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# The Role of ICTs and AI in Supporting Sustainable Local Development Efforts in Algeria

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**Abstract**

This study aims to review and analyze the role of information and communication technology and artificial intelligence in supporting and promoting sustainable local development efforts in Algeria by highlighting its theoretical and knowledge framework, its potential and practical applications, and the reality of experience in Algeria through models of local groups and monitoring the challenges associated with them, and future opportunities. Considering the depth of interdependence and impact between smart technology and development in our time.

**Keywords:** Information and Communication Technologies (ICT) - Artificial Intelligence (AI) - Sustainable Local Development - Local Groups

## INTRODUCTION

Local development is one of the cornerstones for the stabilization and social and economic progress of any country in an era of boom Technology and accelerating digital transformation as information and communication technology (ICT) and artificial intelligence (AI) have become a tool Vitality is reshaping society, the economy, experiences and relationships between stakeholders, and media, communication and intelligence technologies have expanded Artificial to become an integral part of the business model of many organizations and a key strategic element in government and administrative processes public and private sectors in a global, interconnected and interdependent domain that opens up areas of competition, exchange and multidimensional challenges and enables (ICT) (AI) New fields of application in education, marketing, finance, manufacturing, wealth distribution and governance systems with consequent effects on productivity, performance and decision-making. To activate and promote local development and sustainability in Algeria, IT and artificial intelligence tools and means must be

involved in improving the production and distribution of public services, enhancing administrative efficiency, and encouraging local community participation.

**Topic Goals**

This study aims to review and analyze the role of ICT and AI in supporting and promoting sustainable local development efforts in Algeria by highlighting their potential, practical applications, associated challenges, and future opportunities.

- Highlighting the depth of interdependence and impact between technology and development in developing societies.

**Importance of the topic:** The development of technology and innovation leads to tremendous changes in economic, social and political systems. Information, communication and artificial intelligence enhance access to information, communication and modernization, shifts in the nature of work, wealth distribution and governance systems

- Sustainable local development is one of the main pillars for achieving stability and social and economic progress in any country, and a pattern that balances between improving the lives of people today and protecting the right of future generations to resources and opportunities, from a strong local economy, a healthy environment and justice in the distribution of wealth and services, and achieving local governance to ensure the stability and continuity of society and provide solutions in a balanced and clear direction towards the present and the future. The importance of information and communication technology (ICT) and artificial intelligence (AI) as a key factor to support this development is increasing, as it provides innovative tools and special solutions with diverse development challenges such as poverty, unemployment, weak infrastructure, pollution in an era of accelerated digital transformation

- Strategy for Linking Technology and Development in Developing Societies

**Problem:** To what extent do ICTs and AI contribute to promoting sustainable local development efforts in Algeria?

**Sub questions:**

- What is the concept of information and communication technologies and artificial intelligence and its tools used?
- What is the concept of sustainable local development and its dimensions?

-How can ICTs and AI achieve and improve local sustainable development goals and indicators in Algeria?

What are the most prominent projects or initiatives that have integrated information and communication technologies and artificial intelligence into sustainable local development and what are the barriers that limit their effectiveness?

-How can the role of ICTs and AI be operationalized to ensure sustainable development locally in Algeria?

**Hypotheticals:**

- ICTs and AI contribute positively to the promotion of sustainable local development in Algeria, through improved resource management, development of public services, participation in the

decision-making process, transparency and feedback.
- Applying the mechanisms and tools of information and communication technology and artificial intelligence related to the availability of digital infrastructure, qualified human competencies and political will at the central and local levels.
- The absence of a clear and integrated national strategy in the local sphere reduces the potential impact of these technologies on sustainable local development.

**Study Approach:** In this study, we used the descriptive analytical approach in order to take note of the theoretical aspect of the subject and the case study approach to link the two dependent and independent variables

**First: The theoretical and conceptual framework of information and communication technology and artificial intelligence**

1. **The concept of information and communication technology:**

**1-1 Definition of technology**: The technology of a word that is Arabized and has no origin in the books of the Arabic language and its dictionaries, and is matched by a technical word, and a technical word consisting of two syllables, namely: Technique and the meaning of the road or means is logistic and means science, so the general meaning of the word is the science of the means by which a person can reach his goal.[1]

**1.2 Definition of information: Information** can be defined as: "It is what is extracted from the collection, organization, analysis and summarization of data.[2]

**1-3 Definition of communications**: Defined as : The process of transferring and exchanging information and knowledge from the sender to the receiver or group of receivers, using available means and technology.[3]

**1-4 Definition of communication technology: Communication** technology is defined as the set of means used to produce, exploit and distribute information in all its forms and in its various written and audio-visual types [4]. It is those devices, equipment, means and tools that are used to communicate and transmit a message containing information or news from one place to another, regardless of the quality of the information transmitted orally or in writing.

