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Dialectic of the Relationship between the Knowledge Gap and Economic Diversification

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Abstract: Economic knowledge constitutes one of the most important pillars on which economic development depends across various economic sectors. The latter utilizes a set of factors that ensure its continuity and the sustainability of proper operations. According to the latest research papers on economic diversification and its relationship with innovation and technological development, the researchers sought to elucidate this relationship by examining the most significant economic developments. Education has long been considered a critical factor influencing the economic growth of any country. Education can be defined as the process of acquiring knowledge, skills, values, beliefs, and habits that help individuals develop their personalities and improve their social and economic status. The relationship between education and economic growth is a complex issue that has been studied by economists, policymakers, and sociologists for many years. In this section, we will explore the various aspects of the link between education and economic growth, and why education is considered a key driver of economic development. Education is regarded as an important investment in human capital development. Human capital refers to the knowledge, skills, and abilities possessed by individuals that can be used to create economic value. Education is a fundamental element in human capital development because it provides individuals with the knowledge and skills necessary to participate in the labor market and contribute to economic growth. Education also helps increase labor productivity, which can lead to higher wages and improved living standards. Furthermore, education plays a crucial role in promoting innovation and technological advancement. It equips individuals with the knowledge and skills needed to develop and apply new technologies, which can result in innovation. Innovation is a key driver of economic growth, as it helps increase productivity, reduce costs, and improve the quality of goods and services.

Keywords: Education ،Economic Growth ،Human Capital ،Innovation ،Economic Development.

Introduction: Iraq exhibits characteristics similar to those found in developing countries, including low living standards by general metrics such as income, education, health, low private savings, reduced production and productivity, limited productive capacities, weak industrial linkages, and a shortage of skilled labor. However, Iraq, unlike most developing countries, possesses a significant portion of the requirements for economic growth. Iraq has the financial resources required for high levels of investment and imports, as well as abundant natural resources and raw materials, such as crude oil, natural gas, phosphate, and sulfur, alongside vast agricultural land and water resources essential for abundant agricultural production. Moreover, Iraq is characterized by a relatively low population density. What most distinguishes the Iraqi economy is its increasing dependence, since the 1920s, on the extraction and export of crude oil. After the establishment of the Iraqi state and its independence in 1921, the economic policy in Iraq during the period between the beginning of commercial oil exploitation and the generation of oil revenues for the government in 1932, on the one hand, and the significant increase in oil revenues and the start of their utilization for public projects in 1950, on the other hand, was scattered and incoherent. In reality, it was little more than general data reflecting the limited priorities and desires of the government at that time. The term "economic diversification" was not commonly used in most developing countries, and external influence was so strong that these countries were neither free nor independent in their economic policies.

One of the main reasons for the ineffectiveness of economic policies was the state of political instability, as reflected in the rapid changes of governments and the other events witnessed by the Iraqi economy. Additionally, the absence of a competent and trained civil administration capable of formulating and implementing economic policies, along with the widespread corruption and nepotism, also weakened these policies. In the 1950s, government economic policies differed from those of previous decades.

