025)



- The United Kingdom has also made particularly significant efforts in this area: HM Revenue and Customs (HMRC) uses an AI-based platform called “Outmatch” to fully automate the recruitment process for certain junior positions. Candidates are asked to record their answers to six questions linked to a competency framework. The AI tool then analyzes their responses and assigns them a score. The tool is designed to process a large volume of applications by automating the assessment and interview phase. (OECD, 2025)
- In Singapore, ten government agencies have implemented an AI-based recruitment service to automate repetitive tasks in the pre-screening process, such as reviewing and sorting applications. A custom-designed chatbot also manages the written portion of the recruitment process by reviewing and scoring candidates’ written responses. This service has significantly reduced the workload for government agencies, making the process more effective and efficient. (OECD, 2025)

5-Research Methodology:

To conduct a rigorous literature review based on research studies that address the contribution of artificial intelligence to optimizing the performance and decision-making processes of public administrations. The research strategy adopted involved keyword searches in databases for both French and English. Articles were then selected based on several criteria; an initial selection was made based on titles and abstracts, followed by an in-depth analysis of the full text to identify the most relevant contributions. Finally, a review of the bibliographic references of the selected articles identified complementary works, supplemented by an additional search using the Google Scholar academic search engine.

6-Analysis and discussion of the findings regarding the contribution of artificial intelligence to optimizing the performance of public administrations in Morocco:

6-1-Current status:

Artificial intelligence is considered a key driver and tool for modernizing public administration worldwide. It offers significant opportunities to improve the quality of public services, strengthen decision-making processes, optimize resource utilization, and increase the transparency of administrative actions. In the case of Morocco, the gradual integration of artificial intelligence into public administrations is evident, notably through the MAROC DIGITAL 2025 strategy and the National Charter for Administrative Decentralization. Despite these advances, this evolution continues to face several structural, organizational, and cultural challenges that may hinder the adoption and effective integration of these technologies into public management.

6-2-Strategic framework for the development of artificial intelligence in Morocco’s public sector:

Since the 2010s, the Kingdom of Morocco has stepped up its efforts to digitize public administration. ARTIFICIAL INTELLIGENCE is identified as a strategic emerging technology, referenced in several policy documents:



- **Morocco Digital 2025 Strategy:** This plan identifies artificial intelligence as one of the priority technologies to be promoted to improve the efficiency of public services.
- **CESE Report (2024):** titled “Artificial Intelligence in Morocco: Between Promising Potential and Persistent Challenges,” it highlights the importance of accelerating the integration of artificial intelligence into government, emphasizing issues of ethics, governance, and digital sovereignty.
- **Framework Law on Digital Transformation (draft):** currently being drafted, this law aims to regulate the use of advanced technologies, including artificial intelligence, in public institutions.

6-3-Areas where artificial intelligence is beginning to be deployed:

-The healthcare sector:

In Morocco, artificial intelligence is beginning to be used in the healthcare sector to improve the quality of medical services and the efficiency of the healthcare system. AI technologies enable, in particular, the analysis of medical data, assist in the diagnosis of diseases, and optimize the management of hospitals. For example, some projects use AI to analyze medical images (radiology, CT scans, MRIs) to help doctors detect certain conditions more quickly. Artificial intelligence can also contribute to health data management and the planning of medical resources, which is particularly important in the context of the modernization of the Moroccan healthcare system. (Ministry of Health and Social Protection of Morocco (2022), World Health Organization (2021))

- Education and Higher Education :

Artificial intelligence is also being gradually introduced into the Moroccan education system. Several universities and research institutions are developing training programs in artificial intelligence and data science. In addition, certain digital platforms use data analysis and machine learning tools to improve teaching methods and track student performance. AI can also contribute to personalized learning and improved management of educational institutions. (UNESCO (2021), Ministry of Higher Education, Scientific Research, and Innovation (2023))

- Public Finance Management and Taxation :

In the field of public finance, artificial intelligence is beginning to be used to improve budget management, tax data analysis, and fraud detection. Tax authorities use data analysis systems to identify inconsistencies in tax returns and strengthen control mechanisms. AI also helps improve tax revenue forecasting and optimize the management of public resources. In Morocco, the digital transformation of the tax administration is part of a broader strategy to modernize public finances and enhance transparency. General Directorate of Taxes (2023)

- Digital Public Services and E-Government :

Artificial intelligence also plays a role in the development of digital public services in Morocco. The Moroccan government is gradually moving toward the digitization of administrative procedures to simplify processes for citizens and improve the efficiency of public services. AI can be used in digital platforms to automate certain administrative tasks, analyze user data, and



improve service management. This transformation is part of the national strategy Maroc Digital 2025, which aims to accelerate the digital transformation of the government and promote the use of digital technologies in public services. (Digital Development Agency (2022), Maroc Digital 2025).

