



RESEARCH ARTICLE

The Significance of Digital Financial and Banking Technology in Fostering Artificial Intelligence and Contributing to Sustainable Development in Iraq

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ABSTRACT

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The study aims to emphasize the significance of adopting the advancement of digital financial and banking technologies to boost the incorporation of artificial intelligence as a means to achieve sustainable development goals in Iraq. This is to increase the range and area of financial and banking services provided, thus enhancing financial inclusion and delivering these services to cities, rural areas, and villages, making them more accessible, affordable, and comprehensive. There is a recognized problem in the weak usage of digital financial and banking technologies with a decrease in financial inclusion levels. Therefore, it is crucial to adopt these technologies in the field of digital payments, which are most widespread and utilized in the developed world and some developing countries, while there is a decline and low demand for traditional and financial methods that are facing numerous challenges and incompatibility with modern needs for digital transformation and artificial intelligence applications. A necessity for Iraq is to develop a comprehensive strategy that fully utilizes digital financial and banking applications to gain their advantages and benefits. This can be achieved by partnering with advanced technologies like artificial intelligence. The research began with the premise that adopting digital financial and banking technologies would significantly contribute to attaining sustainable economic and social development goals in Iraq. The research was carried out within a comprehensive plan to address the challenges of the financial and banking technology industry. Ultimately, the most important conclusion and recommendation were derived from the study.

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INTRODUCTION

The world is currently experiencing an accelerated development known as the Fourth Industrial Revolution, which will shape the next two decades. The primary driving force behind this progress is the field of economics, which propels societies and peoples forward. At the forefront of sectors is the field of artificial intelligence, which will transform most jobs and businesses. Artificial intelligence will also play a critical role in changing financial and banking technologies, making them more

harmonious. In connection with the more accurate, comprehensive, and cost-effective applications of artificial intelligence, which will have a pivotal, more technical role and broad and diverse advantages, which will lead to increased productivity, capacity growth, and improved quality of financial and banking technologies, and as a result, an increase in the contribution of the financial and banking sector as a result of the use of artificial intelligence systems that generate work, business, profits, and gains. Furthermore, the financial and banking sector's contribution to Iraq's gross domestic product does not exceed (2%), which indicates the potential for growth and development through the use of artificial intelligence systems.

Artificial intelligence has been found to be a vital technology in reshaping the financial and banking industries. Its role is seen in areas such as auditing the correct use of credit cards and large deposits, which is beneficial to the fraud detection departments in banks. Additionally, AI is used to simplify commercial operations by facilitating the estimation of supply and demand, pricing of securities, and aiding in financial and banking techniques across different levels.

Research problem

The Iraqi financial and banking sector continues to face challenges in providing the necessary requirements for the successful implementation of artificial intelligence applications and financial and banking technologies that can enhance their role in achieving sustainable economic and social development. There is a strong correlation between the adoption of financial and banking technologies and the achievement of sustainable development goals in Iraq, whose economy and financial and banking sector remain weak in adopting artificial intelligence applications that could bring benefits and gains to the financial and banking sector. Digital financial and banking services offer tremendous opportunities, particularly for poor communities, by providing essential financing for small and medium-sized enterprises, as well as providing the necessary financing for large income-generating projects that supply the federal budget with the necessary funds, making digital financial and banking technologies an essential element in achieving sustainable development goals.

Importance of research

Many countries, particularly Iraq, are rapidly adopting digital financial and banking technologies and artificial intelligence applications due to their importance in promoting sustainable development. These technologies and applications contribute to the goal of achieving digital financial inclusion by providing significant opportunities for providing sustainable financing to all segments of society and projects. Businesses involved in supplying goods and services and projects that generate employment opportunities can benefit from these applications. The financial and banking industry stands to gain from the applications, which bring advantages and benefits.

Research hypothesis

Incorporating artificial intelligence systems and digital financial and banking solutions can help Iraq accomplish its objectives for sustainable economic and social growth. This is achieved through a well-thought-out strategy to address the challenges facing the financial and banking technology industry.

Research targets

1. The objective of this research is to explore the uses of artificial intelligence, financial, and banking technologies, and what they entail. Additionally, the study will examine how these applications and technologies support the attainment of sustainable development goals.
2. This research will investigate the contribution of financial and banking technologies to sustainable development. It will analyze how these technologies promote economic growth, reduce poverty, and protect the environment.

3. This research aims to explore the extent of adoption of financial and banking technologies worldwide and in Arab countries. The study will identify the countries that have successfully adopted these technologies and those that are lagging behind.

4. The research will identify the challenges facing digital financial and banking applications and technologies in Iraq. It will examine the factors hindering the adoption of these technologies and suggest possible solutions.

5. This research aims to determine the potential impact of adopting artificial intelligence applications and financial and banking technologies on Iraq's gross domestic product. The study will estimate the contribution of these technologies to economic growth and job creation.

Research structure/Methodology followed

The study utilized analytical methods to examine and investigate the problem using a specified collection of data and information on artificial intelligence and digital financial technology indicators.

CHAPTER ONE

The research study is aimed at exploring the practical and theoretical aspects of artificial intelligence and its applications in the financial and banking industry. The researcher will focus on understanding how these technologies can be leveraged to attain sustainable development goals. The study will delve into the opportunities presented by digital financial and banking technologies in achieving economic and social development objectives.