Technological Changes and Knowledge

The scientific and technological advancements in the second half of the 20th century have led to successive developments and the intertwining of technological applications. Progress in electronics, integrated circuit technology, computers, software, and communications has facilitated the rapid transmission, classification, and analysis of data across multiple sectors such as the economy, banking, industry, defense, agriculture, medicine, and the environment. Technological advancements in computers, microprocessors, and software have contributed to the development of communication networks and enabled the exchange of information between computer networks. In recent years, these networks have evolved to connect computers globally through the emergence of the internet, enabling the transfer of data, graphics, images, and sound in digital formats. The beginnings of the scientific and technological revolution were accompanied by space exploration and the launch of communication satellites. The internet networks, combined with a system of communication satellites, have led to the development of what is known as the "Information System Super Highway" to transfer information at high speed and density. Other developments include the use of new materials like optical fibers for terrestrial communication networks and the increasing use of microwave networks for more cost-effective communication transmission【Basseem, 2006, p.11】. These advancements have led to a convergence between the worlds of telecommunications and information. For example, the collaboration between global television networks, print and audio media, and computer and software producers has made it possible to broadcast information and education to both developed and developing countries. This has enabled broad sectors of individuals and groups to shape the media through the exchange of opinions and expertise via the internet. All these developments have created an unprecedented leap in information and knowledge, resulting in immense economic gains and significant human and social development. The economic gains are reflected in the form of material returns resulting from improved information. At the same time, human and social growth is achieved through learning, participation, and direct employment. Thus, the information technology revolution and its various applications have given rise to what is termed the post-industrial society, a society that generates added value derived from information and knowledge【El-Bawab, 2011, p.65】. For example, financial institutions, banks, and industrial and commercial companies have benefited from the rapid transmission of intensive data, information, and knowledge between their branches worldwide. This has led to significant economic returns, as:

A) It became possible to support managerial and financial decision-making by utilizing the available capabilities for linking automated accounts, exchanging programs, data, information, and images, and transmitting them in large quantities instantly to multiple locations simultaneously.

B) Financial information could be transmitted moment by moment and exchanged between stock markets, banks, shareholders, and companies, thereby supporting local and global investment and development activities and encouraging savings to be directed toward better investments, which in turn supports investment and development

C)【Taylor, 2002,】. Millions of dollars have been saved through the transmission of this vast amount of information and advertisements over communication networks, which are more cost-effective. These savings have been reinvested to achieve effective competitive capabilities, while also providing a significant service to consumers by saving time in searching for more affordable alternatives.

D) Experts and consultants, including economists, engineers, and scientists, have been able to expand their consulting services and supervisory capacities by being able to connect instantly with their partners via the internet and mobile phones, thus maximizing the benefits of their knowledge and expertise.

Development and Knowledge

Human development is essential for technological development and knowledge. Human development encompasses health, nutrition, education, training, access to knowledge, innovation and creativity, achieving a better standard of living, participation in the social, economic, and political life of society, employment, and poverty eradication.

This section explores how technological changes have influenced human development in various ways and how this human development, in turn, has improved individuals' abilities in knowledge and innovation, significantly impacting the development of various technologies and knowledge.

We will also examine some negative effects on human development resulting from technological and knowledge

advancements and discuss ways to address these effects.

The Health Sector

Perhaps the most prominent example of the positive and negative uses of technology and knowledge in health is the Nobel discovery of nitroglycerin and its therapeutic properties for heart diseases, followed by the development of dynamite for use in mining, which was far removed from its original therapeutic purpos【Human Development Report, 2011, p.48】. Another example highlights the dangers of technological use, raising both an economic and humanitarian issue by blending severe harm with undeniable benefits. The industrial chemical compound known as DDT was used as a pesticide, saving much agricultural production. It also helped control typhoid epidemics during World War I. However, by the 1960s, its detrimental effects on human health became apparent, and environmental groups successfully convinced governments that it caused irreversible environmental damage, leading to its ban.

Conversely, developing countries like Sri Lanka used small amounts of DDT to combat malaria, which had caused 2.8 million infections and 7,300 deaths, reducing the cases to just 17 without any fatalities. Similarly, 23 other countries, including India and those in Latin America, continued to use DDT as a cost-effective solution to combat malaria, which causes over a million deaths annually despite its known risks. In 2001, the United Nations Environment Programme signed an international agreement banning its use, except for public health purposes. Alternatively, biotechnology has been misused to produce dangerous viruses, such as the HIV virus and flesh-eating bacteria, and genetically modified plant strains that cause allergies or disrupt the natural balance of bodily functions. Some of these viruses and bacteria are easy to produce and do not require advanced laboratories or equipment. Nevertheless, a successful partnership between the United Nations Development Programme and the Japanese government resulted in the production of rice crops with yields increased by approximately 50%, with a reduced growth cycle of 30 to 50 days. The new rice crop was richer in protein and nutritional value, resistant to disease, drought, and pests, and did not require fertilizers. Similarly, Egypt managed to increase wheat production by 17.89% per acre in 2000 compared to the previous year, thanks to scientific research that developed genetically modified and improved wheat varieties to withstand salinity and drought. However, concerns about the health, food, and environmental risks of genetically modified foods have led to the halting of sales of tomatoes, potatoes, and other products in Europe. It is evident that the advancement of knowledge and technology, especially in biotechnology and genetic engineering, has had a significant impact on human health.

