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The digital divide between Iraq and neighboring countries and its impact on the course of the digital economy

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Abstract
The world is witnessing a radical transformation in its economic structure with the increasing reliance on the digital economy, which has become a fundamental pillar of growth and development in various countries. However, Iraq still faces significant challenges in keeping pace with this transformation due to several factors, including weak digital infrastructure, a lack of specialized legislation, limited digital skills, and weak institutional coordination. This study aims to analyze the reality of the digital economy in Iraq, identify the most prominent challenges hindering its progress, and compare it with the experiences of neighboring countries such as the UAE, Saudi Arabia, and Jordan. The study adopted a comparative analytical approach supported by quantitative and qualitative data, and relied on official sources and international reports. The results revealed a deep digital divide between Iraq and its neighbors, along with untapped opportunities that can be capitalized on. The study concluded with a three-phase strategic plan aimed at advancing the digital economy in Iraq and achieving digital integration and sustainable development.

Keyword: Artificial intelligence, digitalization, human capital, cybersecurity, digital innovation

Introduction
In the context of the Fourth Industrial Revolution, the digital economy is no longer merely an option, but an imperative for achieving comprehensive and sustainable development. It involves not only the use of technology across various sectors, but also a reshaping of business models, lifestyles, and the relationships between the state and its citizens, and between the market and the consumer. Within this framework, countries are striving to develop digital infrastructure, enact legislation, and stimulate creativity and innovation to create an inclusive digital environment.

Despite global transformations, Iraq still faces a clear digital divide, manifested in weak e-services, low levels of digital inclusion, and the absence of a unified national strategy, all of which hinder its chances of transitioning to a viable digital economy. Hence the importance of this study, which attempts to analyze the Iraqi digital landscape through clear indicators and a structural comparison with neighboring countries that have made significant progress in this field.

Methodology
The study adopted a descriptive -analytical approach to analyze digital phenomena in Iraq using available data, in addition to a comparative approach to identify structural differences between the digital economy in Iraq and its counterparts in neighboring countries. The following research tools were used:

1. **Analysis of official documents:** Such as reports issued by the Ministry of Planning, the Ministry of Communications, and the Central Bank of Iraq.
2. **Literature review:** Including Arabic and foreign studies on the digital economy and digital transformation.
3. **Secondary data analysis:** From sources such as the World Bank, the World Economic Forum, ESCWA reports, and the ITU.
4. **Charts and graphs:** To simplify numerical comparisons.

The research was divided into three main Parts, with a conclusion and recommendations, according to an integrated systematic research plan.

Research problem

Iraq suffers from a clear slowness in its transition to a digital economy, despite possessing numerous technical and human resources. The fundamental problem lies in the weakness of its digital infrastructure, the absence of legislation regulating the digital space, weak institutional coordination, and cultural resistance to technological change. This is reflected in Iraq's low ranking in digital readiness indices compared to developed countries.

Importance of the research

The importance of this research stems from the following points:

Iraq's urgent need to modernize its economy and keep pace with global transformations.

The absence of in-depth studies linking the Iraqi digital reality to global standards.

Highlighting the digital divide between Iraq and neighboring countries, which allows for the identification of a national plan for progress.

Motivating decision-makers to take measurable executive steps in the field of digital transformation.

Research objectives

Analyzing the reality of the digital economy in Iraq using international indicators and recent statistics.

Comparing Iraq's digital status with that of neighboring countries in the region.

Identifying the most prominent technical and institutional challenges that hinder digital transformation.

Exploring opportunities to advance the digital economy in Iraq.

Develop a proposed strategic plan to achieve comprehensive digital transformation over the next ten years.

Research questions

What is the current level of development of the digital economy in Iraq*?*

What are the main challenges that hinder the development of the Iraqi digital economy*?*

How does the Iraqi digital situation compare with the experiences of neighboring countries*?*

What opportunities can Iraq leverage in digital transformation*?*

What practical steps are proposed to reform the Iraqi digital landscape*?*

Part One: Analysis of the reality of the digital economy in Iraq compared to neighboring countries

First: Digital performance indicators in Iraq

Analyzing digital performance indicators in Iraq is a crucial step in understanding the country's readiness to engage in the global digital economy. This includes assessing infrastructure, digital penetration, skills, legislation, and technology adoption in vital sectors such as education, health, and government services (ESCWA, 2022, p. 17*)*

According to the World Bank's Digital Development Report, Iraq is classified as having "limited digital readiness," meaning that while the country possesses some basic capabilities, it faces structural challenges that hinder real progress (World Bank, 2022, p. 12). International indicators have been used to measure Iraq's digital status, most notably:

1. Network Readiness Index (NRI*)*

This index measures countries' readiness to use information and communication technologies (ICTs) to achieve economic competitiveness. It comprises four dimensions: environment, readiness, use, and impact (WEF, 2022, p. 9). Iraq's ranking in 2022 was 124. Out of 139 countries

- Saudi Arabia's ranking: 38
- UAE ranking: 25
- Jordan's ranking: 60

This late ranking reflects shortcomings in the legislative and regulatory structure, and a low level of digital usage in the government sector.

2. E-Government Development Index (EGDI*)*

Published by the United Nations, it measures the development of government digital services, based on three components: infrastructure, human capital, and government internet services (UN DESA, 2022, p. 14*)*

- **Iraq's rating:** Low
- **Score:** 0.45 out of 1
- **Comparison:** UAE (0.91), Saudi Arabia (0.79), Jordan (0.65)

Iraq still suffers from weaknesses in the provision of digital government services, both in terms of quantity and quality, as it lacks a unified and comprehensive portal, and integration between entities is very limited.

