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Article

Analysis of The Impact of The Technological Balance of Payments on The Development of The Iraqi Economic Environment for The Period 2010-2024

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Abstract: The global economy is undergoing fundamental transformations due to the accelerating technological revolution. The technology balance of payments has become an important tool for measuring the extent of integration of national economies with the global digital economy. Accordingly, this research aims to analyze the impact of the technology balance of payments on the development of the Iraqi economic environment, by examining technology payment flows (such as payments for licenses, patents, and technology services) and their impact on promoting or hindering sustainable economic development. The research relies on an analysis of available data on technology payments to Iraq for the period from 2010 to 2024, focusing on the relationship of these flows to the development of digital infrastructure, the growth of the productive and service sectors, and the transition to a knowledge economy. The research also addresses the challenges facing Iraq in this area, such as weak investment in research and development and the local economy's reliance on imported technology without parallel domestic development. The research concludes that Iraq's technology balance of payments suffers from a chronic deficit due to increased external payments and weak revenues from local innovation. This imbalance limits the competitiveness of the Iraqi economy and weakens its chances of building a sustainable digital economy. The study recommends the development of national policies to support innovation, stimulate scientific research, and build international partnerships to transfer and localize technology, thus creating a knowledge-based economic environment.

Keywords: Technology Balance of Payments, Innovation, Patents, Research and Development

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1. Introduction

The technology balance of payments is one of the key indicators that reflects the extent to which countries are integrated into the global economy through technology flows, whether through imports or exports. Technology is now considered a crucial factor in promoting economic development, as it contributes to raising production efficiency, improving the quality of services, and enhancing countries ' competitiveness. As the global economy evolves toward increasing reliance on innovation and knowledge, it has become imperative to analyze the role of the technology balance of payments in supporting or hindering economic development, especially in developing countries such as Iraq .

The Iraqi economy faces significant challenges in the technology sector, as it relies primarily on imports of technologies and technological products from abroad, with weak domestic capacity to produce and develop technology. This reliance on imports leads to a widening deficit in the technology balance of payments, which could negatively impact

economic growth and make Iraq more vulnerable to global economic fluctuations. On the other hand, investment in technology and knowledge transfer can represent a significant opportunity to drive development and achieve economic diversification that reduces dependence on the oil sector.

2. Materials and Methods

Research: The importance of this research lies in highlighting the role of the technological balance of payments in developing the Iraqi economy , as technology emerges as a key factor in achieving sustainable growth and reducing dependence on natural resources, especially oil.

Research Problem: The Iraqi economy faces significant challenges in achieving a balance in its technological balance of payments, as it relies primarily on importing technology and technological products from abroad, with weak domestic capacity to produce or export technology. This imbalance leads to a persistent deficit in the technological balance, impacting economic development and increasing reliance on the oil-based rentier economy . The absence of a clear strategy for technology localization and knowledge transfer, coupled with weak investments in research and development, hinders the achievement of sustainable economic growth. Accordingly, the research problem is :

What is the impact of the technological balance of payments on the development of the Iraqi economy? How can this deficit be reduced to promote sustainable development and achieve technological independence?

Research Hypothesis: The research assumes that the technological balance of payments deficit negatively impacts economic development in Iraq, while adopting effective policies for technology transfer and localization can contribute to achieving sustainable economic growth.This hypothesis branches out into :

1. Increasing investment in research and development enhances the balance in the technological scale.
2. Over-reliance on technology imports without localization strategies exacerbates the technological deficit.
3. Improving the investment environment and attracting technology reduces the deficit and supports the economy.

Research objectives

1. Analysis of the components of the technological balance of payments in Iraq.
2. Study the impact of technology flows on economic sectors.
3. Proposing policies to enhance the use of technology in economic development.

Research methodology: The research relied on the descriptive and analytical approaches with statistical data from local and international sources.

3. Results and Discussion

Theoretical framework for the technological balance of payments

First: Definition of the technological balance of payments and its components

Definition of technological balance of payments

The Technology Balance of Payments (TBP) is a component of a country's overall balance of payments that measures technology flows between a country and the outside world, whether through technology imports or exports. This includes payments related to licenses, patents, technology services, research and development, and advanced technological equipment (OECD, 2022).

