

Review Article¹

The Use of Artificial Intelligence Technology to Support Sustainable Development Pathways

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Abstract:

This research paper aims to conduct an in-depth legal and analytical study to demonstrate the role of using artificial intelligence (AI) technology in achieving the objectives of sustainable development. It seeks to identify the nature of the relationship between the use of modern technologies in sustainable development pathways and its regulations as a basis for AI governance, functioning as an effective modern tool that supports comprehensive development pathways while balancing the encouragement of creativity and innovation with the protection of the public interest. This raises a question regarding the extent to which artificial intelligence technology can be utilized as an effective developmental tool to achieve sustainable development goals and ensure the safe and responsible use of AI.

One of the results of the study is that genuinely benefiting from the advantages of using AI technology to achieve sustainable development goals remains tied to the establishment of an integrated legal system as a basis for AI governance. This system must keep pace with the developments witnessed in the AI era and protect constitutional values and principles, as well as fundamental rights and freedoms.

Keywords: Artificial Intelligence, Sustainable Development, Constitutional Values, Fundamental Freedoms, Economic Dimension, Social Dimension, Environmental Dimension.

Introduction:

Since achieving the objectives of sustainable development is a strategic requirement for various states and actors, this highlights the importance and role of sustainable development in improving and advancing the lives of individuals and societies by integrating all dimensions to achieve comprehensive development (economic development, social development, and environmental conservation). With the world shifting towards the digital age and the emergence of artificial intelligence in various fields, it has become imperative to move towards integrating AI systems as a strategic lever to achieve sustainable development goals. This is done by relying on AI to simulate human intelligence, potentially making it an alternative system to human labor in critical fields. From this perspective, the relationship between the use of AI technologies and the achievement of sustainable development goals has emerged.

This research paper aims to conduct an in-depth legal and analytical study to demonstrate the role of the strategy of

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using AI systems in developing various sectors, and the extent of its contribution to activating sustainable development pathways as an effective means of implementing public policies to achieve sustainable development goals. It also examines its ability to develop the performance of different sectors and improve the services they provide, especially in light of the growing role of AI technologies and the radical revolution they have brought about. This confronts us with a reality that requires the use of AI technologies to enhance the requirements and principles of good governance for the implementation of public policies. It also necessitates working to establish a precise and comprehensive legal framework to ensure the safe and responsible use of AI technology to achieve sustainable development goals, develop sectors, and improve services, thus contributing to supporting the state's digital transformation strategy while taking into account the principle of the rule of law and the protection of constitutional values and fundamental rights. Asserting otherwise would confront us with legal, practical, and even ethical challenges that may arise from the misuse of AI technologies, particularly concerning risks affecting cyber security.

The study also aims to highlight the role of AI technology in achieving sustainable development goals, and to determine the nature of the relationship between the use of modern technologies in sustainable development pathways and its controls as a basis for AI governance, acting as an effective modern tool supporting comprehensive development pathways and balancing the encouragement of creativity and innovation with the protection of public interest. This poses a fundamental problematic regarding the extent to which AI technology can be employed as an effective developmental tool to achieve sustainable development goals without prejudice to constitutional values and fundamental freedoms, thereby ensuring the safe and responsible use of AI technology?

To address this problematic, a descriptive approach was adopted according to a plan that focused on defining the concept of using AI technology to achieve sustainable development goals, demonstrating the manifestations of using AI technologies and their relationship to the goals and principles of sustainable development, and highlighting the effectiveness of the strategy of using AI systems in achieving sustainable development goals and its challenges.