Therefore, scientific research and technological applications must transparently reveal the benefits and risks to strike a balance between utilizing their advantages and mitigating their dangers.

Education

A knowledge-based economy requires constant development, which can only be achieved through education. With the spread of computers, the internet, and the emergence of distance learning and television-based education, individuals' ability to learn has become much easier than before. Obtaining information no longer requires as much time as it did in the past. Education in a knowledge-based economy has also evolved into "learning through work." This approach encompasses both formal education and the ability of individuals to acquire and apply modern theoretical and analytical knowledge to develop their skills and expertise【Organization for Economic Cooperation, 1996, p.16】. (Sassoon, Joseph)

1- Indicator of Education:

Education is considered one of the key indicators of sustainable development. The literature on sustainable development has highlighted the importance of education as a tool for achieving cultural progress and linking the needs of the labor market with education. Education is also recognized as a fundamental human right aimed at improving the standard of living (Al-Jawarneh Wesoss, 2015:85). This indicator is associated with the essential requirements of sustainable development. The level of education correlates with the economic and social progress achieved by any society. Human resources contribute to real human development through various types of education and training. The growth experiences of some developed countries demonstrate that the impact of education on economic growth translates into an increase in production (Al-Battat & Al-Mas'oudi, 2020:103). It reflects a measure of literacy rates among adults in a population, the percentage of individuals enrolled in different stages of education, and the number of those graduating (completion rates). Furthermore, there are several indicators for measuring education (Hammadi, Feb. 11-14:137), including:

A. Government spending on the education sector.

B. The actual number of students present in the education sector.

C. The share of education spending from the Gross Domestic Product (GDP) and the outcomes of education.

D. Student graduation rates (completion rates).

Number of Schools and Universities:

The continuous increase in spending on education is one of the major responsibilities faced by economists concerned with regulation and economic affairs. This increase is not limited to one country but is seen across various nations. Education spending has become a growing percentage of the state budget and national income compared to spending in other economic and social sectors. These percentages vary from country to country, depending on their level of development and the progress they have achieved. Investment in education is considered an investment in the individual and society because it contributes to the country's growth and advancement. Building an advanced educational production base and providing suitable job opportunities contribute to increasing the national output, making it a tool for development. This happens when individuals can contribute to increasing national production through the development of their scientific capabilities, which are based on the level of education they have received. In Iraq, education is a fundamental factor for the advancement of society, and it is a right guaranteed by the state for all Iraqis, as stipulated in Article (34) of the 2005 Constitution (Iraqi Constitution, 2005: Article 34).

Spending on education is considered an investment in human capital that contributes to economic development and progress, as it is difficult to imagine the continuity of any educational system without financial allocations ensuring its sustainability. Table No. (1) illustrates this.