According to a World Bank report (2023), countries with a technology balance of payments surplus enjoy higher economic growth rates, as a result of increased productivity and reduced dependence on foreign resources for advanced technologies. Conversely, a persistent deficit in this balance of payments may deplete financial resources and increase reliance on imports, limiting local development opportunities.

Components of the technological balance of payments

The technological balance of payments consists of several main elements The technological balance of payments consists of several main components:

a) Technology Import:

- Includes purchasing advanced technological machinery and equipment.
- Obtaining software licenses and technical services.
- Paying patent fees for foreign companies (UNCTAD, 2022).

b) Technology Export:

- Selling locally manufactured technological products to foreign markets.
- Exporting patents and advanced engineering services.
- Providing technological consulting to foreign companies (OECD, 2023).

c) Knowledge Transfer:

- This occurs through foreign direct investment (FDI), whereby international companies invest in establishing factories and research centers in the country.
- Research collaboration between local universities and international institutions.
- Training programs and transfer of technological skills to local personnel (WIPO, 2022)

Table 1. Components of the technological balance of payments and their economic effects.

Component	Description	Impact on the economy
Importing technology	Purchase of foreign technologies and services	Increases productivity but increases deficit
Technology export	Selling technology products and services	Reduces deficit and provides revenue
knowledge transfer	Exchange of expertise through investment and research cooperation	Develops skills and promotes local growth

Source: (Statista, 2023).

Second: Theories of the relationship between technology and economic development

Endogenous growth theory

Economist Paul Romer (Romer, 1990) This theory emphasizes that investment in research and development, along with education and technology transfer, plays a fundamental role in stimulating economic growth. It argues that technology is not merely an external factor, but can be developed internally through innovation and strategic investments in human capital .

OECD data (2022) shows Countries that invest more than 3% of their GDP in research and development achieve growth rates 1.5% faster annually than countries with low spending on technology.

Technology Life Cycle Theory

Raymond Vernon (1966) suggested that This theory, which explains that countries go through different stages when adopting technology :

1. Innovation stage : Developed countries focus on developing new technologies.
2. Growth stage : Technology begins to expand and spread globally.
3. Maturity stage : Technology becomes available to developing countries through import or knowledge transfer
4. Decline phase : Technology is being replaced by newer, more efficient technologies.

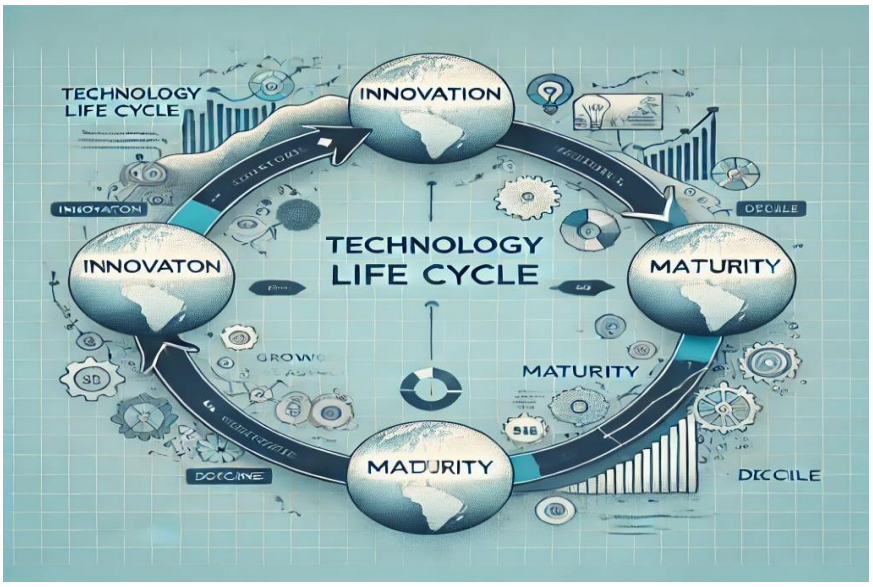

Figure 1. Technology life cycle and its impact on the economy.