3. Internet Usage Index

According to statistics from the Ministry of Communications, the internet penetration rate in Iraq reached about 49% in 2023, a low percentage compared to the average of the Gulf countries, which exceeds 90 % (Communications, 2023, p. 10). Ministry of

Among the main reasons for low usage:

- The high cost of internet access compared to income.
- Weak infrastructure outside major cities.
- Limited coverage in rural areas.

4. Digital Skills Index

This refers to the availability of skilled human resources capable of handling modern technological tools. In Iraq, UNESCO reports indicate a weakness in this area, as educational curricula do not include training in advanced digital skills (UNESCO, 2022, p. 22). It is estimated that less than 30% of Iraqi youth possess the technical skills that qualify them for the digital job market.

5. Cybersecurity Index

Issued by the International Telecommunication Union, it measures a country's preparedness to counter cyberattacks, through the existence of legislation, institutions, and human resources specializing in digital security (ITU, 2022). p. 7). Iraq obtained:

- **Global ranking:** 113 out of 182 countries
- **Score:** 0.36 out of 1
- **Comparison:** UAE (0.91), Saudi Arabia (0.83), Jordan

(0.69)

This indicator reveals that Iraq still suffers from a fragile cybersecurity infrastructure, lacking a unified national cybersecurity authority and a clear strategy for protecting sensitive data and information. This challenge is considered one of the most significant obstacles to expanding the provision of digital government and financial services.

6. E-commerce index

Despite the relative spread of e-commerce websites in Iraq in recent years, the e-commerce index remains low due to the lack of effective electronic payment gateways, weak trust in delivery and service, and the absence of regulations governing digital commerce (UNCTAD, 2021, p. 8). It is estimated that e-commerce sales represent no more than 1.3% of the total Iraqi market, compared to 7% in Jordan and 15% in the UAE.

7. Global Digital Competitiveness Index

This index measures countries' ability to adopt digital technology as a tool to increase productivity and innovation. It takes into account factors such as infrastructure, education, the regulatory framework, and integration between the government and the private sector (IMD, 2022, p. 14*)*

- **Iraq's ranking:** Outside the global rankings
- **Comparison:** UAE (ranked 12th globally), Saudi Arabia (31st), Jordan (58th*)*

Iraq's exit from this ranking reflects the absence of an integrated digital strategy and weak coordination between the public and private sectors.

Data gaps

One of the major challenges in measuring digital performance in Iraq is the scarcity of up-to-date official data. Most of the available indicators come from international sources, reflecting the absence of a national system for measuring and monitoring digital progress, a necessary step for building evidence-based policies.

8. Indicators of women's digital empowerment

Digital empowerment of women is a crucial component of any digital transformation strategy, with World Bank studies indicating that women's participation in the digital economy can boost GDP by up to 2% annually (World Bank, 2022, p. 18). In Iraq, however, indicators reveal a significant gap in this area.

Percentage of women working in the digital sector: less than 10*%*

Percentage of women benefiting from free digital courses: does not exceed 8*%*

The absence of national programs to empower women technologically

This is due to cultural, educational, and technical factors that need to be addressed through quality programs that take into account social privacy and encourage women's participation in the digital transformation.

8. Lack of specialized local indicators

One of the major challenges facing the assessment of the digital landscape in Iraq is the absence of national research centers that collect and analyze data regularly. Most reports rely on international sources or individual studies, which negatively impacts data accuracy and the responsiveness of government policies. The ESCWA report recommended the establishment of a "National Observatory for Digital Transformation" with the authority to monitor, analyze, and publish data (ESCWA, 2022, p. 27*)*

9. Weak institutional framework for digital implementation

Institutional reviews indicate that Iraq lacks a central body responsible for formulating and implementing the country's digital policy. Tasks are distributed among the Ministry of Communications, the Ministry of Planning, the General Secretariat of the Council of Ministers, and others, without clear institutional coordination. This fragmentation leads to wasted resources, duplication of projects, and the failure of many digital initiatives due to conflicting approaches and the absence of a unified strategic plan (Al-Jubouri, 2023, p. 14).

Second: A numerical comparison between Iraq, the UAE, and Saudi Arabia

Digital comparison between Iraq and its neighbors is an important analytical tool for understanding Iraq's position on the regional digital map and accurately determining the extent of the digital divide. This comparison encompasses several key dimensions, including infrastructure, legislation, human capital, cybersecurity, digital government services, and e-commerce. Such comparisons help identify successful models that can be emulated and define national priorities (ESCWA, 2022, p. 9*)*

1. United Arab Emirates

The UAE leads the Middle East and North Africa region in digital economy indicators. It also ranked first in the Arab world in the e-Government Development Index (EGDI). Issued by the United Nations, with a score of 0.91 out of 1 (UN DESA, 2022, p. 6*)*

The UAE's most prominent digital achievements:

- The existence of a comprehensive national strategy for digital transformation.
- Integrating artificial intelligence into government services.
- *"*UAE PASS" is a unified platform for government services.
- Digital payment penetration exceeds 95*.%*

The digital infrastructure is extremely robust, with 5G coverage reaching 99% of the population and significant investments in data centers and cloud services. A Ministry of Artificial Intelligence was also established in 2017 to lead the transformation.