First Section: The Theoretical Framework for the Use of Artificial Intelligence Technology to Achieve Sustainable Development Goals:

First The Concept of Artificial Intelligence:

Artificial intelligence is defined as the field that relies on a set of technologies and systems to create machines capable of enhancing intelligent behavior and transitioning towards reliance on a machine-based system designed to achieve specific goals by relying on data, such as making decisions independently and influencing various environments. Some researchers link the concept of AI as a system aimed at simulating aspects of human intelligence (The Dartmouth Conference Definition). Alternatively, it is the practical test aimed at assessing the degree of AI to determine the extent of intelligent systems' ability to respond to various phenomena compared to human intelligence (Turing Test Definition). John McCarthy also provided a significant definition of AI in 1955 as the science and engineering of making intelligent machines, emphasizing the interdisciplinary nature of AI and the integration of scientific and engineering principles (John McCarthy's Perspective). From modern viewpoints (Modern Perspectives), several definitions of AI have been presented, describing it as the study of agents that receive percepts from the environment and perform actions, reinforcing the idea of interactive intelligent agents with their surroundings. Additionally, Tom Mitchell's 1997 definition stated that machine learning requires the study of computer algorithms to perform tasks without explicit programming (Machine Learning-Centric Definition). With the developments in the technological and technical fields, the discussion on the use of AI technologies has become linked to the extent of consideration for ethical values and considerations. This highlights the importance of using smart technology while taking ethical values and considerations into account, particularly in the fields of scientific research. AI systems multiply given the levels of autonomy and adaptability, alongside the need to understand the reality of adopting AI in legal work—especially in light of rapid technological transformations—and setting a clear policy based on data and information to

enhance efficiency and reduce costs, particularly with the emergence of AI as an influential factor in various sectors. Furthermore, the existence of an incubating environment tailored to the rapid shift towards using AI systems necessitates clear legislation and policies for its use and development. This ensures effective benefits from the advantages of smart technology and reduces the level of risks resulting from the use of AI systems, particularly from a legal and ethical standpoint, especially given the multiple challenges and gaps in the transition path towards AI to develop various sectors, and the practical problems that have arisen from it, particularly at the organizational, institutional, legal, or ethical structure levels.

Second Characteristics of the Use of Artificial Intelligence Technology:

Relying on AI technologies allows for solving various problems, especially complex and precise ones, and provides the capacity for perception, thinking, acquiring knowledge, and applying it. This also includes the ability of AI systems to understand, learn, and benefit from past expertise and experiences, employing them to address issues or problems and respond to detecting various matters or developments, including dealing with complex, difficult, or ambiguous cases.

In addition, relying on AI systems contributes to the ability to visualize, understand, and perceive visual matters, providing information and relying on it to make administrative decisions independently and quickly.

Third The Legal Consecration of the Use of AI Technologies in Algerian Legislation:

Besides the general rules in the Civil Code related to artificial intelligence, the Algerian legislator has adopted special texts in the digital field. This includes Executive Decree No. 23.07, which regulates the conditions and modalities of establishing internet services; Decree No. 01.123 of May 9, 2001, relating to the exploitation system applicable to all types of networks, including electrical wireless, and various telecommunications services, amended and supplemented by Executive Decree No. 07.162; Ordinance No. 11.03 of August 26, 2003, relating to money and credit, which included the provision on modern electronic payment methods in the banking sector; Law No. 09.03 relating to consumer protection and fraud repression; Law No. 09.04 containing specific rules for the prevention and fight against offenses linked to information and communication technologies; Presidential Decree 15-247 containing the regulation of public procurement and public service delegations, amended by Law 23/12; Law No. 15-03 on the modernization of justice; Law No. 15-04 fixing the general rules relating to electronic signature and certification; Law 18-04 fixing the general rules relating to postal and electronic communications; Law No. 08-01 relating to insurance, particularly the provisions relating to the electronic use of the Chifa card; and Law No. 22-18 relating to the Investment Law.

Fourth The Importance of Artificial Intelligence in Achieving Sustainable Development Goals:

Smart technologies based on AI systems contribute to improving the efficiency of using natural resources, saving energy, and reducing environmentally harmful emissions. AI can also contribute to improving renewable energy systems and the smart distribution of energy, and providing smart automated transportation and urban sustainability. Furthermore, AI can contribute to enhancing production capacity and achieving sustainable development by analyzing data and optimizing operations using AI technologies and systems.