**1-5 Definition of information technology**: It is defined as: the various types of discoveries, novelties and inventions that dealt with and deal with data and information in terms of collecting, analyzing, organizing, storing and retrieving them in a timely and appropriate manner and in an appropriate and available manner. It is one of the main tools invested by humans, especially managers in companies and institutions, in order to face the changes and developments surrounding them and coexist with them, and even invest them in improving performance and providing the best products and services.[5]

Ghassan also defined information technology as all the advanced technologies that are used in converting data of all kinds and forms into information and that are used by its beneficiaries in

all areas of life.[6]

It is also known as: the information revolution associated with the manufacture, marketing, storage, retrieval and display of information and distributed through modern, sophisticated and rapid technical means, through the common use of computers and modern communication systems.[1] ICT is related in its definition in light of new changes and the digital world as: "One of the management tools used, which consists of five components:

**1-6- Information hardware:** represented in the physical equipment for processing-: **software**

**- Storage technologies**:These are physical stands for storing data such as hard and optical disks and software to organize data on physical stands.

**- Communication technology:** It consists of equipment, physical media and software that connect various hardware accessories. We transfer data from one place to another so that computers can access communication equipment to form exchange networks and share sounds, photos and videos[2]

**- Networks :** These computers are connected to exchange data or resources and through these definitions it is clear that ICT is A set of modern and sophisticated technical tools that collect, store, process, retrieve and communicate information using modern communication technologies.

**1-7Characteristics of information technology: Information** technology has many characteristics, the most important of which are:

**A- Reducing time:** Technology makes electronic places contiguous, for example, the Internet, which allows each of them to obtain the necessary information and data in a short time, regardless of their geographical location.

**B- Raising productivity:** Information technology raises productivity when it is used well and effectively.

1- Houria Belouidat, The Use of Modern Communication Technology in the Algerian Economic Corporation, Master Thesis, University of Constantine, Algeria,2008,p.45

-2 Turki Sultan 1995 Computerized Information Systems, Egypt: Dar Al Mars,1995,p.21

3- Amer Ibrahim Qandaliji and Samarrai Fadel Iman, Information Technology and its Applications, Jordan: Al-Warraq Foundation,2002,p.68

4- Hisham Laithi Naya Al-Shammari 2008 Knowledge Economy Amman: Safaa Publishing and Distribution House,2008,p.54

-5 Amer Ibrahim Qandaliji and Samarrai Fadel Iman, op. Cit.,P.32

6 Ghassan Qassem 2009, Information Technology in Business Organizations, Amman: Al-Warraq Publishing and Distribution,2009,p.16

**Definition of ICT:** It is' a set of tools and means used to process data and exchange information using digital technologies'. These tools include computers, networks, smart phone applications, and modern communication technologies such as fiber optics and the Internet.[3]

It is also known as: Information and communication technology is represented in the physical components of computers and ready-made programs, in addition to communications networks and other devices required to process, store, organize, display, send and retrieve information, with the required speed and accuracy.

Through the above definitions, we can say that ICT is all the physical and software means that operate and exploit information and various connectivity networks and their applications that help to reserve information and process data, produce, store, retrieve, publish, communicate and share it with the parties to the communication process.

## II. Types of ICT

**There are many and varied communication and information technologies, but they are innumerable, and we will address some of their types:**

**-2-1 Internet: The** Internet is a global network of interconnected computers, allowing the exchange of information and data between individuals

institutions, and enable users to access a huge amount of resources, information, and services such as e-mail, websites, social networking sites, cloud services, applications, and unimaginable programs, among others. According to **Castells Manuel**, the Internet is "the basic infrastructure

1- Shawki Shadi , The Impact of the Use of Information and Communication Technology on the Performance

2- of Small and Medium Enterprises, Master Thesis, Faculty of Economic, Commercial and Management Sciences, University of Ouargla, 2008, pp. 113-112-2 Nouvelle Hadid, Internet Technology and Rehabilitation of the Institution for Integration into the Global Economy, PhD Dissertation, Faculty of Economic, Commercial and Management Sciences, University of Algiers 2007,p. 53

3- Arab Council for Information Technology, 2021, p.45

of the information society, as it is the main medium for the transfer of knowledge and information in the modern digital economy[1], and it is also known as a global system of interconnected computer networks that use the Internet Protocol (IP) to exchange data between connected devices[2].

According to the 2024"Figures and Facts" report by the International Telecommunication Union (ITU), the number of Internet users in 2024 was about 5.5 billion people, equivalent to 68% of the world's population.