2. Kingdom of Saudi Arabia

Saudi Arabia adopted Vision 2030, which placed digital transformation as one of its main pillars. It has made remarkable progress in the e-government readiness index, ranking 31st globally in 2022 (OECD, 2022, p. 13*)*

Key Saudi digital achievements:

- Launch of the "Absher" platform, which includes more than 160 services.

- The "My Health" application, which changed the mechanisms for accessing health services.
- Digitalization of the judicial system, education, and taxes.
- Deploying blockchain technology in government transactions.

Saudi Arabia also demonstrates a high capacity for implementing complex digital projects, supported by generous government funding and cooperation between the public and private sectors.

3. Jordan

Despite its limited resources compared to the Gulf region, Jordan has made remarkable progress in the areas of digital government and e-learning. It ranked 60th in the EGDI index and has a clear strategy for digital transformation (World Bank, 2022, p. 19).

Key Jordanian digital initiatives:

- "Sanad" platform for unified government services.
- Expanding the use of distance learning in universities.
- Programs to empower women digitally in partnership with UNDP.
- A national cybersecurity center and a specialized academy.

Jordan is a good example of a country with limited resources that has succeeded in achieving effective results thanks to smart policies and the state's interest in digital transformation as a strategic option.

Third: A numerical comparison between Iraq, Turkey, and Iran

1. Republic of Turkey

Turkey is considered a relatively advanced country in adopting digital technology and possesses one of the strongest telecommunications infrastructures in the region. It ranked 48th in the United Nations E-Development Index (UN DESA, 2022, p. 16) and adopted a national digital transformation strategy in 2015 called "Digital 2023."

Turkey's most prominent digital achievements:

"e- Devlet " platform, which offers more than 5,000 digital government services.

Digital transformation programs in the health and tax sectors.

The use of electronic payment and online commerce has expanded.

There is relative progress in cybersecurity, with the existence of a specialized national center.

Turkey has succeeded in building a diversified digital economy that combines digital manufacturing, financial technology, and digital government services, and this is a viable experience for countries with similar political and economic challenges.

2. Islamic Republic of Iran

Despite international sanctions, Iran has made significant progress in developing its domestic digital infrastructure, particularly in the areas of electronic payments and telecommunications. Internet penetration in Iran reached over 84% in 2022 (ITU, 2022, p. 11)

Iran's most important digital achievements:

- A national electronic payment system that relies entirely on bank cards.
- Developing a local internet network (National Information Network).
- Digital university education is widespread, especially during the Corona pandemic.
- The existence of a central government platform for electronic services

However, Iran suffers from restrictions on international digital openness, weak cybersecurity, and restricted access to the global internet for political reasons, which affects the dynamics of digital growth.

Table 1: Comparison of Iraq with neighboring countries – Simplified table

Index / Country	Iraq	The UAE	Saudi Arabia	Jordan	Türkiye	Iran
EGDI (UN 2022)	0.45	0.91	0.79	0.65	0.70	0.61
Internet coverage (%)	49%	99%	98%	87%	92%	84%
Cybersecurity	weak	advanced	advanced	good	middle	weak
Government services	partial	comprehensive	comprehensive	middle	comprehensive	middle
Digital payment	limited	wide	wide	middle	wide	comprehensive
Digital legislation	Incomplete	Advanced	Advanced	Medium	Good	Medium

Comparative analysis

This comparison shows that Iraq ranks lowest among the compared countries in most digital indicators. The biggest gaps are evident in the legislative framework, service availability, and cybersecurity. In contrast, the Gulf states (the UAE and Saudi Arabia) are characterized by clear government strategies, extensive funding, and partnerships with the private sector.

As for Jordan and Turkey, they constitute intermediate models that can be emulated, especially given the similarity of some structural challenges and resources.

3. Lessons learned from regional experiences

Studying the experiences of neighboring countries provides Iraq with a set of lessons applicable to its local context. The most important of these are:

- **Developing a comprehensive digital strategic vision:** The UAE, Saudi Arabia, and Jordan have developed integrated digital transformation strategies, including measurable goals, implementation pillars, and clear timelines. Iraq currently lacks such a vision.
- **Establishing a central body for digital transformation:** The Saudi and Emirati experiences have proven that having a unified entity overseeing digitization contributes to coordination and reduces conflict. Iraq suffers from a fragmentation of powers among ministries and agencies.

- **Adopting a comprehensive digital government model:**
  The UAE has successfully transformed most of its services into digital platforms through unified applications for citizens and residents. Iraq can start with five key government services and unify their platforms.
- **Investing in digital infrastructure:** Most neighboring countries have invested in fiber optic networks, expanding internet coverage, and upgrading data center systems. In contrast, Iraq still relies on traditional and dilapidated infrastructure in some provinces.
- **Improving digital trust through cybersecurity:** Jordan's experience in establishing a national cybersecurity center is a good example. Iraq could adopt a similar model, along with enacting data protection laws.
- **Supporting financial inclusion and digital payments:** Digital transformation will not succeed without an effective digital payment system. The Iranian experience, despite sanctions, demonstrates how electronic payments can spread even under restrictions, through incentive policies and local applications.