The first requirement for applications that utilize artificial intelligence is to have a robust and secure database. This entails employing technologies such as big data, cloud computing, encrypted currencies, and financial technology to safeguard the database against hacking and manipulation by Internet attackers. Additionally, AI applications must have the capability to identify and categorize customers based on their spending habits by conducting easy data analysis according to age, gender, and social class. AI-based applications also have a complex encryption process that is carried out, featuring programming that saves contracts in a way that is difficult for hackers to compromise. Furthermore, these applications are capable of combating money laundering due to the systems based on artificial intelligence, which are characterized by strength and intelligence in combating the process of money laundering, as well as detecting fraud and deception.¹

The use of artificial intelligence in the financial and digital banking sectors is significant, as it monitors fraudulent credit card activities and substantial bank deposits. This benefits the bank's fraud detection department. The integration of artificial intelligence applications in various industries and businesses is expected to alter the nature of services, especially in financial and banking services, where new services will replace the traditional ones as the use of artificial intelligence in performing tasks and businesses expands.²

The second requirement pertains to the digital financial and banking technologies, which is defined as a phenomenon that signifies the common characteristics between financial and banking services and the ability to leverage technical sectors, technology and artificial intelligence. As artificial intelligence companies enter the market to innovate products, applications, and technologies, they offer to the traditional financial and banking sector, enabling it to benefit from productive technology and innovative business models. These technologies are characterized by digitization and communication, which makes the availability of financial and banking services more advanced, cost-

¹ .Fahd Al-Hazmi and Victor Sahab, Artificial Intelligence, its technologies, its development, and its promises, Al-Qafila Magazine, Issue (1), Volume 66, February, Algeria, 2017, p. 37 .

² Fahd Al-Hazmi and Victor Sahab, Artificial Intelligence, its technologies, its development, and its promises, Al-Qafila Magazine, Issue (1), Volume 66, February, Algeria, 2017, p. 37 .

effective, comprehensive, and accessible, thus contributing to the direct achievement of sustainable economic and social development.³

Digital finance and banking technology encompasses various digital products and services such as digital payments and crowdfunding platforms in different forms, lending, equity-based financing, smart insurance, wealth management, and risk management regulatory frameworks. The advancement of digital finance and banking technologies is a result of the digital revolution, changing consumer preferences and behavior, and the impact of the global financial crisis on traditional financial institutions, which led to a loss of trust in conventional financial and banking systems.⁴

The third requirement, which is the connection between monetary and banking technologies and artificial intelligence to the sustainable development objectives, leaves no room for doubt that the continuous increase in the use of smart phones and the international information network (the Internet) and the increase in financial and banking technologies that facilitate electronic payment operations, trade and investment in money, commercial papers, stocks and bonds have created a pressing need for the possibility of individuals, peoples and communities to benefit from digital technologies, which enhances the goals of sustainable economic and social development in the judiciary. In terms of poverty, hunger, good health, well-being, quality education, clean and affordable energy, decent work, and economic growth, as digital financial and banking services provide small and medium-sized enterprises, opportunities to obtain financing through crowdfunding platforms, and increased "digitization" of employee inputs and commercial payments to customers and suppliers, as well as all types of industry. Including the financial and banking industry, innovation and the provision of credit, which increases the chances of obtaining financing for productive institutions, providing financial and banking services, and providing new tools and methods for low-income families to increase their income, improve their financial flexibility, and reach economic and productive opportunities in light of sustainable cities and local communities that provide digital financial and banking services. It provides digital payment services to residents in light of alleviating excessive mortgages for adequate housing.⁵

The UN's updated digital strategy targets digital development in countries with the aim of promoting digitization, including advancements in mobile smartphone technology, artificial intelligence, and the use of the Internet for financial and banking services. This new approach to thinking translates into a way of working that allows individuals and financial institutions to innovate using financial technology. The ultimate objective of the UN's long-term vision is to help create a world in which "digitalization" serves as an empowering force for people and the planet, with the goal of reducing poverty and assisting countries in achieving sustainable economic, social, and digital development.⁶

Digital transformation is a crucial element in the future of the financial and banking industry, as clients are progressively turning towards conducting their financial and banking transactions via electronic applications and smart solutions. Additionally, artificial intelligence and financial technology are playing an increasingly significant role in this sector. These applications aim to enhance the efficiency of banks and financial institutions, thereby improving profitability while minimizing financial and banking risks and expenses.

³ Hamdoush Wafaa, The importance of adopting digital financial technologies as a mechanism for achieving sustainable development in Arab countries, reality and challenges, *New Economy Magazine*, Volume (16), Issue (1), 2021., Algeria, p. 321 .

⁴ .Layan Farid Habib, *Financial Technology, the Financial Sector's Bridge to the Future*, Federation of Investment Companies, UAE, 2019, p. 34 .

⁵ . ESCWA, *Information and Communication Technology Bulletin for Development in the Arab Region*, United Nations, 2022, p. 12 .

⁶ .UNDP, *Digital Strategy 2022-2025*, pp. 13-18.

Operationally, the banking industry is anticipated to reap the advantages of artificial intelligence systems, as specialized reports indicate the potential role of AI technology and applications in enabling banks to generate profits of up to \$1 trillion by 2030, reduce expenses by 50%, and increase productivity by up to 35%. Given the significant capabilities of AI technologies, financial and banking institutions are seeking to adopt AI applications in order to attain leadership in the digital age.⁷

CHAPTER TWO

Digital financial and banking technologies and the expected role of the transition to artificial intelligence and achieving sustainable development in Iraq

The incorporation of artificial intelligence into various industries and sectors necessitates the requirement for leveraging these applications in financial and banking domains to achieve sustainable economic and social progress. It should be noted that there is a digital divide caused by the high cost of the internet and varying digital skills between countries worldwide. Hence, some countries, including Iraq, need a digital revolution in banking services, financial, and banking technologies, as well as applications of artificial intelligence for digital transformation. A new digital strategy is required to move towards a constantly evolving digital reality equipped with knowledge and tools to enable the new electronic platforms to facilitate access to financial and banking services, reducing opportunities for corruption.