**-2-2 Smartphone:** It is a mobile phone that has a sophisticated system and has more features and benefits than a regular mobile phone, including the feature of playing audio files, video imaging , mapping system, surfing the Internet, receiving wireless networks such as WiFi and the third generation, and the most important thing is that it contains an advanced operating system such as Android, Symbian, Windows Phone and other systems, and the smartphone is used to communicate between individuals through phone calls or text messages as it can entertain a person by listening to audio files, games or watching videos .....

**Campbell (2012)** defined a smartphone as "a mobile device that combines voice communication functions and computing capabilities, and allows users to interact with the Internet and a wide range of digital applications and services."[1]

**2-3 Social networks:** Perhaps the most prominent of which is the definition of the researcher Dyson "Esther", which defined it as: " Websites that allow individuals to identify themselves and participate in social networks, and they also facilitate the process of creating different social relations centered on a center of common interest, and these networks consist of a group of actors who communicate with each other within a specific system Friendships, joint work, or exchange of information and others, and the existence of these networks is maintained through the continued interaction of members among themselves. (2006)[2] (Torloting, Example: Facebook - YouTube - Platform -X Instagram - Telegram and many others. Through the two previous definitions, our definition of social networks is determined as a group of websites on the Internet that emerged in the first decade of the current century that allow users to communicate and interact with each other through the exchange of messages, photos and videos.

1- Manuel Castells, The Rise of the Network Society, Wiley-Blackwell, 2010, p. 370

-2 Taha Hussein Youssef, Introduction to Information and Communication Technology, Amman: Dar Al-Masirah, 2016,p.88

1- Campbell, S. W. (2012). Mobile media and communication: A new field or just a new journal? Mobile Media & Communication, 2012P8-13.

2- Torloting, Enjeux et perspectives des réseaux sociaux. paris, consultant français cazals, France: institut supérieur de commerce de paris,2006

There are large and varied numbers of these networks, some of which are of limited spread and some of which are of high spread, and each of them has services and content that differ from the other, the most famous of which are Facebook, YouTube and Instagram - YouTube - Platform - X Telegram and others Information and communications technology

**The importance of ICT is reflected in the following:**

- **Productivity:** ICT, especially mobile computers and the Internet, stimulates the practical productivity of the organization's activity, engineering, marketing, and in all sectors.

- **Access to information:** ICT allows the market to be more efficient. It also allows the consumer to search and find appropriate prices. It allows institutions to obtain information about suppliers. ICT can also reduce the costs of exchanges and barriers to entry.

- **Globalization:** ICT is the amount of important data and information that can be stored under the form of formed digital chains that are sent to a place in the world at a low cost. Globalization in this sense is linked to each other to reduce communication costs. Globalization has already led to the globalization of markets, production and capital. Globalization has also created competition, innovation and the rapid spread of new technology at low trade and investment costs.

**-Innovation:** ICT speeds up the process of innovation and breaks the routine, facilitates the processing of large amounts of data as quickly as possible and is taken by the creation of new products and the offer of good services.

- **Transforming the world into a small global village:** communication between people in voice, image and writing is what makes them feel close to each other, even if they are thousands of miles apart geographically.

- **Low communication costs**: Organizations can coordinate the efforts of their workers easily and at low costs.

- **Accelerated distribution of knowledge:**[1] In the sense that they contribute to immediate direct access to information sources and in vital areas.

It also featured significantly on the development of means of transport and communications significantly and speed in the implementation of production processes and increase production in quantity and quality contributing to the development of information exchange between responsible and working bodies and the liberation of workers from repetitive and mind-free work or intelligence, exhausting physical work, reduced working hours, and communication technology led to the great spread of education, making everyone It learns as technology has been used in the educational system, which has saved a lot of effort and trouble for students, in addition to facing a shortage of teachers.ICT expresses the development of countries, and the

-[1] Studies in information systems and networks. Tripoli: Radiation Technical Library and Press, 996,p. 34

more this technology develops in a country, the more it indicates its development and keeping pace with it. global changes, while the underdevelopment of this technology reflects the lagging behind of civilization and technology. ICT is considered a military force of states because it can protect and secure the borders of the homeland while tracking the enemy and eavesdropping on his communications.[1]

## V. characteristics OF modern ICT

**Modern information and communication technology has many characteristics that can be limited to the following:**

**5-1Speed and efficiency in information processing:** Modern information and communication technology allows processing huge amounts of data at high speed, which reflects positively on decision-making. One of the most prominent characteristics of contemporary information technology is the high speed of data collection and processing, which enables effective and rapid decision-making.[2]

**5-2Interconnection and Networking (Global Communication):** ICT provides unprecedented communication possibilities between individuals and institutions locally and globally. Modern communication technology has the ability to unlimited networking between individuals and institutions all over the world [3]

**5-3 Digitization:** It is based on converting documents and information from paper to digital format, which makes it easier to save and retrieve them. It is one of the most important characteristics of information technology, as it consists of archiving, saving and retrieving information electronically.