Fourth: Iraq and its potential strengths

Despite the significant delay, Iraq possesses some factors that qualify it to catch up with the digital revolution if they are invested in systematically:

- The large youth segment: More than 60% of the population are under the age of thirty.
- There is untapped university talent in the fields of programming and information technology.
- Popular desire for modernization, especially among students and entrepreneurs.
- Openness to international cooperation with organizations such as the World Bank and UNDP to support digital initiatives.

Summary of the comparative analysis

Comparison with neighboring countries reveals that Iraq's digital lag is not inevitable, but rather a result of a lack of integrated planning and implementation. Furthermore, the existence of successful regional experiences offers a genuine opportunity to learn from them, whether in terms of developing a national digital strategy, reforming legal frameworks, or integrating digital transformation into state institutions from the ground up.

Recommendations drawn from the comparison

Develop an Iraqi digitization plan with a clear timetable.

- Strengthening partnerships with the local and global private sector.
- Adoption of a financing program specifically for digital infrastructure.
- Building a reliable and widely used electronic payment system.
- Adopting a unified platform for government services.

Part Two: Analyzing the Digital Divide Between Iraq and Regional Countries

The term "digital divide" refers to the disparity in access to and use of information and communication technologies between individuals or countries. This includes disparities in infrastructure, digital skills, legislation, and opportunities for the actual use of technology (UNESCO, 2022, p. 11). Analyzing the digital divide between Iraq and its neighboring countries is a necessary step to identify the causes of Iraq's digital lag and the possibility of reducing this gap through effective policies.

First: Digital divide indicators

By analyzing regional and international data, the most significant numerical differences between Iraq and its neighbors can be identified in the following indicators:

1. The digital coverage gap:

4)G) network coverage in Iraq did not exceed 65% by 2023, compared to 99% in the UAE and 97% in Saudi Arabia (ITU, 2022, p. 13)

The internet in Iraq suffers from poor speed and infrastructure, while the Gulf countries have already begun to transition to the fifth generation (5G)

2. The digital skills gap

Less than 35% of Iraqis possess basic digital skills, compared to more than 70% in Jordan and 85% in the UAE (World Bank, 2022, p. 15)

Iraq does not have a national program for teaching digital skills in secondary or university education, while neighboring countries include them in their educational curricula.

3. The gap in access to electronic services

Iraq offers approximately 40 incomplete digital government services through multiple portals.

Saudi Arabia offers more than 200 unified government services through "Absher", while the UAE offers 300 services through "UAE PASS" (OECD, 2021, p. 21)

4. The gap in digital legislation

Iraq does not have a clear law for data protection or digital identity.

The UAE and Turkey have complete legal frameworks that include laws on cybercrime, data protection, and digital signatures (ESCWA, 2022, p. 16)

The investment gap in digital transformation

The size of the Iraqi government's spending on digitization projects does not exceed 0.3% of the general budget.

Saudi Arabia and the UAE invest more than 2.5% of their budget in digital projects (McKinsey, 2022, p. 18)

Second: Factors causing the digital divide in Iraq

The main reasons for Iraq's digital divide compared to neighboring countries can be summarized as follows:

1. **The lack of a clear political will for digital transformation:** There is still no digital strategy document approved by Parliament or the government, and this is what makes digital transformation happen in an unsystematic way.
2. **Poor coordination between government institutions:** Digital projects are managed by multiple ministries without integration between them, leading to

duplication of efforts and conflicting priorities.

3. **Lack of sufficient and sustainable funding:** Most digital initiatives are funded through external loans or support from international organizations, which makes their sustainability questionable and prevents their expansion.
4. **Lack of public trust in digital services:** A large segment of citizens still prefers paper transactions due to weak digital awareness, fear of data loss, or weak government response.

Administrative corruption and its impact on digital transformation

The existence of administrative corruption networks within some state institutions constitutes a barrier to the digitization of procedures that may threaten the interests of those networks.

Third: Manifestations of the digital divide in key sectors

To understand the nature of the digital divide more accurately, it is necessary to review it within specific sectors that represent the vital structure of any digital economy, namely: education, health, government services, and the financial sector.

1. **Digital education:** In countries like the UAE and Saudi Arabia, digital education has become an integral part of the educational process, with schools and universities using interactive platforms, online assessments, and accredited digital learning resources (OECD, 2022, p. 13). In contrast, in Iraq:

- The percentage of schools connected to the internet does not exceed 20 % (UNESCO, 2023, p. 9).
- The limited use of digital learning platforms such as Google Classroom or Moodle, and the use of informal alternatives via Telegram or WhatsApp.
- The absence of a unified national education portal that provides official curricula and electronic tools.

2. **Digital health:** In Saudi Arabia, for example, digital applications are used to book medical appointments, dispense medications, provide initial diagnoses, and monitor chronic conditions, through apps like "Sehhaty" and "Tawakkalna." In Iraq:

- There is still no unified government health platform.
- Paper files are used to document medical records in most hospitals.
- Only rare cases in some private hospitals deal with electronic records.
- This reality highlights a significant digital divide in the health sector, preventing the provision of faster and more accurate services in a country suffering from chronic health pressures and staff shortages.

Government services:

- Most neighboring countries offer fully digital government services, including passports, taxes, civil registry, justice, and social security. In contrast, Iraq offers:
- Limited electronic services across multiple, unconnected platforms.
- The absence of a national digital identity hinders the connection between citizens and services.
- Existing digital services do not provide complete procedures (e.g., applying for a passport requires a paper-based attendance after filling out the electronic form).