The first requirement is for the monetary and banking world to adopt advanced technology and artificial intelligence instruments. The challenge is to rework digital communication so that it is an integral part of the global network, encompassing all people, regardless of location or social standing. Presently, 2.9 billion individuals worldwide are not connected to the internet, which means that artificial intelligence presents a chance for financial and banking industries to transform the skill set necessary for their workforce. Due to AI, new positions and services will arise, resulting in the replacement of certain jobs and services. Hence, financial and banking organizations should be aware of the latest technology and adapt to it to benefit from its advantages. By doing so, they will be able to enhance their role in promoting economic and social development, attaining sustainable goals.

America 248, China 99, 19 United Kingdom, Canada 9, Germany 7 France 7 South Korea 6 France 6 Singapore 4 Japan 4 Switzerland 3 Australia 3 .

According to the figure below, the United States has secured the largest investment in artificial intelligence among all countries, surpassing other nations. This demonstrates the preeminence of the American economy in embracing artificial intelligence and its applications, which determine the trajectory of global leadership and dominance in the field of artificial intelligence. As the contribution of artificial intelligence applications continues to grow, this trend is likely to continue. In terms of job creation and increasing the value added of industrial economies, the role of financial and banking sector institutions in providing the necessary funds to advance smart economies that rely on financial and banking technologies cannot be overstated. These technologies are essential in providing digital financial and banking services.⁸

⁷ .Muhammad Hamoud Al-Sami'i, The Future of Banks and Financial and Banking Institutions in the Age of Artificial Intelligence, Yemeni Banking Association, Yemen, Sana'a, 5/22/2023, p. 5. .

⁸ .Saadia Zahidi, Tomorrow's Jobs, Some Jobs Will Disappear and Others in the Context of the Double Disturbances Facing the World, Finance and Development Journal, Issue 6, December, Algeria, 2020, p. 25.

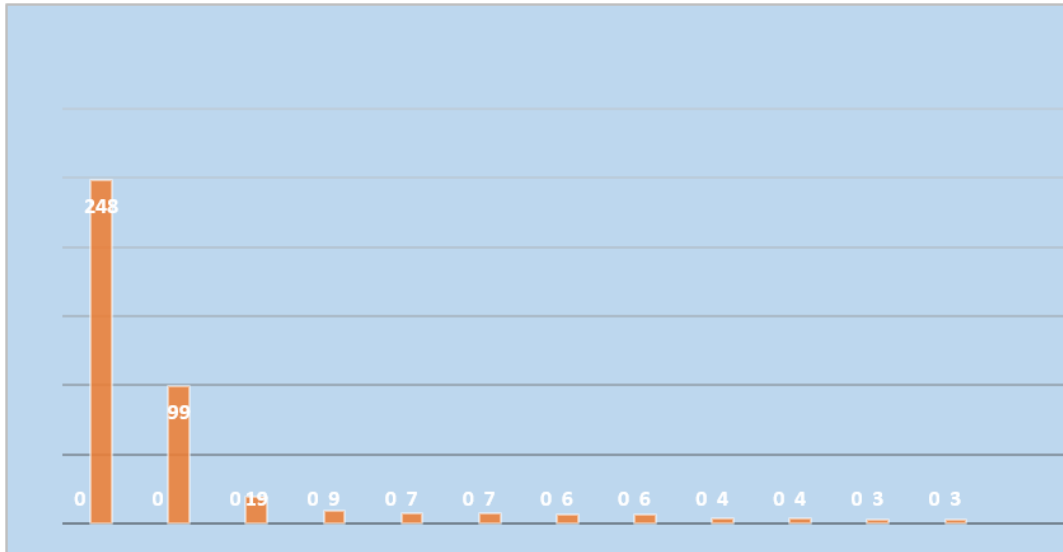


Figure 1: Shows the total private sector investment in artificial intelligence 2013-2022 billion dollars

Source: Artificial Intelligence: Opportunities and Challenges, The Impact of Artificial Intelligence on International Relations, Artificial Intelligence and Future Wars, Economic Indicators of Artificial Intelligence, Al Jazeera Center for Studies, Qatar, November 2023, p. 12.

According to studies, the implementation of artificial intelligence will lead to cheaper products, causing a downward impact on prices. Specifically, artificial intelligence will boost GDP in China by 26% and North America by 14.5% in 2030. The industry is expected to witness an increase in GDP by at least 10% by 2030. Recent global estimates indicate that 30% of work and business activities can be smart and automated. The expansion of financial and banking services through the internet has contributed to the closure of many bank branches, making teller jobs and related jobs decrease by about 40%, but there is an increase in jobs related to artificial intelligence applications. This is related to the reality of education and its future, which means the need for digital financial and banking institutions to expand the recruitment of additional workers that are compatible with the economics of artificial intelligence.⁹

The advanced countries are striving to access all aspects of the Fourth Industrial Revolution, most notably the outcomes of this revolution, which is known as "artificial intelligence." The volume of investment has reached 450 billion dollars in 2022, with the majority of this investment being in the United States of America, accounting for about 60% through 9,200 companies that make up these companies. The American market accounts for about 50%, and the artificial intelligence market could contribute around (15.7) trillion US dollars to the global economy by 2030. Its impact on economic growth has become clear. What is certain is that the entry of artificial intelligence applications will enter various professions and businesses, which means a new wave of jobs and services that achieve... A new type of digital financial and banking technology.¹⁰

⁹ .Muhammad Al-Azab and Ghada Al-Nashar, Artificial Intelligence and its Implications in Education, International Journal of Artificial Intelligence in Education and Training, Volume 2, Issue 2, June 2022, p. 15 .

¹⁰ .Bernard Ward, Applications of Artificial Intelligence, How 50 Successful Companies Used Artificial Intelligence and Machine Learning to Solve Problems, translated by Aisha Yakan, Obeikan Publishing and Distribution, Riyadh, 2022, p. 23 .