-1 Nabar Rabiha, Information and Communication Technology, Characteristics and Effects, Journal of the Researcher in Humanities and Social Sciences , Al-Wadi University, Volume 9, Issue2, 2018 p .91

-2 Al-Hadi, Abdul Hamid, Introduction to Management Information Systems,Amman: Dar Al-Masirah Publishing and Distribution, 2019,p.42

-3 Raad Abdullah, Al-Obaidi, ICT and its impact on human development,Amman: Wael Publishing House,2020,p.67

**5-4Flexibility and** Multifunctionality ICT**:** It can be employed in multiple sectors such as education, administration, trade, and services. Modern communication technologies are flexible, as they can be used effectively in various fields of human activity.[1]

**5-5Integration and Integration:** ICT allows the integration of different systems and software within a unified digital environment. Modern information systems contribute to the integration and integration of data and functions within organizations, which enhances efficiency and control.

**-5-6Accessibility:** Individuals can access data and services anytime and anywhere online. Modern technology provides digital services that predict the user to access information and services remotely. Modern ICT technologies enable access to data and services from anywhere and at any time, especially via cloud computing.[2]

**5-7 Mobility**: that is, the transmission and reception of information from any other place during the movement of the product and the future of information, using a number of different devices such as television, mobile phone, TV integrated into the wristwatch, portable electronic computer.[3]

**5-8 Connectivity and installation:** The development of communication technology has led to the unification and integration of communication systems, for example, the units of the reception system through concave antennas that are collected from different models but perform their function in the reception and transmission of signals to the fullest, and they facilitate the work of the communicator or receiver.

**-5-9 Prevalence and spread:** By which we mean the systematic spread of the communication system around the world and within each layer of society, and it is not limited to the rich only, but includes all groups and layers of society.

**5-10- Decentralization:** a feature that allows the independence of information and communication technology

**-5-11 Non-public**: that is, it can be controlled as it reaches directly from the producer to the consumer, that is, it can send the communication message to one individual or to a specific group. It also allows combining different types of communications, whether from person to person or from group to group.

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-[1] Ali Hussein Al-Mousawi, Communication Technology and Digital Media. University of Baghdad – Faculty of Media.,2021,p.88

2-Marinescu, D. C. Cloud Computing: Theory and Practice (2nd ed.). Morgan Kaufmann2017,P49.

-[3] Rahima Al-Tayeb Issani, Introduction to Media and Communication: Basic Concepts and New Jobs in the Age of Media Globalization, Aman: The Modern World of Books,2008,p. 16

**5-12Monopoly:** The technology industry is characterized by a lot of focus on a limited number of major industrialized countries and within companies monopoly, and not only on the process of transferring and marketing this technology in less developed countries, but also in influencing the way it is managed, used and often even maintained in these countries, which strengthens the grip of the manufacturing societies of this technology on the countries imported and establish the subordination of the second to the first in the cultural field.[1]

**مفهوم الذكاء الاصطناعي:**

**6-1Definition of artificial intelligence:** Proudfoot &, Copeland (1993) defines it as: "The process of developing computer systems so that they are able to perform tasks that normally require the use of human intelligence, such as visual perception, speech recognition, decision-making, and translation.[2]

Minsky Lee Marvin defined it as the construction of computer programs that engage in tasks that are satisfactorily accomplished by humans, because they require high-level mental processes such as cognitive learning, memory organization, and critical thinking.

Artificial intelligence has also been defined as the behavior and certain characteristics of computer programs that make them simulate the mental abilities of humans and their modes of work. One of the most important of these characteristics is the ability to learn, deduce and react to situations that have not been programmed in the machine. Artificial intelligence also refers to systems that display intelligent behavior by analyzing their environment and taking actions with a certain degree of independence to achieve specific goals.

**6-2 Applications of artificial intelligence: Artificial** intelligence applications are defined as a branch of computer science, by which computer programs that simulate the method of human intelligence can be created and designed, so that the computer can perform some tasks instead of the human, which require thinking, understanding, hearing, speaking and freedom in a logical and organized manner. [4] Applications of artificial intelligence are also defined as the set of efforts to develop computerized information systems in a way that they can behave and think in a manner similar to humans.

- Khaled Manser, Relationship between the use of modern information and communication technology and the alienation of university youth, Master's thesis, University of Batna, Algeria, 2012, p. 66

2- Heba Abdel Moneim and Mohamed Ismail , The Economic Implications of the Fourth Industrial Revolution Artificial Intelligence - Arab Monetary Fund (ed.) Economic Studies Series,2021,p. 7. 3- Souad Boubaha, Artificial Intelligence: Applications and Implications,Journal of Finance and Business Economics, Mila University Center, Volume 6, Issue 2022,4,p. 93

-[4] Lahoul Ben Ali,Khaled Breiki, Artificial Intelligence in the Scientific Field between Determinism in Application and Risks in Production, Heritage Magazine,Volume14, March 2024,p.70

They can learn natural languages and accomplish actual tasks in an integrated format or use a picture and cognitive forms to rationalize material behavior. At the same time, they can store accumulated human experiences and knowledge and use them in the decision-making process.

