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The Role of Digital Economy in Iraqi Economic Growth for The Period of 2010-2022 (Analytical Study)

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Abstract

The research addresses the role of the digital economy in the growth of the Iraqi economy during the period from 2010 to 2022. The research is based on the hypothesis that the digital economy has become one of the primary growth drivers worldwide and has a close relationship with economic development. Therefore, the digital transformation in Iraq can accelerate bridging developmental gaps with other countries.

It has become evident that the Iraqi economy suffers from structural imbalances for various reasons, hindering economic growth. These reasons include political and economic factors, as well as the absence of a well-thought-out policy to promote the agricultural sector, which is considered one of the fundamental sectors capable of stimulating the Iraqi economy.

The study found that the digital economy contributes to increasing the gross domestic product if computer technology and information and communication technology are applied in economic activities such as agriculture, industry, trade, finance, and services. Furthermore, focusing on local expertise and educated individuals can be significant. The study recommends providing the necessary infrastructure for the digital economy in Iraq to serve all sectors, especially the agricultural sector and e-commerce. It also emphasizes the need to promote innovation, reduce corruption, and achieve security stability to create a safe environment for foreign investment. It aims to introduce advanced technology to Iraq and preserve scientific capabilities. Establishing an independent institution to manage and regulate the implementation of the digital economy as a national priority and working on improving information and communication technology is also advised.

Paper type: Research paper.

Keywords: Digital Economy, Economic Growth, Digital Transformation, Economic Development, Digital Technology

1.Introduction

In light of the changes occurring in the world, characterized by the Fourth Industrial Revolution, knowledge has become a fifth essential production factor alongside the traditional four factors (land, labour, capital, and organization). Knowledge is now at the forefront of its ability to lead and steer the economy towards sustainable growth and development. Since knowledge is tied to individual cognitive processes such as perception, learning, thinking, and judgment, and individuals interact with their world and the external world, the human mind has become the foundation. The actual cost lies in research and development, with other production factors playing a supportive role.

Digitization is considered one branch of the knowledge economy that began with the Third Industrial Revolution in the mid-20th century but was initially used in a limited manner. It has seen remarkable development with the advent of the Fourth Industrial Revolution, and its impact has extended to many countries worldwide in the current decade. Digitization can accelerate progress and achieve sustainable development goals by reducing costs, improving services, diversifying revenue sources, creating new jobs, reducing poverty, and preserving natural resources and their sustainability.

Furthermore, it brings about changes not only in production systems and management but also in social and individual life. It affects the relationship between humans and nature and has become an integral part of society, even within our bodies as individuals. Its effects ripple through productivity levels, raw material prices, produced goods and commodities, consumer preferences, job opportunities, product supply levels, income levels, healthcare, education, infrastructure, and more.

1.1 Literature Review

Many studies have dealt with the digital economy, especially those that have been discontinued, including these studies:

Nehme (2015) provided a comprehensive vision of the digital economy regarding features and indicators and their impact on some macroeconomic variables. The study reached several conclusions, including that the digital economy has brought about a change in economic life and changed the economy from a scarcity economy to a knowledge economy. It was also found that electronic commerce is vital in Promoting economic growth and increasing the gross domestic product. The study emphasized the necessity of preparing a national strategy to develop information and communication technology and access to the knowledge society to keep pace with global development.

Bukht and Heeks (2017) defined the theoretical and scientific concept of the digital economy and found specific measures for the digital economy. The study concluded that the digital economy arose with the emergence of the global communications and information network (the Internet). Measuring the digital economy faces challenges such as the limited availability of data about some digital activities and pricing issues. The Internet can... Facilitating economic operations, especially in the financial and commercial sectors.

ESCWA (2017) raised awareness about the digital economy in the Arab region and its contribution to achieving sustainable development. The study concluded that many Arab countries have succeeded in establishing technology and communications infrastructure, and many of their individuals and youth have begun to use the Internet. Statistics show that Arab countries have made remarkable progress, as the percentage of They were used four times over the decade, and the gap between developed and developing countries was closed. The study recommended formulating a digital plan at the national and regional levels to strengthen the digital economy and preparing detailed digital economic statistics on which public policy priorities and goals are based while improving data collection.

Abdel Moneim and Qaloul (2021) built a composite index to monitor the development of the digital economy in Arab countries to identify the progress achieved in this field and link it to several other economic and social aspects, including the contribution of the digital economy to increasing the rate of growth, productivity, competitiveness, levels of human development and other dimensions of importance to the authors. Policies. Mainly evaluating the impact of the various strategies adopted by Arab countries to promote digital transformation, this study summarized that the United Arab Emirates topped the Arab countries' composite index of the digital economy and its four pillars. It is also clear that the Gulf Cooperation Council countries lead the Arab countries in the four pillars of the index. The International Monetary Fund's composite digital economy, in general, is a reflection of several factors, perhaps the most important of which is the digital transformation strategies applied in many of these countries, in addition to the high levels of income in these countries, and this is what helped them keep pace with rapid technological developments in many fields by encouraging Investment in the field of communications and information technology services. In this context, Jordan, Morocco, Tunisia and Egypt are distinguished by average performance levels in the digital economy.