3. **Digital financial inclusion:** E-wallets and digital payment solutions represent a cornerstone of the digital economy. In the UAE, Turkey, and Saudi Arabia, digital payments account for more than 80% of daily transactions (McKinsey, 2023, p. 22). Meanwhile, in Iraq:

More than 70% of citizens do not have bank accounts.
Only 15% of transactions are done electronically, most of them in the government sector via the "Key Card."
Weakness in the acceptance of electronic payments by merchants, due to a lack of awareness or the unavailability of POS points of sale.

Fourth: The effects of the digital divide on development

Slowing economic growth:

The absence of digital transformation keeps Iraq in a traditional economic model that does not benefit from the global shift towards digitalization and data-driven productivity.
Denying vulnerable groups access to digital opportunities, such as women, those with limited income, and rural residents, perpetuates social and economic inequality.

1. **Hindering anti-corruption efforts:** Digitalization means reducing direct contact with government employees, which reduces opportunities for bribery and favoritism, and its absence keeps the system fragile.
2. **Reduced ability to respond to crises:** as happened during the COVID-19 pandemic, when education, health and administrative services in Iraq were almost completely disrupted, while most neighboring countries continued to rely on ready-made digital systems.

Fifth: Opportunities to reduce the digital divide in Iraq

Despite the depth of the digital divide, there are many untapped opportunities that can be leveraged to accelerate digital transformation and narrow this gap with neighboring countries, including:

1. **Young human resources:** More than 60% of Iraq's population is under 30, a demographic capable of learning and quickly adapting to technology. This human resource, if properly utilized, is capable of leading digital projects across all sectors (UNDP, 2022, p. 10)
2. **The development of telecommunications infrastructure**: Recent years have witnessed a gradual improvement in mobile phone network coverage and the initiation of projects to expand the fiber optic network, which paves the way for accelerating digital transformation if accompanied by appropriate operating and investment policies.
3. **Increasing international partnerships:** Iraq is currently collaborating with organizations such as ESCWA, the World Bank, and UN programs to support digital projects encompassing education, health, governance, and financial inclusion. These partnerships can be expanded to include staff training, the development of online platforms, and building public

trust in digitalization.

4. **Successful regional experiences:** The existence of successful experiences that are geographically and culturally close (such as Jordan) makes it easier for Iraq to "replicate policies," through official cooperation or by adopting policies that have proven effective without having to build everything from scratch.
5. **Signs of growth in digital entrepreneurship:** The emergence of digital business incubators in Baghdad, Basra, and Najaf, such as "Tech Hub" and "Riyada", demonstrates the existence of a digital youth movement that only requires official support and accessible funding to become the nucleus of a broader digital transformation.

Part Three: Future Challenges and Solutions for the Digital Economy in Iraq

Despite Iraq's belated recognition of the importance of the digital economy, the transition process faces a number of structural and technical challenges that hinder the desired development. These challenges are not limited to the technical aspect alone, but also intertwine with the administrative, economic, and cultural systems, making them complex and requiring long-term, fundamental solutions (World Bank, 2022, p. 18).

1. Weak technological infrastructure

Technological infrastructure is the foundation for a functioning digital economy, and it includes telecommunications networks, data centers, computing systems, fiber optic networks, and service providers. In Iraq:

- Poor internet coverage outside major cities, especially in rural and southern areas.
- The infrastructure is dilapidated as a result of years of neglect, wars, and lack of investment.
- The lack of national data centers with independent operational capacity forces organizations to rely on expensive and fragmented imported solutions.

International reports indicate that Iraq needs an investment of more than one billion dollars to upgrade its digital infrastructure over the next five years (ITU, 2023, p. 7)

2. Digital skills gap

The shortage of qualified personnel is a major challenge:

- Iraqi universities produce only a limited number of specialists in artificial intelligence, data analysis, cybersecurity, and digital platform design.
- Most digital talent migrates abroad in search of better opportunities.
- Poor coordination between the Ministries of Higher Education and Communications leaves a gap between educational outputs and the digital labor market.

For example, the number of cybersecurity engineers working within the government sector does not exceed 500 engineers, while the actual need is estimated at more than 5,000 specialists (UNDP, 2023, p. 12).

3. Incomplete digital legislation

A functioning digital economy cannot be built without a comprehensive legal and regulatory framework. Iraq currently lacks such a framework.

A law to protect personal data.

A legally binding digital government law.

Legislation specific to digital transformation or artificial intelligence.

Clear licensing regulations for digital service providers or payment platforms.

This leads to a legal vacuum that makes local and foreign investors hesitant to enter the Iraqi digital market.

First: Structural and technical challenges

1. Lack of public trust in digital services

One of the behavioral challenges hindering the digital economy in Iraq is the lack of public trust in digital services, both in the public and private sectors. A survey conducted by the Central Statistical Organization shows that:

- More than 60% of citizens prefer paper transactions over electronic ones.
- Approximately 45 % They do not trust the safekeeping of their information online (COSIT, 2023, p. 9)
- There is a widespread belief that digital services are ineffective or merely "formal," without tangible results.

2. This is due to several reasons:

- Weak legal framework for protecting users.
- Poor technical response from service providers.
- The technological gap between citizens and new digital systems.

This highlights the need for educational and training campaigns, and digital literacy programs, in parallel with improving the quality of the services themselves.

