The role of the digital economy in supporting sustainable development
Algeria as a sample

دورالاقتصاد الرقمي في دعم التنمية المستدامة
الجزائركعينة

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Received: 14th/10/2022; Accepted: 19th/10/2022

Abstract: This paper aims at illustrating the role of digital economy in supporting sustainable development in Algeria as important substitutes to the rentier economy that depends on hydrocarbons. And because of their role in achieving sustainable economic and social development by providing jobs and transferring development to remote areas and creating investment opportunities in the light of the state's tendency to support emerging institutions. Algeria has components, capabilities and natural resources that make it regionally and internationally one of the most important countries; however, despite all these available components and capabilities, the reality of the digital economy and sustainable development in Algeria is weak in terms of structures, facilities, infrastructure and investment... This is what necessitates the development of a strategy in order to exploit all the possibilities and ingredients for each of them to achieve the hoped-for digital economy and sustainable development. The digital economy is an economy based on digital technology and several components including technological infrastructure, hardware, software, and networks, in addition to digital mechanisms through which commercial and economic businesses, including e-commerce, and electronic transactions are carried out entirely on the Internet. Thus a secure and inclusive digital economy that achieves sustainable economic and social development, and enhances the capabilities of the digital economy and leadership at the national level through a comprehensive process that supports the development and the evolution of digital skills, digital services, digital assets, enabling environment in addition to digital and community leadership. This, in collaboration with the public and private sectors and civil society institutions. The study concluded that the digital economy has a major role in the dimensions of sustainable development, but the process of activating it is still immature and needs more modernization and encouragement, including the achievement of sustainable development.

Keywords: digital economy, sustainable development, dimensions of sustainable development.

Introduction

The digital economy is the economy based on digital technology and is based on several components, including technological infrastructure, hardware, software, and

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networks, in addition to the digital mechanisms through which commercial and economic business takes place, including e-commerce, and electronic transactions that are entirely on the Internet, which results in a secure and inclusive digital economy that achieves sustainable economic and social development, and enhances the capabilities of the digital economy and leadership at the national level through a comprehensive process that supports the development and the evolution of digital skills, digital services, digital assets, the enabling environment in addition to digital and community leadership; this, within collaboration between the public and private sectors and the civil community institutions.

Sustainable development is the most important goal that all countries of the world seek to achieve, where the individual is the focus and the basis of any economic or social development. This new proposal for development made it an approach in itself. Moreover, the valuation of human resources leads to achieving sustainable development in its economic, social and environmental dimensions. Thus, the premise is the interest and efforts of countries to achieve high rates of well-being and prosperity, and to improve the standard of living of individuals in a way that supports the level of competitiveness and social and economic development. On the other hand, we find that the digital revolution led to major changes, and extended to include aspects of economic, social, political and cultural life, which transformed societies from a society based on industrial production to a society based on digital production. This resulted in the emergence of what is known as the digital economy and digital products, which contributed to the entrance of organizations to the virtual world of business.

This research paper aims at highlighting the role of the digital economy in supporting sustainable development in Algeria as two important alternatives to the rentier economy dependent on hydrocarbons; and for their role in achieving sustainable economic and social development by providing jobs, transferring development to shadow areas, and creating investment opportunities in light of the state's tendency to support emerging institutions. Algeria has components, capabilities and natural resources that make it regionally and internationally one of the most important countries, but despite all these components and capabilities available, the reality of the digital economy and sustainable development in Algeria is weak in terms of structures, facilities, infrastructure and investment. This requires a development of a strategy in order to exploit all the possibilities and ingredients to achieve the desired digital economy and sustainable development, including the following problem: What is the role of the digital economy in supporting sustainable development in Algeria?

The following hypothesis can be put forward: The indicators of the digital economy support sustainable development in Algeria.

The relevance of the study: The importance of this study emerges from the great role that the digital economy has played in the contemporary world, whether at the economic or social level, which calls for Algeria to work hard with its various huge material and human resources in order to take advantage of the benefits it provides. The digital economy aims to achieve sustainable economic, social and environmental development.

Study Objectives: We aim through this study to monitor and analyze the reality and level of progress of the digital economy in Algeria and its repercussions on some developmental aspects in this country.

Study Methodology: In order to achieve the objectives of the study and answer the research question, we used the descriptive approach, as it is the most appropriate to explain and clarify the various events and situations expressing a phenomenon or a group of phenomena. By relying on a number of international reports related to the subject of the study. This is what we will try to answer through the following three sections:

The first section: the theoretical framework of the digital economy

The second section: the theoretical framework for sustainable development

The third section: indicators of the digital economy and dimensions of sustainable development in Algeria

In its theoretical part, this study deals with the definition of the digital economy and its importance, in addition to the dimensions and indicators of the digital economy.