6-4- The Role of Artificial Intelligence in Optimizing the Performance of Public Administrations: An Academic Perspective :

The digital transformation of public administrations has gradually emerged as a strategic lever for improving the efficiency, transparency, and responsiveness of public action. In this context, the integration of artificial intelligence represents a major evolution in the process of administrative modernization. Indeed, these technologies offer new opportunities to enhance public performance by transforming management methods, decision-making mechanisms, and interactions between government agencies and citizens. In particular, artificial intelligence enables the use of large amounts of data to improve the analysis, planning, and evaluation of public policies, thereby contributing to more effective and results-oriented public governance (Organization for Economic Co-operation and Development, 2019).

-Artificial Intelligence for Operational Performance :

One of the key benefits of artificial intelligence in the public sector lies in the intelligent automation of administrative processes. Technologies such as machine learning, natural language processing (NLP), and robotic process automation (RPA) make it possible to:

- Reduce processing times for files and procedures,
- Lower operational costs,
- Minimize human error,
- Improve the reliability and quality of administrative services.

According to J. Mergel and colleagues (2019), automation based on artificial intelligence frees up time for higher-value-added tasks, while ensuring greater standardization and traceability within administrative management chains. Similarly, K. Arai et al. (2021) emphasize that these technologies help make government more efficient and responsive to citizens' needs.

-Beyond automation, artificial intelligence facilitates the shift from a reactive approach to a predictive and proactive one. Big data analysis makes it possible to anticipate citizens' needs, detect social or territorial risks, and offer personalized services. Example: Tax authorities (such as in Estonia or Canada) use artificial intelligence to pre-fill tax returns, detect fraud, and tailor audits based on risk profiles (OECD, 2021). In this context, artificial intelligence helps increase the perceived value of public services and boost user satisfaction, which is a key indicator of public performance (Bouckaert & Halligan, 2008).

-In the case of Morocco, several exploratory initiatives (digital portals, smart taxation, administrative chatbots) demonstrate that artificial intelligence can improve the performance of public services, particularly in terms of:

- Reducing processing times,



- Automating procedures,
- Supporting budget management.

However, regional inequalities, the fragmentation of databases, the skills gap, and the lack of clear regulation constitute major obstacles to genuine and sustainable optimization. A comprehensive strategy is necessary to ensure that artificial intelligence is integrated not merely as a technological tool, but as a pillar of the reform of Morocco's public administration. ("The Strategic Role of Artificial Intelligence in Optimizing Performance and Decision-Making in Moroccan Public Administrations in the Era of this New Vision for the Digital Transformation of the State: Current Status and Prospects for Future Research" ISSN: 2351-8111).

-Narrative Cohesion: International vs. Morocco Comparison Matrix:

International Practice	Lever Engaged	Corresponding Moroccan barrier	Possible implementation in Morocco
France — Structured HR Strategy (AI, Planning, Training)	Integrated Change Management	Lack of a clear regulatory framework	National Charter for the Governance of Administrative AI
United Kingdom — Outmatch (HMRC)	Recruitment Automation	Lack of in-house digital skills	Supervised sector-specific pilot programs (e.g., local government)
Singapore — Multi-agency pre-screening chatbot	Inter-agency Interoperability	Database Fragmentation	Inter-ministerial interoperable data platform
Estonia / Canada — Predictive Tax Pre-Filling	Large-Scale Predictive Analytics	Limited data quality and availability	Centralized Tax Data Lake (DGI Extension)

6-5-Results and Discussion:

An analysis of the reviewed literature highlights the effects of artificial intelligence (AI) on public sector management. The results show significant and multidimensional impacts, primarily affecting administrative performance, operational efficiency, and public governance. These effects translate into improved operational efficiency, reduced costs, increased automation of administrative processes, and enhanced transparency. These findings confirm that AI is a key driver of transformation in public management practices and the quality of services provided to citizens.