1. Financial and funding challenges

The digital economy requires massive investment, and Iraq faces recurring financial crises due to its near-total dependence on oil and weak revenue diversification. Financial challenges include:

- Weak budget allocations for digitization projects: They do not exceed 0.3% of the general budget (Ministry of Finance, 2023, p. 11)
- The absence of funding mechanisms specifically for digital transformation.
- Lack of support for the digital private sector, such as startups and programmers.

International funding is also often conditional on reforms that have not yet been implemented, making it difficult for Iraq to access concessional financing for its digital projects.

Sixth: Weak cybersecurity

Cybersecurity is the most important pillar for ensuring the continuity of digital services and protecting user privacy. However, Iraq suffers from a clear weakness in this area.

There is no national cybersecurity strategy.

Most government websites are vulnerable to hacking and do not rely on advanced security protocols.

The lack of specialized human resources and the absence of a national emergency center to respond to cyberattacks.

In a report by the International Telecommunication Union, Iraq ranked 113th out of 182 countries in the Global Cybersecurity Index (ITU, 2022, p. 16)

1. Weak digital corporate governance

Digital transformation requires an effective governance system that defines responsibilities, monitors performance, and evaluates results. In Iraq:

- There is no single central body managing the digital transformation process.
- There is a conflict of powers between the Ministry of Communications, the Ministry of Planning, and the governorate departments.
- The absence of a digital Key Performance Indicators (KPIs) system To measure the development of initiatives or to assess their impact.
- This institutional chaos leads to a waste of time and resources, and weakens the chances of achieving tangible results on the ground.

2. The gap between the center and the governorates

Iraq suffers from a highly centralized system of policymaking and implementation, leading to significant disparities in digital readiness between Baghdad and the other governorates, particularly those in the south and west. Data from the Ministry of Planning indicates that:

Approximately 80% of digitization projects are concentrated in Baghdad and Erbil only.

Border and rural governorates suffer from a near absence of digital connectivity and electronic services (Ministry of Planning, 2023, p. 14).

This geographical disparity perpetuates the digital divide and deepens the manifestations of marginalization, which requires a decentralized vision based on transferring digital powers to the governorates, while providing flexible funding and digital development allocations for each governorate

3. Digital illiteracy and weak technological culture

Despite smartphone penetration exceeding 70% in Iraq, their use for economic or educational purposes does not exceed 20 %. This is due to widespread digital illiteracy and the absence of national technology education programs from the primary level (UNESCO, 2023, p. 12).

Some local studies show that:

- More than 40% of public sector employees do not have sufficient knowledge of using email or ERP systems.
- High school and university students use the internet to a large extent for entertainment purposes, not educational ones.
- This cultural reality poses a major obstacle to any digital initiative, because digital transformation is not just about providing technology, but about changing society's behavior towards technology.

4. Lack of partnerships between the public and private sectors

Countries like the UAE and Jordan have successfully built a digital economy based on public-private partnerships, where technology companies implement major national projects. In Iraq, the relationship between the two remains weak for several reasons:

- The lack of clear regulatory laws to govern these partnerships.
- Fear of corruption or mismanagement of government contracts.
- The absence of tax and investment incentives for emerging digital companies.
- If the private sector's role in digitization projects is not activated, it will be difficult to achieve sustainability or real development, because governments alone do not have the required efficiency or speed in the world of technology.

Analysis of structural and technical challenges shows that Iraq does not suffer from a "lack of capabilities" as much as it suffers from policy chaos, weak institutional will, lack of coordination, and cultural dysfunction in dealing with digital transformation.

The challenges are real, but not impossible. Investing in overcoming them is an investment in Iraq's economic and social future.

Second: Opportunities and trends of the digital economy

Despite the complex challenges hindering the growth of the digital economy in Iraq, a number of strategic opportunities exist that could serve as a starting point for building a comprehensive digital economic system. These opportunities arise at a time when the world is undergoing rapid digital transformations, requiring countries to adopt proactive policies to capitalize on the digital wave rather than lagging behind (World Economic Forum, 2023, p. 6).

1. The youth population environment

Iraq's demographics present a unique opportunity; over 60% of the population is under 30. This demographic is highly receptive to learning digital skills, engaging in digital entrepreneurship, and developing technological applications and platforms. This demographic advantage is a driving force that can be leveraged through:

- National training programs for digital skills.
- Supporting emerging youth technology projects (startups).
- Launching digital competitions and accelerators in cooperation with universities.

Young people are not just recipients of digital transformation, but are capable of leading it if they are framed and encouraged within national programs.

2. The banking sector's shift towards digitalization

The Iraqi banking sector has begun, albeit slowly, to adopt digital payment methods and transformation. Specifically:

- Activating smart cards such as "Mastercard" and "Keycard."
- Launch of electronic banking applications by some local banks.
- Encouraging the use of electronic wallets for salaries and aid.

These initiatives, although limited, represent a promising foundation for expanding the digital financial economy system, especially with the increasing confidence in them by employees and retirees.

3. The increasing demand for e-commerce

Data from the Iraqi market indicates a significant increase in the popularity of online shopping, particularly in major governorates such as Baghdad, Basra, and Najaf. Among the

encouraging factors are:

- High rental prices are pushing traders to reduce physical branches.
- Consumer behavior has changed towards convenience and speed.
- The emergence of efficient local delivery companies (such as "Talabat" and "Suraa ").
- If laws are developed to protect consumers and encourage electronic payments, the e-commerce sector could become one of the pillars of the new economy.