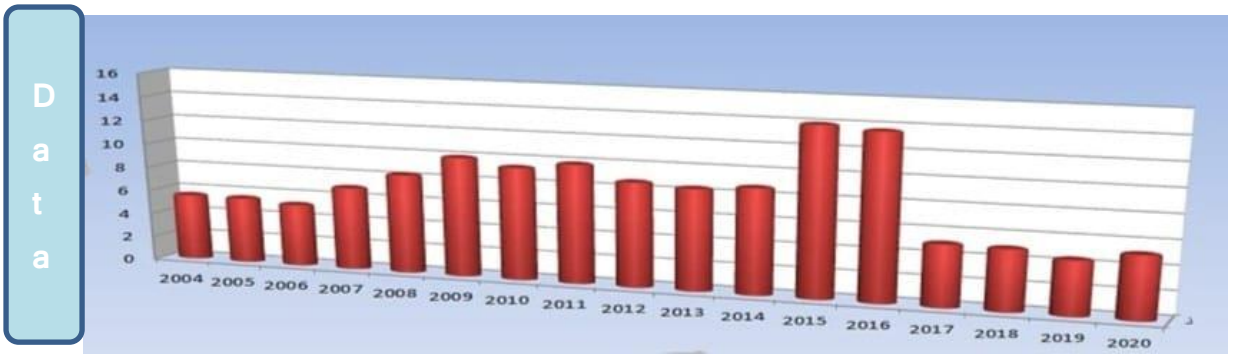
In 2005, education spending declined, reaching 1,472,788.2 million dinars, accounting for 5.58% of total expenditures, compared to 2004 when spending was 1,802,610.9 million dinars. This decrease was due to the deteriorating security situation, with a focus on military expenditures. From 2006 to 2014, there was a rise in public education spending, reaching 2,051,914.3 million dinars in 2006, accounting for 5.28%, and continuing to increase until 2014 when it reached 2,621,688 million dinars, accounting for 8.80%. This rise in education spending was attributed to oil revenues generated from the export of crude oil. However, public spending on education fluctuated, with a decline in 2015 when it reached 9,874,555.6 million dinars, accounting for 14.02%. The state of education in Iraq faced a significant collapse, as the UNESCO report indicated that 2 million children were out of school, and 14,000 teachers were displaced due to sectarian and ethnic wars in several areas such as Kirkuk, Diyala, Baghdad's Belt, Salahuddin, and Anbar. These statistics were compiled before the liberation of provinces from ISIS control. Additionally, the illiteracy rate in Iraq rose to 6 million citizens, nearly 20% of the population (Al-Shammaa, 2017.14p). In 2017, public education spending decreased to 3,907,899 million dinars, accounting for 5.17%. In 2019, it increased to 5,053,840 million dinars, accounting for 4.52%, compared to 2018, when spending was 4,121,195 million dinars, accounting for 5.09%. In 2020, public spending on education reached 3,991,824 million dinars, accounting for 5.24%, due to the dual crisis (health crisis and declining oil prices). Most projects were halted, and public revenues declined, leading to the reduction of public spending, particularly investment spending in all sectors.

The Amount of Public Expenditure on Education and Its Percentage of Total Public Expenditure for the Period (2004-2020) (in Million Dinars)

years	Public Spending 1	Public Spending on Education 2	Growth % Rate 3	Percentage of Public Spending on (Education 4

2004	32117491	1802611	-	5.61
2005	26375175	1472788	-18.29	5.58
2006	38806679	2051914	39.32	5.28
2007	39031232	2728653	32.98	6.99
2008	59403375	4943190	81.15	8.32
2009	52567025	5267520	6.56	10.02
2010	70134201	6617860	25.63	9.43
2011	78757666	7842843	18.51	9.95
2012	105139576	9194187	17.23	8.74
2013	119127556	E+071	9.91	8.48
2014	115937762	E+071	1.05	8.8
2015	70397515	9874556	-3.3	14.02
2016	75055865	E+071	4.34	13.72
2017	75490115	3907899	-62.07	5.17
2018	80873189	4121195	5.45	5.09
2019	111723523	5053840	22.63	4.52
2020	76082443	3991824	-21.01	5.24

Columns: - *Columns (1, 2) * are based on data from the Central Bank of Iraq, Statistics and Research Directorate, statistical bulletins for various years. - *Columns (3, 4) * are the result of the researcher's work.



Years: -"The percentage of public expenditure on the education sector."