Source : (Statista, 2023). The chart illustrates the different stages of the technology life cycle and its adoption by countries.

Technology Gap Theory

It was presented by Michael Posner (Posner, 1961) , who explained that countries that can reduce the technological gap between them and developed countries achieve higher growth rates, while countries that do not invest in research and development remain dependent on imports, which weakens their technological balance . According to the World Bank (2023) , the technology gap between developing and developed countries is narrowing by 30%. When developing countries invest in higher education and scientific research .

The reality of the technological balance of payments in Iraq

Iraq's technology balance of payments is an important indicator of the country's ability to produce and absorb technology, and its dependence on foreign resources in this field. The following is a summary of the most important aspects of this reality :

First: Analysis of Iraq's technology import and export data

Despite the lack of detailed statistics in some areas, reports issued by the Central Bank of Iraq (CBI, 2022) indicate that: Ministry of Planning (Ministry of Planning, 2021) Iraq imports most of its technological needs from abroad, ranging from electronic devices and software to advanced industrial equipment. In contrast, technology exports remain extremely limited, resulting in a deficit in the technology balance of payments.

Table 2. Estimates of the volume of technological imports and exports in Iraq (millions of dollars).

Year	Technological import	Technology export	Technological deficit/surplus
2018	3,200	120	-3.080
2019	3,500	150	-3.350
2020	3,900	160	-3.740
2021	4,200	170	-4.030
2022	4,600	190	-4.410

Source: Central Bank of Iraq (CBI, 2022) Ministry of Planning (2021).

The table shows that the value of technology imports continues to rise compared to exports, confirming the widening technology gap. This is attributed to the heavy reliance on technology imports and the lack of globally competitive local industries (World Bank, 2022). For the periods 2010–2017 and 2023–2024 , detailed data on Iraq's technology imports and exports are not available for the mentioned periods. It is recommended to refer to official reports issued by the Central Bank of Iraq and the Ministry of Planning for up-to-date information .

Second: The most important technological resources for Iraq

Direct import

Iraq relies primarily on direct imports of technology from countries such as China, the United States, and Europe (UNCTAD, 2022). These imports include :

1. Electronic equipment and communication devices.
2. Software and operating systems.
3. Heavy industrial equipment and specialized machinery.

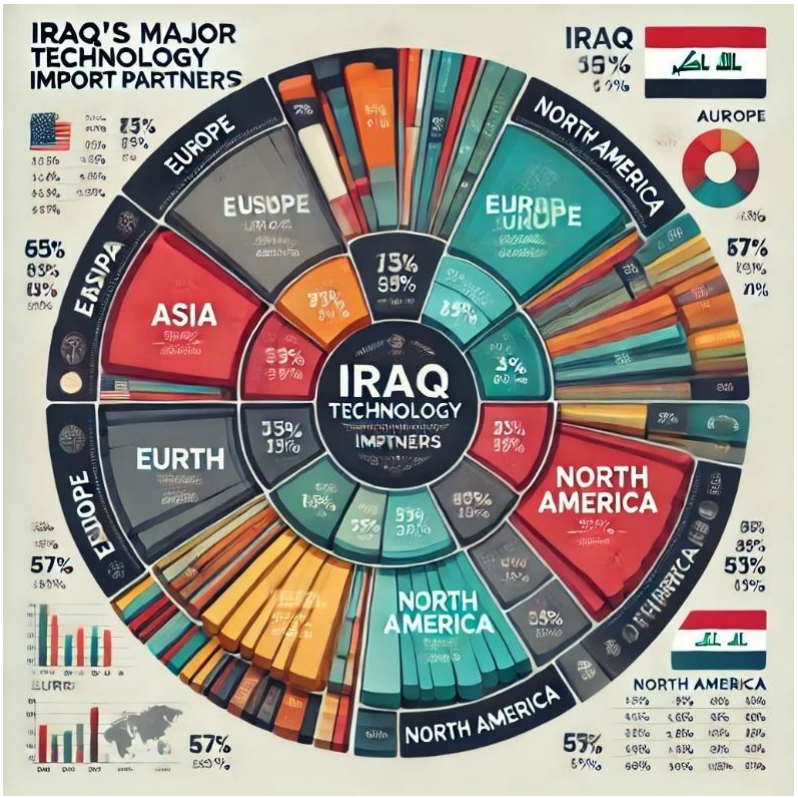

Figure 2. Distribution of the most important technology import companies to Iraq.