شكل 01: أنواع الذكاء الاصطناعي


المصدر: https://www.jawsak.com/the-age-of-ai-has-begun/

**(a) Narrow or weak artificial intelligence:** It is the simplest form of artificial intelligence, programmed to carry out specific functions related to a specific topic and in a specific environment. It is a response to a particular situation, operating within the conditions of its own environment.

**(b) General artificial intelligence:** This type collects, analyzes and transforms data derived from the experiences and expertise it acquires from situations, which qualifies it to make independent and autonomous decisions. Examples include self-driving cars and instant chatbots.

**C- Super Artificial Intelligence:** It refers to models that seek to simulate humans. Two main types can be distinguished here: the first tries to understand human thoughts and emotions that affect behavior, while the second relies on theory of mind, as these models are able to express their internal state and anticipate and interact with the feelings and attitudes of others.

-1 Lahoul Ben Ali,Khaled Breiki, op. Cit.,P.70

**4-6 Characteristics of Artificial Intelligence:**[1]

Artificial intelligence has several characteristics, including:

- Ability to think, perceive, acquire and apply knowledge
- Using Intelligence to Solve Problems in the Absence of Completed Information
- Ability to learn and understand through previous experiences and acquired knowledge
- Ability to take advantage of attempts and mistakes to explore different things
- Respond quickly to new situations and circumstances and address difficult and complex issues
- Ability to imagine, create, understand, and perceive visual issues

Artificial intelligence is classified as an advanced technology within the ICT ecosystem, and is one of the most important tools for its development in data analysis, intelligent communication, and automation through the following: Information and Communication Technologies (ICT) include:

- Data and Information Processing
- Digital Connectivity
- Networks & Internet
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Artificial intelligence works **within these areas** because it:

- Processes data and media content
- Used in communication management (Chatbots, machine translation, text analysis)
- Linked to communication applications (recommendation, cloud computing, network analysis)
- Assists in decision making in digital platforms

-[1] Asmaa Elsayed Mohamed,Karima Mahmoud Mohamed,Applications of Artificial Intelligence and the Future of Educational Technology,Cairo: Arab Group for Training and Publishing,2020,p. 23

**Seventh: Theoretical and Conceptual Framework for Sustainable Local Development**

**Preface:** The trend towards decentralization in development for years, the world has witnessed an interest in decentralization and the participation of civil society institutions. The World Bank pointed out in its 2002 Development Report to the need to make governance closer to the people and involve local actors, which led to the emergence of actors at the local level under decentralization. The emergence of the role of entrepreneurship in local development, according to the 1992 report of the Organization for Economic Cooperation and Development, which showed the role of entrepreneurship in exploiting local resources, creating new jobs, fighting unemployment and creating wealth. Or it is the process of change that takes place within the framework of local public policy that expresses the needs of local unity through local leaders capable of using and exploiting local resources and persuading local citizens to participate Popular and benefit from the material and moral support of the government in order to raise the standard of living of each member of the local unity and integrate all units in the state. Hence, local development is aimed at satisfying the general needs of members of the local community and is not limited to developed countries as well as developing countries.

Regional disparities led to the consideration of the regional question in the early 1960s and 1970s in most countries, both industrialized and developing, and the local question was raised only at the beginning of the 1980s . The concept of local development emerged after the increase in interest in local communities as a means to achieve comprehensive development at the country level. Self-efforts and popular participation are no less important than government efforts to achieve Development, and here it can be said that local development is the sum of processes and activities that aim to develop the social level

In Algeria, local communities are the main pillar of regional decentralization, according to Article 163-162 of the 2020 Constitution, and they represent the bridge between the state and the citizen at the local level. Local development is therefore the adoption of the principle of building from below, by making the development of local communities the main starting point for the development of society as a whole. Organic Law No. 06-06ofFebruary 20, 2006 defines municipalities and states and defines their functions and powers.