Fifth The Relationship Between Digital Transformation and Artificial Intelligence:

Digital transformation is closely linked to AI systems, as adopting a digital transformation strategy provides a massive amount of data and information. This data is essential for developing AI systems and utilizing them to develop various sectors and activities by integrating smart technology into the activities of various facilities and institutions and the services they provide. This includes introducing AI technologies into the medical field due to their ability to analyze medical data, diagnose, and propose treatments and solutions accurately. It also includes agricultural fields by relying on innovative AI technologies, and relying on smart technologies to monitor weather and climate changes and soil characteristics to develop the agricultural sector. This confirms the interconnectedness between digital transformation

and AI and its role in creating an environment for creativity and innovation in the field of AI, developing various sectors, and contributing to achieving sustainable development goals at innovative and ambitious levels.

Second Section: Manifestations of the Use of Artificial Intelligence Technology to Achieve Sustainable Development Goals:

The trend towards adopting the use of AI technology contributes to supporting the achievement of developmental sustainability, which highlights the importance of relying on AI technologies in developing various sectors. The scope of using AI technologies is determined in data analysis, managing and developing vital sectors, managing human resources, and contributing to enhancing the digital transformation strategy and using smart technology in various resource management operations and developmental projects to achieve sustainable development goals. This is done by relying on innovative smart technical programs and systems that contribute to achieving developmental sustainability, especially in light of the challenges facing societies, the environment, and the economy.

1. The Role of Using AI Technology in Ensuring the Sustainability of Natural Resources:

The use of AI technology plays an important role in enhancing the optimal use of natural resources by relying on diverse innovative modern technical tools and systems to manage and operate those resources and ensure their sustainability. This includes using AI technologies in managing environmental elements, monitoring pollution manifestations and their impacts, weather conditions, water, waste management and operation, and contributing to reducing environmental impact.

2. The Role of Using AI Technology in Developing the Agricultural Sector to Achieve Agricultural Sustainability:

The use of AI technology contributes to developing the agricultural sector by adopting smart systems in agricultural sectors, monitoring various agriculture-related data, tracking soil conditions and studying its quality, weather conditions, and managing agricultural crops with smart systems. This contributes to developing the agricultural sector, improving its service and production performance, protecting natural resources, achieving the optimal use of agricultural natural resources and ensuring their sustainability, and raising production capacity to achieve agricultural sustainability and agricultural and food security. It also effectively contributes to preserving environmental elements and reducing the negative environmental impact on agricultural activities, which would indirectly contribute to developing and revitalizing other sectors such as industry, trade, and investment.

3. The Role of Using AI Technology in Achieving Environmental Sustainability:

Relying on AI technologies through the use of smart and innovative technological systems contributes to preserving the environment and ensuring the sustainability of its elements. This includes preserving natural resources and moving towards achieving smart energy, smart management of water resources, smart waste management, and using smart systems to mitigate natural risks and disasters, smart transportation...

4. The Role of Using AI Technology in the Energy Field to Achieve Smart Energy:

The optimal use of energy resources and rationalizing their use to ensure energy sustainability is among the challenges faced by states and the world in general. The use of AI systems in the energy sector is considered one of the important solutions that significantly contribute to reducing energy consumption and integrating innovative smart applications into the management and operation of energy resources by relying on smart energy grids. This considers that smart devices or applications use advanced sensors and meters, renewable energy sources, remote digital controllers, and innovative modern analytical tools to manage, distribute, or store energy. This is in addition to the role of smart technology in relying on an automated demand response system and preparing virtual energy plans using AI techniques and systems. It also contributes to creating an advanced infrastructure for information and communications networks, smart buildings or smart cities, continuous energy consumption, and the shift towards using clean energy, which reduces pollution levels and improves air quality.