4. The spread of smart communication services

Despite its weak infrastructure, Iraq has high smartphone usage rates, with an estimated 75% of adults owning one. This is a significant indicator because smartphones are the primary gateway to the digital economy, whether for education, services, entertainment, or payments.

This widespread deployment provides broad possibilities for smart service applications, both governmental and private, making it necessary to provide an infrastructure that supports these applications and to expand mobile internet coverage to include remote areas.

Third A roadmap for digital transformation in Iraq

Digital transformation in Iraq is no longer an option, but an urgent necessity to keep pace with global developments and address internal challenges efficiently and transparently. To achieve this goal, a clear national roadmap is essential, defining objectives, phases, stakeholders, and indicators to ensure a comprehensive and sustainable digital transformation (World Bank, 2023, p. 21)

Strategic framework of the roadmap

1. The success of the digital transformation roadmap requires that it be based on the following principles:

- Comprehensive dimensions: include government, economy, education, health, security, and environment.
- Phased focus: Dividing the plan into short (1-2 years), medium (3-5 years), and long (6-10 years) time phases.
- Clear institutional leadership: A higher authority that leads the coordination between all parties, such as the "National Authority for Digital Transformation."
- Linking funding to implementation: Every digital project must have a source of funding, a follow-up mechanism, and a clear objective.
- Phase One – Institutional and Legislative Establishment (Year 1-2)

Objectives

Establishment of the (National Authority for Digital Transformation) .

Issuance of basic laws: data protection, digital signature, electronic payment.

Adopting the national digital identity and linking it to the unified card.

Activities

Preparing a draft of the national digital strategy in collaboration with national and international experts.

Organizing training workshops for ministries and departments on the fundamentals of digital transformation.

Building a central database for human resources and digital infrastructure in ministries.

Indicators

Issuance of 3 digital laws.

Launch of a unified national digital portal.

Training 5,000 employees in digital transactions.

Phase Two – Building the Digital Infrastructure (Years 3–5)

Objectives

The fiber optic network has been deployed in 80% of the governorates.

Establishing a national data center (Data Center).

Providing high-speed internet to all schools and health centers.

Activities

Partnering with international and local telecommunications companies to expand networks.

Developing a national cloud computing system.

Integrating digital education into the curriculum from the fourth grade of primary school.

Indicators

% 90 of schools are connected to the internet.

Launching a unified national application for health and education.

Activating the digital payment service in all government departments.

Phase Three – Full Digital Transformation of Government Services (Years 5–7)

Objectives

%100digitization of basic services in ministries and official departments

Developing a unified electronic portal that includes all citizen transactions.

Linking all government databases to a single digital identity.

Enhancing transparency and combating corruption through a unified electronic monitoring system.

Activities

Converting paper-based services (such as passports, residency permits, taxes, and licenses) to fully digital.

Linking ministries to a centralized e -governance system.

Introducing "software robots" to automate repetitive government procedures (RPA)

Indicators

%80of citizens have registered in the government's digital system.

The rate of paper attendance in government institutions has decreased by 70.%

Reducing the time required to complete government transactions to less than one day.

Phase Four – Integrated Digital Economy (Years 8–10)

Objectives

Transforming Iraq into a regional digital hub in the fields of programming, digital commerce, and cross-border digital services.

Supporting the digital economy to contribute 15% to the GDP.

Adopting artificial intelligence in government decision-making.

Activities

Establishing a "digital free zone" in Baghdad or Basra would attract global companies.

Partnerships with international universities to establish colleges specializing in the digital economy.

Supporting Iraqi software and digital services exports.

Indicators

Creating 5,000 local digital startups.

Employing more than 100,000 young people in the digital economy.

Exporting $1 billion worth of digital software and products annually.

The institutional structure required to implement the roadmap

The success of this roadmap requires an integrated institutional structure based on:

Supreme Council for Digital Transformation: Headed by the Prime Minister, and includes the Ministries of Communications, Education, Finance, Planning, and the private sector.

An independent executive body: responsible for day-to-day implementation, and possessing contracting and planning powers.

Local digital councils in each governorate: linking the central government with local authorities, and implementing digital projects tailored to the needs of each governorate.

A "National Digital Transformation" law should be enacted to define powers and compel all state institutions to engage digitally.

Finance and Sustainability

Funding the roadmap requires:

Allocate 2-3% of the general budget annually to digitization projects.

The establishment of the "National Digital Transformation Fund" is funded by the state and international partners.

Activating partnerships with the private sector through BOT contracts, and relying on local innovation.

Fifth: A roadmap for digital transformation in Iraq

Key Performance Indicators (KPIs) for measuring the success of the roadmap

Any national roadmap should include a clear set of performance indicators to measure progress, assess effectiveness, and make corrective decisions when needed.

Table No. (2) shows some of the proposed measures

Index	Index description	Target in 10 years
Percentage of digitization of government services	% number of digital services out of total services	100%
Percentage of citizens registered in the digital identity system	% of the population registered in the unified system	90%
The contribution of the digital economy to GDP	percentage of GDP	15%
Digital payment usage rate	Out of total transactions	80%
Number of digital startups	Officially registered with the Ministry of Commerce	5,000
Cybersecurity Index	Iraq's global ranking	Among the top 50 countries

These indicators are used in an annual review issued by the "National Authority for Digital Transformation" and are published transparently in a report presented to Parliament and civil society.