1-Ahmed Rashid, Administrative Reform, Thinking Department, Cairo: Dar Al-Nahda Al-Arabiya, 1996,p.25

**7-1 Definition of sustainable local development:**

Sustainable local development, according to Hani 2016), p. 35, means an ongoing process aimed at improving the standard of living in local communities, by integrating various actors in achieving a balance between the requirements of the economy, social justice, and environmental conservation. Thus, sustainable local development is a process in which all people in localities, who come from all sectors and work together to stimulate local economic activity, which results in a resilient and sustainable economy. It is a process aimed at creating new jobs and improving the quality of life of the individual and society, including the poor and marginalized. |||UNTRANSLATED_CONTENT_START||| مع المحافظة على البيئة.[1]|||UNTRANSLATED_CONTENT_END|||

**2-7 Its dimensions:**

**First: The economic dimension:** The economic dimension refers to the need to achieve sustainable economic growth that takes into account the efficient use of resources and ensures growth and equitable distribution of wealth. Mohamed Abdelhay Shehata believes that "achieving economic growth is not enough to achieve sustainable development, unless this growth is accompanied by fair income distribution and poverty reduction"[2]

Resource efficiency emphasizes that “economic sustainability presupposes the rational and long-term use of non-renewable resources through technology and economic diversification.”[3]

**A- Diversification of local sources of income:** Many Algerian municipalities lack alternative sources of income to centralized transfers. The Accounting Council reports that more than 70% of municipalities rely almost entirely on central support [4]. The absence of an effective local tax system hinders the ability of local communities to achieve self-reliant economic development.

B-**Supporting the social and solidarity economy:** In recent years, local initiatives have emerged to encourage micro-enterprises, especially in the south, where some municipalities have coordinated with the National Agency for the Support and Development of Entrepreneurship (ANADE) to encourage young people to establish small enterprises. The local economy + represents the backbone of sustainable development, and there must be participatory tools that activate this axis at the level of grassroots groups.

**Second: The social dimension:** The social dimension is concerned with achieving social justice, equality, the formation of vulnerable groups and improving the quality of life. Social justice is

-1 Ali Boudlal, Local Universities between Structural Coercions and the Conditions of Sustainable Development,University : Algerian Journal of Public Finance, Issue 02, December 2012, pp.79 -2 Hamad Abdelhay Shehata. Economy, Environment and Sustainable Development, Cairo: Dar Al-Fikr Al-Arabi, 2011,p.84

-3 Samia El Sayed Sharaf, Green Economy and Sustainable Development,Alexandria: Modern University Office, 2013, pp. 112

-4 Report of the Accounting Council, 2020, p. 24

"social development cannot be achieved without the active involvement of all groups of society, especially women and youth"[1] One of its most important indicators is education and health, as achieving sustainability requires raising the level of education and health, because it is the starting point for every sustainable development process.[2] This dimension aims to reduce social disparities and ensure comprehensive coverage of basic services such as health, education, housing, and public utilities.

**Third: The environmental dimension:** The environmental dimension is the cornerstone of sustainable development, given the deterioration of the global environment and its threat to natural and human systems Protecting resources and biodiversity Abdul Karim Gharib believes that "one of the basic conditions for sustainable development is to protect the ecological balance and ensure the continuity of natural resources for future generations."[3]

Combating pollution and climate change is the cornerstone of a sustainable environmental dimension, with Youssef Abul-Hajjaj explaining that "the deteriorating environment imposes a significant economic and social cost on countries, and addressing climate change is an urgent priority"[4] The environmental dimension is at the core of sustainability, given the need of future generations for a healthy environment and renewable natural resources and the most important indicators of this:

**A- Urban waste management**: Regional communities face significant challenges in this area, especially in medium and small cities. The 2022 report of the Ministry of Environment indicated that only 45% of municipalities have a regular waste collection and sorting system.[5]

B. **Conservation of natural resources:** Sustainable development requires integration between local and regional authorities to protect resources such as groundwater and vegetation. In southern Algeria, some municipalities have begun to adopt solar energy in public lighting as a green initiative. Adopting renewable energy sources locally is a strategic entry point for achieving sustainable environmental development.

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1- Ammar Bouhouche, Human Development Issues in the Arab World, Algeria: Diwan of University Publications, 2010, p. 143 Ben Saad, Fatima Al-Zahra. (2015) Introduction to Sustainable Development Algeria: Dar Al-Huda.

2- Fatima Al-Zahra bin Saad, Introduction to Sustainable Development, Algeria: Dar Al-Huda, 2015, p.66

3- Abdul Karim Gharib,Environment and Sustainable Development, Moroccan Journal of Local Administration and Development, Rabat,2009,pp. 92

-4 Yousef Abu Al-Hajjaj, Environment and Man: A Comprehensive Vision, Amman: Dar Safaa for Publishing and Distribution, p. 121

5- Report of the Algerian Ministry of Environment, 2022, p. 11

**Eighth: Employing Information and Communication Technologies and Artificial Intelligence in the Areas of Sustainable Local Development**