In addition, many studies addressed which is the economic growth, including:

Khaddar (2012) aimed to diagnose the relationship between economic growth and human development and to demonstrate the degree of influence between them. To achieve the objective of this study, the theoretical aspect of both economic growth and human development and the relationship between economic growth and human development were reviewed. In the applied aspect, the descriptive method was adopted to analyze human development indicators and economic growth in the Arab world. Additionally, statistical methods were used to demonstrate the mutual influence between components of human development and economic growth using the Ordinary Least Squares (OLS) method through the SPSS program, concluding that the relationship between output growth and human development in the Arab world is causal.

Dahdouh (2020) aimed to examine the impact of economic growth on poverty through a standard study from 2000 to 2018. To achieve the study's objective, the theoretical aspect of both poverty and economic growth was reviewed. The study also presented the evolution path of poverty and economic growth. As for the applied standard aspect, the Autoregressive Distributed Lag (ARDL) methodology was relied upon to determine the effect of the economic growth rate, unemployment rate, and inflation on poverty. It concluded that there is no relationship between poverty and economic growth, or in other words, economic growth indirectly affects poverty. Additionally, there is a causal relationship between poverty, unemployment and inflation.

Ali (2021) aimed to monitor the criteria of Iraqi economic growth and its reflections on the Iraqi reality for the period 2000-2012 through analysis that contributes to monitoring these criteria to reach practical solutions and identify the reflections of growth criteria through the Gross Domestic Product (GDP) index, income inequality, and the average per capita share. The study concluded that Iraq needs a severe structural problem, foremost among them being the monoculture of the economy and reliance on oil as the primary source of local income formation, with weak contributions from other sectors such as industry and agriculture. The study also found that the high economic growth rates in Iraq have not improved human development and its indicators. This is because the rates of economic growth are not genuine enough to ensure social and economic development that is commensurate with the rates of growth.

Jawad and Abdulla (2023) identified the theoretical literature for all the variables of the study (ICT, GDP) as well as identified the practical side of the impact of ICT on the per capita GDP in Iraq for the period (2004-2021). The study was based on the hypothesis that ICT impacts per capita GDP in Iraq. The problem of the study was to answer the question: Does ICT contribute to per capita GDP? The study concluded that an increase in the rate of internet users per 100 people by one unit would increase. Increasing the landline telephone rate per 100 people by one unit will increase GDP per capita. In addition, increasing the mobile phone rate per 100 people by one unit will increase GDP per capita. The study recommended adopting rational

policies to ensure the application of the results of the development of information technology to the policies adopted by governments in the manner and quality of Use and put at the service of development.

There are studies linked between the first and second variables, such as:

Ismael (2021) proved the impact of digital economy indicators on economic growth in the selected countries, as well as analyzed the relationship between the digital economy and the economic growth of these countries. The thesis concluded that the digital economy will achieve an increase in Iraq's gross domestic product if attention is paid to applying computer technologies, communications and information technology in economic activities (Agriculture, industry, trade, finance, and services) and paying attention to local minds and those holding academic degrees in the field of information and communications technology or information systems and programming.

Al-Jundi and Halfi (2022) examined the relationship between the digital economy and economic growth in Arab countries from 2008 to 2017. This is based on the theory of homegrown growth, as the standard model includes three variables: capital formation as a percentage of the gross domestic product and participation in the labour force as a percentage of the gross domestic product. Overall, the technological readiness index shows the positive impact of the development in technological readiness on economic growth in Arab countries. The results reached increased importance of increasing investments in digital technological infrastructure, enhancing human capabilities in the field of technological information technologies, and enacting legislation to protect electronic transactions, in addition to developing Digital government to stimulate the business environment and enhance trust and transparency to attract foreign and local investments.

Nasr El-Din and Abdel-Rahman (2023) measured the impact of the digital economy on economic growth in a group of Arab countries during the period (2000-2020), using the Panel Data model to measure the relationship between economic growth expressed in per capita GDP as a dependent variable, and digital economy indicators as variables. Independent. The study sample represented 4 Arab countries: the Kingdom of Saudi Arabia, the State of Kuwait, the Kingdom of Bahrain, and the Sultanate of Oman. The data were estimated using three models: cluster regression model, fixed effects, and random effects. The results indicated that the fixed effects model is most appropriate for this study. Using the E-views statistical program, the study concluded, as expected, that there is a direct relationship between the percentage of Internet users and economic growth. Contrary to expectations, the study found an inverse relationship between economic growth and both the percentage of fixed broadband subscriptions and the percentage of communications and computers from service imports. The study also found that economic growth is not affected by the number of mobile cellular subscriptions.

The research problem starts with two critical questions:

- i- What is the nature and importance of digital transformation as one of the information technology innovations?
- ii- What is the starting point for digital transformation and the appropriate mechanisms to avoid exacerbating the digital gap in the face of the challenges of the problems that the Iraqi economy is already suffering from?

The Research Objective aims to understand the nature of the digital economy, explore its various facets, examine its impact on economic growth, and establish fundamental principles for an initial point that supports the digital transformation process.

2. Material and Methods

2.1 The Research Hypothesis

The digital economy has become one of the primary growth factors in world countries. It has a close relationship with the development of economic growth, so digital transformation in Iraq can accelerate the process of avoiding development gaps with other countries.

2.2 The Importance of Research

Explaining the reality of digital transformation in Iraq and the appropriate mechanisms to reduce the gap, at least with developing countries that have taken great strides in this field, as well as to benefit from the advantages of digital interaction in addressing the economic and social problems that the Iraqi economy suffers from and avoiding potential risks to it.

2.3. The concept of the Digital Economy

The concept of the digital economy emerged in the 1990s after the economic recession that hit the Japanese economy. This crisis compelled them to search for alternative sources of income. Indeed, the term "digital economy" was first used in 1995 by the Canadian information technology expert Don Tapscott in his book published in English, titled "The Digital Economy: Promise and Peril in the Age of Networked Intelligence" (Al-Bashir, 2018). Then, various labels emerged for it, such as the new economy, the intelligence economy, the electronic economy, the internet economy, the web economy, and the information economy (ESCWA, 2017). Due to the multitude of labels, multiple definitions have also emerged. For example:

"It is the economy that uses digital technologies to develop economic and social activities by increasing the efficiency of producing goods and delivering services, improving their quality, providing opportunities to create new value chains, and enhancing the well-being of society and individuals." (Arab et al., 2020). It has also been defined as "the economy that generates wealth through intangible knowledge processes based on human capabilities" (Nour El-Din, 2018). Furthermore, it has been defined as "the share of the total economic output derived from a number of extensive digital inputs, including digital skills, digital equipment, and intermediate digital goods and services used in production. These broad measures reflect the digital economy" (Bukht & Heeks, 2018).

Based on the previous definitions, we can provide a simple summary of the digital economy: It encompasses all activities that utilize digital data, where customers are digital, companies are digital, and technology and products are digital. Everyone can buy and sell from anywhere in the world without the need to physically meet in stores, thanks to online platforms. Thus, the market is no longer where buyers and sellers meet, as traditionally taught. Access to international markets has become more accessible, product and service quality can be improved, and competitiveness can be enhanced across all economic and social sectors and activities, whether in production or consumption.

2.4 Characteristics of the digital economy

What distinguishes this era is the survival of the smartest and the fastest in using digital technology, expanding its applications in various aspects of life, achieving precision and efficiency in performance, and applying knowledge. It is the path to shaping the future. A digital economy is a type of advanced economy because it stands on its own. It has introduced several changes in the international environment due to its connection to information technology and advanced means. The digital economy possesses the following characteristics:

A. Flexibility and Renewal: The digital economy is dynamic and can renew and evolve continuously, making it flexible in dealing with it. It harnesses technology and uses it for sustainable development, building a knowledgeable society through continuous education about the importance of information technology. This includes increasing the number of computers, using them in transactions and operations, and increasing the number of users in international information networks (the internet). Furthermore, it continues to develop software and manage human resources, educational activities, and training.

B. Knowledge: The digital economy relies on knowledge and a culture that focuses on business and the economy to benefit from massive resources. It collects information through human capital. Knowledge is power and a means to change life for the better through new opportunities, leading to the retraining of workers who lack knowledge and enhancing their specific capabilities in the field of knowledge.

C. Boundless Economy: The digital economy is boundless, meaning there are no obstacles for people to enter the digital world as long as they have the skills. Access to information sources is easy due to infrastructure availability, reduced subscription costs, availability of devices, and continuous education and training to equip individuals with the necessary skills. The ease of using electronic money, such as credit cards, also contributes to this.

D. Innovation:

Innovation is one of the most essential characteristics of the digital economy. It is the product of the human mind influenced by the digital environment provided by society through educational and developmental means. The more innovation increases, the more production and productivity increase, achieving the principle of increasing returns and marginal zero or near-zero costs.

E. Virtuality: Virtuality refers to transforming tangible physical things into modern applications promoted through the virtual world, represented by the internet. It contrasts with the economic rules on which the old classical economy is based. It has led to companies and universities where individuals can access all services without physically visiting a location.

2.5 Comparison between the digital economy and the traditional economy

It is known that both the digital economy and the traditional economy are based on well-known economic foundations and theories and that the fundamental difference between them lies in that the digital economy was based on the process of transitioning to the use of advanced information technology in the first place, and this is what made it have abundant resources that are inexhaustible when used. It increases because knowledge increases through practice and use. Unlike the traditional economy, it is an economy of scarcity. When the use of its resources increases, it decreases. In terms of regulations and laws, the digital economy is dominant, as it is difficult to implement regulations, laws, restrictions, and taxes. Thanks to globalization, everything has become available. As for the traditional economy, it is local and is governed by the regulations, laws, restrictions, taxes, and legislation specific to each country, and this difference is a double-edged sword. In light of the digital economy, time and place restrictions are eliminated due to virtual institutions and markets that contribute to reducing costs and efforts and increasing speed and efficiency in completing transactions.

In contrast, the traditional economy remains restricted by time and place. In terms of the source of value in the digital economy, it is an investment in knowledge capital (Al-Mansouri et al., 2014), which depends on innovation and quality as a fundamental driver of the digital economy. As for the traditional economy, the investment is in physical capital and depends on muscular effort to a primary degree, and the machine is the main engine of the industrial economy (Arvis, 2019). Regarding the labour force, the primary goal in the digital economy is to reach the highest income by relying on personal skills. The high knowledge available through education and training and the nature of employment is dynamic. As for the traditional economy, the goal is to reach a state of full employment without specifying distinct skills to perform the work. The digital economy depends on the networked organizational form through the use of the Internet and communications, and production in it has become more flexible and depends on Creativity, innovation, knowledge, innovation and invention. Competitive advantage constitutes an essential element, which is quality, innovation and the ability to adapt. Whereas the traditional economy depends on the organizational form, it may be bureaucratic, and production is a large production and depends on capital and labour. The source of competitive advantage is cost reduction through the budget and, on the consumer side, changes in demand. In the digital economy, change is rapid and cannot be predicted, unlike in the traditional economy, it is slow and linear (Ali, 2020).

Based on the above, the digital economy is distinguished by many criteria that distinguish it from the traditional economy, which relies primarily on information and communications technology in all its applications.

Table1: The difference between the digital economy and the traditional economy

Organizational Characteristics		
Comparison factors	Digital economy	Traditional economy
Markets	Fickle	Continuous
The competition	International	Local
Role of the public sector	Privatization, joining the World Trade Organization, and partnership with the private sector	Infrastructure and restricted industries
Production characteristics		
Resources	Information and knowledge resources	Material resources
Main sources of production	Digital	Machines and machines
Growth vectors	Invention, innovation and knowledge	Labor and capital
Labor and employment characteristics		
education level	Continuous, lifelong learning and learning by doing	Task-specific
Wages	High wages	Low and medium wages
Labor market relations	Solidarity – joint	Competitive

Source: Arab Planning Institute, Investment Strategies and Policies in the Knowledge Economy in Arab Countries, 2019.

2.6 Analyzing the relationship between the digital economy and economic growth

The digital economy is a new way of doing business and economic activities through the use of digital technology represented by the global communications and information network, computer technologies and smartphones to increase and improve economic growth through the development of all economic sectors (agricultural, industrial, commercial, service and financial), as well as the production of intangible digital goods such as Software using digital and computer means, methods, and technologies. Economic growth is the continuous increase in actual domestic product, as Simon Kuznich defined it, “as a quantitative phenomenon that means a continuous increase in the number of population and output per capita of the population” (Ahmed, 2009), and the theory of endogenous growth explains long-term growth, which must stem from economic activities that create new technological knowledge. Endogenous growth is long-term economic growth determined by an internal force in the economic system, such a force that governs opportunities and incentives to create technological knowledge in the long term. Economic growth and the growth rate of per capita output depend on the growth rate. Total worker productivity, which in turn is determined by the rate of technological progress, and it is worth noting the neoclassical growth theory, including the Solow model, as it assumes that the rate of technological progress is determined by a scientific process separate from and independent of economic forces. Therefore, the neoclassical theory indicates that economists can take the long-run growth rate as it is given outside the economic system. However, endogenous growth theory challenges neoclassical theory by proposing channels through which the rate of technological progress and, thus, the long-run rate of economic growth can be affected as technological progress occurs. Through innovations in the form of new products, processes and markets, many of which result from economic activities. (Mohamed and Omar, 2022) Economists have become primarily focused on knowledge, technology, information and communications because they have realized that the digital economy is a modern and effective

variable in economic growth, as it contributes directly or indirectly. In increasing production and productivity of various production factors, digital transformation has become an urgent necessity in light of the need to diversify the economy to mitigate its vulnerability to shocks in global markets and enhance productivity and competitiveness, especially for sectors that can benefit from accelerated technical development. Thus, a large part of economic transactions has become Through the Internet. Economic transactions are completed broadly and rapidly after they were done slowly, and this contributes to increasing productivity, reducing costs, providing easy access to global markets, and enhancing its competitive position, all in the service of achieving an increase in growth rates, income, and added value generated by increasing the number of operating projects and companies. In 2019, mobile phone technology and services achieved an added economic value of \$4.5 trillion, or 5% of the global GDP, and the contribution of the digital economy to the gross domestic product reached 15.5%, equivalent to \$11.5 trillion, in 2019. (The Fund Arab Monetary, 2021).

2.7 Analysis of the Reality of The Digital Economy in Iraq

The importance of the digital economy in Iraq can be analyzed and measured through internationally approved indicators, which are:

Table 2: Digital economy indicators in Iraq for year (2010-2022)

Scientific and technical journal articles	Percentage of spending on research and development as a percentage of GDP	Human capital	ICT Infrastructure	Internet services	Digital government	Years
530	0.04	0.2295	0.0182	0.0518	0.2996	2010
593	0.03					2011
820	--	0.6151	0.1201	0.2876	0.3409	2012
816	--					2013
820	0.04	0.5283	0.2173	0.1969	0.3141	2014
851	0.04					2015
1207	0.04	0.4803	0.1647	0.3551	0.3334	2016
1927	0.05					2017
3369	0.04	0.5094	0.184	0.3194	0.3376	2018
6776	0.03					2019
9814	0.04	0.4358	0.537	0.3353	0.436	2020
--	--					2021
--	--	0.5888	0.5201	0.206	0.4383	2022

Source: United Nations, New York, E-Government Survey for The Year 2010-2022

Through Table (2), we can observe that the e-Government Index in Iraq reached a value of 0.2996 in 2010. Subsequently, the index continued to increase, reaching a value of 0.4383 in 2022. However, it still needs to be more robust due to the limited availability and quality of e-government services, as well as low levels of public participation. Additionally, technical problems related to the inadequate technological infrastructure contribute to the weakness of this index.

As for the Internet service index, it stood at 0.0518 in 2010, which is considered very low. In 2012, the Internet service index in Iraq increased to 0.2876. However, it declined in 2014 to 0.1969 due to the influence of terrorism in some Iraqi provinces, leading to disruptions in Internet services. The Internet service index in Iraq has fluctuated between highs and lows. In 2022, it reached a value of 0.206, still indicating weak Internet service.

The Internet service in Iraq faces several challenges, including high costs and poor quality, as it relies on outdated mechanisms for delivering Internet services (wireless). In contrast, the world has moved towards fibre-optic cable services, representing the latest technology in the field.

The Technological Infrastructure Index reached a value of 0.0182 in 2010 and began to steadily increase, achieving significant progress in 2020 and 2022 with percentages of 0.537 and 0.5201, respectively. This represents a moderate improvement compared to the situation in 2010.

Human capital plays a crucial role in the digital economy, as it is the factor that can provide a competitive advantage and contribute to increased productivity. This is embodied by individuals who possess knowledge, technical skills, and the ability to use computer technologies, communication, and internet-based information. The Human Capital Index in Iraq was 0.2295 in 2010, then increased to 0.6151 in 2012. However, it decreased in 2014 and 2016 to 0.5283 and 0.4803, respectively, due to events and challenges the country faced during that period. In 2018, the index rose to 0.5094, but it dropped to 0.4358 in 2020, mainly due to the COVID-19 crisis. The highest peak was reached in 2022 with a value of 0.5888.

Research and development receive limited attention in Iraq. In 2012 and 2013, no budget allocation was made for this activity from the general budget. Scientific research in Iraq is characterized by its limitations and modesty, with the country ranking low globally in indicators measuring research and development progress. These indicators include research expenditure, scientific publications, and the number of patents. This reflects the presence of local difficulties and obstacles that hinder researchers and limit their scientific output. Iraq's spending on research and development as a percentage of GDP is low compared to the global average of 2.3% and the developing countries' average of 1.5%. There is a fluctuation in the level of interest in research and development activities in Iraq (UNESCO, 2015).

As for the index of scientific and technical journal articles published annually in Iraq, it was 530 scientific papers in 2010, and it increased to 9814 scientific papers published in 2020. These research papers are published in international and regional journals. However, the practical application of these published research papers is absent in Iraq due to the underdevelopment of the private sector, which needs a strong incentive to invest in information technology and related technologies. Additionally, there needs to be more support for this type of investment in the country.

2.8 The impact of the digital economy on economic growth in Iraq

Iraq heavily relies on its crude oil sector to boost its economic growth. This dependence is unrealistic because achieving economic growth in a country depends on the activity and contribution of non-oil production sectors to the Gross Domestic Product (GDP). The oil sector dominates and contributes significantly to the GDP, reaching 87.29% in 2022. In contrast, agriculture and forestry, which used to be one of the most critical sectors stimulating the Iraqi economy in the 1970s, 1980s, and 1990s, only contributed 4.35% in 2022. Distribution activities, including trade, transportation, communications, banking, and insurance, contributed 15.32% to the GDP. Additionally, service activities related to social and personal development services and housing property contributed 19.33% to the total GDP (National et al., 2022).

Table 3: Economic growth in Iraq for the period from 2010-2022

GDP growth rate	Per capita GDP at current prices ((dinar	GDP at current prices ((million dinars	Years
—	4988141	162064565.5	2010
34.09	6518752	217327107.4	2011
16.97	7431918	254225490.7	2012
7.61	7795455	273587529.2	2013
-2.65	7648994	266332655.1	2014
-26.90	5528730	194680971.8	2015
1.15	5444537	196924141.7	2016
12.56	5968459	221665709.5	2017
21.31	7053761	268918874.0	2018
2.69	7057826	276157867.6	2019
-20.41	5473669	219768798.4	2020
37.03	7311200	301152011.8	2021
27.19	9066881	383064030.2	2022

Source: Ministry of Planning, Directorate of National Accounts, Statistical Centre

From the previous table, it can be observed that the Gross Domestic Product (GDP) multiplied several times, reaching approximately 383,064,030.2 million dinars in 2022, while it was around 162,064,565.5 million dinars in 2010, the lowest level during that period. From 2010 to 2013, we witnessed an increase in the GDP to about 273,587,529.2 million dinars in 2013, with an annual growth rate of 7.61%. This corresponded to an increase in per capita GDP to 7,795,455 dinars.

However, in 2014, the GDP decreased to 266,332,655.1 million dinars due to the deteriorating security situation in Iraq and the control of terrorism over four Iraqi provinces, resulting in a decline in the GDP. In 2015, the GDP reached 194,680,971.8 million dinars, with an annual decrease of -26.90%. This was attributed to terrorism's control over significant areas, including oilfields and refineries, along with the drop in oil prices from \$94 per barrel to \$44 per barrel due to the global crisis.

From 2016 to 2019, the Iraqi economy gradually started to recover until the end of 2019. However, it began to decline again in 2020, reaching 219,768,798.4 million dinars, with an annual decrease of -20.41% due to the COVID-19 pandemic, which led to a drop in oil prices. In 2021 and 2022, the GDP increased, reaching 383,064,030.2 million dinars in 2022, along with an increase in per capita GDP to 9,066,881 dinars, reflecting an annual growth rate of 27.19%.

From those above, it can be concluded that the Iraqi economy has suffered from structural imbalances for various reasons, including political and economic factors. The lack of a well-thought-out policy to uplift the agricultural sector, which is considered one of the most straightforward sectors capable of stimulating the Iraqi economy, is one of the contributing factors to this economic struggle.

Our research suggests the importance of focusing on the primary and fundamental sector in Iraq, the agricultural sector. Strengthening this sector and promoting industrial integration is crucial to achieving economic growth and sustainable development. This can lay the foundation for the eventual launch of the digital economy and the digital information revolution.

2.9 Challenges facing the digital economy in Iraq

The digital economy has become a fundamental component within the five-year strategy of the Arab Monetary Fund (2020-2025). Given the ongoing changes in the global landscape, digital transformation has emerged as an imperative. This transformation is aimed at keeping pace with these changes and addressing prior developmental deficiencies. Its overarching goal is to reduce dependence on oil revenues and diversify the economy to mitigate the impact of global shocks that affect oil prices.

By emphasizing economic sectors that can leverage technological advancements to bridge gaps, Iraq can achieve a substantial qualitative leap in economic growth. This transformation is intended to tackle various issues, most notably unemployment and poverty, which have been persistent challenges in the Iraqi economy. The digital economy offers a promising future, as it can deliver high growth rates in the short, medium, and long term through increased innovation in information technology and communications, infrastructure development, and the promotion of innovative solutions.

While Iraq has embarked on digital transformation initiatives, these endeavours have been relatively modest compared to other developing and Arab nations. These efforts have encountered various challenges and issues spanning economic, technological, and regulatory dimensions. These challenges have impeded the efficiency and adaptability of Iraq's digital transformation efforts, both on a global and regional scale.

Some of the notable challenges and issues include:

i. Digital illiteracy: This trait distinguishes our society because of its isolation from global developments in information technology, communications, and the emerging global economy. Even though the number of internet users and users of social media platforms exceeded 28 million, constituting 70% of the population in 2022, digital illiteracy is widespread among approximately 60% of the young generation, which represents the majority of the Iraqi population (Abdulmajeed, 2020).

ii. The low level of digital content indicators in the Iraqi digital economy: The absence of precise indicators for digital content can be attributed to several reasons, as Iraq is in the early stages of its digital economy. This is due to various factors, including political instability and widespread administrative corruption. Consequently, there is a relationship between information technology indicators and investments on the one hand, and on the other hand, there is a connection between economic and social development. It is incumbent upon decision-makers to strengthen the linkages between these relationships to develop the state's economy (Hussein, 2018).

iii. Technology infrastructure: The presence of infrastructure allows for a smooth and easy digital transformation, encompassing networks, servers, storage systems, and the necessary software, along with qualified technical personnel to lead the digital transformation and provide cybersecurity to safeguard the data used in economic and business operations (Al-Mutheiri et al., 2015).

iv. Disputes and conflicts: There are three aspects to this challenge (Ali, 2008)

A- International Conflict

B- Regional conflict

C- Internal conflict

v. Poor management and decision: Mismanagement of resources has led to a general weakness in various aspects of life following the decline of both the digital and traditional economy. This is evident in the prevalence of investment, financial, and administrative corruption in many state institutions in general, as reflected in the low Government Integrity Index for 2022 (0.4383) (Dway & Hussein, 2018).

vi. The migration of skilled cadres and efficient workers outside Iraq constitutes an obstacle to attempts at development and technological development, which enhances the scientific and digital gap between Iraq and the developed countries of the world that attract scientific minds and technical cadres. (Al Musa, 2015).

2.10 Appropriate mechanisms for digital transformation

We said previously that the digital world would force countries and their ruling systems to change their policies, whether in dealing with other countries or dealing internally. This means that digital transformation has become an absolute and inevitable necessity and is a matter of time. The most backward countries can catch up with the digital transformation, and they will need help to prevent them from doing so. Learning. In light of this revolution, no one can force any person to remain backward. All information can be obtained with a button without backward government procedures. This means the matter is entrusted to the government if it can be digital and create a digital citizen and economy. All of this, in light of the availability of research tools such as computers and telephones, will create a research environment and learning opportunities. If these capabilities are available, a prisoner or refugee in a camp can develop himself and outperform another person in the most prestigious countries in the world. The mind cannot comprehend the development that is taking place. It is a revolution, not like the agricultural revolution. Nor the industrial revolution, but a revolution in everything: our mind, our body, our space, and our surroundings, and change is a matter of will, strategy, and appropriate mechanisms to be applied to maximize economic participation regionally and internationally. Hence, we will find appropriate mechanisms for digital transformation. (Arab Planning Institute, 2019).

- i. Compiling a unified database and making it available to all parties and developing approved administrative and operational processes to suit modern technological development to reduce time and cost, increase productivity, and improve customer service. This requires building an integrated work team that works to develop these systems in the best possible ways.
- ii. Eradication of digital illiteracy: Digital literacy requires possessing abilities in several areas, including the ability to use technology and information, as well as providing personal security and privacy. Digital literacy is “the ability to use digital tools to solve problems, produce innovative projects, enhance communications, and prepare for the challenges of the digital world.” Increasing.” (Readings on digital literacy and its impact on higher education institutions).
- iii. Developing the technological infrastructure to enhance the growth of the digital economy: The infrastructure contributes to ease of communication and accessibility for all members of society and increases the capabilities of individuals, markets, and companies, as it is an essential and quick means of accessing information and data that serves businesses in the digital society. The Ministry of Communications must provide the necessary infrastructure to communicate for most regions of Iraq, even remote and marginalized areas.
- iv. Encouraging research and development in the digital field: Spending on research and development in Iraq must be increased annually as a percentage of the gross domestic product until it reaches the ranks of developed countries by relying on the digital economy and building a strategy with international companies to establish research and development centres for electronic products and services to sustain the digital transformation in Iraq.
- v. Activating the partnership to stimulate the growth of the technology sector: The partnership helps in creating digital markets that contribute to employing unemployed workers, stimulates the technological sector, and contributes to supporting information technology projects through cooperation between the international community and all stakeholders, and the partnership takes place between agencies, ministries, the private sector, scientific research institutions, and universities. (Hamza and Hassan, 2020).
- vi. Providing a regulatory environment: The regulatory environment helps the technology sector grow faster, and the presence of a regulatory entity that supports the digital labour market would enhance the process of developing digital technology in Iraq. This is represented in cooperation between the Ministries of Communications, which is interested in drawing up strategies, and the Ministry of Higher Education, which is interested in scientific research and its application to... On the ground, this ensures appropriate support for technology, thus creating a competitive environment for organizations and markets whose work is limited to the scope of advanced

technology to ensure consumer protection and its positive effects on the labour market and institutions appear significantly on the one hand, and on the other hand, on the ease of dealing and confidence of individuals in internal and external transactions, The contribution of technology to GDP will increase, and job opportunities will be created through the creation of new professions if regulatory bodies implement the policies set by the Ministry of Communications (Ministry of Communications, 2019)

vii. Providing a legislative environment: The importance of the legislative environment is no less critical than the regulatory environment, but instead integrates with it to ensure the expansion of digital technology and to protect intellectual property rights, which is concerned with ideas and their application expressed by innovators and creators of inventions and to guarantee them the right to use and sell innovations and achieve sufficient returns, and that the types of intellectual property rights were These are the rights of trade secrets, the labour market, design, trademarks, etc. However, in our present time, property rights are not limited to innovations but rather to education rights and the database (Al-Dime, 1998).

viii. The Iraqi government must implement several practical programs to achieve reform, and among these programs is a focus on the role of e-government, enhancing the role of human capital, and using innovation in financing development. For financing development in Iraq, technology transfer must take place through Directing oil revenues in order to create a base for a new economy in Iraq through digital transformation, as it has become a necessity for all institutions and bodies seeking to develop and improve services and facilitate their access to beneficiaries. (Al-Ani, 2020)

ix. Focusing and focusing attention on the three factors of development, namely (science, technology and innovation), as these factors must interact continuously in order to achieve sustainable strategic goals, the most important of which are reducing poverty, treating diseases, and preserving the natural and human environment, through rational and conscious management that realizes The importance of attracting specialized and professional human cadres (Shakara, 2018).

3. Discussions of Results

It is evident from the preceding that all indicators of the digital economy in Iraq are characterized by weakness. Therefore, the Iraqi government and the Ministry of Communications should undertake developmental reforms in digital economy indicators, such as providing e-government services and facilitating access to data. This includes increasing spending on technological infrastructure and internet service, ensuring its high quality and affordable cost, and enhancing human capital by providing technological expertise to the youth to achieve digital transformation.

The Iraqi economy has suffered from structural deficiencies for various reasons that have hindered economic growth, including political and economic issues and the need for a well-thought-out policy to uplift the agricultural sector, one of the fundamental sectors that work to stimulate the Iraqi economy. Our research recommends focusing on the primary leading sector in Iraq, the agricultural sector, for industrial integration and interconnectedness to achieve economic growth.

Consequently, launching the digital economy and the digital information revolution, Iraq remains one of the lagging countries in the use of economic technologies, especially regarding the digital economy, due to the bloody events Iraq has experienced. In contrast, most countries worldwide have made significant progress in the field of the internet and the tremendous revolution in information technology.

Therefore, Iraq needs to stimulate awareness of the digital economy and support sustainable development by directing attention to achieving optimal use of oil revenues and directing them towards achieving self-sufficiency through the use of the digital economy, stimulating economic growth, and improving the provision of public services. Iraq must remain resistant to the digital revolution. However, it must benefit from its benefits and address the

problems it generates, especially since Iraq possesses material and human resources and a geographical location that enables it to develop and improve its position in the world.

4. Conclusion

i- The Iraqi digital economy can contribute to achieving an increase in the gross domestic product if attention is paid to applying computer technology and information and communications technology in economic activities (agriculture, industry, trade, finance, services) and attention is paid to expertise, competencies, local minds, and holders of scientific degrees.

ii- The deterioration of the security situation in Iraq led to the migration of researchers abroad, the absence of direct foreign investments that could be used to transfer technology, the decline in job opportunities, and the deterioration of production and consumption in all sectors.

iii- Iraq suffers from weak technological infrastructure due to political and economic mismanagement

iv- Digitization has not only an economic impact but also a social one, as it contributes to achieving development goals

v- The digital economy can contribute to increasing economic growth rates and reducing poverty and unemployment rates, thus improving sustainable development indicators and helping to solve societal problems.

vi- Iraq needs to improve its digital illiteracy due to reduced allocations for spending on the education sector, research, and development.

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دور الاقتصاد الرقمي في نمو الاقتصاد العراقي للفترة (2010 – 2020) دراسة تحليلية

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مستخلص البحث

يتناول البحث دور الاقتصاد الرقمي في نمو الاقتصاد العراقي خلال الفترة من 2010 إلى 2022. وينطلق البحث من فرضية مفادها أن الاقتصاد الرقمي أصبح أحد المحركات الرئيسية للنمو على مستوى العالم وله علاقة وثيقة بالتنمية الاقتصادية. ولذلك فإن التحول الرقمي في العراق يمكن أن يسرع عملية سد الفجوات التنموية مع الدول الأخرى. لقد أصبح من الواضح أن الاقتصاد العراقي يعاني من اختلالات هيكلية لأسباب مختلفة، مما يعيق النمو الاقتصادي. وتشمل هذه الأسباب عوامل سياسية واقتصادية، فضلاً عن عدم وجود سياسة مدروسة للنهوض بالقطاع الزراعي الذي يعتبر من القطاعات الأساسية القادرة على تحفيز الاقتصاد العراقي. توصلت الدراسة إلى أن الاقتصاد الرقمي يساهم في زيادة الناتج المحلي الإجمالي إذا تم تطبيق تكنولوجيا الكمبيوتر وتكنولوجيا المعلومات والاتصالات في الأنشطة الاقتصادية مثل الزراعة والصناعة والتجارة والتمويل والخدمات. علاوة على ذلك، فإن التركيز على الخبرات والكفاءات المحلية والأفراد المتعلمين يمكن أن يلعب دوراً مهماً في هذه العملية وتوصي الدراسة إلى توفير البنية التحتية الأساسية للاقتصاد الرقمي في العراق لخدمة جميع القطاعات وخاصة القطاع الزراعي والتجارة الإلكترونية وتفعيل الابتكار والعمل على الحد من الفساد وتحقيق الاستقرار الأمني لخلق بيئة آمنة للاستثمار الأجنبي لغرض إدخال التكنولوجيا المتقدمة إلى العراق والحفاظ على الكفاءات العلمية ورعايتها، وإنشاء مؤسسة مستقلة تدير وتنظم تطبيق الاقتصاد الرقمي باعتباره أولوية وطنية، وتعمل على تحسين تكنولوجيا المعلومات والاتصالات.

نوع البحث: ورقة بحثية¹

المصطلحات الرئيسية للبحث: الاقتصاد الرقمي، النمو الاقتصادي، التحول الرقمي، التنمية الاقتصادية، التكنولوجيا الرقمية.

*البحث مستل من رسالة ماجستير