Section One: The Theoretical Framework of the Digital Economy

1. Defining the Digital Economy

There are many opinions about finding a unified definition of the digital economy (knowledge, smart, new), and perhaps the most prominent of these definitions are:

- It is the economy that is based on digital information technology, and employs information and knowledge in its management as the new source of wealth and a source of inspiration for innovations. (Al-Razzo, 2006, p. 13)
- The digital economy is defined as: "The economy based on the Internet or the web economy. It is the economy that deals with digital or digital information, digital customers and digital companies, digital technology and digital products." (Najm, 2004, p. 88)
- It is also defined as: “The practice of economic activities in the electronic field using the means of communication and information technology, by creating effective links between the parties to the economic activity.” (Khaled Muhammad Al-Brahma, 2010, n.p.)
- It is defined as: "The economy that is based on benefits and services related to technology in information and communication." (Al-Najjar, 2007, p. 25)
- The digital economy is also defined as “the continuous interaction, integration and coordination between information technology and communication technology, on the one hand. And the national sectorial and international economy on the other hand, in order to achieve transparency, immediateness and productivity in all economic

indicators and support for all economic, commercial and financial decisions in the country during a certain period." (Fred, 2007, p. 25)

Despite the absence of an agreed on definition for the digital economy, in this context, it is possible to refer to the definition proposed by the Organization of Economic Cooperation and International Development:

> "… all economic activities that depend on the use of digital inputs including digital technologies, digital infrastructure, and services Digital. It is an economy whose main feature is the employment and exploitation of the latest modern technology within a global networked framework. And whose main motto is innovation, digitization, modernization, innovation and invention in accordance with the principle of permanent and continuous knowledge investment"

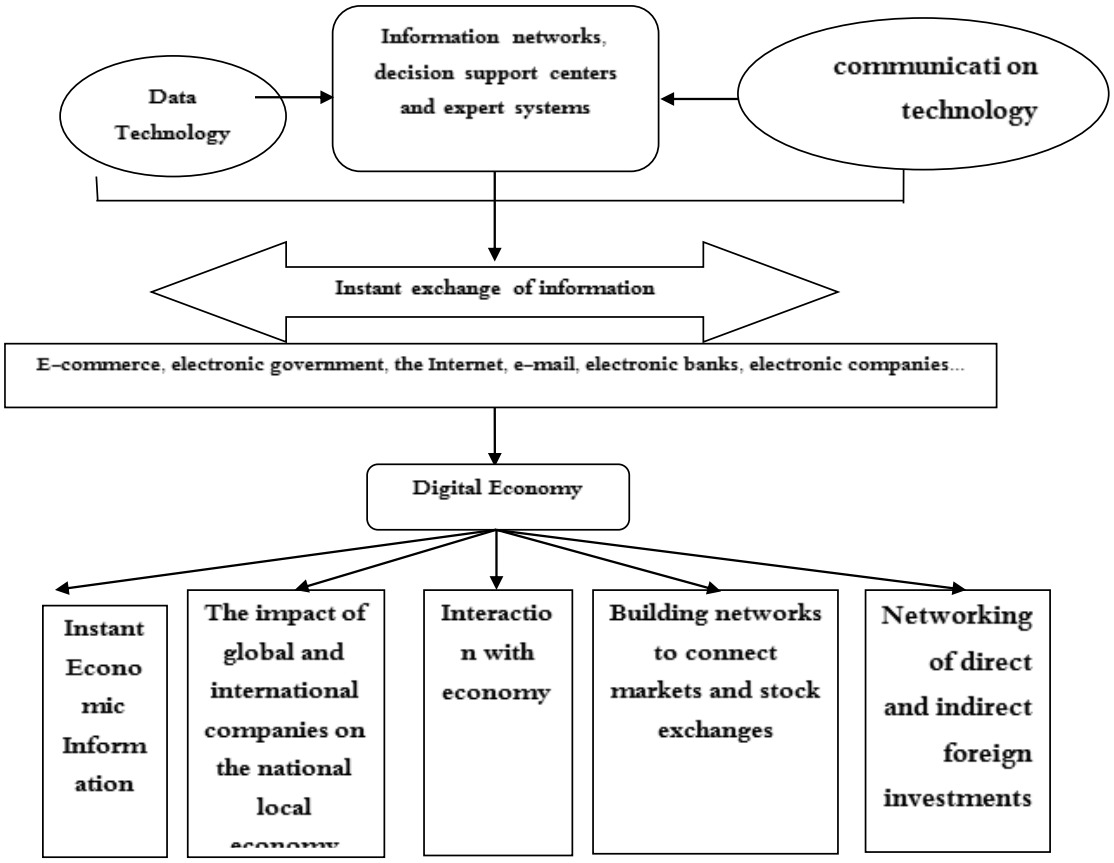
Thus, we conclude that the digital economy or the so-called electronic economy is based mainly on technological and information development that increases the opportunities for growth and development of products and services, especially those tradable digitally through information networks. It is based on a set of pillars, of which the most important are: data, information, technology and information systems including equipment, software, etc., (Khalofi, Rita, and Zaghlami, 2020). And the digital economy helps:

- Increasing the integration of the country's economy into the global economy;
- Increase global trade opportunities and access to global markets;
- Improves relations between suppliers, exporters, competitors, investors, banks, insurance companies, manufacturers, producers, government agencies, customs, taxes, international institutions, and others.

2. Elements of the Digital Economy

The digital economy came as a result of the birth of a new sector, which is the information and knowledge sector as a fourth sector within the economy as a whole, and also thanks to a restructuring of the traditional elements of the economy. The new structure of the digital economy can be depicted through the following figure: (Ahmed and Bin Zaf, 2018, p. 10)