5. The Role of Using AI Technology in Managing Water Resources:

The smart management of water resources using AI technology is a real bet to ensure good management of water resources to achieve water security and address issues of water scarcity. Consequently, relying on innovative smart digital technological techniques contributes to ensuring the optimal exploitation of water resources and achieving equity in their distribution. This is in addition to monitoring data and information related to water resources management in a way that enables consumers to know the true status of the sector, rationalizing water consumption, and the necessity of relying on rational consumption patterns of water resources to ensure their sustainability. Furthermore, AI technologies have the ability to track and monitor weather conditions, such as working with a sensor system to know the weather state or the occurrence of natural disasters like floods, and the ability to predict and deal with them as quickly as possible. Relying on AI technologies to manage and operate water resources also provides information, data, and details regarding water resource networks and achieves smart water distribution based on smart systems.

6. The Role of Using AI Technologies in Achieving Smart Waste Management:

The use of AI technology in waste management and operation contributes to achieving good management of waste collection and recycling through the use of a sensor system for the movements of various wastes and managing them from the source until disposal. Innovative AI systems help preserve environmental elements, especially in the case of waste accumulation and its impacts on environmental elements and humans, and work to transform the role of waste from an environment-affecting source to a resource that contributes to wealth creation through recycling and utilizing waste. This involves converting it into materials that may be used in agriculture or industry, especially with the emergence of the waste recycling activity as a source for waste treatment and creating significant financial resources. Examples of using AI technology in waste management include the use of modern technologies and systems in the field of renewable energy, monitoring and tracking means, and methods of landfilling and recycling waste.

7. The Role of Using AI Technology in Developing the Transport Sector:

Since transport is one of the most vital sectors aiming to achieve the goals of economic and social development, and at the same time is considered one of the most impactful sectors on the environment—through gas emissions and pollutants caused by vehicles that affect air quality and the environment in general—relying on AI technologies in the transport field undoubtedly leads to finding innovative options or alternatives based on AI systems to develop the transport sector to achieve smart transport. Examples include relying on autonomous means of transport, and driving equipped with a motion sensor system and spatial awareness feature. It also contributes to developing the efficiency of transport systems, enhancing traffic safety, and empowering individuals with necessary information and data based on integrated applications and innovative modern communication technologies that operate remotely.

8. The Role of Using AI Technology to Mitigate Natural Risks and Disasters:

Furthermore, relying on AI technology—which depends on precise communication and information networks, satellite sensing, and determining air and weather conditions and wind movement through smart technologies—contributes to predicting the occurrence of dangerous natural phenomena such as floods, volcanoes, hurricanes, and strong winds, helping actors take the necessary preventive measures to minimize their impacts.

9. The Role of Using AI Systems in Achieving Economic Development:

Relying on AI technologies contributes to enhancing mechanisms of transition towards a smart economy by relying on information and communication technology and the informational database related to various economic activities. This has led to the emergence of many concepts such as e-commerce, e-tourism, and digital transactions, given that AI technologies use data and information in decision-making. This may lead to achieving strong management among economic actors, benefiting from the characteristics of AI to develop industrial sectors, and integrating knowledge

with the new market rules and changes occurring in the economic field.

Consequently, the use of AI technologies contributes to achieving competitiveness in companies or organizations, and their ability to keep pace, change, predict expectations, and study interaction and coordination within institutions by using smart technology to monitor opportunities related to technological developments concerning organizations or companies or creating new markets. This grants institutions and companies significant options in optimizing available opportunities to achieve set goals.