This increase in the share of public spending on education from total public expenditure does not necessarily indicate an improvement in the quality of education in the country, nor does it provide a clear indicator due to the imbalance in the general budget. The majority of the expenditure is allocated to the operational budget at the expense of the investment budget. After 2003, successive governments sought to advance the education sector by overcoming the obstacles facing this sector. Therefore, a set of indicators will be reviewed, which reflect the educational reality in Iraq and the impact of public spending on these indicators, as follows:

1. Primary Education Indicators in Iraq

From the table, it can be observed that the number of primary school students was (4,334,609) in the academic year 2003–2004, and the number of primary schools in Iraq reached (13,914). However, there was a decline in the academic year 2004–2005, with the number of students decreasing to 3,767,369 and the number of schools to 11,129. The number then increased during the academic year 2006–2007, reaching 4,150,940 students and 12,141 schools. This upward trend continued, reaching 5,555,674 students in the academic year 2013–2014, and 15,807 schools. This increase was attributed to the improved security situation, the inclusion of data from private primary schools, an increase in school construction, and better security conditions for teaching staff. Subsequently, the numbers declined in the academic year 2014–2015, with the number of primary schools dropping to 10,779 and the number of students to 4,283,044. The decline was attributed to deteriorating security conditions, the entry of terrorist groups, and military operations. The numbers increased again in the academic year 2018–2019, with 6,501,053 students and 17,235 schools, due to political and security stability, as well as the implementation of projects aimed at building schools to accommodate the growing numbers and expand the capacity of educational institutions. However, in the academic year 2019–2020, the number of students decreased to 6,255,849, and the number of schools to 15,470.

2. Secondary Education Indicators in Iraq

The table shows that the number of secondary schools, students, and teachers fluctuated due to the unstable security situation. In the academic year 2003–2004, there were 4,269 schools and 1,571,288 students. In the following academic year, 2004–2005, the numbers decreased to 3,576 schools and 1,437,842 students, due to the lack of security, which prevented the accurate counting of students in some areas. The numbers increased again in the academic year 2006–2007, with 4,109 schools and 1,491,933 students, before declining and then rising again in 2007–2008. The numbers continued to rise, reaching 7,083 schools and 2,526,133 students in the academic year 2013–2014, due to a relative improvement in security. However, accurate data for the years 2014–2015, 2015–2016, and 2016–2017 is unavailable due to the security instability in some provinces. The number of schools then increased to 7,485 in the academic year 2017–2018, with 2,933,539 students. By the academic year 2018–2019, the number of schools rose to 8,139, with 3,140,110 students.

3. Higher Education Indicators in Iraq

The development of higher education indicators in Iraq witnessed significant growth after the events of 2003, with universities spreading across all Iraqi provinces, reflecting the critical role higher education plays in achieving economic development in Iraq, as illustrated in the table. According to Table (2), the number of graduates rose to 74,676 in the academic year 2003–2004, with 17 universities. The numbers continued to increase, with 31 universities and 98,673 students in the academic year 2011–2012. The rise continued, with the number of students reaching 537,085 in the academic year 2019–2020 and 35 universities, compared to the 2018–2019 academic year, when the number of graduates reached 681,140.

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However, higher education was affected by the COVID-19 pandemic, leading to challenges in managing the

educational process. No solutions or strategies were developed to address how millions of students would receive their lessons during that period. Higher education institutions relied on online learning, but many students could not access the internet due to their poor living conditions. Distance learning also had several disadvantages, including a lack of social interaction, decreased development of personal skills, skepticism about the credibility of online education among employers, internet-related issues, and the complexity of learning methods for some students.

"The Education Index in Iraq for the period(2004-2005.)"