Figure 01: Elements of the digital economy



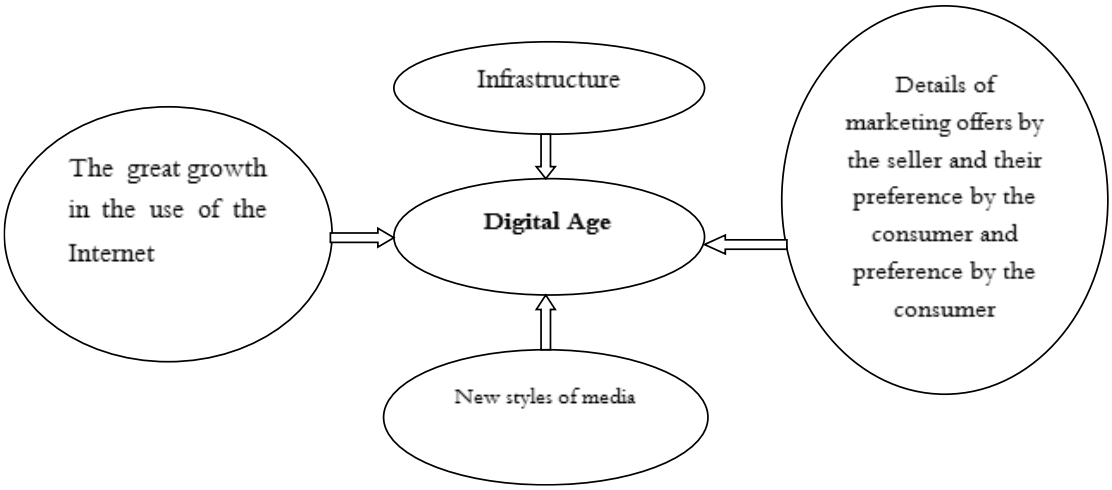
Source: (Muhammad Abd al-Azim Abu al-Naga, 2008, p. 311)

According to the above figure, it is clear that the base of the digital economy and its basis is information and communication technology, and the resulting information systems, decision support bases and centers as well as expert systems. On the other hand, the realistic embodiment of these concepts is embodied in the digitization of all areas of commerce and electronic business, management and electronic government, Electronic banks as well as virtual institutions to meet electronic customers. This formed the current concept of the digital electronic economy, which was able to provide many advantages, such as the unification of the global market and the abolition of time and geographical restrictions that were previously known, both for the markets for goods and services, financial markets, as well as the investment market.

3. Dimensions of the problem of the digital economy

In fact, the digital economy is the result of the convergence of the efforts of four forces that play a vital role in shaping it, as shown in the following figure:

Figure 02: The Shaping Forces of the Digital Age



Source: (Muhammad Abd al-Azim Abu al-Naga, 2008, p. 311)

A- Infrastructures: They are represented in digital technologies (Youssef Ahmed Abu Fara, 2004, p. 23) and communication mechanisms that are used to support e-business operations and activities and e-commerce exchanges. The infrastructure includes:

- Telephony networks, wired and wireless and satellite services.
- Software.
- Physical devices and equipment, including information storage mechanisms that have become involved in digital components that operate these systems and devices in accordance with the new technology.
- The trained, specialized and qualified human resource.

Thus, enable the growing and continuous technological progress to have an increasing growth in the number of devices and systems that operate according to any digital information, capable of being communicated through communication networks. That made it possible to carry out the majority of business over networks.

B- The huge growth in the use of the Internet: The Internet is the greatest technological revolution ever. It has been able to create a field of work, exchange and virtual communication capable of meeting the purposes of institutions as well as customers alike, allowing them to use it to evaluate the information published on the Internet before making a decision, including important investment decisions.

C- New styles of broker: The applications of modern technological technologies have resulted in the emergence of thousands of virtual institutions. The great success of these types of institutions has clearly affected many traditional industrial institutions, and the distributors in the actual markets. Because of the emergence of electronic sales and, thus, the emergence of a new type of brokers on the Internet, which caused the dispensation of the services of traditional distributors, which is what the new type of brokers in distribution operations means. Evaluate the way it serves its markets. (Mohammed Abdel-Azim Abul-Naga, 2008, p. 314)

D- Details of marketing offers by the seller and their preference by the consumer: According to the digital economy, organizations may base their business decisions on information. This is because information has become the main source for obtaining the advantages of differentiation, especially with the rapid development of the Internet and communication technologies, where institutions have been able to develop their capabilities by collecting the most accurate information on the individual aspects of consumers, suppliers, and distributors.

Organizations mainly focus on the standardization of their products, by directing their investments in building a brand that enables them to obtain the advantages of standardizing their marketing offers, to achieve a growth in the demand for their products.

Section Two: The Theoretical Framework for the Concept of Sustainable Development

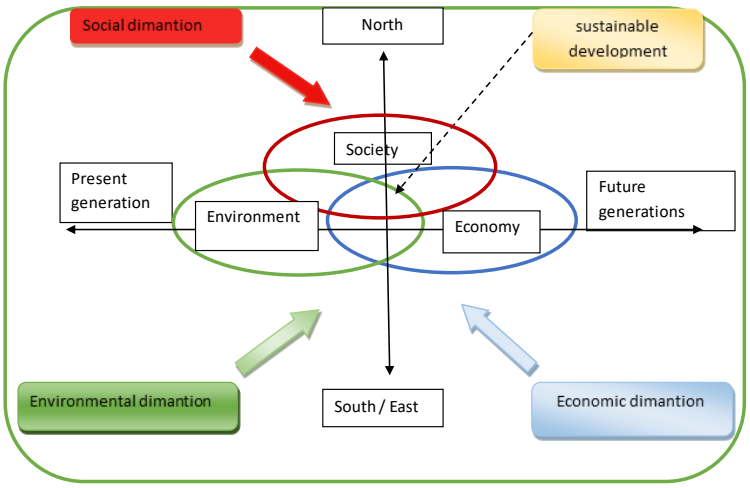
1. Sustainable Development as a Multidimensional Concept

The subject of sustainable development is one of the topics that have captured the attention of thinkers in various global economic, environmental and social fields, making this concept a school of thought in its own right.