Smart economic management also contributes to developing economic institutions by enhancing their ability to detect risks and available opportunities based on network and information systems. This is in addition to encouraging investment in human resources by enhancing the role of scientific research, innovation, and employing and using knowledge to develop functional and service performance for the economy, contributing to achieving sustainable development goals, and creating an attractive environment for foreign and national investment by providing a database and information that relies on AI and modern technology in managing and running investment activity. Furthermore, the use of AI technologies in the agricultural field has greatly contributed to developing the agricultural sector, which relies on satellites to provide precise data images and information for the desert space, mapping the borders of arable agricultural lands, and identifying areas of groundwater concentration, considering that providing digital maps gains importance in exploiting desert areas.

Additionally, applications of AI use find a place in many economic fields, such as self-driving cars, drones, and various robots whose important role has emerged in the technical and medical aspects. This is seen through integrating AI technologies into medical activities like medical diagnosis and conducting surgeries, and medical staff utilizing these technologies when analyzing medical data and results to contribute to the early diagnosis of diseases and proposing appropriate treatments for them. This is in addition to using AI technologies in the military sector by achieving accurate identification of locations and targets in complex and difficult areas, smart gaming applications like chess and video games, smart home services, phones, televisions, and others.

From the above, it can be said that the use of AI technology is considered one of the most important outputs of industrial development in light of the Fourth Industrial Revolution, given its multiple uses in various economic, industrial, technical, medical, service, and educational fields, among others.

Third Section Challenges and Prospects of Using Artificial Intelligence Technologies to Achieve Sustainable Development Goals:

The process of activating the role of using AI technologies faces many challenges linked primarily to political instability, corruption, and mismanagement in many countries, which has negatively affected the achievement of sustainable development goals. This is in addition to the impact of some cultural and societal norms on achieving development through passive behaviors or participation when adopting the strategy of using AI technology. Furthermore, there are risks that the use of AI technology may entail through its role in eliminating many professional jobs, economic inequality, and impacting privacy and cyber security.

The connection between ethics and modern technology has also raised significant issues that generated numerous ethical and philosophical challenges that could affect the achievement of developmental sustainability. This has led to the emergence of dominant global powers in the field of using AI technology, opening the door to many fears or risks in case of misuse of modern technology that relies on AI techniques, big data, and the Internet of Things, and the extent of governments' ability to protect individuals' rights and train them to keep pace with and adapt to smart technology. This necessitates achieving an interconnectedness between the use of AI technology and the requirements of consecrating ethical principles and considerations so that everyone benefits, by consecrating the principles of equality, transparency, accountability, social responsibility, and building trust in modern smart technology among various actors.

Moreover, technological integration has raised several issues in light of integrating smart technology into various areas of public life in order to develop them. The use of AI technology may result in an increase in forms of cybercrime such as piracy and violations of data and privacy, making it one of the most important challenges facing the field of cyber security. This is because the infrastructure relying on AI systems is highly affected by cyber risks. Consequently, it has become imperative for states and governments to build information systems that use strong cyber systems to protect personal data and enhance encryption methods and other security protocols to strengthen effective protection mechanisms against cyber data risks. Conversely, the advantages of smart technology may be utilized to prevent manifestations of prejudice to cyber security by relying on AI technologies in the security field.

As for the prospects of using AI technologies, we can emphasize that states and governments must work to develop a comprehensive, dynamic, sustainable, and interoperable digital environment that supports the responsible use of AI technologies. This particularly concerns the database, AI technologies, computing infrastructure, and mechanisms for sharing knowledge in the fields of scientific research and AI. The aim is to achieve a flexible and comprehensive regulatory environment that incubates AI and is interoperable, work on developing and supporting human capacities, and keep pace with changes and developments witnessed in the labor market and the activity of various institutions and organizations to achieve sustainable development goals. This is alongside enhancing manifestations of international cooperation for the safe use of reliable AI technologies by enhancing cooperation among states and stakeholders and engaging in this field to strengthen principles of good governance and move towards responsible management of reliable AI. It also involves exchanging knowledge in the AI field, promoting the development of leading global technical standards based on compatibility, trust, and credibility to develop various sectors based on AI systems, and adopting a system for evaluation and study regarding the reality of using AI technologies and the extent of progress in implementing principles of good governance within the framework of integrating AI technologies and its challenges.