Potential risks and how to address them

Despite the clear opportunities, the roadmap may face a number of challenges during implementation, and it is important to anticipate these risks and develop contingency plans, including:

Political changes: Every new government may change priorities. This can be countered by making the strategy legally binding and approved by parliament.

Administrative corruption: The solution lies in full digital oversight and monitoring of implementation through technical indicators that cannot be falsified.

Weak community awareness: This is overcome through comprehensive digital awareness campaigns on television, the internet, and schools.

The funding shortfall: This is overcome through international partnerships and the private sector, and the establishment of an independent support fund.

Lessons from the experiences of neighboring countries

By examining regional experiences, the following can be drawn upon:

From the UAE: Focus on "comprehensive digital government" and unifying services.

From Saudi Arabia: Adopting a long-term national vision (such as Vision 2030) that includes digital transformation.

From Jordan: Focusing on building human capacities in parallel with digitalization.

From Turkey: Integration between the public and private sectors in developing digital projects.

From Iran: Despite the restrictions, success in popularizing electronic payment through national systems.

The roadmap for digital transformation in Iraq is not merely a technical plan, but a national project requiring a fundamental shift in the way the state operates, the mindset of its citizens, and the structure of its economy. Its success hinges on political will, funding, community participation, and collaboration between the government and the private sector.

Time is no longer on Iraq's side, and every delay widens the digital divide with the rest of the world. Therefore, moving quickly to implement this roadmap represents a real opportunity to achieve a qualitative leap in economic, administrative, and social performance.

Conclusion, Recommendations, and Suggestions

First: Conclusion

1. This comprehensive research examines the reality of the digital economy in Iraq, addressing its theoretical dimensions, comparing it with successful regional experiences such as those of Saudi Arabia, the UAE, and Jordan, and concluding with an analysis of the challenges hindering digital transformation, available development opportunities, and a proposed plan for

advancing the digital economy in Iraq. This review reveals that Iraq, despite lagging behind in the digital transformation process, possesses latent potential that could enable it to make significant strides if a comprehensive and integrated national vision for digital transformation is adopted.

2. The study revealed that Iraq faces a significant digital divide compared to its neighbors, including weak infrastructure, a lack of legislation, a shortage of skilled personnel, limited digital literacy, and the absence of a unified vision. However, despite these challenges, the study also highlighted several opportunities for advancement, most notably its young population, growing international interest, and emerging trends in areas such as financial technology and digital education.
3. One of the most significant findings of the research is that digital transformation cannot be reduced to the digitization of services, but rather requires a comprehensive restructuring of the state and society, encompassing culture, administration, education, and law. Furthermore, a comparison of regional experiences has shown that success in this area depends on the availability of strong political will, independent institutional leadership, and empowering society to be an active partner in this transformation.
4. The digital economy is not a luxury, but a necessity for development, an engine for growth, and a means to achieve justice, transparency and efficiency in management. It is the most effective option to overcome the economic and administrative crises that the Iraqi state is suffering from.

Second: Recommendations

1. Launching a national strategy for digital transformation, officially announced and binding on all state institutions, with its priorities, time phases, and performance measurement indicators defined.
2. Establishing a national authority for digital transformation, independent of ministries, to oversee the development of digital policies, monitor implementation, and coordinate between governmental and private entities.
3. Updating the legislative environment by issuing modern laws that regulate data protection, electronic signatures, digital transactions, and cybercrimes, in a way that achieves legal security and enhances trust.
4. Expanding the digital infrastructure, by supporting communication networks, establishing national data centers, linking ministries electronically, and generalizing the use of unified government platforms.
5. Integrating digital transformation into education and training, through updating curricula, enhancing digital skills, and establishing digital training centers in every governorate.
6. Enhancing private sector participation by granting tax and investment incentives, and activating public-private partnerships, especially in the fields of communications and digital services.
7. Developing cybersecurity by establishing a national cybersecurity agency, developing protection protocols, training personnel, and launching awareness campaigns.

Third: Practical proposals for rapid recovery

Based on the general recommendations above, a number of practical proposals can be put forward that can be implemented in the near term to stimulate digital progress in Iraq:

1. Establishing a national center for digital talents: It works to discover and train young people in basic and advanced digital skills, such as programming, application design, data analysis, and artificial intelligence. This center is run in partnership with local and international technology companies and has branches in every governorate.

2. Launching the "Iraq Without Paper " initiative: It is launched by the government in cooperation with all ministries, and aims to digitize official documents and transactions within five years, to reduce corruption and bureaucracy, increase transparency, and achieve administrative efficiency.

3. Developing a unified application for government services: Like the "Tawakkalna" or " Absher " model in Saudi Arabia, it offers more than 100 electronic services from various ministries, and through it one can obtain official documents, make payments, apply for services, track, and evaluate.

4. Providing free internet access in educational and health institutions:

As a step towards digital justice, we can start by providing free, high-quality internet access in government schools, universities, and hospitals, to ensure fair digital access.

5. Establishing a Digital Innovation Fund: To finance emerging technology projects in the fields of education, health, transportation, and commerce. This fund is financed by the state budget, private sector contributions, and international aid.

6. Establishing a network of women in technology: To enable women and girls to enter the digital field, and to provide scholarships, vocational training, and support for women-led digital projects.

7. Issuance of the National Digital Identity Card: It is used to access all government, banking, educational and health services, and carries the citizen's data electronically.

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