**Preface**: In light of the rapid technological transformations, artificial intelligence is classified as an advanced technology within the system of information and communication technologies, and it is one of the most important tools for its development in data analysis, intelligent communication, and automation. Artificial intelligence is also one of the basic engines that redraw the parameters of development in the world and its entry as a supporting tool. This technology is no longer limited to major industrial applications, but its impact has extended to the social, environmental, and service fields, and even at the level of local communities. In the Algerian context, there is an urgent need to employ artificial intelligence tools to support the path of sustainable development, especially in light of the multiple challenges faced by regional groups related to efficiency, resources, and effective management, the most important of which are:

**8-1Modernization of local administration**: The adoption of digitization in administrative work contributes to improving the quality of performance, facilitating transactions, and reducing time and cost, which enhances citizens' confidence in the administration. In this context, digitization is an effective tool to establish transparency and strengthen the relationship between the citizen and the local institution.[1]

**8-2Involving citizens in decision-making:** Modern technologies have provided new spaces for popular participation, through digital platforms that allow citizens to contribute to monitoring local affairs and proposing solutions. The UNDP report indicates that the use of digital means has contributed to strengthening forms of participatory democracy at the local level.[2]

**8-3Improving daily services:** Whether it comes to issuing administrative documents or submitting complaints, digital solutions have become an effective alternative to traditional methods, which raises the quality of services provided.

**-8-4 At the economic level**: The adoption of digital tools contributes to stimulating the business environment, especially through the facilities provided investors locally, and support e-commerce activities. and entrepreneurship.

**-8-5 Smart urban planning:** Artificial intelligence technologies provide local authorities with advanced tools to analyze population and geographical data, which helps them to make more accurate planning decisions, whether in terms of directing investments or designing infrastructure, as the use of artificial intelligence systems in urban planning leads to a significant improvement in the use of land and resources and expresses the smart city that is Connecting

-1 National Information Technology Report, 'Digital Transformation in Algeria,Achievements and Challenges, Algeria: Government Publications,2023, p.15 -2 UNDP Report 2020' (UNDP,

Physical Infrastructure, IT Infrastructure, Social Infrastructure, and Commercial Infrastructure to leverage the collective intelligence of the city.[1]

**6-8Development of public services:** Artificial intelligence can be used to support and improve the efficiency of municipal services, such as monitoring water, sewage, and waste networks, and even in energy management. Virtual assistants can also be adopted to serve citizens around the clock, which contributes to reducing pressure on employees.

**8-7 Environmental protection and risk management:** In the environmental field, artificial intelligence technologies play a crucial role in monitoring air and water quality, tracking sources of pollution, and predicting natural disasters. The World Economic Forum 2021 (WEF) has affirmed the importance of these applications in mitigating the effects of climate change at the local level.

**8-8Encouraging citizen participation:** Artificial intelligence tools have contributed to supporting e-participation platforms, by analyzing citizens' comments and suggestions, and helping them make decisions based on accurate data, which consolidates the principle of participatory democracy.

**Ninth: Some models of employing information and communication technologies and artificial intelligence in local communities**

**-9-1 Digital Project: "Citizen Portal" – :2019 In 2019**, the Municipality of Tizi Ouzou launched a digital project under the title **"Portal Citizen"**, a website and smartphone application aimed at facilitating interaction between the administration and citizens, through:

- Request administrative documents electronically (birth certificate, residency, .)...
- Complaints and feedback about cleanliness, roads, lighting
- Track the status of submitted administrative files
- Presentation of the municipality's budget and plans for works in progress
- Bringing the administration closer to the citizen and saving time and effort for everyone **40%**in the first year.
- **72%**according to an internal survey (2020).

1. Hartley, J.Innovation in Governance and Public Services : Past and Present. Public Money & Management, Volume 25, Issue 1,15 March 2005.

**Results achieved:**[1]

**A- Significant improvement in services:**

- Reducing the time of processing administrative requests by
- Increasing the percentage of citizens' satisfaction with the performance of the municipality to

**|||UNTRANSLATED_CONTENT_START|||ب- مشاركة المواطن:|||UNTRANSLATED_CONTENT_END|||**

- More than 6,000 citizens created accounts on the platform during the first 6 months.
- More than 2,500 reports of neighborhood problems (lighting, roads, cleanliness) were recorded, 78% of which are addressed in less than a week.

**C-Challenges faced by the project:**[2]

Weak digital training for some employees, especially in administrative departments.

Disparities in the turnout of citizens, where the percentage of using the application did not exceed 35% of the population in 2021, due to poor awareness Digital.

Problems of internet outages in some neighborhoods, which limited the effectiveness of some services.

**(d) Experiment enhancers:**

Direct political and administrative support from the mayor.

Partnering with a local software development startup.

Organize awareness campaigns in neighborhoods and schools on how to use the digital platform.

**9-2 Capital City Smart City Project:Algiers** is an official project launched by the Wilaya of Algiers from the spring of 2017.