The second requirement for the adoption of digital financial and banking technologies in Arab countries is the need to address the disparity in possession of these technologies. The Arab region has the lowest levels of ownership of these applications and financial inclusion, particularly for the selected groups, including females, males, the poorest, and remote and rural areas. There is also a gap in financing between genders in the field of borrowing for income-generating projects due to the disparity in bank account ownership, which is higher among males than females. Additionally, the weakness of the process and the inability of the poorest groups and residents of remote and rural areas to take advantage of basic digital financial and banking services indicate limited interaction with smart financial and banking services. This is in contrast to the development taking place in the field of intelligence applications. The limited ability of the Arab region to achieve economic and social development goals requires comprehensive measures to develop financial and banking work to better benefit from the adoption of financial and banking technologies in the Arab region.¹¹ . Second, For the successful implementation of digital financial and banking technologies in Arab countries, there are several obstacles that must be overcome.¹²:

1- The widespread use of smartphones and the internet exposes people to various cybersecurity threats, such as theft of credit card information, assaults on financial accounts, and the privacy and integrity of personal data.

2- Banks and financial institutions must find a way to balance the need for innovation and growth with the need to adhere to regulatory compliance while creating new products and services that are compatible with modern AI technologies. They must ensure that these products and services are in line with existing regulatory frameworks and identify potential risks that could harm their reputation and the confidence of their clients, customers, and investors.¹³ .

3-The lack of confidence in the use of new financial and banking applications, which are compatible with artificial intelligence applications, is a concern for the Arab region. This is because the region still prefers the option of cash payment over receipt, despite the increase in financial and banking illiteracy and the decrease in bank account usage.

The issue of debt and electronic lending requires high-speed and quality internet services and electronic payment methods to facilitate the exchange and transaction process between financiers and borrowers. This requires the implementation of a massive digital technical process that is consistent with artificial intelligence data, exceptional engineering skills, continuous maintenance, and technological skill and experience to expand the scope of digital finance and banking services. This is done to maximize the portfolio of beneficiaries and consumers and gain credibility, comprehensiveness, and availability to all.

Fourth requirement: The drive of Arab countries to adopt financial and banking solutions in electronic payment. The digital payments industry is the most significant digital financial and technological sector, and the United Arab Emirates is at the forefront of Arab nations in terms of transactions in 2022, recording 60 million deals. Algeria comes in second with 38 million transactions, followed by Bahrain with 18 million deals, and Iraq and Saudi Arabia with 9 million transactions.

The rise in the number of electronic payment transactions can be attributed to the measures and incentives implemented by these countries to stimulate demand for electronic payment. These

¹¹ .Institute of Banking Studies, Financial Inclusion, Illuminations, Eighth Series, Issue 7, Kuwait, 2021, p. 12 .

¹² .United Nations, Technology for Development Bulletin in the Arab Region, Global Prospects and Regional Trends, United Nations, 2021, 45 .

¹³ .Abdel Moneim Wahiba, and Tali Saif Al-Din, Implications of Technology, Business Information and Customary Economy, Al-Balqa University, Jordan, 2019, pp. 26-28 .

countries have lowered fees and commissions associated with electronic payment transactions and mandated banks and businesses to install ATMs and points of sale for purchasing goods and services. Additionally, they have set guidelines for cash withdrawal to enhance the role of technology companies. Digital finance and banking in the retail payment sector have been granted exemptions related to licensing requirements for the operation of these technologies. Financial and banking technology platforms have been established to facilitate communication between all parties of the technology system, while exceptions have been given to the elements of identifying the owners and holders of electronic payment accounts and simplifying procedures related to the nature of payment institutions.

To boost the usage of artificial intelligence applications in digital financial and banking services, the Arab world should invest in modernizing communication infrastructure and activating digital solutions. This can't be achieved without expanding access to the internet for individuals and organizations, making it faster, more reliable, and less expensive. The purpose is to ensure that financial and banking services are accessible to all segments of society. Moreover, the development and expansion of digital electronic payment infrastructure should be encouraged to push communities towards digital payment platforms and reduce the use of cash in daily transactions.¹⁴ .

The third requirement for achieving sustainable development in Iraq is the implementation of advanced financial and banking technologies coupled with the integration of artificial intelligence. This includes addressing the existing challenges and optimally utilizing the potential of AI to improve financial systems in the country.

In examining the disparity between the Iraqi experience and international experiences regarding digital inequality, it becomes evident how significant the gap is in terms of access to digital technologies, particularly in relation to the financial and banking industry. This disparity is largely attributed to countries that have emerged from conflicts, political instability, and economic difficulties, which consequently place the infrastructure and institutions required for an effective digitization process at risk.

In light of these challenges, it is necessary to examine the extent of the digital divide in these areas, specifically addressing the disparities in access to financial and banking technologies, artificial intelligence, the Internet, financial literacy, and digital banking. This is in order to ensure that everyone has equal access to economic opportunities. Therefore, it is imperative to digitize systems in fragile societies in order to empower individuals, enhance connectivity, and improve the provision of financial and banking services linked to artificial intelligence. This requires addressing legal infrastructure limitations, ensuring privacy and security, and advocating for more comprehensive, accessible, transparent, and equitable digital policies to bridge the gap and enhance resilience and sustainable economic and social development.¹⁵

Firstly, the overall indicator for evaluating present-day financial and banking technologies is the General Index of Modern Arab Financial and Banking Technologies. This index aims to assess the endeavours of these nations in promoting the advancement of the modern financial and banking technology industry and to contribute to formulating a vision for this industry in Arab countries. It also seeks to shed light on the challenges and difficulties faced by the development of the modern financial and banking technology industry in the Arab world. Arab countries can benefit from this

¹⁴ .Sahnoub Heba, *Artificial Intelligence and its Applications in the Banking Sector*, a collective book on the applications of Artificial Intelligence as a modern trend to enhance the competitiveness of business organizations, Arab Democratic Center, Berlin, Germany, 2021, p. 45 .

