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THE ROLE OF ARTIFICIAL INTELLIGENCE IN IMPROVING THE FINANCIAL EFFICIENCY OF BANKS: AN APPLIED STUDY OF A SAMPLE OF INDIVIDUALS WORKING AT AL-RAFIDAIN AND AL-RASHEED BANK IN DHIQAR

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ABSTRACT

This research aims to identify the strengths of artificial intelligence, which appear through the adoption of its tools and its role in improving the financial efficiency of government banks in Iraq. As the presence of artificial intelligence is one of the most important components of banks in the course of development, allowing them the ability to optimize their financial efficiency, and in light of the uncertain conditions experienced by organizations, the presence of artificial intelligence is expected to have a prominent role in improving the financial efficiency of banks. Government at present.

The conceptual framework of the current study was built on two main variables: artificial intelligence as an independent variable, financial efficiency as a dependent variable. The main question of the study was formulated as follows: "What is the role of artificial intelligence in financial efficiency in the Iraqi banking sector? What is the role of digital transformation in that relationship?" This study was applied in the governmental banking sector in Iraq in Al-Rafidain and Al-Rasheed Banks in DhiQar and their subsidiaries.

The current study relied on the descriptive method to analyze the opinions of a sample of (201) working individuals who were randomly selected using a set of statistical tools available in SPSS programs. V.22 – (AMOS V.22).

Keywords: *artificial intelligence, digital transformation, financial efficiency.*

INTRODUCTION

The banking system is one of the most important pillars of any economy, as it works to facilitate and stimulate the movement of capital in a way that provides sufficient financing for most investments in order to advance vital projects, achieve economic development and increase the rate of growth in them, as the banking system witnessed during recent decades a kind of complexity and dynamism Due to the waves of globalization and the acceleration of innovations (Huebner et al., 2019), which put the banking sector in various countries in front of many obstacles and to keep pace with these developments in order to maintain the market share in financial institutions as

well as the orientation towards new markets, this led to the emergence of areas Many are interested, in various ways, in financial services and their development, such as artificial intelligence (Loh et al., 2022; Minh et al., 2022), and this is in order to keep pace with the developments of modern globalization and the trend towards simulating human intelligence (Zhang et al., 2022), which is considered one of the most prominent products of modern technology in the world that the banking system seeks to adopt in order to analyze the big data and turn it into a dynamic process Accurate and smooth as well as reduce operational costs and reduce financial risks, which leads to raising financial efficiency in the system exchange, and thus increasing the ability of

the banking sector to keep pace with developments and technological transformations for the success of the policy of integration into the global economy (Buch & Goldberg, 2020). The problem of the study crystallizes in the possibility of applying artificial intelligence in Iraqi banks and its role in raising financial efficiency. Hence, the following main question can be asked:

What is the role of artificial intelligence in raising financial efficiency in the Iraqi banking system? As this study was applied to the Iraqi governmental banks in Iraq, Al-Rafidain and Al-Rasheed Banks in Dhi Qar Governorate as a model.

The Importance of Studying

The importance of the study comes from the importance of the variables investigated in the banking sector, as it is considered one of the important sectors in the economy, as it is primarily responsible for providing capital in the economy to advance economic reality and achieve economic development. Industry and its role in raising and improving financial efficiency in the banking sector. This is done through digital transformation as an intermediate variable between them, which enhances the efficiency of the banking sector as a whole, as the importance of the study is derived through the following:

- **Scientific importance:** Due to the lack of Arab studies within the limits of the researchers' knowledge, the study focused on the role of artificial intelligence on financial efficiency and its application in the government banking sector in developing countries. Al-Bashir is able to possess the tools that enable institutions to continue and survive through the adoption of technological and modern systems that result in the adoption of innovative work methods that are compatible with the desires and needs of all workers in the banking sector.
- **Applied importance:** The study is concerned with the applied level in order to identify the possibility of using the surveyed banks for artificial intelligence and interest in financial efficiency, and then providing the employees of these banks with data and information showing the importance of the role that artificial intelligence plays in improving financial efficiency, which achieves direct benefit to the banking sector in question. The application and the banking system as a whole. Through the modest review of researchers in previous studies related to the variables of the study, as there is no study that dealt with the relationship directly and indirectly between the independent variable and the variable of the current study, as there were studies dealing with artificial intelligence as a factor that enhances the success and development of

institutions, whether financial or non-financial.