Number of graduates	Number of colleges	Number of high schools	Number of students	Number of elementary schools	Number of students	years
74676	17	4269	1571288	13914	4334609	2004 - 2003
74518	17	3576	1437842	11129	3767369	2005 - 2004
74669	17	3920	1389017	11828	3941190	2006 - 2005
75529	18	4109	1491933	12141	4150940	2007 - 2006
67053	19	4364	1603623	12507	4333154	2008- 2007
69020	19	4756	1750049	13124	4494955	2009 - 2008
73988	19	5182	1877434	13687	4672453	2010 - 2009
93357	20	5472	1953766	14048	4864096	2011 - 2010
98673	31	6041	2211421	14674	5124257	2012 - 2011
99772	31	6425	2394678	15156	5351319	2013 - 2012
100190	31	7083	2528133	15807	5558674	2014 - 2013
100848	35	4953	2032880	10779	4283044	2015 - 2014 *

130488	35	6022	2442935	12973	4997052	2016 - 2015 **
144201	35	6605	2624140	14024	5473997	2017 - 2016 ***
152467	35	7485	2933539	15965	6197870	2018 - 2017
681140	35	8139	3140110	17235	6501053	2019 - 2018
537085	35	8612	3258718	15470	6255849	2020 - 2019

- Source*: Ministry of Planning, Central Statistical Organization, Annual Statistical Report, Education Statistics (2018-2019).

* Excluded governorates: Nineveh, Anbar, Salah al-Din, Kirkuk.

** Excluded governorates: Anbar, Nineveh.

*** Excluded governorate: Nineveh.

CONCLUSIONS:

1. Since its establishment and up until 2020, the Iraqi government had a developmental orientation, represented by governmental actions aimed at reforming the Iraqi economic structure and achieving economic development.

2. The priorities in the distribution of investment shares were not based on clear foundations or derived from a practical study of the realities of the economic sectors in terms of their capacities or intersectoral effects. This led to negative impacts on the economic structure, including bottlenecks and surpluses.

3. The absorptive capacity of the Iraqi economy was one of the main obstacles to economic development efforts, making it difficult to achieve structural transformation towards reforming the economic structure.

4. The Iraqi economy is still suffering from the dominance of the oil sector in contributing to the formation of the Gross Domestic Product (GDP), which indicates the unsoundness of the Iraqi economic structure.

5. Regarding the role of the state in the new economic environment: Globalization brought with it several changes that, in total, reduced the state's role in the economic life of many developing countries. This shift followed the extensive role that states had played during the 1960s and until the mid-1980s, which required significant resource depletion, high debt, and declining economic efficiency and competitiveness. This occurred despite achieving a degree of social justice and stability. To reform their economies, these countries moved towards economic liberalization and deregulation, in line with advice from international institutions. However, this resulted in a significant reduction in the economic role of the state without laying the foundational pillars for this transformation, such as a sound institutional framework, ensuring the right of various societal groups to participate in decision-making, freedom of expression, and the role of media in raising awareness and promoting a market economy culture. In other words, the transformation measures were not well thought out, and there was no comprehensive vision. Economic policies were formulated and implemented without referring to a comprehensive strategic framework that accounted for all aspects (political, social, and cultural), leading to many economic, social, and even political crises. These crises impacted sovereignty and loosened the state's grip on its assets, forcing it to relinquish many of its essential functions, and gradually shrinking its influence in favor of global institutions and corporations, ultimately serving external interests at the expense of the domestic economy.

RECOMMENDATIONS:

1-It is essential that the goals and policies established are

fundamentally based on the economic and social realities of the Iraqi economy, ensuring their achievability. Otherwise, exaggerating the setting of goals without achieving the intended results undermines any effort or initiative to amend the economic structure towards achieving economic development.

2- Learn from the experiences of previous countries with economies similar to that of Iraq, which have achieved results in growth and economic development, especially considering the resources that Iraq possesses that can contribute to the process of economic development.

3- Focus on the education sector due to its significant importance in achieving economic development, particularly since Iraq has scientific capabilities and a willingness coupled with governmental capacity. Additionally, modern technologies should be utilized to develop this vital sector, given its role in increasing inter-sectoral linkages.

4-Emphasize the concept of sustainable development and the necessity that this focus arises not only from recognizing the environment as a complex and contemporary issue, but also as a matter linked to human life and its future. The continuation of this problem will turn the planet into a center of waste and gas emissions, making it difficult to live normally due to the harm to human health and the degradation of nature in its various forms.

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