¹⁵ .Wafa Fawzi Hamza T., *Analysis of the Digital Divide in Fragile Societies Affected by Conflicts and Wars*, Al-Bayan Center for Studies and Planning, Al-Bayan Center for Studies and Planning series of publications, Iraq, Baghdad, 2023, p. 5 .

index by adopting national policies that leverage job opportunities within these technologies and provide capabilities to enhance the future of work in this industry, which provides benefits and gains to financial and banking institutions.

The Financial and Banking Technologies Index, which gauges the level of modernity of the sector, is made up of a total of 100 points and is calculated based on the performance of six indicators, each weighted differently according to their importance. These indicators include policy and legislation, demand side, access to financing, infrastructure, talent development to support innovation, and finally cooperation between financial and banking institutions and economic companies. Figure (3) shows the ratios of these indicators.

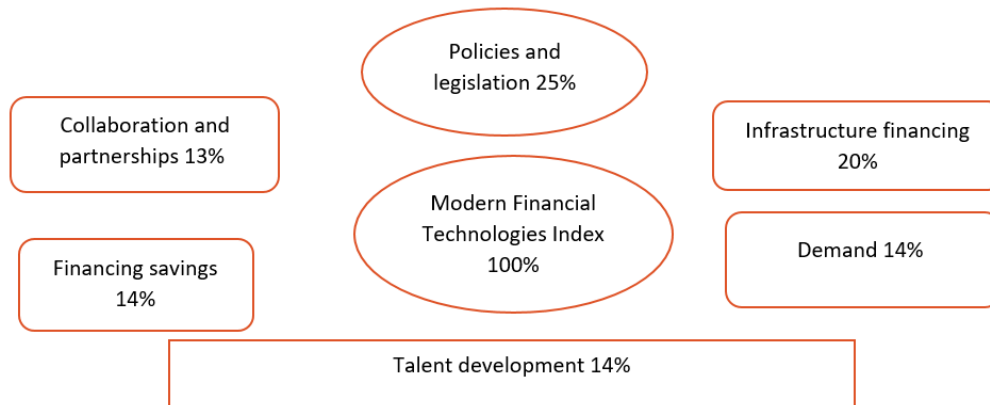


Figure 2: Ratios of indicators of modern financial technologies

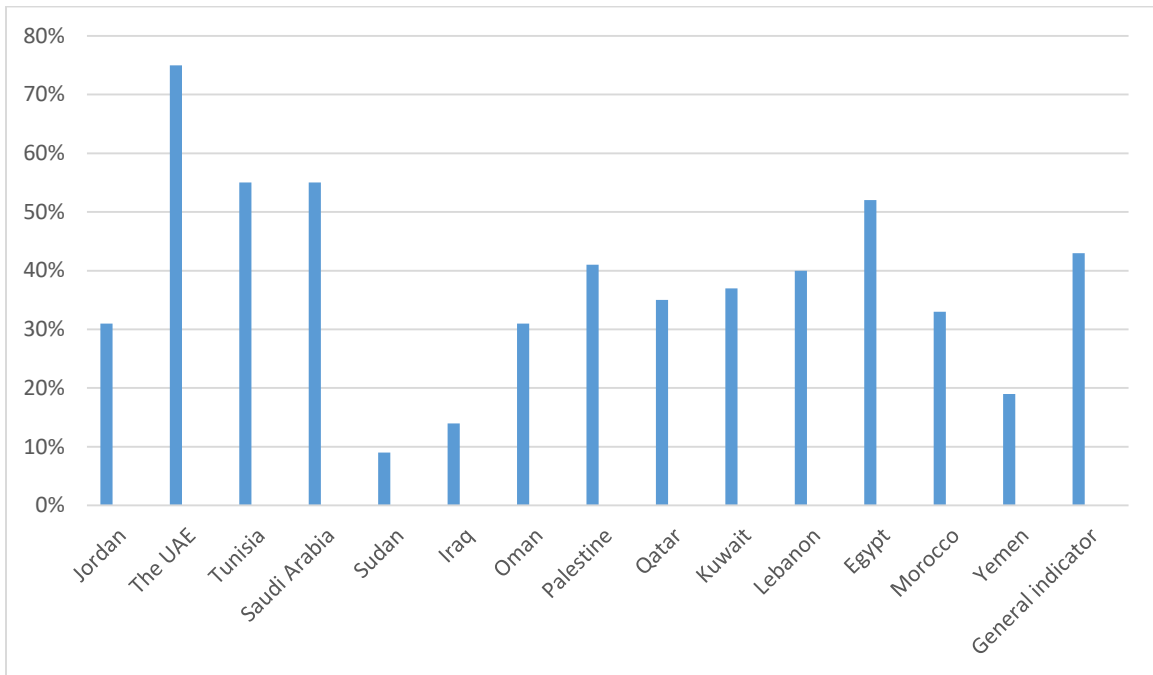
Source: Dr. Sultan Jassim Al-Nasrawi, Iraq's status in the financial and banking technology industry index, Al-Bayan Center for Studies and Research, Iraq, Baghdad, 2023, p. 12 .

Iraq's standing in the financial and banking technology sector index among Arab countries is being evaluated. The world is currently in the Fourth Industrial Revolution, which is driven by unparalleled advancements in digital financial and banking technologies, big data, digital wallets, electronic payment systems, and the use of digital identity and electronic signatures. The financial and banking sector is one that greatly benefits from artificial intelligence techniques, providing great opportunities for enhancing efficiency, encouraging entrepreneurship, promoting digital financial inclusion, and providing sustainable financing for small and medium-sized enterprises.