Study objectives

The study aims to build a conceptual model for the variables of the study, represented by the independent variable (artificial intelligence) and its dependent variable (financial efficiency), for the purpose of reaching the development of the banking sector and keeping abreast of developments in the global economic system, and among its most important objectives:

- Recognizing the nature of artificial intelligence as it simulates human intelligence.
- Recognizing the role of artificial intelligence in improving financial efficiency in the banking system.
- The possibility of applying artificial intelligence in the banking sector in Iraq?
- Identify the pros and cons of applying artificial intelligence in the banking sector in Iraq?
- Testing the direct impact relationship between artificial intelligence as an independent variable and financial efficiency as a dependent variable.

The study sample

The study sample is determined in the application of artificial intelligence within the Iraqi banking sector, especially in the Rafidain and Rasheed banks in Dhi Qar Governorate, as a model, and that the study sample consists of a group of working individuals, whose number reached (201) in the surveyed banks.

Theoretical framework

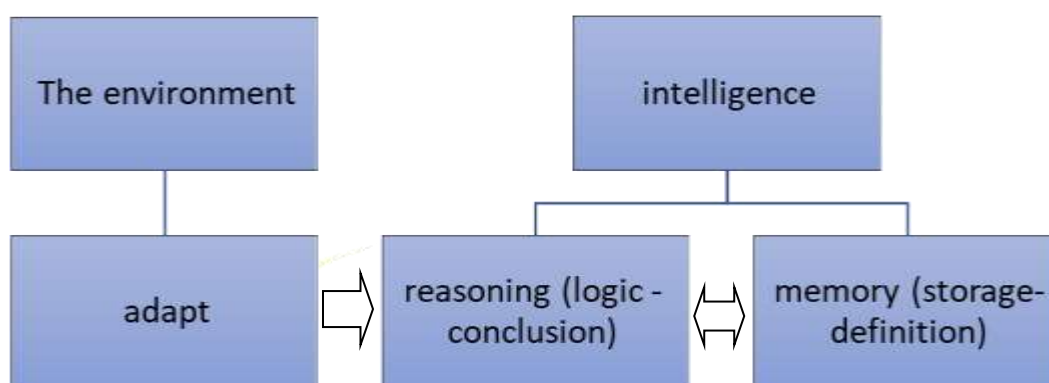
1 . Artificial intelligence

Technology transformations, recent innovations, and deep research have contributed to transforming and analyzing data into a quick and clear automatic process, through the use of models and applications that simulate the intelligence of the human element under the name (artificial intelligence) to the extent that it has led to a fundamental weakening of the human role in banking operations and the gradual abandonment of system tools. Through the development of accounting programs that are characterized by the development of solutions and ease of application, and through this axis you will touch on the theoretical concepts related to it ([Shmatko et al., 2022: 1026](#)).

In general, there are many basic concepts of artificial intelligence, the most important of which are: It is a group of modern

methods and methods that are used in programming computer systems, which contribute to the development of systems that simulate the intelligence of the human element and allow the provision of useful deductive processes about the problem as well as understanding languages and living perception through laws. It is represented in the memory of the computer (Villar & Khan, 2021: 74). Or it is one of the branches of computer science through which computer programs that simulate human intelligence are created and designed to be more accurate in performing some tasks in a logical and organized manner (Moss & Atre, 2007: 20). It is also viewed as a set of efforts to develop and develop information systems in the computer through which it can carry out tasks effectively and in an integrated coordination, as well as the use of images and perceptual forms that help rationalize material behavior (Huang et al., 2022: 1033). Through these concepts, artificial intelligence can be defined as "one of the most important branches of information that specializes in developing smart technologies and algorithms that can be applied to computers and robots, making them flexible and intelligent behavior in performing their tasks and solving complex computational problems (Ashta & Herrmann, 2021: 211). Where Artificial intelligence consists of two basic concepts: memory, which represents

storage, and inference, which is the ability to analyze with perception (Isik et al., 2013: 7). Figure (1) shows the components of intelligence in the industrial concept.