To transform the capital into a “smart city” based on information and communications technology, data, artificial intelligence, and the Internet of Things with the aim of improving city management and urban services. Its main objective: “Improving the quality of life of the residents of the capital through effective digital management of movement, energy, water, waste, facilities, transportation, and other municipal services, the project is fused as a roadmap that extends to 2035, and it is not just a theoretical concept but a gradual implementation plan.

Municipality: Tizi Ouzou Report on the Citizen Digital Portal Project. Tizi Ouzou: Directorate of Regulation and Public Affairs,2020

2-Djamila, M.Digital Governance in Algerian Local Authorities: The Case of Tizi Ouzou. Mediterranean Journal of Public Administration, 2021, p24.

**A- Components of the Smart Capital Project:**

1. Digital infrastructure: An integrated network comprising fiber optics, wireless networks, and data centers has been built to intelligently manage urban services. Innovation labs and centers (Fablabs) have also been established to support youth and entrepreneurs in developing innovative technology solutions

2. Supporting innovation and entrepreneurship: The project involves the involvement of more than 300 start-up institutions and researchers from the Algerian diaspora abroad, which promotes cooperation between government, academic institutions and the private sector in the development of advanced urban solutions.

3. Urban planning and public services. The project aims to modernize the urban infrastructure through the rehabilitation of the waterfront

Corniche, improving transportation, and increasing green spaces, in line with sustainable development standards.[1]

| | **ion strategy and implementation** | **e** |
|---|---|---|
| 2017 | Project officiallylaunched | Develop the general strategy for the development of the capital |
| 2018 | Establishing Fablabs and Innovation Labs | Supporting innovative and experimental projects |
| 2018 | Smart Cities SummitFirst Summit | Integrating International Innovation and Investment |
| 2019-2023 | Implementation of pilot projects | Pilot projects in the areas of transport, environment and services |
| 2025 | Strategic Review | Confirm the continuation of the project and its transformation into an urban reference model |

**-9-3 "My Smart City" platform:** Launched in 2022 by a startup, it aims to track environmental indicators such as air quality and waste percentage in selected neighborhoods of the capital. This experience was an example of how partnership between the technology sector and municipalities can be operationalized.

1- Publishing, 2018. https://frankrayal.com/wp Oxford Business Group. Algiers Smart City Booklet. Frank Rayal1-content/uploads/2018/07/OBG_Alger-Smart-City-Booklet_English.pdf

**Conclusion**

Integrating ICTs and AI into Algeria's local sustainable development efforts is no longer an option, but a necessity posed by modern challenges. While some of the first experiments have proved useful, mainstreaming this approach requires political will, digital infrastructure, and qualified human resources. Artificial intelligence is not just a technological tool, but a strategic lever capable of improving the quality of life of the citizen, strengthening local governance, and achieving the desired sustainability.

All **information and communication technologies (ICT) and artificial intelligence (AI)** are among the most important contemporary tools that predict groups

to achieve the **Sustainable Development** Goals, through improving administrative performance, enhancing transparency, engaging citizens, and developing services

In Algeria, these technologies are still in the stage of gradual adoption, with encouraging local experiences

**Findings**

1. **Artificial intelligence** contributes to supporting urban planning decisions, waste management, and the protection of natural resources through forecasting tools and analysis

Data

2. **Information and communication technologies** contribute to improving access to information, reducing bureaucracy, and enhancing citizen confidence in management.

3. Despite the benefits, **structural barriers** remain:

- Lack of specialized human training, especially at the municipal level.
- Weak digital infrastructure in some municipalities and**lack of structured data**, which is a prerequisite for the success of any system
- Smart.
- The **absence of legislative frameworks** regulating the use of artificial intelligence in the public utility.
- The absence of an integrated national policy to employ these technologies in local management.
- The limits of **financial resources** for the acquisition of devices and the development of appropriate software.

4. The success of these tools in supporting sustainable development is linked to the extent of integration between technical, human, and institutional aspects.

**RECOMMENDATION:**

Preparing a national strategy for the digitization of local work based on the integration of artificial intelligence and ICT Supporting local communities with digital training and equipment Encouraging partnerships between municipalities, universities, and emerging technological institutions. Issuing regulatory frameworks to secure data and ensure digital transparency.

Raising citizens' awareness of the importance of digital participation through continuous local campaigns.Haut Encouraging entrepreneurial centers at the level of institutions and universities in all states to adopt ideas of invention projects and devise solutions to various local problems in order to achieve sustainable development based on digital technology and artificial intelligence.

Supporting, facilitating and following up the business incubator in each university institution in order to promote the establishment of emerging institutions that provide innovative solutions to the local reality, contribute to production and wealth creation, activate the local environment, involve university competencies in decision-making and participate in the dynamics of local development work.

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