The Arab Monetary Fund launched the Technologies Index to showcase the latest developments in financial and banking technology and support the digital transformation in artificial intelligence. This move is aimed at promoting financial inclusion and stability, as well as providing opportunities for sustainable economic and social development in the region. The initiative is in line with the Fund's efforts to advance the adoption of modern financial and banking technologies and support the application of AI technologies and applications.¹⁶

According to the analysis, Iraq obtained a score of 14% in the general index, ranking second to last among Arab countries. The United Arab Emirates obtained the highest score of 75%, followed by Saudi Arabia with 64%, Bahrain with 40%, and Tunisia, Egypt, and Palestine with scores of 55%, 52%, and 41%, respectively. Lebanon had a score of 40% in the general index, and the scores ranged from 20% to 35% for countries such as Qatar, Morocco, Kuwait, Oman, and Yemen. Iraq was followed by Sudan, which had a score of 9%.

¹⁶ .Arab Monetary Fund, Special Report on the Occasion of Arab Financial Inclusion Day on April 27, 2021, Index of Modern Financial and Banking Technologies and Digital Financial and Banking Services in Arab Countries, United Arab Emirates, Dubai, 2021, p. 23 .



In accordance with the Arab Monetary Fund's special report, the digital financial and banking services in Arab countries have a noticeable lack of uniformity. The majority of countries are still in the early stages of development when it comes to digital banking, with only a few countries having more advanced digital solutions. The report highlights that there is an urgent need for standardization and harmonization of digital financial and banking services throughout the Arab world, in order to improve financial inclusion and promote economic growth.

Table 1: Shows the general index and the six main sub-indices in Iraq

Policies and legislation	Demand	Availability of financing	Developing talents and competencies	Infrastructure	Inter-institutional cooperation and partnerships
0.223	0.267	0.00	0.00	0.243	0.00

Source: Arab Monetary Fund, Regional Index Report for Modern Financial Technologies, Arab Monetary Fund Statistics Publications, 2021, p. 12.

According to Table 1, there is a noticeable decrease in the overall index and its sub-indices related to the availability and development of skills, competencies, and collaboration between institutions and businesses. This necessitates the development of plans and strategies to adopt the use of digital financial and banking technologies that are linked to artificial intelligence tools. National activities and programs for digital transformation and the development of financial services and banking should be implemented to increase smart business and financing opportunities for small and medium-sized enterprises.

The Central Bank of Iraq should implement digital financial and banking technologies in order to achieve sustainable development. To keep up with global and regional developments in the financial and banking sector, the Central Bank of Iraq must adopt strategies that incorporate digital transformation, artificial intelligence, and other cutting-edge technologies. This will enable the development of a financial and banking sector that drives sustainable economic and social growth.

The Central Bank of Iraq has implemented measures to boost financial inclusion and promote electronic payment mechanisms to simplify and accelerate financial and banking transactions for both public institutions and private sector entities. This initiative seeks to reduce cash transactions, establish economic stability, and foster sustainable development. Advancements in financial infrastructure have contributed to enhancing financial and banking operations through electronic applications and systems. This framework comprises the technical, technological, programming, and network elements that support payment systems, financial transfers, electronic banking, electronic commerce, retail trade, and other financial and banking activities. The Central Bank of Iraq has taken measures to enhance cybersecurity by adopting applications, technologies, and systems for protecting data and information. Additionally, it has encouraged international cooperation to combat cyber threats aimed at safeguarding digital financial and banking services and maintaining confidentiality.

Improving payment systems and technology is a priority for the Central Bank of Iraq. They have launched electronic platforms for letters of guarantee, developed monitoring systems for suspicious financial movements, and created a rapid payments system to facilitate immediate financial and cash transfers between banks. Additionally, they are developing the total settlement system and operating the Arab regional electronic payment system platform. All of these efforts are being pursued by the Central Bank of Iraq to develop the electronic financial and banking infrastructure, enhance cybersecurity, support financial and banking institutions, and promote financial stability in the country.¹⁷

The Central Bank of Iraq has taken steps to enhance financial inclusion, including increasing the availability of bank accounts, electronic wallets, and ATMs. The liquidity coverage ratio index and net stable financing available to banks in Iraq also increased by 261% in 2022, surpassing the minimum requirement of 100%. This indicates that banks in Iraq are well-equipped to manage liquidity risks. Additionally, the percentage of net stable financing for the banking sector rose to 207% in 2022, indicating that banks have access to more than enough financing to cover their assets. Asset quality indicators also improved, with overdue debts to cash credit decreasing from 8.81% in 2021 to 7.19% in 2022, and the ratio of overdue debts to total assets decreasing from 2.93% to 2.19% during the same period.¹⁸

It is essential to highlight the progress in the development of development banking and the provision of necessary financing for revenue-generating projects, be it for the public or private sector. The growth in credit granted to the private sector has been positive, with a notable increase in the growth of cash credit provided to the private sector by approximately 18.4% after it was 15% during the previous year. This increase is attributed to the role of electronic applications and initiatives of the Central Bank of Iraq in supporting various sectors with necessary funds to mitigate the state of economic recession in the Iraqi economy. There is a tendency for the Central Bank of Iraq to support specialized banks through loans to finance projects in agriculture, industry, and real estate. The Central Bank of Iraq has canceled interest on previous loans granted to the Housing Fund and the Real Estate Bank and is now satisfied with collecting a one-time administrative fee of 1% for the benefit of the bank on the remaining installments. Furthermore, the Central Bank of Iraq has postponed the collection and interest of agricultural and industrial projects. Additionally, the financial infrastructure has been strengthened by increasing internal financing, which provides opportunities for local banks to provide various banking services to employees. This application has contributed to providing the appropriate infrastructure and digital financial technology. The table presents a set of indicators that help in developing the financial and banking sector infrastructure

¹⁷ .Central Bank of Iraq, Department of Statistics and Research, Financial Stability Report, 2022, pp. 5-8 .

¹⁸ .Same source, p. 4 .

and serve as the foundation for developing financial and banking technologies that contribute to sustainable development.¹⁹ .

Financial inclusion metrics are evaluated using two primary indicators: access and use. The access indicator measures the spread of banking branches, ATMs, POS terminals, payment and settlement systems, and mobile payment applications. These applications play a role in enhancing the efficiency of financing and providing access to financial and banking services to different segments of society to achieve sustainable economic and social development goals, lower poverty and unemployment rates, and generate AI-related creativity.