Conclusion:

The study highlighted the importance of adopting a strategy for the responsible use of AI technologies to develop various sectors and fields, which reflects positively on society and the achievement of sustainable development goals.

Perhaps the most important findings of the study are:

- What distinguishes AI technologies is that they rely on programs and algorithms, and the ability to make decisions independently, making them among the important means for developing sectors and activities, especially given the broad reliance on these technologies in various economic, social, medical, and security fields.
- AI is considered one of the most important outputs generated by the Fourth Industrial Revolution, which has led to its inclusion in various sectors and fields.
- Relying on AI systems would support the process of managing activities in various institutions, especially their ability to deal with difficult and precise tasks.
- Given the importance of using AI technologies, it has opened the door for researchers, research laboratories in study and training centers, and companies to benefit from the advantages of AI technologies and identify their disadvantages so that states and actors can balance the pros and cons of using AI technology.

In order to activate the role of using AI technology, we recommend:

- Reviewing the legal system and establishing an independent legal regulation specifically for AI that defines the legal regime for artificial intelligence.
- Integrating the digital dimension that relies on AI technologies into various activities and sectors.
- Activating mechanisms for developing sectors by employing AI technologies and systems to achieve sustainable development goals.

- Training and raising awareness about the importance of using AI technology in various sectors.

References

- Azri, A. (2026). The synergistic impact of human-centric AI adoption, digital leadership, and work flexibility on employee productivity in the digital era. *Science, Education and Innovations in the Context of Modern Problems*, 9(8). <https://doi.org/10.56334/sei/9.8.10>
- Council of Europe. (2024). *Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*. <https://www.coe.int/en/web/artificial-intelligence/the-framework-convention-on-artificial-intelligence>
- Djeghbala, A., & Hamlaoui, S. (2026). Strategic dynamics of renewable energy innovation within contemporary sustainable development frameworks. *Science, Education and Innovations in the Context of Modern Problems*, 9(8). <https://doi.org/10.56334/sei/9.8.5>
- European Parliament & Council of the European Union. (2024). Regulation (EU) 2024/1689 laying down harmonised rules on artificial intelligence (Artificial Intelligence Act). *Official Journal of the European Union*, L, 2024/1689. <https://eur-lex.europa.eu/eli/reg/2024/1689/oj>
- Noureddine Ahmed Houssam Eddine, Benhada, M., & Chegrani, M. (2026). Adopting artificial intelligence in entrepreneurial ecosystems: An analytical assessment of digital readiness among young entrepreneurs in Algeria. *Science, Education and Innovations in the Context of Modern Problems*, 9(6). <https://doi.org/10.56334/sei/9.6.1>
- Organisation for Economic Co-operation and Development. (2019). *Recommendation of the Council on artificial intelligence* (OECD/LEGAL/0449). <https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449>
- United Nations Educational, Scientific and Cultural Organization. (2021). *Recommendation on the ethics of artificial intelligence*. <https://unesdoc.unesco.org/ark:/48223/pf0000381137>
- United Nations General Assembly. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development* (A/RES/70/1). <https://undocs.org/A/RES/70/1>
- United Nations General Assembly. (2024). *Seizing the opportunities of safe, secure and trustworthy artificial intelligence systems for sustainable development* (A/RES/78/265). <https://undocs.org/A/RES/78/265>
- Vinuesa, R., Azizpour, H., Leite, I., Balaam, M., Dignum, V., Domisch, S., Felländer, A., Langhans, S. D., Tegmark, M., & Fuso Nerini, F. (2020). The role of artificial intelligence in achieving the Sustainable Development Goals. *Nature Communications*, 11, Article 233. <https://doi.org/10.1038/s41467-019-14108-y>