The credit for the emergence and development of the concept of sustainable development is attributed to the Club of Rome, which was established in 1968, through a detailed report on the development of human society and its relationship to the exploitation of economic resources and the expectations that will occur until the year 2100.

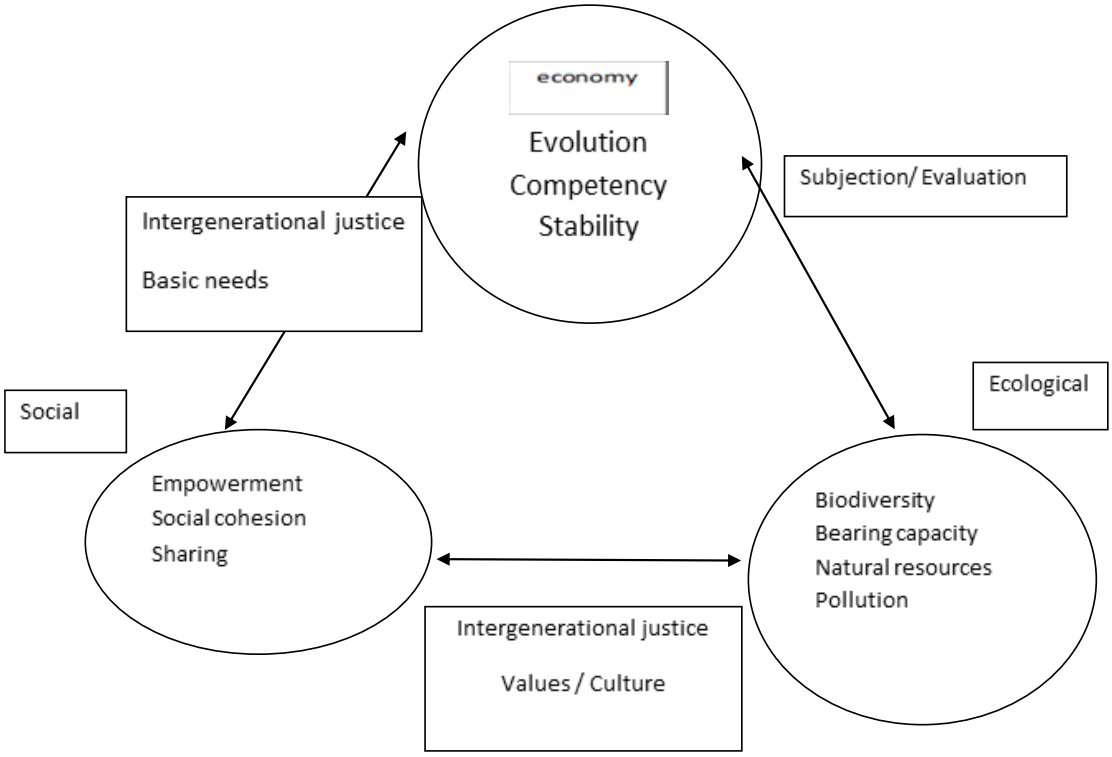
The first official use of this term dates back to the Norwegian Prime Minister Gro Harlem Brundtland in 1987 in a report entitled "Our Common Future" to express the quest for a kind of justice and equality between present and future generations (Youssef, 2018, p. 90). It is a complex multidimensional economic, social and environmental phenomenon, where concern for the environment is the main dimension to achieve this concept, and the following figure illustrates this:

Figure 03: Dimensions of sustainable development



Source: (Al-Rezki and Bin Othman, 2020, p. 175)

In this direction, Munasinghe (1992) asserts, that the concept of sustainable development is based on three main dimensions, which can be represented in the following form (Cited in Paul, 2008, p. 582):



Source : (Paul, 2008, p. 582)

Through this figure, we find that the concept of sustainable development depends on three pivotal dimensions that are interconnected and integrated among them and that the point of intersection is the achievement of individual well-being, and this is due to the close connection between society, the economy and the environment. The economic dimension seeks to maximize human well-being and exploit economic events and this appears through growth efficiency and stability; while the environmental dimension focuses on the integration of ecosystems to achieve comprehensive environmental stability, while the social dimension confirms that individuals are the most important factor in sustainable development, which can be achieved through Empowerment, social cohesion and participation. There is also a consensus among thinkers to consider justice between members of the current generation and members of future generations as an essential element of this concept, but the concept of justice is still ambiguous.

2. Sustainable Development Theories

Based on what has been said above, the most important theories of sustainable development can be addressed:

A- Theories Based on the Environmental Dimension:

1- **The GAIA theory (Burgenmeier, 2005, p. 195):** James Lovelock, the founder of this theory, believes that the Earth is a large living body capable of responding to adaptation that may exceed the activities and actions of

man, and according to this theory, nature takes precedence over man, who is only a part of it. Hence, nature was created to preserve itself and not to meet the needs of present and future generations. This theory also confirms that ecological standards are the only ones that guide the relationship between the environment and society without taking into account the economic and social aspects, as it aims to create fairness for non-human beings at the expense of humans.

2- **The Pessimistic Theory (Burgenmeier, 2005, p. 196):** In 1798 Thomas Malthus published his famous essay on his principles of population. In that essay, he declared his rejection of the optimistic theories of economic growth, which was espoused by some philosophers of his time such as the French philosophers including Nicolas de Condorcet and those who believed that the solution to all economic problems and obstacles that direct economic growth in the future would be through the use of human reason and technological development. Thomas Malthus was of the opinion that if the human race continues to reproduce and increase reproduction, it will face the problems of the limits of depleted natural resources; and that this will lead to misery, famine and stability in wage rates. He also believes that technological development can lead to a short-term increase in the work of limited natural resources.

3- **Optimistic Theory (Dubdar et al., 1988, pp. 57-58)**: Among the classical economists are less pessimistic, for example John Stuart Mill who held that while limited or depleted natural resources could represent a constraint on increasing production in the future, these limits have not yet been reached; and no country in the world will reach them within the time frame of any of the existing industries. John Stuart Mill based his principles on the future development of the agricultural sector and on the role of social institutions in raising the rates of economic welfare, all of which are factors that lead - as he believed - to reduce population growth rates.

4- **The Growth Limits Theory of the Club of Rome (mock, 2017, p. 36)**: Only nearly nine years after the publication of the Brant and Morse study, in 1972 the Club of Rome announced a report, "The Limits to Growth".

5- This report presented a new model for the purpose of predicting the future of development using five global variables, namely, population, food, manufacturing, depleted resources, and pollution. The forecasts reached by the report were excessively pessimistic, as it predicted that the future growth rates of the world's population, food production, and the degree of industrialization would initially grow exponentially, but would collapse during the next century.

B- Theories based on the economic dimension (mock, 2017, p. 37)

1- **Market Adjustment Theory**: Liberal economic theory holds that all phenomena that cannot be expressed critically in the market are neglected

in the economic system. From this standpoint, waste was treated as well as natural resources, which were seen as available and available resources in an unlimited way. Nevertheless, Marshal emphasized that there are some factors external to the market that can influence in one way or another the performance of economic dealers and introduced the concept of 'external economy'. Hence, it has become imperative to consider natural resources in the economic process and to address them as effective influences, which therefore requires market adjustment.

2- **Depleting Resource Theory**: The economist Harold Hotelling published his study on "The Economics of Depleting Resources" in 1931. In this study, Hotelling built a theoretical model on how to efficiently use depleted natural resources and maximize their long-term benefit.

3- **The Theory of Total Economic Value**: It is customary that the approaches directed to giving value to the environment are carried out by estimating the damages using methods of financial assessment of the visible effects, where physical changes to the status of natural areas are observed, then the effects and losses resulting from them.

4- **Ecological Economics Theory**: Among the criticisms of the whole approach to the market, a new trend emerges that is more of a program of work than a theoretical framework.

C- **Theories based on the social dimension (justice in the distribution of wealth and development) (Mock, 2017, p. 38)** Theories based on the social dimension are as follows:

a. **Circular Round Cumulative Causation:** The Swedish economist GONER MYRDAL has formulated this theory. It is based on the idea that the cumulative circular development in a country is linked to the natural and historical conditions and characteristics of this country and its regions. Where the free movement of economic and social forces leads to an increase in regional differences of various types between the center, which is usually represented by urban areas or cities and the margin periphery, which is represented by the countryside.

b. **Core-periphery theory:** developed by Friedman, who believes that the geographical system in developing countries consists of two sub-systems:

- The core, the coré, is the main urban area and the pole or center of growth.
- The periphery is the hinterland or the marginal areas.

The relationship between these two subsystems is one of dependency, with the margins following the center.

D- **Urban Bias Theory:** Developed by M. Lipton, he tried to answer the question: Why do the poor remain poor? He tried to explain the phenomenon of poverty in the countryside through a number of social and political factors, mainly, without neglecting the economic factors.

E- **Optimal Economic Growth Theory:** The Theory of Optimal Economic Growth, in its formulation as presented by Frank Ramsey and developed by

others after him, is a comprehensive theory of the utilitarian approach. It has a utilitarian dimension in its presentation of the benefit of societies as a function of the benefit of individuals.

F- Brundtland theory (1987) (Suan, 2006): This theory is based on a basic idea, which is to respond to the needs of the present without exposing future generations to danger to meet their needs. Among the most important principles of this theory:

- **Reviving growth**: developing the environmental and economic aspects of the decision-making process.
- **Population and human resources**: fixing the size of the population compared to the available resources.
- **Makers**: reorientation of technology and methods of managing and managing risks.
- **Energy**: the development of alternative energy systems.
- **Human stability and land use**: access to the urban growth challenge.

From the above and according to the approach based on the environmental dimension, it is the environment that needs to be sustainable, through the protection of biodiversity and increased attention to ethical and environmental aspects and this is within two different directions: from pessimistic theories about the limitations of natural resources, and the threat to them from growth in demand. In addition to neglecting the role that technological progress can play in replenishing natural resources and preserving the environment, which is consistent with Mallow's hierarchy of needs theory, they consider that the gradual rise of these needs will pose a threat to humanity. On the other hand, we find the optimistic theories, which emphasize the primacy of nature over man.

Moreover, theories based on the economic dimension focused on the repercussions and results of the economy on the environment; and how to improve industrial techniques by heading to renewable energy industries, the efficient use of natural resources and maximizing their benefit in the long term, which is the theoretical basis from which the concept of sustainable development was later launched. She also stressed the need to introduce the technology variable in achieving development, through the role that governments play in investing in the research and development process, education and sector institutions to support innovations and inventions that in turn lead to the advancement of technological development rates.

As for theories based on the social dimension, one of their most important priorities was to achieve justice in the distribution of resources between current and future generations. This means reaching the level of community well-being within the framework of social equality, and it is one of the most important issues of sustainable development, which largely reflects the quality of life and public participation and is linked with justice Inclusiveness in distributing resources and providing opportunities. It is thus an attempt to combine the behavior of social organization and human nature. According to their view, in order to achieve human development, it is necessary to take into account social factors and to allocate appropriate programs for that, through the policy of analyzing development programs and demographic growth rates, as well as

paying attention to poverty, public health, wars, natural disasters, and economic policies.

Section three: indicators of the digital economy and dimensions of sustainable development in Algeria

1. Indicators of the Digital Economy in Algeria

To determine the indicators of the digital economy in Algeria, the Arab Union carried out a study for the Digital Economy and the Council of Arab Economic Unity in the League of Arab States. The Arab Digital Economy Index relies on five strategic dimensions:

- **Digital foundations**: This strategic dimension aims to reach the level of information and communication technology infrastructure in the Arab countries to a degree of qualification that enables them to keep pace with the rapid technological changes worldwide.
- **Digital innovation**: This dimension aims to enable all Arab countries to keep pace with the accelerating technological future at the international level, and the availability of education systems and skills that help innovation in line with modern technology trends.
- **The digital citizen**: This strategic dimension aims to maximize the individuals' benefit from using digital technology, the availability of the level of education and skills qualified for this, and the raising of the quality of life for citizens.
- **Digital Business**: This strategic dimension aims to enable companies to make optimal use of modern information and communication technologies, to actively participate in the digital economy, and to provide a digital business environment conducive to technological changes.
- **E-Government**: This strategic dimension aims to provide a digital government that aims to invest in communications and information technology for the benefit of its citizens, reduce transaction costs, raise the quality of life for citizens and achieve transparency, with effective governance mechanisms available to achieve benefit between the three relevant parties, individuals, companies, and governments.

2. The Bases for constructing the Arab Digital Economy Indicator

In our study, we have relied on the Arab Digital Economy Indicator. It is one of the most important initiatives of the Arab vision for the digital economy and a tool specially designed by the Council of Arab Economic Unity in the League of Arab States to depict the current digital and economic situation of each Arab country; and to highlight the strengths, opportunities and areas of development. The Arab Digital Economy Index combines economic and digital indicators to measure the impact of digital transformation on many aspects of the economy and sustainable development. The index consists of nine sub-axes that enable the classification of Arab countries based on their performance across 57 main and sub-indicators. The following table shows the axes of building the index:

Table No. 01: The Arab Digital Economy Index

Sequences	axles	Main indicators	Sub-indicators
1	Institutions	3	3
2	Infrastructure	2	4
3	Education and skills the total	5	0
4	The electronic government	5	0
5	innovation	5	0
6	knowledge and technology	4	0
7	Business environment and network readiness	5	8
8	Financing market growth	6	0
9	Sustainable development	2	0
	The total	37	20

Adapted from (Book of the Arab Union for the Digital Economy and the Council of Arab Economic Unity in the League of Arab States, 2020)

3. Indicators of the digital economy in Algeria

The problem of measuring the digital economy in the world is a major dilemma, as there is no agreement between countries on a fixed set of indicators that can be relied upon in determining the extent to which countries are developing in the transition towards a digital economy. Some indicators have been adopted in the Arab Digital Economy Index 2020 Second Edition as shown in the table. The following is where the value of the Arab Digital Economy Index ranges between the best 100 and the worst 0:

Table No. 2: The value of indicators of the digital economy in Algeria

The indicators	The institutions	Infrastructure	Education and skills	The electronic government	innovation	knowledge and technology	Business environment and network readiness	Financing market growth	Sustainable development
The value	**31.31**	**37.63**	**59.66**	**10.58**	**32.62**	**28.47**	**00**	**28.82**	**62.05**

Source: (Adapted according to the book of the Arab Union for the Digital Economy and the Council of Arab Economic Unity in the League of Arab States, 2020)

2. The Dimensions of Sustainable Development in Algeria

To determine the dimensions of sustainable development in Algeria, we relied on the research of Sultan and Bouakal (2020). Despite the improvement in the living framework of the Algerian individual and the efforts made the development of human resourse, according to the report of the Economic and Social Council for Human Development, the illiteracy rate remains significantly high. It is remarkable, as it is estimated at more than 28%, and this is despite the compulsory education in Algeria.

From the above, the dimensions of sustainable development can be represented as follows:

A. Social Dimension:

- **Poverty**: The study of the National League for the Defense of Human Rights in 2019 indicates that the level of poverty in Algeria has reached 15 million Algerians who live below the poverty level at a rate of 38% of the total population of Algeria. This is due to the high unemployment rate and the inflation rate (it reached 9% in 2020) in addition to the slow growth of the economy outside of hydrocarbons. Poverty is represented in the deterioration of the standard of living, poor health services, the spread of chaotic neighborhoods (https://www.echoroukonline.com/15, 2019).
- **Unemployment:**

Table No. 03: Evolution of the unemployment rate in Algeria

Years	2016	2017	2018	2019	2020	2021
Unemployment rate	10.5%	11.7%	11.7%	12.5%	11.1%	13%

Source: (Adapted according to Sultan and Bouakal, 2020, p. 141)

We note that the unemployment rate in Algeria is relatively constant during the last four years. There is a great discrepancy between the unemployment rate of the educated and the less educated i.e., it increases with the high level of education. This is due to the control of small and medium enterprises that do not rely much on technology, that is, education in Algeria does not provide a guarantee against unemployment (Sultan and Bouakal, 2020, p. 141).

The unemployment rate in Algeria in 2019 reached more than 12%. This rise is due to the Corona pandemic, as many institutions in different sectors were closed in addition to thousands of self-employed who were classified among the list of unqualified and inactive labor. More than 100,000 workers have been laid-off, up to 150,000 workers, since the beginning of the epidemic crisis and this is related to direct or indirect job positions or temporary positions. To note that the Corona pandemic has paralyzed the Algerian economy due to the continued decline in oil revenues, which represents about 92% of financial revenues, with exports dropping to 25% compared to last year. (https://www.echoroukonline.com/15, 2019)

- **Health**: The life index was relied upon in order to identify the reality of health in Algeria, as it is considered the most important criterion for judging the quality of sustainable health development for a particular country.

Table No. 05: Evolution of average life expectancy in Algeria

Years	2016	2017	2018	2019
average life expectancy (a year)	77.5	77.6	77.6	77.5

Source: (Adapted according to Sultan and Bouakal, 2020, p. 141)

It is evident from the table above that the average life expectancy in Algeria is witnessing a relative increase from year to year. This increase can be explained by the social and economic changes that Algeria has witnessed recently through the changes in human resources in all disciplines, the provision of various methods of disease prevention, the improvement in the purchasing power of the citizen and progress in the medical field. Despite the efforts made by the state to achieve sustainable health, the level of health in Algeria remains somewhat modest (Sultan and Bouakal, 2020, p. 242).

B. **The economic dimension**: The Algerian economy's high dependence on the hydrocarbon sector, which directly contributed to environmental degradation in all its forms and in extreme proportions, made Algeria see the other economy as a means to implement sustainable development goals and as a lever for development and technological progress. Therefore, it allocated $828 billion for the success of the new five-year plan for growth (2015-2019) so that the plan encourages investments in key sectors of the green economy. Among the achievements in the green economy framework, we mention the following: The Hybrid Solar and Gas Energy Center in Hassi R'Mel, cement plants with fabric filters), the Beni Haroun Dam, the large water transport in Ain Saleh / Tamanrasset, seawater desalination plants, household waste management, smart architectural design (Sultan and Bouakal, 2020, p. 242)

C. **The environmental dimension:** Faced with this miserable situation of the environment, Algeria has worked to find the necessary solutions to restore the balance between economic development and environmental development, the most important of which is the enactment of laws to take real care of the environment, and to make several interventions in this field, and most of the areas of intervention were the following: (Sultan and Bouakal, 2020 , p. 242)

- **In the field of water pollution**: The ongoing work is related to the rehabilitation of drinking water financing networks for 10 cities with a population of more than 2 million people, and the rehabilitation of 24 water treatment plants.
- **In the field of air pollution**: It started to generalize the use of liquefied petroleum gas as a fuel gas, and to introduce unleaded gasoline, where we currently register about 40,000 cars converted to LPG, and the completion of 160 stations spread across the region, although there is only one refinery plant to produce unleaded gasoline. Lead, Sonatrach invested 272 million US dollars to reduce the pollution of flared gases.

- **In the field of urban and industrial waste**: The process of collecting and evacuating urban wastes in Algeria takes place in somewhat acceptable conditions, but this is still happening in conditions that do not provide any protection for the environment, especially emptying it into chaotic dumps despite attempts to establish control dumps. The situation of industrial waste is also a cause for concern, although Sonatrach is working on studies on the chemical treatment of oil sludge instead of burying it.

3. The value of indicators of the digital economy in Algeria

The problem of measuring the digital economy in the world is a big issue, as there is no agreement between countries on a fixed set of indicators that can be relied upon in determining the extent to which countries are developing in the transition towards a digital economy. Some indicators have been adopted in the Arab Digital Economy Index 2020 Second Edition, as shown in the table The following is where the value of the Arab Digital Economy Index ranges between the best 100 and the worst 0:

Table No. 06: The value of indicators of the digital economy in Algeria

The indicators	The institutions	Infrastructure	Education and skills	The electronic government	innovation	knowledge and technology	Business environment and network readiness	Financing market growth	Sustainable development
The value	**31.31**	**37.63**	**59.66**	**10.58**	**32.62**	**28.47**	**00**	**28.82**	**62.05**

Source: (Adapted according to the book of the Arab Union for the Digital Economy and the Council of Arab Economic Unity in the League of Arab States, 2020)

Based on the results of this table, we conclude that Algeria is digitally promising because it is attractive to investment. However, it needs digital activation, and more investments to maximize the capabilities of its infrastructure. Moreover, it faces challenges that require special attention at the state level especially with regard to:

- Institutional capabilities;
- technology dissemination;
- Trade and the digital economy as driving forces behind digital transformation;
- Open data and information and their role in building inclusive societies;
- Digital skills as a cornerstone of the future in employment, education, health, and other sectors particularly relevant to those affecting citizens' quality of life, economic empowerment, gender gaps and smart cities.

Conclusion:

In light of the technological revolution that we are witnessing, the transition to the digital economy has become one of the most important ways to support sustainable development; since achieving sustainable and balanced development is one of the most important goals that all countries of the world seek to achieve. This by considering the human resource being the centerpiece and basis of any economic or social development and by improving the level of quality of life. And this is reflected positively on a person's psychological and health life, and thus his abilities to advance society and lead any development strategy adopted by any country, and this leads to achieving sustainable development in its economic, social and environmental dimensions. Income and working conditions of the individual to interest in improving the quality of life as the basis of any development.

The digital economy in Algeria has a significant contribution to supporting and achieving sustainable development, as digital technology is intertwined in all aspects of life and sectors. The goals are up to or more than 22% to fully support the transformation required by the sustainable development goals. Thus, the indicators of the digital economy are viewed based on their impact on all the main sectors that make up the global sustainable development goals for the year 2030, and therefore Algeria cannot remain immune from this revolution. It should rather take advantage of the benefits it offers, and address the risks it poses.