The literature also emphasizes that reducing administrative costs is one of the benefits most sought after by governments. Process automation allows routine tasks to be delegated to intelligent systems, reducing the human workload and limiting errors that could generate additional costs. According to the OECD (2019), AI contributes to more efficient management of public resources by streamlining processes and reducing the need for costly manual interventions.

Although artificial intelligence holds considerable potential for improving public administration, its adoption comes with major challenges and risks that could limit its benefits. The literature highlights ethical, technological, legal, and organizational issues which, if not



anticipated and properly managed, can negate the benefits of AI or create new vulnerabilities within public administrations. These risks directly influence the dimensions of performance, governance, and efficiency analyzed earlier.

-The first issue concerns the ethical risks associated with the automation of decision-making in sensitive areas of public policy.

-The second issue concerns algorithmic biases, which are widely documented in the literature.

According to the OECD (2019), governments must strengthen their capabilities in data governance, anonymization, and cybersecurity in order to maintain public trust and ensure the integrity of public systems. Poor data management can thus undermine both operational efficiency and public governance. Another risk concerns technological dependence, resulting from the use of proprietary solutions, opaque algorithms, or platforms controlled by a limited number of private actors. This dependence can undermine the digital sovereignty of governments, limit their ability to conduct audits, and generate high maintenance or migration costs. Janssen et al. (2020) emphasize the importance of prioritizing open, transparent, and modular solutions in order to maintain strategic control over digital systems and avoid technological lock-in.

Finally, the transformation of public servants' skills represents a major organizational challenge. The integration of AI is changing the nature of administrative work by shifting certain repetitive tasks to automated systems and requiring new skills related to data management, the interpretation of algorithmic results, and the oversight of technologies. As Mergel (2019) points out, public administrations must invest in continuing education, develop a digital culture, and adapt their organizational structures to support this transition. Without strengthening human skills, the performance and efficiency gains associated with AI risk remaining limited or generating new internal inequalities.

6-6-Concrete Operational Recommendations:

- Data interoperability: Define a standardized exchange protocol (unified APIs) between ministerial information systems, led by the Digital Development Agency (ADD), with a phased timeline for compliance.
- Algorithmic audit: Develop national guidelines inspired by the framework of the European AI Act, requiring traceability documentation for any AI system used in an individual administrative decision.
- Skills development: Establish a mandatory certification program in digital literacy and AI for civil service executives, integrated into the continuing education plans of existing training institutions (ISCAE, ENA, or equivalents).

7-Conclusion:

The analysis presented in this article highlights the growing role of artificial intelligence (AI) in the public sector. The findings indicate that AI's ability to increase operational efficiency, reduce costs, automate administrative processes, and enhance the transparency of public actions makes it a key driver of public administration reform. These positive effects, as documented in



a growing body of scientific and institutional literature, demonstrate that public administration is gradually modernizing its procedures, improving its governance mechanisms, and responding more effectively to citizens' rising expectations. Nevertheless, this transformation also entails ethical, technological, and organizational risks that must be taken into account, particularly when AI is deployed in sensitive areas of public policy.

In the Moroccan context, this study has shed light on both the progress made and the persistent challenges regarding the integration of artificial intelligence into the management and oversight processes of public administrations. This analysis shows that artificial intelligence can play a pivotal role in optimizing organizational performance through intelligent task automation, predictive analytics, data-driven decision support, and the continuous improvement of services provided to citizens. However, its deployment remains limited in the Moroccan public sector, due in particular to constraints related to insufficient digital skills, a lack of interoperable technological infrastructure, the scarcity of high-quality data, and the absence of a clear and incentivizing regulatory framework. As part of a comprehensive digital transformation of the government, it is imperative to develop an integrated public strategy for artificial intelligence, centered on several key areas: strengthening human capacity, developing open and secure data platforms, establishing a collaborative innovation ecosystem, and implementing ethical and regulatory mechanisms tailored to the specificities of the Moroccan context.

Overall, artificial intelligence presents a major opportunity to modernize public service. However, its implementation requires a balanced, responsible strategy that is grounded in the core values of public service. The future of public administrations will thus depend on their ability to reconcile technological innovation, institutional ethics, and organizational performance.

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