The data in the table illustrates financial inclusion metrics, which are calculated using two fundamental measures: accessibility and utilization.

Table 2: Financial inclusion indicators in Iraq 2018-2022

Banking propagation	Banking density	Number of bank branches	The economically active population ranges from 15 to 64 thousand people	Growth rate of the total number of employees whose salaries were localized in the Iraqi sector, one million employees	Year
3.81	26.27	864	22.696	2018
4.02	24.88	888	22.090	1.0	2019
3.93	25.44	891	22.668	1.9	2020
3.89	25.72	904	23.255	4.0	2021
3.67	27.25	876	23.870	6.6	2022

Source:

- Central Bank of Iraq, Financial Stability Report of the Central Bank of Iraq, for the years 2019-2022, p. 125.
- Ministry of Planning, website <https://mop.gov.iq/news/view/details?id=508>.

According to the table, it can be seen that there has been an increase in certain indicators. This is because of the rise in the localization of employee salaries, which went from one million employees in 2019 to 6.6 million employees in 2022. This resulted in an increase in the number of bank accounts and an increase in the number of electronic cards granted to them. It also led to competition between banks to provide the best services. The fields of finance and banking have been enhanced by the digital applications of artificial intelligence, and it is noted that the banking density index is still high, reaching 27.25 thousand people per branch in 2022 after covering 25.72 thousand people per branch in 2021. As for Table (3), it illustrates the spread of Electronic payment services in Iraq.

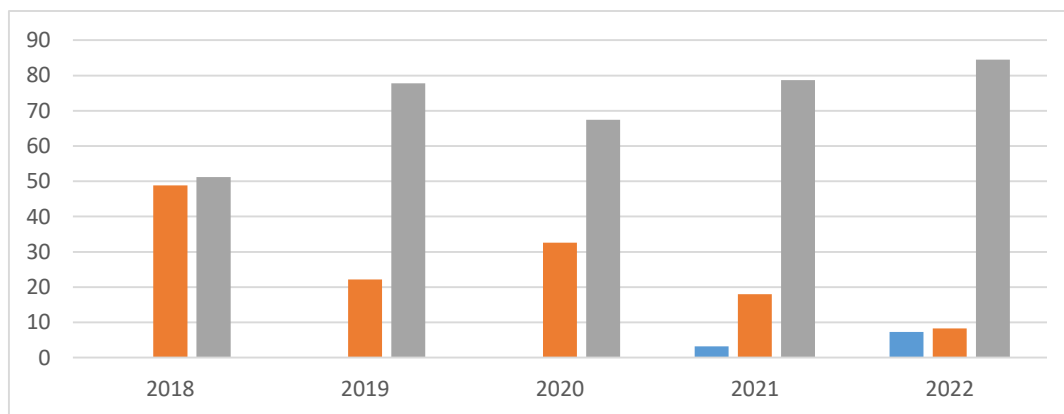
¹⁹ .Central Bank Financial Stability Report, 2022, pp. 58-75 .

Table 3: The spread of electronic payment services to the population of Iraq per 100,000 adults and to the area of Iraq 1,000 km² (2018-2022).

POC to / Iraq area	Electronic point of sale devices / Iraq area	ATM / Iraq area	POC to Population in Iraq	Electronic point of sale devices / Iraq's population POS	ATM/population	Year
15.1	5.0	2.0	29.2	9.7	3.8	2018
26.6	5.1	2.3	52.9	10.1	4.6	2019
31.5	17.2	3.1	60.9	33.3	5.9	2020
33.5	19.0	3.6	63.2	35.8	6.7	2021
40.2	27.5	5.1	73.8	44.9	9.3	2022

Source: Central Bank of Iraq, Department of Statistics and Research, Statistical Bulletin, 2018-2022, p. 128.

Electronic payment services are an efficient, swift, and efficient means of accessing financial and banking services, helping to reduce expenses. Consequently, the Central Bank of Iraq is working to increase the spread of these services, with this being one of its primary objectives to enhance electronic payment systems and facilitate electronic commercial transactions. The banking industry has seen a rise in the spread of ATMs, point-of-sale devices, and cash withdrawal devices, as demonstrated in the table above. The Central Bank's goal is to boost these percentages to improve financial and electronic banking services, leveraging artificial intelligence applications. An increase in these applications will contribute to enhancing the use of electronic financial and banking services by citizens and institutions in Iraq. Table (3) illustrates that there has been a rise in the percentage of ATMs. The percentage of automated machines in the region of Iraq has increased from 3.6 in 2021 to 5.1 in 2022, while the percentage of point-of-sale devices has increased from 19 in 2021 to 24.5 in 2022, and payment devices have increased from 33.5 in 2021 to 40.2 in 2022. Studies indicate an expected increase in percentages in the future. As for the spread of mobile payment services, Figure (3) demonstrates this.

**Figure 3: Percentage of amounts transferred from mobile payment companies**

Source: Central Bank of Iraq, Information Technology and Payments Department, Central Bank of Iraq, Financial Stability Report, Statistical Bulletin, years 2018-2022, p. 133.

According to the Central Bank of Iraq's annual reports, Zain Cash has a strong hold over financial transfer operations in the country. The percentage of transactions carried out through it increased from 77.8% in 2019 to 84.5% in 2022. This trend indicates that a group of companies is driving competition in the field of digital financial and banking services, which utilize artificial intelligence. This competition is pushing financial and banking institutions to offer better deals that support sustainable economic and social development, as well as improve the financial inclusion index.