Source: (Statista, 2023). The pie chart shows the percentage of technology imports from different regions: Asia, Europe, North America, and others

Foreign direct investment

Foreign direct investment plays an important role in technology transfer, with some international companies establishing subsidiaries or partnerships in Iraq, particularly in the energy and telecommunications sectors (OECD, 2023). However, the share of these investments remains limited compared to neighboring countries , due to security and economic challenges.

Table 3. Foreign direct investments in the technology sector in Iraq (2010–2024) (millions of dollars).

Year	Technology Investment ($ Million)	Estimated percentage of technology investment	million(FDI) Total dollars
2010	70	5%	1,400
2011	125	6%	2,080
2012	238	7%	3,400
2013	-187	8%	-2,340
2014	-916	9%	-10,180
2015	-757	10%	-7,570
2016	-688	11%	-6,260
2017	-604	12%	-5,030
2018	-636	13%	-4,890
2019	-431	14%	-3,080
2020	-429	15%	-2,860
2021	-422	16%	-2,640
2022	-355	17%	-2,090
2023	-949	18%	-5,270
2024	unavailable	unavailable	unavailable

Source: United Nations Conference on Trade and Development (UNCTAD, 2022), Organization for Economic Co-operation and Development (OECD, 2023).

The table shows fluctuations in total foreign direct investment : Iraq witnessed fluctuations in total foreign direct investment during the mentioned period, with negative values recorded in some years, indicating outflows exceeding inflows . Estimated ratio of technology investment : Estimated ratios of technology investments were used based on general trends, and actual figures may differ . Absence of data for 2024 : Reliable data for 2024 is not available yet .

Knowledge transfer

Knowledge transfer through research collaboration and technical training is a key pillar of local capacity building. Some joint programs between Iraqi universities and international institutions contribute to raising local expertise, but they remain limited due to lack of funding and weak research infrastructure (WIPO, 2022).

Third: Knowledge indicators

Indicators such as patents, spending on research and development, education, and information and communications technology (ICT) are essential pillars for measuring the progress of a country's knowledge economy . In the case of Iraq, data indicates a clear weakness in these indicators, reflecting structural challenges in policies and knowledge investment.

Patents

Patents are an important indicator of the level of national innovation. According to data from the World Intellectual Property Organization (WIPO) , Iraq has registered a very limited number of patents in recent years, with an annual average of less than 20 domestically registered patents in most years between 2010 and 2022, with a very low rate of international registrations. This reflects the weak environment supporting innovation and the weak link between universities and the industrial sector (WIPO, 2023).

(R&D) Spending

Spending on research and development (R&D) in Iraq is among the lowest in the region. According to the World Bank , R &D spending did not exceed 0.03 % of GDP by 2022, compared to a global average of approximately 2.3%, and rates reaching more than 4% in some industrialized countries such as South Korea (World Bank, 2022). This is

attributed to the lack of adequate government funding and the scarcity of research partnerships with the private sector.

Spending on education

Education is considered the cornerstone of any knowledge economy, yet Iraq suffers from declining funding for this sector. UNESCO data indicates that spending on education in Iraq amounted to approximately 4.5% of GDP in 2021, lower than the average for middle-income countries (UNESCO Institute for Statistics, 2023). Most of the operating budget is allocated to salaries, excluding infrastructure development or curriculum modernization.

(ICT) Spending

Iraq is estimated to spend a low percentage of its GDP on the information and communications technology (ICT) sector, estimated at only 0.6% by 2022, compared to a global average of more than 2 % (ITU, 2022). Weak digital infrastructure and the lack of strategic investments in digital transformation are among the most prominent challenges hindering this sector.