(Hislop et al., 2017: 10)

Where artificial intelligence focuses on two main goals

A- Enabling machines to analyze and process information in a way that is closer to the human element in banking operations in several orders, at the same time and without effort.

b- Understanding the process and programming of human intelligence and simulating it, to reach the best results (Partanen et al., 2017: 124).

The interest in studying artificial intelligence comes by keeping pace with the development of world economies through innovations and modern technologies that contribute to raising the ability of institutions to diagnose and treat various problems, as well as the possibility of education and self-development through artificial intelligence systems and programs,

and also contributes to providing legal advice, Which leads to ease of use and reduces human effort and risks to which the organization is exposed. It also has the ability to contribute to maintaining security and providing services at low costs, as well as finding mechanisms and solutions to face challenges such as electronic crimes (Omari, 2008: 50-52).

One of the main motives in the use of artificial intelligence is the creation of an organized database in which information is stored effectively and securely, as well as storing it to protect it from leakage and loss, in addition to creating a mechanism that is not subject to human feelings and emotions such as anxiety and physical and mental effort (Omarini 2017: 2-3) Where the concept of artificial intelligence has expanded significantly, due to the emergence of three main factors: the

increase in the volume of available digital data, the increase in data storage capacity and the processing of computational operations and its low cost, and the development in the algorithms used. Thirdly, thanks to these changes, the use of artificial intelligence is growing rapidly. It is significant and is not limited to the financial sector only, but extends to the economy as a whole (Feuerriegel et al., 2022: 614).

Characteristics and Types of Artificial Intelligence

Since artificial intelligence is a computer system based on simulating the human element in their behavior, this does not indicate that it is a piece of software that works through certain algorithms that perform specific actions that are considered artificial intelligence, but rather it must be able to learn, analyze, collect data and make decisions based on a process Analysis that simulates the way of thinking of the human element, and one of the most important characteristics that are available in artificial intelligence are (Villata et al., 2022: 3):

- The ability to learn, that is, to acquire information and instructions for its work, as well as to recognize sounds and speech, and the ability to move things, as well as the use of speech in analyzing the problems it faces.

- The possibility of collecting and analyzing data and information, understanding the inputs, and producing good results in order to provide outputs that meet the user's needs with high efficiency.
- Working on making decisions based on the process of analyzing information, as well as finding appropriate solutions to unfamiliar problems, using his high cognitive abilities.
- Working on processing the huge amount of data and information that it faces, as well as separating similar patterns in the inputs and analyzing them with a high efficiency that exceeds human capacity and in a specific time (Stoffels et al., 2019: 11).

Positive and negative aspects of the application of artificial intelligence in the banking sector and risk.

The banking sector has witnessed rapid growth in the field of artificial intelligence, so most banks have adopted work with artificial intelligence systems to provide customer needs and detect fraud, as artificial intelligence is a double-edged sword and has pros and cons. Human to artificial intelligence, correct errors received from the human element, work on storing and retrieving data quickly, with less effort, and more effectively, as well as constant communication in the banking business, which allows customers to know services,

answer inquiries, and solve payment or credit problems (Stoffels et al., 2019: 13). As for the negative aspects of using artificial intelligence, it has some drawbacks, such as weak supervision due to the contribution of full automation of banking operations, as well as the inability to make decisions under special circumstances. As for the risks of using artificial intelligence, it can cause harmful and dangerous operations due to the progress of artificial intelligence, such as in-depth manipulation, which is a digital fabrication that works to change the image very effectively, as well as the ability of artificial intelligence to create fake personalities that do not exist, through algorithms and electronic neural networks, as well as on defamation, facial recognition, machine control, etc. (Beccalli et al., 2020: 21).

The uses of artificial intelligence and its application in the banking sector

The components of artificial intelligence can be limited to three basic dimensions, which are (Romi, 2016: 8):

A- Infrastructure Interface Applications: This consists of several sub-applications (natural languages, speech recognition, multi-sensory, virtual reality).

B- Smart machine applications: These consist of several sub-applications, namely

(visual perception, sense of touch, dexterity, motor navigation, neural networks, and smart agent).

C- Cognitive science applications: These consist of several sub-applications, which are (expert systems, learning systems, fuzzy logic, genetic algorithms) (Razzaq et al., 2017: 10).

One of the most important applications that can be used in the banking sector is combating money laundering, through the use of some procedures or laws and regulations that clean income generation, as well as chat bots, detecting cases of fraud and fraud, working on analyzing big data and moving from descriptive analysis to forecasting in Real time, as well as generate reports and automate automated processes (Baduge, 2022: 142).

2. Financial efficiency

Financial efficiency is the main pillar because of its important role in the banking sector in general, and for this reason all banking sectors are racing to achieve financial efficiency. There are many concepts related to banking financial efficiency, the most important of which is (Bonetti et al., 2022: 2). It is the optimal utilization of resources or achieving maximum outputs from the financial resources available in the banking institution

at the lowest possible cost. Or is to choose the best combination of financial resources at the lowest cost to produce the maximum financial services. Or is to improve the management of financial flows and transactions. Finally, efficiency is the best way to link available resources with outputs from financial services. Accordingly, banking financial efficiency can be defined as the optimal use of banks' financial resources at the lowest possible cost, and banking financial efficiency can be achieved through three foundations.

- Efficient cost allocation by striving for optimal volume.
- The efficient use of available resources is called cost efficiency.
- The efficiency of distributing financial products through diversity in activity is called range efficiency (Varesi, 2015: 261-274).

Where researchers believe that financial efficiency has a distinguished position because of the role it plays in reforming the capital structure, which is the real performance of the banking sector.

As for the importance of financial efficiency in the banking sector, it creates a market for intense competition, which pushes other banks to reach the highest levels in order to help improve the management of financial flows and

transactions, and thus gives them priority in controlling and controlling the technical aspects of financial intermediation in order to reach the provision of maximum services Financial (Villata et al., 2022: 3), and since financial efficiency is used to evaluate the internal activities of the sector and how to use the available resources for this, its importance is evident in achieving a competitive advantage in the market as well as contributing to the development and development of the banking sector as well as openness to the outside world and directing the available economic resources to achieve the largest possible amount of returns and the least possible amount. From waste and extravagance, as well as controlling and controlling its material and human energies, achieving the optimal size and offering a wide range of financial services and products, in addition to doing the work in the best possible way to save time and effort as well as profitability (Shin & Kim, 2013: 41-45).

Objectives of banking financial efficiency and its types

The financial efficiency of any bank aims to improve the level of financial performance, as well as work to develop its financial capabilities and facilitate the process of providing financial services and products, as well as reduce the gap between

the available resources in the bank and costs, as banks aim to raise the capacity of financial efficiency in order to avoid wasting financial resources and work to The optimal use of those resources and the provision of the best results, which helps to provide a suitable environment for work and reduce expected errors, in addition to the bank's ability to achieve huge financial savings that help it adopt the use of modern systems such as artificial intelligence, digital transformation and financial technology in general, and provide financial allocations to finance banking needs and financial requirements. And human resources, thus providing the best services and products to customers as well as employees, and giving them the opportunity to work on providing internal and external investments, in addition to facilitating deposits and borrowing operations (Sekar & Gowri, 2015: 51-63).

As for the types of banking efficiency, where the banking sector is a productive unit, and for this reason efficiency in the banking sector is divided into:

A- Productive efficiency: The banking sector is considered a financial institution that provides financial services and products that use the production elements represented in labor and capital to produce various financial services and products and provide

loans and financial facilities. Productive efficiency is the relationship between the amount of resources available and used in the production process and its outputs That is, the higher the ratio of output to resources used in the productive process, the higher the efficiency (Roger & David, 1993: 261).

B- Efficiency and economies of scale: Scope efficiency in the banking sector is the extent of its capabilities to diversify its services and products, and it is calculated through the cost savings ratio of producing more than two products at the same time (Morris, 2008: 33).

C - Efficiency and economies of scale: Efficiency and economies of scale in the banking sector is the cost saving when increasing the volume of products while maintaining a mixture of fixed inputs and changing them to different levels of production through production cycles and other methods (Hu et al., 2022: 368; Young, 1997: 29-30).

Financial efficiency and ways to measure it

Financial efficiency in the banking sector is measured by comparison between the real actual values of the banking institution's inputs and outputs and their optimal values, where efficiency is calculated through the total outputs over the

total inputs in the case of the efficiency of the outputs, but in the opposite case, i.e. the sum of the inputs over the total outputs, it is calculated on the basis of the efficiency of the inputs (Zuzana, 2009: 1), as well as calculating financial efficiency through financial ratios or financial analysis in traditional ways, and the return on equity model is one of the main pillars for evaluating the performance of the banking sector and measuring the efficiency of banking costs. To traditional and quantitative measurement methods, namely (Hafeez et al., 2022: 2):

A- Traditional measurement methods: Financial analysis is considered an essential input in evaluating the management of banks, and it is still of great importance

- Methods of financial analysis: It is considered one of the important tools in banking institutions and is done for the purpose of planning and control, and it is done through two methods:

Vertical analysis: It is based on the relationship between the financial items in the financial statement during a certain period of time, with the aim of determining the relative weight of each item compared to the sum of the other financial items.

Horizontal analysis: It is based on the comparison between two consecutive

periods, i.e. calculating the amount of change between the two periods.

Financial analysis tools: Financial ratios are among the most used tools in financial analysis, i.e. they help to reveal the strengths and weaknesses of the banking institution. The most important financial analysis tools are:

Return on Equity: This model shows the impact on the efficiency of cost management and asset productivity divided by the profitability of assets and is usually known as the return on assets index.

Economic added value: It is a measure for estimating the real profit associated with maximizing shareholder wealth, which is the difference between the net operating profit after taxes and the cost of funds calculated on the basis of the weighted average of the cost of all financing sources.

A- Quantitative measurement methods: It is divided into two types of methods, one of which is based on linear programming and the other on statistical estimation, as follows:

- Encapsulated data analysis: It consists of two measures, which are the measurement of net technical efficiency and the measurement of volume efficiency. It has the ability to reveal hidden relationships

and then sources of weak financial performance efficiency.

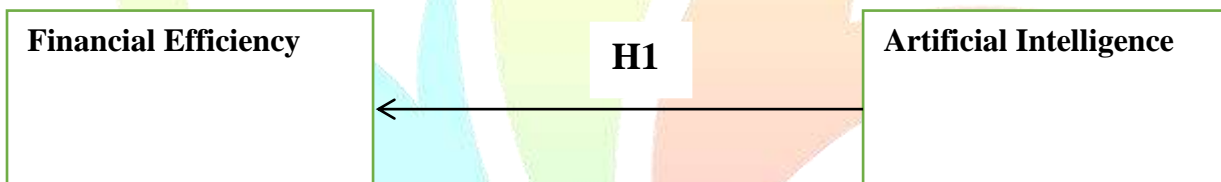
- **Random cost limit:** It is a method that relies on regression techniques to estimate the total cost function, which is to measure the relative efficiency of expenditures through the degree of difference between current costs and their expected value, assuming the current cost of expenditures is not less than their expected value. There are two additional methods, the thick limit method and the thick limit method. Free distribution.

Study Hypotheses

The study hypotheses are based on clarifying the main variables of the study that were adopted in formulating the problem of the current study, and clearly stating the relationships that link the variables on which the researchers relied in formulating the study hypotheses, which are:

H1: There is a direct, statistically and significant relationship between artificial intelligence and financial efficiency.

Figure (2) hypotheses of the study



Develop hypotheses

The relationship between artificial intelligence and financial efficiency in the banking sector

Digital progress is considered one of the most important pillars for the future of the banking sector and an important source for achieving financial efficiency, as dealers in this sector are increasingly tending to carry out their financial transactions in banks through digital technological applications

and smart solutions, and accordingly (Ashta & Herrmann, 2021). both artificial intelligence and digital transformation contribute to changing The structure of banking financial services from traditional means to modern technical means, which serves the human element by providing services in a faster, more secure and transparent manner, as well as providing modern and innovative financial solutions that simplify the conduct of banking operations (Union of Arab Banks, 20, 2021).

It can be said that the use of artificial intelligence systems in the banking financial sector works on analyzing historical data, real-time statistics and accurate reports that contribute to raising financial efficiency as well as supports the decision-making process, as well as works to reduce operational costs and improves banking financial performance and profitability, so all banking institutions seek to invest. In the applications of artificial intelligence tools, the main role of artificial intelligence in the banking sector is to obtain an appropriate and accurate view of big data with a low level of error and to provide good protection for funds as artificial intelligence techniques detect any fraudulent transaction (Bonetti et al., 2022), and that the advantages of artificial intelligence are many in the banking sector, as it enables banks to obtain financial efficiency by providing a clear, appropriate and accurate view of the data with a low level of error, reducing operational costs and optimal use of available financial resources, which contributes to improving the quality of banks' performance with high efficiency to ensure understanding customer needs and providing an equal experience for customers. Also, the relationship between artificial intelligence and financial efficiency in the banking sector leads to several advantages, including the optimal use of available resources in the banking institution, as well

as lower operational costs, which contributes to increasing the output of the banking institution at the lowest possible cost (Ashta & Herrmann, 2021). It also contributes to improving banking performance, increasing revenues and improving the effectiveness of its employees, in addition to working on regulatory compliance at a high level, which contributes to reducing the commission of financial crimes such as fraud and money laundering, providing virtual observers in the use of smart systems, working on communication outside banking hours, through the use of Conversational or chat assistants (Alzaidi, 2018: 142).

Artificial intelligence and international experiences in the banking sector

Developed countries are interested in employing artificial intelligence in all fields, as India may be one of the emerging economies that has shifted from a policy of government guidance to a policy of liberalization and integration in globalization, as these reforms began at the beginning of the last century and the financial sector was one of its interests, as the Indian government applied artificial intelligence. In the economic system as a whole, it worked to organize special initiatives that indirectly affect the banking and financial sector industry. These government initiatives include the following:

- The Artificial Intelligence Task Force:

- Ministry of Corporate Affairs:
- Reserve Bank of India:
- Indian strategic companies:

There are a number of factors that prompted India to adopt artificial intelligence technologies as a general direction in the economic system and the financial and banking sector in particular, which led to increased customer satisfaction, reduced costs, and the provision of distinguished and free human resources, as well as reducing errors and proportionality with competitors, and thus these technologies worked to provide an environment suitable for intelligence. industrial sector, which in turn leads to an increase in financial efficiency in the banking sector (Bonetti et al., 2022).

Data analysis results:

The nature of the data distribution

There is a need to determine the nature of the data distribution for the purpose of selecting the appropriate statistical method for analysis. As the trend will be towards parametric statistics if the data is distributed normally, while the trend will be towards non-parametric statistics when the data is distributed abnormally (Pallant, 2011:57). For the purpose of ascertaining the nature of the data distribution, Skewness and Kurtosis will be tested to ascertain the nature of the data. Based on this test, and since the level of significance or degree of confidence required in this study is ($P < 0.05$), the data approaches the normal distribution curve when the Z value for skewness and kurtosis is within (± 1.96). The Z value is extracted by dividing the computed wobble and flattening values by their standard error (Khine, 2013: 36). Table (1) shows the results of the data distribution test:

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Table 1: Results of a normal distribution test

Kurtosis			Skewness			Variables
Z Kurtosi	Std. Error	Statistic	Z Skewness	Std. Error	Statistic	
-1.791	.254	-.455	0.913	.127	.116	artificial intelligence
-1.917	.304	-.584	-1.880	.153	-.287	infrastructure interface applicat
-1.863	.304	-.567	-1.954	.153	-.299	Machine intelligence applications
.678	.304	0.207	-.740	.153	-0.113	Cognitive science applications
-0.540	.254	-.137	-0.047	.127	-.006	Financial efficiency

Through the above table, it is clear that the data distribution was normal because the Z values for Skewness and Kurtosis did not exceed (± 1.96), therefore, parametric statistical tools will be used.

Descriptive statistics and correlation

Table (2) presents the descriptive statistics and the relationship between the variables. The results indicated that the mean of the variables was at an average level for the variables, which ranged between (2.92-3.66). The table also showed that the standard

deviation of the variables were slight differences between the opinions of the respondents. The results also indicated that there are positive correlations at the level of significance (0.05), and this supports the hypotheses of the current study. Finally, the results indicate that the stability coefficient for all variables (α) has exceeded (0.700), which indicates that the stability of the variables has been achieved, and the possibility of achieving the same results using the same measures.

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Table 2: Descriptive statistics, correlation, and stability coefficient

Financial efficiency	Cognitive science applications	Machine intelligence applications	Infrastructure interface applications	artificial intelligence	D.St	mean	Variables
				(0.750)	1.10	3.24	artificial intelligence
			(0.780)	.673**	1.00	3.26	Infrastructure interface applications
		(0.750)	.617**	.512**	0.91	3.04	Machine intelligence applications
	(0.765)	.627**	.633**	.733**	0.76	3.42	Cognitive science applications
(0.825)	.512**	.487**	.380**	.538**	0.67	2.92	Financial efficiency
<p>**). Correlation is significant at the 0.01 level (2-tailed).</p> <p>Note: The values in brackets represent the stability coefficient (α)</p>							

Hypothesis testing:

The path analysis available in the Amos program was used for the purpose of testing the main hypotheses of the study and the sub-hypotheses underlying it, because this analysis achieves the same purpose as the regression analysis, in addition to providing graphs. As the Estimate value represents the estimated value of the impact coefficient, which corresponds to the value of beta in the

regression analysis, while the S.E. The standard error, while the value of Critical ratio (C.R.) represents the critical value that corresponds to the value of (t) in the regression analysis, which must exceed +- 1.96 to accept the hypothesis, and finally (P) represents a significant level of confidence in accepting the hypothesis, whose value must be less from 0.05.

Table (3) Testing the main hypotheses of the study

Statistical decision	P	C.R.	S.E.	Estimate	Path			
Accept	***	11.352	.099	0.471	financial efficiency	<---	Artificial intelligence	H1

H1. There is a direct and positive impact of artificial intelligence on financial efficiency at a significant level (0.01).

CONCLUSIONS

Artificial intelligence refers to the occurrence of an industrial revolution in digital banking services in the banking field, demonstrating competitive advantage, improving its performance, and opening it up to the outside world. The results also indicate that enhancing the chances of success of artificial intelligence in the banking sector does not depend only on the adoption of modern and digital technologies only, but rather goes beyond the existence of a cultural and organizational transformation, as well as the provision of qualified and trained human capabilities. And artificial intelligence can help reduce the duration of banking work, which works to develop work skills and improve the provision of financial services. On the other hand, artificial intelligence in the banking sector contributes to raising the profitability of the services sector. And the application of artificial intelligence in the banking sector is characterized by many advantages, such as increasing customer satisfaction and

reducing costs to the lowest possible extent, as well as contributing to reducing negative aspects associated with work such as cases of fraud and money laundering, as well as reducing human errors. Finally, it can be concluded that investment in the field of artificial intelligence and digital transformation faces many challenges, represented by risk management and the security challenge against electronic attacks and piracy.

RECOMMENDATIONS

Based on the results reached and the presentation of the conclusions reached by the researchers, the following can be recommended: First, issuing laws that define the banking sector in the field of artificial intelligence and digital transformation techniques and set their conditions. Secondly, an attempt to establish high confidence among dealers in the field of artificial intelligence, digital transformation, and awareness-raising. Third, stimulating investment in the field of artificial intelligence in the banking sector and keeping abreast of developments to advance the Iraqi banking reality. Fourth, improving the infrastructure for modern

innovations and digital technology in general, and the need to provide correct data. Fifth, improving the business environment by easing restrictions on foreign investment in order to provide capital through digital technology companies. Finally, recommending the continuous pursuit of increasing financial awareness and preparing training programs for the human element related to artificial intelligence and how to benefit from them.

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REFERENCES

- Allen, J., & Liu, Y. (2007). Efficiency and economies of scale of large Canadian banks. *Canadian Journal of Economics/Revue canadienne d'économique*, 40(1), 225-244.
- Alzaidi A A, (2018). Impact of Artificial Intelligence on Performance of Banking Industry in Middle East. *International Journal of Computer Science and Network security*, Vol 18 , N10.
- Ashta, A., & Herrmann, H.(2021). Artificial intelligence and fintech: An overview of opportunities and risks for banking, investments, and microfinance. *Strategic Change*, vol 30, issue 3.
- Baduge, S. K., Thilakarathna, S., Perera, J. S., Arashpour, M., Sharafi, P., Teodosio, B., ... & Mendis, P. (2022). Artificial intelligence and smart vision for building and construction 4.0: Machine and deep learning methods and applications. *Automation in Construction*, 141, 104440.
- Beccalli, E., Elliot, ., &Virili, F. (2020). *Artificial Intelligence and Ethics in Portfolio Management*. Digital Business Transformation, Cham. Springer International Publishing.
- Bonetti, F., