The Digital Economy and Its Role in Enhancing Human Development Indicators in Algeria

الاقتصاد الرقمي ودوره في تفعيل مؤشرات التنمية البشرية في الجزائر

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Abstract:

The world has witnessed significant advancements in the fields of science and technology that have greatly impacted various sectors (economic, social, political, cultural, legal, and environmental). This has led countries to transition from a commodity-based economy to a digital economy. The digital economy primarily relies on knowledge stemming from rapid advancements in information and communication technology, computer programs, and the internet. It encompasses three main dimensions: technological evolution based on the information and communication system, the economic dimension where sectors like agriculture, industry, and administrative services heavily rely on digital knowledge, and the social dimension aiming to spread digital knowledge across all social strata.

Keywords: Digital economy, human development, human development indicators, **Algeria.**

JELClassificationCodes: A2،O15 ، O150.

ملخص:

عرف العالم تطورا هائلا في مجال العلوم والتكنولوجيا أثر بشكل كبير على كل المجالات (الاقتصادية والاجتماعية، السياسية والثقافية، القانونية والبيئية) أدت بالدول إلى الانتقال بالاقتصاد من الاقتصاد السلعي الخدمي إلى الاقتصاد الرقمي، حيث يرتكز الاقتصاد الرقمي بالدرجة الأولى على المعرفة الناتجة عن

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التقدم السريع في مجال تكنولوجيا المعلومات والاتصالات وبرامج الكومبيوتر وشبكة الانترنت، وعلى نتائج البحوث العلمية المحكمة والمعتمدة من طرف المنظمات العلمية ومراكز البحوث فهو ينطوي على ثلاثة محاور أساسية التطور التكنولوجي القائم على نظام المعلومات والاتصالات، المحور الاقتصادي حيث أصبحت كل القطاعات الاقتصادية كالزراعة والصناعة والخدمات الإدارية تعتمد وبشكل كبير على المعرفة الرقمية ، والمحور الاجتماعي الذي يهدف بالدرجة الأولى إلى إيصال المعرفة الرقمية لكل فئات المجتمع باختلاف مستوياتهم الاجتماعية.

كلمات مفتاحية: الاقتصاد الرقمي ،التنمية البشرية ،مؤشرات التنمية البشرية ،تفعيل ،الجزائر.

تصنيفات JEL: A2، O15،O150 .

1. INTRODUCTION

The new global economy is built upon advancements in information and communication systems, reshaping work environments and producing non-material resources that surpass the significance of material resources. This economy revolves around creating, distributing, sharing, utilizing, and employing knowledge to enhance human life in all aspects. The knowledge economy has proven its ability to improve the well-being of individuals, organizations, and society as a whole, considering digital knowledge as a production factor. This sets modern economy apart from traditional economy. The digital economy plays a crucial role in activating human development indicators alongside economic development, particularly in education and social improvement through income elevation and better healthcare.

1.1 Research Problem:

Abundance in natural, human, material, and financial resources does not necessarily guarantee human development. This is especially true in the case of modern economic resources, such as knowledge and human capital, which require appropriate quantity, quality, and timing of utilization for rational development.

Research Question: "What is the role of the digital economy in achieving human development and improving its indicators in Algeria during the period 2008-2022?"

1.2 Research Hypothesis:

The digital economy plays a fundamental role in achieving human development in Algeria, especially when digital knowledge is utilized rationally, taking into account advancements in information and communication technology.

1.3 Significance of the Study:

The study gains significance due to the growing interest in the digital economy and its effective role in boosting national economies through impacting economic activities, employing new mechanisms, techniques, and technologies, and providing cognitive and technological services to individuals and society. The economy significantly contributes to achieving comprehensive human development.

1.4 Research Objectives:

The study aims to achieve the following objectives:

-Understand the concept of the digital economy and its role in global economy and wealth accumulation.

-Highlight the role of the digital economy in achieving human development and elevating its indicators through improving living standards and education.

-Emphasize the role of information and communication technology, scientific knowledge, and technology in achieving human development.

-Analyze digital economy and human development indicators in Algeria.

1.5 Research Structure:

To address the research question, the study is divided into the following sections:

Theoretical framework of the digital economy.

The digital economy and its relationship with human development.

Human development indicators in Algeria.

2 .The Theoretical Framework of the Digital Economy:

In this section, we delve into the concept of the digital economy:

2.1 The Nature of the Digital Economy:

Before delving into the concept of the digital economy, let's touch on some related concepts:

2.1.1 Digitization Concept :

Digitization refers to the reproduction of a pre-existing document on a physical medium such as paper or film, through recording the image of each part of the document as a sequence of binary digits (0s and 1s). This is done using a chosen encoding system (characters A, B...) representing black points, white points, or a sequence of consecutive points in a single color. The resulting digitally produced document can be subjected to corrections and amendments using specialized software without altering the informational content (Khatir, 2007-2008, p. 59).

2.1.2 Distinctive Features of Digital Enterprises:

Digital enterprises have distinct advantages, summarized as follows:

2.1.2.1 Capital Requirement:

Digital enterprises require significantly less capital for establishment. Since they primarily exist on the internet, they do not incur the substantial costs associated with physical establishments, rent, decorations, factories, and equipment. This makes it feasible for innovative ideas to be realized.

2.1.2.2 Provision of Required Solutions:

The internet provides digital entrepreneurs with tools and applications needed for swift project initiation. Everything is readily available, from branding design applications to ready-to-launch e-commerce store templates, secure electronic payment applications, and solutions necessary for any online business venture.

2.1.2.3 Ease of Employment and Skill Attraction:

The internet has enabled digital project owners to employ remote workers and attract skills from around the world. It establishes communication networks, both individual and collective, and this comes at no cost.

Furthermore, digital project owners benefit from substantial savings on expenses that would typically arise when hiring foreign skills, such as travel tickets, accommodations, visas, health and social insurance, transportation, housing, allowances, and end-of-service benefits.

The current economic crisis has caused unemployment among skilled workers. This reality favors digital business owners with extremely low

wages and high productivity in comparison to local or imported labor, in addition to the ease and flexibility of employment.

2.2 The Concept of the Digital Economy:

2.2.1 Definition of the Digital Economy:

Various definitions exist for the digital economy, including:

It encompasses novel products that are essentially knowledge-based and digitally encoded, or products primarily built upon knowledge, such as computer-based processes (Ghadeer, Not specified, p. 77).

The practice of economic activities in the electronic realm using communication means and information technology, by creating effective links between economic actors (Al-Alami, 2012-2013, p. 04).

2.2.2 Characteristics of the Digital Economy:

The key characteristics can be summarized as follows:

2.2.2.1 Access to Information:

The success and growth of the digital economy depend on individuals' and institutions' ability to participate in information networks and various internet platforms. Effective participation necessitates the existence of a robust digital infrastructure within the economy.

2.2.2.2 Competition and Market Structure:

Information technology influences the degree and methods of competition, enhancing competitive positions. The market structure varies based on the extent of information technology application in the digital economy, both domestically and internationally.

2.2.2.3 The Future of the Overall Economy in the Digital Economy:

Information technology plays a crucial role in increasing economic growth rates, capital investment, domestic and international e-commerce, and affecting business transaction methods. It brings forth new methods and ways of conducting business, such as:

-The share of each economic sector in e-commerce.

-Inflation, growth, employment, and productivity rates and their impact on the digital economy.

-Gains of market participants from e-commerce.

-The percentage of e-commerce between different sectors and their economic activities.

2.2.2.4 The Digital Economy and the Hyper-Speed Economy:

The digital economy thrives on swift movement, facilitated by satellites and email communication. This rapid pace necessitates nimble companies, organized through network relationships and instant information sharing.

2.2.2.5 Cost Compression for Every Transaction:

The internet has introduced a new phenomenon to transactional dynamics - the concept of clicks equaling transactions. Traditional companies often avoided small transactions due to their high handling costs in comparison to returns. However, the internet has substantially reduced these costs, leading to an unprecedented increase in overall activity volume. This presents a remarkable opportunity to earn money through clicks.

2.3 Indicators for Measuring the Digital Economy:

The essential indicators that should be adopted for measuring the digital economy can be elucidated as follows (Al-Alami, Hussein, 2012-2013, p. 6):

-The form and size of the main components of the digital economy, which is still in its developmental stage, such as e-commerce and the evolving role of computers and related technologies, their presence in workplaces.

-Business enterprises and their utilization and development of advanced technology and e-commerce.

-The changes occurring in the market structure and functions, which encompass alterations in the distribution methods of goods and services. Additionally, changes in the nature of local and international competition.

-The economic and social applications of the information and communication technology revolution, including the changes in productivity resulting from investment in information technology.

-The demographic characteristics of society in the context of the digital economy.

Due to the continuous evolution and dynamism that characterize the digital economy, these indicators are no longer sufficient to measure and identify the effects of the digital economy on society and the global state. Thus, they have been modified and developed as follows (Al-Alami, Hussein, 2012-2013, p. 06.08):

2.3.1 Information and Communication Technology Infrastructure:

The physical aspect (equipment and tools) and the digital aspect (software) of the infrastructure for the digital economy should be measured. Specifically, efforts to collect standard data should focus on the physical infrastructure (information and communication technology facilities including computers, phone lines, fiber optic lines, satellites, wired and wireless networks). Moreover, investments in software must be measured. Basic information about the extent of internet and other network coverage, as well as network congestion, should also be provided. Measuring the obsolescence and depreciation of digital infrastructure is crucial.

2.3.2 E-commerce:

E-commerce should be measured by examining the volume and nature of electronic transactions between businesses (B2B), between businesses and consumers (B2C). Moreover, efforts should be made to measure the quantity of digital and non-digital goods and services separately. Physical products should be physically delivered to consumers, while digital products bypass wholesalers and retailers to reach the end consumer directly. Digital products may have different (non-linear) pricing models due to their high fixed costs and low marginal costs. Additionally, it is crucial to measure the volume of e-commerce transactions that serve purposes other than settlement, such as customer service, general information, and product advertising.

2.3.3 Industrial Company Structure:

The improvements in information technology, software, and the internet should be measured for their impact on the structural composition of companies and markets. In general, it is necessary to identify changes in location (localization), industry, size, and organizational structure of business enterprises. Additionally, changes in input mix (capital, labor, inventory) and their relationship to other companies (outsourcing or reliance on external sources) should be measured.

2.3.4 Demographic and Labor Characteristics:

The demographic and labor market characteristics of individuals and workers participating in the digital economy should be measured and compared with those participating in other sectors. Specifically, the use of

computers at school, work, and home should be measured and linked to economic outputs such as wages and assets, as well as demographic characteristics such as education, employment, gender, ethnicity, age, and location.

2.3.5 Price Behavior:

The factors leading to the contraction of prices of goods and services should be adapted to reflect the extent of quality changes due to information technology. This will allow for more accurate measurements of major statistical aggregates such as productivity. Measuring price variations between goods and services sold through different methods (e-commerce vs. traditional methods) and also measuring price dispersion among producers using the same method is of utmost importance to understand the nature of competition in the digital economy.

2.4 Factors of Integration in the Digital Economy:

The transition from a material economy to an immaterial economy relies on human capital as its foundation. This transition requires the presence of several key factors, including (Boutaleb & Faisal, 2014, pp. 256-257):

2.4.1 Information and Communication Technology (ICT):

Establishing technological infrastructure within the framework of the digital economy is primarily based on investment in Information and Communication Technology (ICT), such as software and information technology equipment industries. These industries involve innovation, encompassing tasks like designing, implementing, and testing computer programs. They rely primarily on human intellect and their production is not constrained by time or location. They operate within an integrated marketing system, have minimal environmental impact, generate high and rapid returns, and compete in international markets.

2.4.2 Education and the Information Society:

Previously, education spending was often seen as a form of consumption. However, in today's context, it is considered an investment in human capital with a significant impact on economic development. In the era of the digital economy, education is crucial for knowledge-intensive activities. Education needs to focus on nurturing individuals with the ability

to innovate and create, particularly in areas relevant to the digital economy, such as biotechnology and software development.

2.4.3 Research and Development (R&D):

Research and development laboratories are spread throughout the digital economy, and both governments and private entities give them great attention as they are at the heart of technological progress. Entering the digital economy necessitates an increase in spending on R&D projects as a percentage of Gross Domestic Product (GDP). This ratio serves as an indicator within the digital economy framework, and it tends to be high in advanced countries. Governments and the private sector in these countries share the responsibility of R&D project funding.

3.Nature of Human Development:

The term "human development" is not new in development discourse and emerged in the latter half of the 20th century, with its concept crystallizing in the 1990s through the United Nations Development Programme (UNDP). The essence of human development lies in making development serve people rather than placing people in the service of development. Human development aims to empower individuals to make their own choices regarding earnings, personal security, and political participation. This requires creating a conducive environment that facilitates local initiatives and reforms.

3.1 Definition of Human Development:

The UNDP played a pivotal role in shaping a new vision of development through its Human Development Reports starting in 1990. The first report defined human development as "expanding people's choices, to lead lives that they value, and improving the human condition." This definition encompasses:

- Living a long and healthy life.
- Access to knowledge.
- -Having access to resources to achieve a decent standard of living.

The report, however, overlooked additional dimensions, including:

- Political, social, economic, and cultural freedoms.
- The sense of security.
- Opportunities for creativity and productivity.

Later, the 1993 Human Development Report refined the definition as "development for people, by people, and with people":

- "Development for people" means investing in human capabilities, whether in education, health, or skills, to enable productive and creative lives.
- "Development by people" involves ensuring equitable distribution of benefits from economic growth and power decentralization.
- "Development with people" signifies inclusion and participatory decision-making.

The three essential dimensions of human development are:

-The first dimension focuses on building human capacities, such as improving healthcare and enhancing cognitive abilities.

-The second dimension involves utilizing these capacities for enjoying life and increasing work productivity.

-The third dimension concerns various aspects of human well-being.

The 2014 Human Development Report emphasizes the importance of building resilience against risks. It emphasizes the human-centric approach and addresses inequalities within and among countries. It identifies groups that are more vulnerable to risks due to historical injustices or unequal treatment based on factors like gender, race, origin, and geographic location. This report acknowledges that "exposure to risk does not mean poverty, scarcity, or deprivation. It means vulnerability to shock, stress, or strain) imane الصفحات، 2017-2016 ،P 8-9(."

3.2 Objectives of Human Development:

The objectives of human development can be summarized as follows (Ibrahim, 2006, p. 222):

- Providing access to education for all members of society and eliminating illiteracy and ignorance.
- Generating employment opportunities and creating favorable conditions for work, especially in rural and urban areas, to combat unemployment.
- Improving healthcare, especially for children under 15 and pregnant women.
- Ensuring adequate shelter for individuals with low incomes.

- Eradicating hunger and improving nutrition.
- Reducing poverty.
- Enhancing individuals' quality of life by increasing their income.
- Assisting individuals in meeting their various needs.
- Ensuring political and economic freedoms.

3.3 Human Development Indicators:

These indicators can be summarized as follows:

3.3.1 Qualitative Indicators:

These indicators include:

3.3.1.1 Education:

Human development addresses education from three angles ; Providing education as a tool for acquiring technology and meeting market needs ; Recognizing education as a fundamental human right aimed at improving individuals' well-being, not just preparing them for work.

3.3.1.2 Health:

Investing in health contributes to increased individual productivity and, consequently, enhances the national economy. Human development plays a crucial role in poverty alleviation and reducing societal suffering. Ensuring long and healthy lives free from diseases is a primary goal of human development (Ibrahimi, 2012-2013, pp. 20-24).

3.3.1.3 Income:

Income represents the nominal or real value of goods and services produced within a country's economic resources over a specific period, usually a year. This includes both domestic and foreign production, traded according to established regulations (Hoshyar, 2005, pp. 73-74).

3.3.2 Quantitative Indicators:

These indicators mainly include: (Ibrahimi, 2012-2013, p. 20)

- Opportunities for creativity and innovation.
- The right to participation and enjoying human rights.
- Sustainable Human Development Indicators, as included in the UNDP's Human Development Reports. These include topics such as women's empowerment, achieving justice, and fairness.
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3.4 The Relationship between the Digital Economy and Human Development:

In this realm, the digital economy, driven by digital technology, has become a significant contributor to human development. A key indicator is the degree of accessibility and control over this technology. Training is an optimal pathway to enhance and develop individuals' capabilities. Digital technology has significantly contributed to building human competencies, elevating skills, expanding capabilities, and acquiring new knowledge through: (Toufik, 2015-2016, pp. 119-120)

- Enhancing human resources competencies.
- Raising skills and abilities.
- Acquiring new knowledge.

The impact of digital technology on human resources is evident in various aspects:

3.4.1 The Impact of Digital Technology on Administrative Processes and Activities:

Studies indicate that human resources' motivation and morale in technologically complex institutions are lower compared to those using less complex technology. **Herbert Simon** identified seven dimensions of technology's impact on society:

- Enhancing human capacities to achieve collective goals, such as mass production of goods.
- Providing knowledge about harmful side effects, contributing to risk avoidance.
- Offering new alternatives for decisions, targeted programs, and necessary behaviors.
- Facilitating the discovery of new needs arising from future changes or modern life's nature.
- Providing tools and means for analyzing and understanding complex systems, linking technology to decision-making processes for selecting appropriate technology.
- Deepening self-understanding, aiding in diagnosing circumstances and conditions, contributing to understanding human aspirations and their impact on behavior.

3.4.2 Tools of Digital Technology Used in Human Resources Development and Training:

- These tools include:
- Programmed instructions: A form of self-learning for acquiring work-related skills systematically.
- Video and video discs.
- Interactive Video Training (IVT) devices.
- Wireless communications.
- Computer-based training.
- Development and training through programmed instructions.

Simulation.

3.4.3 Methods of Human Resources Development Through Digital Technology:

Building human competencies, raising skills and abilities, and acquiring new knowledge occur through:

- Developing education systems and their basic requirements in research colleges and training centers.
- Training and developing individual skills using various methods within and outside institutions.
- Developing scientific research centers and applied research through new projects or enhancing existing resources.

A comparison between digital and traditional human resources can be found in the following table:

Table 01 : Comparison between Digital and Traditional Human Resources

Digital Human Resource	Traditional Human Resource
-Multiple functional variables in various directions. -Successive and short-term goals, global and local. -Dependent on his work and audacity. -Inclined towards empowerment, embraces change, and absorbs surprises. -Linked to relationships, ideas, and networks. -Concerned with results and the big picture, a knowledge producer and information creator. -Accomplishes work through innovative ideas and excels in listening. -Takes risks with new projects and sometimes abandons them before they fail. -His communication style and linguistic expressions are crucial tools at work. -Accomplishes multiple tasks simultaneously. -Multifaceted, with a variety of communication windows, relationships, and tasks. -Communicative and open to others' institutions. -Either an experimenter or an enjoyer. -Compelled to learn and learns intentionally or by choice.	-A linear, one-directional fixed job path. - Long-term, local, productive, and market-oriented goals. - Relies on age and job position. -Tends towards centralization and hierarchical sequencing. - Linked to the organization and individuals. - Attentive to details and discriminates within them. Producer, marketer, and seller. -Accomplishes work vocally and prefers verbal communication. -Avoids risks and seeks a margin of safety. - Appearance and features are crucial tools at work. - Focuses on one task before moving to another. -Mood swings - either happy or sad throughout the day. - Introverted and closed within his institution and peers. - Either complimentary or confrontational (without intermediaries). - Not compelled to learn, and learns incidentally and reluctantly.

Source : waman, Mohamed Tawfik, "Human Resource Development in the Digital Environment :A Study of Socio-Technical Dimensions, Case of the Security Directorate of Biskra province",Unpublished doctoral thesis submitted to obtain a Ph.D in Sociology, specializing in Human Resource Development, College of Social and Human Sciences, Department of Social Sciences, Mohamed Khider University, Biskra, 2015-2016, p 126.

5.3 The Digital Economy and Human Development Indicators in Algeria :

Through this axis, we will address the impact of the dimensions of the digital economy on human development indicators in Algeria during the years 2020 and 2022.

5. 3.1 Strategic Dimensions Regarding Algeria's Performance :

Through this element, we aim to address the components of the Digital Economy Index in Algeria for the years 2020 and 2022, and compare them with the Human Development Index and Sustainable Development, respectively :

Table 02 : illustrates the Digital Economy Index and Human Development in Algeria

		2020		2022	
The Dimension	**The Axes**	**The Value**	**The Ranking**	**The Value**	**The Ranking**
Digital Foundations	Institutional Axis InfrastructureHaut du formulaire Haut du formulaire Haut du formulaire	43.66	11	42.33	8
Innovation Dimension	Education and Skills Innovation, Knowledge, and Technology	40.28	9	Innovation 43.54 Knowledge, and Technology 14.05	12
E-Government	E-Government	47.33	12	51.73	11
Digital Business	Business Environment and Digital Readiness Digital Growth of Financial Markets	43.49	12	Market forces 28.33 Evolution of the financial market 59.23	12

Digital Citizen	Education and Skills Infrastructure	53.12	10	57.86	9
Sustainable Development as a Cross-Cutting Dimension		62.05		71.71	
Human Development Index		0.745		0.748	
Digital Economy Index		35.5		46.55	

Source: My reports "Arab Digital Economy Index for the years 2020 and 2022", "Arab Vision for the Digital Economy", Arab Economic Unity Council, National Council for Media, First Edition, United Arab Emirates, pages 129 and 201 respectively.

Through Table 02, we observe a slight improvement in the Digital Economy Index from the year 2020 to 2023, attributed to the Algerian economy's recovery from the setbacks of the COVID-19 pandemic. The index increased from 35.5 in 2020 to 46.55 in 2023. This had a marginal impact on the Human Development Index, which transitioned from 0.745 to 0.748. Similarly, the Sustainable Development Index moved from 62.06 to 71.71 for the same period.

5. 3.1 Evolution of the Human Development Index in Algeria:

The evolution of human development in Algeria can be elucidated through the following table:

Table 02 : Evolution of the Human Development Index in Algeria

Human Development Index	Years
0.695	2008
0.691	2009
0.710	2010
0.711	2011
0.713	2012
0.717	2013
0.736	2014
0.745	2015
0.752	2016
0.754	2017
0.759	2018
0.748	2019
0.745	2020
0,745	2021
0.748	2022

Source: Human Development Reports issued by the United Nations from 1995 to 2015, using the United Nations website: www.un.org

From the above table, it is evident that the Human Development Index, which is a composite index consisting of Education Index, Health Index, and Income Index, has exhibited continuous fluctuations. It experienced a steady increase starting from the year 2010, reaching 0.759 in 2018. This is the highest rate Algeria has achieved, placing it at the 83rd position globally in the Human Development Index ranking. This achievement is a result of the measures taken by Algeria through its economic recovery, support, growth, and investment programs in various sectors, particularly health, education, and individual income enhancement. Consequently, Algeria transitioned from the category of medium human development to high human development.

6.Conclusion:

Through this study, we attempted to highlight the role of the digital economy in achieving human development, which is the foundation of economic and sustainable development. The digital economy plays a crucial role in development due to its effective contribution to information and communication technology transfer, as well as its role in integrating national and international economies. This integration is ultimately facilitated by the human resource, which serves as the cornerstone of progress.

From this study, we arrived at the following conclusions:

- The digital economy has become essential due to financial and economic globalization.
- The digital economy has impacted all facets of society, including the human resource, which is at the core of these facets.
- The digital economy is primarily reliant on information and communication systems, directly influencing human development.
- The digital economy contributes to the integration of national and international economies.

- Algeria has sought to achieve high rates in the Human Development Index through gradual digitization, utilizing economic recovery programs.

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