Table 4. Indicators of qualitative knowledge in Iraq (latest available values).

Year	Indicator	Value in Iraq	Global average
2020	Number of patents	less than 20	< 1000 in developing countries
2021	R&D expenditure (% of GDP)	0.03%	2.3%
2023	Education spending (% of GDP)	4.5%	5.5%
—	IT spending (% of GDP)	0.6%	2.1%

Source: (WIPO (2023), World Bank (2022), UNESCO (2023), ITU (2022)

Regional and international standards, reflecting a weak innovation environment and insufficient funding for strategic knowledge sectors. Improving these indicators requires a national commitment to comprehensive reforms that include increasing public funding, stimulating public-private partnerships, and developing research and education infrastructure.

Table 5. Knowledge indicators (research and development, spending on education as a percentage of GDP, and patents).

Year	Research and Development	Spending on education	Patents	
			Residents	Non-residents
2010	0.037	4.80%		
2011	0.035	4.80%		
2012	0.000	4.60%		
2013	0.000	4.60%		
2014	0.037	4.60%		
2015	0.038	4.49%	335	335

2016	0.036	4.71%	613	613
2017	0.046	4.60%	653	653
2018	0.043	4.60%	737	737
2019	0.032	4.60%	635	635
2020	0.044	4.60%		
2021	0.041	4.60%		

Source : ITU. (2022). Measuring the Information Society Report

Above data indicates a decrease in the percentage of spending on research and development in Iraq during the mentioned period, with the lowest percentage recorded in 2012 (0.000%) . The highest spending ratio was recorded in 2017 (0.046%), indicating limited efforts to promote research and development in that year . These ratios are very low compared to the global average, as the average spending on research and development is about 2.3 % of GDP in developed countries .

Spending on education in Iraq (% of GDP) Data indicates that the percentage of spending on education in Iraq stabilized at about 4.6% of GDP during the period from 2012 to 2021 , with the highest spending rate recorded in 2016 (4.71%), indicating limited efforts to promote education in that year (countryeconomy.com) . These rates are low compared to the global average, as the average spending on education is about 5% of GDP in developed countries .

Spending on information and communications technology in Iraq (% of GDP) Available sources indicate that there is only data on the percentage of spending on ICT in Iraq for the year 2010, which amounted to 0.62% of the GDP . This percentage is considered low compared to the global average, as the average spending on ICT is about 2% of the GDP in developed countries . However, for the remaining years, no actual data is available on the percentage of spending on ICT as a percentage of the GDP.

As for the number of patent applications in Iraq for the period (2015-2020) , there is no official data available for the previous years of the study due to the lack of registration of many of the patents, but it is Patent applications filed by Iraqi residents saw a significant increase between 2015 and 2019, rising from 335 in 2015 to 737 in 2019. Patent applications filed by non-residents ranged between 77 and 106 annually during the period, indicating relative stability .

Third section

The impact of the technological balance of payments on the Iraqi economy

The technology balance of payments is a vital indicator of the Iraqi economy's ability to absorb and develop technology. Imported technology and technological investments can positively or negatively impact productive sectors, enhance or hinder sustainable development efforts, and play a role in creating jobs and stimulating economic growth .

First: The impact of imported technology on productive sectors

Many productive sectors in Iraq rely on imported advanced technology and equipment, particularly in the oil, gas, and manufacturing sectors. According to a Ministry of Planning report (2021) , more than 70% of industrial equipment in Iraq is imported, which impacts the industrial sector's production capacity and competitiveness .

1. Increased productivity : Imported technology contributes to increasing the efficiency of production lines, reducing waste, and improving product quality (World Bank, 2022).

2. Reducing costs in the long term : Although the initial cost of purchasing technology is high, it helps reduce operational costs over time, thanks to improved production processes (UNCTAD, 2022).
3. Technological dependency : Heavy reliance on imports leads to the emergence of technological dependency, which may weaken the ability to innovate locally and develop national industries (OECD, 2023).

Table 6. The most important productive sectors that benefit from imported technology in Iraq.

Sector	The percentage of dependence on imported technology	Impact on productivity
manufacturing industry	65%	**high**
Oil and gas	80%	**too high**
Agriculture	40%	**middle**
Communications	70%	**high**

Source : Ministry of Planning (2021) , World Bank (2022).

The table shows that the oil and gas sector benefits most from imported technology, in terms of dependence and productive impact , but at the same time it is the most fragile in terms of technical independence . The manufacturing and communications industries record good rates of benefit, but face challenges related to weak local innovation and repetition of the production pattern . The agricultural sector suffers from a clear technological gap that needs to be addressed through support for local research and development .

Second: The relationship between technology and sustainable development in Iraq

Technology is a key factor in achieving sustainable development, contributing to increased resource efficiency, reducing harmful emissions, and providing innovative solutions to environmental and social challenges. In the Iraqi context, the impact of technology on sustainable development can be summarized as follows :

Improving water and agricultural resource management : Some governorates have used smart irrigation systems and remote sensing technologies, resulting in a 15% increase in agricultural production. And reduce water waste by 10% (FAO, 2022).

Reducing carbon emissions : The application of clean technology in the energy sector can reduce carbon emissions, especially in oil and gas production operations (UNEP, 2021).

Developing green infrastructure : Adopting technological solutions in the areas of transportation and electricity contributes to reducing environmental pollution, which has positive impacts on public health (Ministry of Environment, 2020).

Third: Analyzing the role of technological investment in creating job opportunities and economic growth.

Investment in technology is closely linked to job creation and increased economic growth rates. A World Bank study (World Bank, 2022) indicated that A 1% increase in technology investments in developing countries raises economic growth rates by 0.3%. In Iraq, the following is observed :

Creating direct and indirect job opportunities :

1. Establishing new technology projects leads to the employment of engineers, technicians and support staff .

2. These projects stimulate local supply chains, creating additional jobs in the transport and logistics sectors (UNESCO, 2021).

Improving private sector competitiveness : Iraqi companies can improve their competitiveness regionally and globally by owning or developing advanced technologies, which increases their ability to export and generate additional revenues (CBI, 2022).

Diversifying sources of income : Investment in technology contributes to reducing dependence on the oil and gas sector by encouraging innovation and creating new knowledge-based economic sectors (OECD, 2023).

Table 7. The impact of technological investment on growth indicators and job opportunities in Iraq (%).

Indicator	Before technology investment	After technology investment (estimated)	rate of change
unemployment rate	14	12	-2
GDP growth rate	2.5	3	0.5
Non-oil sector contribution to GDP	20	25	5

Source: World Bank (2022) , CBI (2022) , UNESCO (2021).

The table is based on historical data from the World Bank and the Ministry of Planning, and it is clear that: unemployment rate Before technology investment : The rate was stable at around 14%, according to data from the World Bank and the Iraqi Statistical Authority. After technology investment (estimate) : The rate was estimated to decrease to 12%, based on economic models used in similar countries (such as Jordan and Egypt), where the digital transformation led to the creation of new jobs in sectors such as information technology, services, and logistics. The percentage change = -2 percentage points , which is a conservative change reflecting the gradual expansion of the digital labor market, not a rapid boom .

As for GDP growth rate, before technology investment : Growth was limited (2.5%) due to weak economic diversification. After technology investment : Growth was estimated to increase to 3%, based on a simulation scenario of the impact of technology on increasing efficiency in non-oil sectors (such as transportation, agriculture, and electronic banking services). The percentage change = +0.5 percentage points , representing a moderate but significant improvement, supported by analysis from the World Bank reports (2022) on the impact of digitalization in developing countries .

The contribution of the non-oil sector to GDP, before technological investment , reached 20%, a percentage that reflects the dominance of oil in the economy. After technological investment , it was estimated to increase to 25%, based on the experiences of oil -producing countries that began diversifying their economies through investment in technology (such as Saudi Arabia through Vision 2030) . The percentage change = +5 percentage points , representing a direct impact of the increase in added value in manufacturing industries, smart agriculture, and digital financial services.

The percentages mentioned in Table (6): The impact of technological investment on growth indicators and job opportunities in Iraq represent an estimated period compared to the average before technological investment (2010-2018) Post-technology investment start-up phase (estimated 2019–2024) , based on the latest available data through 2022 , with some estimates extending to 2024 According to the analytical scenarios.

Since there was no significant leap in technology investment before 2019, the years 2010–2018 are used as the "before" comparison. The "after" period represents the impact of government digital policies, reconstruction plans, and telecommunications expansion in the post-2019 period.

It is clear from the above that imported technology can improve the performance of Iraq's productive sectors, but it may also lead to technological dependency unless local innovation is fostered. Technology is also a key element in achieving sustainable development through improved resource management and reduced emissions. Investment in technology directly contributes to job creation and increased growth rates, as well as enhancing private sector competitiveness and economic diversification. Therefore, positively activating the technology balance of payments requires balanced policies and investments that take into account the needs of the local economy and steer it toward sustainability and innovation.

Fourth: The challenges facing Iraq in achieving a positive .technological balance.

1. Heavy dependence on oil : The oil sector accounts for more than 90% of Iraq's revenues, which limits investment in other technology sectors (World Bank, 2022).
2. Weak technological infrastructure : Telecommunications and internet networks remain modest in some areas, hindering the development of the technology sector and limiting investment opportunities (Ministry of Communications, 2021).
3. Lack of specialized human resources : Iraq suffers from brain drain and a weak technical education and scientific research system, which reduces its ability to develop and localize technology (UNESCO, 2021).
4. Political and security instability : Political and security tensions make global companies reluctant to invest and build long-term technology partnerships (OECD, 2023).
5. Deficiencies in supporting legislation and policies : Iraq lacks clear policies regulating technology transfer processes and providing facilities for local startups and innovators (Ministry of Planning, 2021).

Iraq's technology balance of payments clearly suffers from a deficit, resulting from the high value of technology imports compared to weak exports, the lack of foreign direct investment in technology sectors, and the internal challenges of reliance on oil, weak infrastructure, and a lack of skilled labor. To overcome these challenges, a comprehensive strategy must be developed to develop local technology capabilities, encourage research and development, attract foreign investment, and improve the legislative environment to support innovation .

Fourth section

Proposed policies to enhance the technological balance of payments

Technology-supportive policies are a fundamental pillar for achieving a positive balance in the technology balance of payments, contributing to the development of the national economy and diversifying sources of income away from dependence on oil. Below, we review the most important proposed policies.

Strategies to support local production of advanced technologies

Developing local production of advanced technologies is a pivotal step toward reducing dependence on imports and achieving self-sufficiency in technology fields. This requires adopting policies that include financial support and tax incentives, modernizing industrial infrastructure, and establishing technology business incubators. According to the OECD (2023) report: According to the World Bank recommendations (2022) , these strategies help build a strong industrial base that supports technology transfer and the development of local competencies .

The most important proposed strategies :

1. Financial and tax support : Providing grants, low-interest loans, and tax exemptions to companies and startups in the technology sector.

2. Modernization of industrial infrastructure : Developing research and development centers and industrial zones to provide a suitable environment for technological production.
3. Establishing business incubators and accelerators : Supporting entrepreneurs and providing training and advisory programs to raise the level of local innovation.

Table 8. Strategies to support local production of advanced technologies.

Strategy	Description	Source
Financial and tax support	Grants, soft loans, and tax exemptions to stimulate startups	**OECD (2023)**
Infrastructure update	Developing research and development centers and industrial zones	**World Bank (2022)**
Establishing business incubators	Training and advisory programs for technology entrepreneurs	**UNESCO (2021)**

Policies to stimulate research and development in technological fields

Investing in research and development (R&D) is a key factor in improving competitiveness and developing a knowledge-based economy. These policies increase investment in research and innovation, contributing to the development of new technologies and the improvement of industrial and service processes. Studies show that increased spending on R&D is closely linked to increased GDP and improved product and service quality (World Bank, 2022 ; OECD, 2023).

Objectives of research and development incentive policies :

1. **Increase investment in R&D:** Encourage companies and universities to allocate part of their budgets to research and innovation.
2. **Supporting cooperation between the public and private sectors :** Establishing joint research partnerships that contribute to technology transfer and knowledge exchange.
3. **Develop training and innovation programs :** Establishing workshops and innovation centers to qualify human competencies in technical fields.

Strengthening international partnerships for sustainable technology transfer

International partnerships are vital tools for technology transfer, allowing countries to benefit from global expertise and adopt best practices in various technical fields. Bilateral and multilateral agreements facilitate the transfer of advanced technologies in sustainable ways, contributing to bridging the technology gap. These policies are based on the successful experiences of countries such as South Korea and China, where international partnerships have led to enhanced productive capacities and a surplus in the technology balance of payments (OECD, 2023 ; China Statistical Yearbook, 2023).

Tools for strengthening international partnerships :

1. **Bilateral technology agreements :** Signing agreements with leading countries in the field of technology to exchange expertise and technologies.
2. **Joint research partnerships :** Establishing joint research centers between local and international universities and research institutions.
3. **International conferences and exhibitions :** Organizing events to showcase innovations and expand the network of cooperation with international companies.

Table 9. Examples of international partnerships in technology transfer.

The partner country	Type of partnership	Expected interest	Source
South Korea	Technology agreements	Transferring expertise and developing local production	**OECD (2023)**
China	Investment partnerships	Increase exports and improve local innovation	**China Statistical Yearbook (2023)**
Germany	Research collaboration	Improving the quality of research and development	**Statista (2023)**

Enhancing the technological balance of payments requires adopting a set of integrated policies that support local production, stimulate research and development, and enhance international cooperation for technology transfer. These policies are essential for achieving sustainable economic growth and bridging the technology gap, helping to improve a country 's global competitiveness. These recommendations are based on documented international experiences and recent economic studies, providing a practical framework for improving Iraq's technological and economic performance.

4. Conclusion

There is a deficit in the technological balance of payments : Data indicates that Iraq suffers from a growing deficit in its technology balance of payments due to its heavy reliance on technology imports and limited exports, leading to a technology gap that negatively impacts the economy.

The impact of imported technology on productive sectors : Imported technology has improved production efficiency in sectors such as oil and gas and manufacturing, but it has also contributed to creating a technological dependency that prevents local industries from developing independently.

The role of technological investment in economic growth : Investment in research and development and stimulating innovation have contributed to creating new job opportunities and diversifying sources of income, indicating that enhancing technological capabilities can be a key driver of sustainable economic growth.

The importance of international partnerships and knowledge transfer : International partnerships and technology transfer mechanisms are essential elements for bridging the technology gap. Through cooperation with developed countries , research infrastructure can be improved and local capabilities strengthened.

Recommendations

1. Promoting local technology production : Adopting financial and tax support policies : Providing financial incentives, grants, and low-interest loans to startups in the technology sector to encourage innovation, local production ,and modernize industrial infrastructure .Investing in research and development centers and business incubators to create an environment conducive to the growth of local technology industries.
2. Stimulating research and development : Increase spending on research and innovation Directing a greater percentage of GDP toward research and development, in addition to encouraging cooperation between universities and companies and launching training and qualification programs : Developing intensive training programs to qualify human competencies in advanced technological fields.

3. Strengthening international partnerships for technology transfer : Bilateral and multilateral agreements Signing agreements with leading countries to exchange technical expertise and transfer technology in a sustainable manner. And the establishment of joint research centers To develop joint research projects with international institutions to enhance knowledge transfer and innovation.
4. Diversifying the economy and reducing dependence on oil : Supporting non-oil sectors : Encouraging investments in the technology, manufacturing, and innovation sectors to reduce dependence on oil revenues and achieve more sustainable economic growth.
5. Improving the legislative and regulatory environment: establishing a clear legal framework To develop legislation that contributes to facilitating technology transfer and encouraging foreign investment in the technical field, while ensuring the protection of intellectual property.

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