Electronic payment companies have made significant contributions to financial inclusion by offering a variety of financial and banking services, such as bank accounts, electronic payment methods, and credit cards. Financial companies play a vital role in enhancing the level of financial inclusion. In 2022, there were fourteen electronic payment companies, compared to eleven companies in 2021. Al-Arab Company leads the electronic payment companies in terms of the percentage of transactions submitted in relation to the form of outgoing financial services and collection processing. It recorded 75% of the total "transactions of financial service providers." In 2022, Ishtar Gate Company came second with a rate of 13%, while Iraq Gate Company recorded a rate of 6.6%. This indicates the existence of competition between local companies, which enhances the development of the financial sector and improves the quality of services provided.²⁰

Table (6) shows a growth in the number and size of bank accounts, electronic wallets, and electronic cards, with a 41% rise in the number of electronic wallets and electronic cards in 2022 compared to 2021, while there was an 8.7% increase in the number of electronic cards in 2022 compared to 2021, and a 31.3% rise in the number of bank accounts in 2022 compared to 2021.

Growth rate in electronic wallets	Growth rate in electronic cards	Growth rate in the size of bank accounts	Year
			2018
48.5	19.3	86.4	2019
203.7	11.8	101.6	2020
71.8	26.9	9.3	2021
41.0	8.7	31.3	2022

Source: Central Bank of Iraq, Financial Stability Report, 2022, p. 133

In summary, the banking depth index measures the accessibility of banking services and their influence on economic and social growth and funding initiatives and enterprises. This index is calculated using the ratio of credit provided to the private sector to the gross domestic product and the ratio of private sector deposits to the gross domestic product. These ratios are used jointly to estimate the depth of the banking sector. To foster economic and social activity and finance revenue-generating projects for the individual and society, the Central Bank of Iraq aims to enhance the capacity of banks to provide credit and accumulate deposits and provide all means to develop financial and banking technologies to increase digital, social, economic, and sustainable development.

²⁰ .Central Bank of Iraq, Financial Stability Report, 2022, pp. 131-133.

CONCLUSIONS

- 1) 1). The significance of financial and banking applications, digital transformation, and artificial intelligence applications in achieving sustainable development goals cannot be overstated. However, there are numerous obstacles and challenges that need to be addressed in order to promote the development and expansion of these concepts. To this end, it is essential to establish a national program for training in digital financial and banking services, as well as a national portal for electronic services, to enhance the development of financial skills. Furthermore, digital banking should be made accessible to enable individuals to access these services and develop, integrate, and use digital identity services, signatures, financial accounts, and digital banking on a large scale. .
- 2) Although the indicators of financial and banking applications in Iraq are low, this does not mean that the banking administrative procedures of the Central Bank of Iraq are inactive. Instead, it shows that there have been great efforts to develop electronic banking work. This is confirmed by the evaluation report of the digital landscape in Iraq 2023 within the United Nations Development Program, which covers areas such as the digital finance, legal framework, digital data and databases, secure data exchange, digital identity and secure electronic signature, digital professions and skills, access to financial and banking services, banking awareness, and digital infrastructure.
- 3) There has been a substantial growth and advancement of financial and banking services through the international communication network (the Internet), which has caused a significant decline in traditional bank branch positions. This accounts for a 40% decrease in teller jobs and related occupations. This information is supported by expert research, and it has also led to the emergence of new employment opportunities as a result of this transformation. Specifically, there is a requirement for skills in utilizing smart applications related to digital financial and banking services, which involve the use of artificial intelligence.
- 4) Stronger protection of data and information is provided by artificial intelligence applications, which is of great importance in banking work. These smart digital applications bring about fundamental transformations in the financial and banking sector, offering advantages such as better predictions, reduced costs, and improved customer satisfaction. Additionally, AI can enhance the efficiency of business operations, foster a more sustainable environment, and optimize investment decisions.

RECOMMENDATIONS

- 1) Efforts should be made to create policies, plans, and strategies that will help develop a comprehensive regulatory, legal, and legislative framework to encourage the adoption of these comprehensive policies and build a supportive environment for financial and banking technologies. Initiatives should be launched and their work should be organized with real procedures for activating identity, electronic signature, and electronic commercial exchanges.
- 2) Strategies should be developed to nurture talents and competencies by creating curricula for modern digital financial and banking technologies and artificial intelligence applications, which have become an essential necessity for economic life in general and the sector.
- 3) Work should be done to develop policies, plans, and strategies that will create a supportive environment for financial and banking technologies. Efforts should be made to develop a comprehensive regulatory, legal, and legislative framework that will encourage the adoption of these comprehensive policies. Initiatives should be launched and their work should be organized with real procedures for activating identity, electronic signature, and electronic commercial exchanges.
- 4) Formulate plans to foster the development of skills and abilities, and establish coursework in advanced digital financial and banking technologies and artificial intelligence applications that are

now an unavoidable necessity for economic life in general and the financial and banking sector specifically.

5) Aim to launch nationwide digital platforms related to digital identity, digitizing government payments systems, and streamlining private sector payment systems by implementing digital onboarding for bank customers, and promoting digital financial inclusion, as well as simplifying access to sustainable financing for individuals, organizations, and emerging businesses, in order to increase revenue-generating investments and enhance infrastructure development for the advancement of digital financial and banking technologies.

6) Enhance investments in developing digital financial and banking technologies to expand access to smart finance and associated technologies, and promote the use of smart devices as incubators, tools, and modern means of financial and banking innovations linked to artificial intelligence tools.

7) Work towards promoting the culture of using modern technologies, enhance financial and banking education, and keep pace with developments in information and communications technologies, while imposing applications in shopping malls for consumer goods, fuel and oil sales centers, service centers, entertainment centers, and restaurants, in a way that serves the national economy and reduces the use of cash in daily trading.

8) The Iraqi government must adapt to the trends mentioned in the Arab Government Administration's report on Digital Transformation and Artificial Intelligence, in order to leverage innovation and technology to overcome global challenges facing humanity, through a pioneering digital government administration in the use of digital technology for better services and more effective policies.

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