From the above, we can consider the hypothesis put forward in the introduction correct.

Recommendations:

In light of the previous results, we can present a number of recommendations that we consider necessary and relevant:

- Increasing the coverage density of the telephone network and the Internet for all areas of the national territory
- Providing the legislative environment for the digital economy, and activating important laws on e-commerce and electronic certification in order to give confidence to digital transactions, with the necessary protection for all parties dealing in the digital economy from the protection of privacy and data;
- Work to develop banks, the stock exchange and electronic payment methods to live up to international requirements as the most important elements of commercial transactions.
- The Algerian state must ensure that all citizens have access to the same services and opportunities offered by digitization
- Directing and allocating local investments and attracting foreign capital in the ICT sector
- Supporting cooperation programs among countries in the field and drawing on the experiences of successful countries
- Adopting a policy of technology education through training and education programs in professional institutions and encouraging them to research and

innovate in the field of information and digital technologies by providing appropriate financial conditions and an appropriate work environment

- Drawing up a national policy to encourage the adoption of e-commerce and electronic payment by small and medium enterprises
- Work to digitize all government sectors and all daily commercial transactions of citizens to gain time, reduce costs, improve the quality of services provided, and increase confidence in e-commerce as one of the most important applications of the digital economy
- Increasing the benefit of the advantages of information technology, and its use in the national economy as a basis for integration into the global economy and for access to global markets that require work within the characteristics of the digital economy
- Searching for other investment opportunities outside the field of hydrocarbons, and the information and communication technology sector represents a fertile ground for this.

List of references:

- Abdel Azim Abu Naga, M., (2008), *Advanced Marketing - Global Marketing - Customer Relationship Management,* Alexandria, Egypt: Al-Dur Al-Gamia for publishing and distribution.
- Abdullah bin Salwa, R., et al., (2020), "The Role of Using Green Energy in Achieving Sustainable Development - a Case Study of Algeria", *Journal of Strategy and Development*, Special Issue of the Second International Conference, Green Energy and Sustainable Development - Approaches and Experiences, (p. 175). Algeria.
- Abu Fara, Y., (2004), *E-Marketing: Elements of the Internet Marketing Mix* (Version I 1). Amman, Jordan, Wael House for Publishing and Distribution.
- Al-Brahmah, K., M., (2010), *The Digital Economy "information"*. Retrieved date 06 01, 2022, from www.aecfkh.org/articles.action-articles-id-2.htm.
- Al-Najjar, F., (2007) *The Digital Economy and the Restructuring of Investment, Stock Exchanges and Electronic Banks* (first edition). Alexandria, Egypt: University Publishing House.
- Beat Burgenmeier, (2005), *Economie du Developpment Durable (Version 2),* Bruxules, Paris: De Boeck. *thrived from:* https://ar.tradingeconomics.com/algeria/unemployment-rate. (2022), Redemption Date 06 01, 2022
- https://donnees.banquemondiale.org/indicateur/sp.dyn.le00.in?locations=DZ. (2020), and from: https://www.echoroukonline.com/15. (2019).
- Hamed Dobdar, M., et al., (1988) *Fundamentals of Political Economy*, Beirut: University House.
- Khuloufi, S., et al., (2020), "Assessment of Algeria's Readiness to Enter the Digital Economy", Al Namaa Journal of Economy and Trade, Vol. 04, No. 02.
- Marrush Y., (2018), *Liberalizing Arab trade and its role in achieving sustainable development, a comparative study between the countries of the Arab Maghreb Union and the countries of the Gulf Cooperation Council*, PhD thesis, specializing in economic analysis. University of Algiers 03, Algeria.
- Muzaffar, H., and Al-Razzo, (2006), The Components of the Digital Economy and an Introduction to the Economics of the Internet, Institute of Public Administration, Research Center, pp. 13.
- Paul, B. D., (2008), "Sustainable Development - Atheoritical Approach. Annals of the university of Orcada", *economic science series*, Vol. 17, No. 2, pp. 582.
- Qaid N., et al., (2018), "The Reality of Consumer Protection and the Digital Economy in Algeria3, The third national conference on the consumer and the economy: the necessity of transition and the challenges of protection, (p. 10).

- Shanbei, S., (2017), *Using the Smart Transport Strategy as a Tool to Support Sustainable Transport Tools, Study the Application Requirements in Road Transport in Algeria*. Doctoral thesis, specializing in management sciences, University of Mohamed Boudiaf of M'sila, Algeria.
- Star Abboud Star, (2004), *Electronic management strategy, functions and problems*. Kingdom of Saudi Arabia, House of Mars.
- Suan, B. (2006), *Sustainable Development (second edition).* OXON, ABINGDON: Routledge.
- Sultan, K., and Bouakal, A., (2020), "The Knowledge Economy and its Role in Achieving Sustainable Development - the case of Algeria and Tunisia", (University Center Ahmed bin Yahya Al-Wonsharysi Tissemsilt, editor*), Journal of Modern Economy and Sustainable Development*, Vol. 03, No. 01, retrieved from: (https://donnees.banquemondiale.org/indicateur/sp.dyn.le00.in?locations=DZ, 2020) , and from: https://ar.tradingeconomics.com/algeria/unemployment-rate, 2022
- Unique Carpenter, (2007). *The digital economy (first edition)*. Egypt: University House.
- The book of the Arab Union for the Digital Economy and the Council of Arab Economic Unity in the League of Arab States. (2020). The Arab Digital Economy Index, COVID-19, and the necessity of transitioning to a digital economy.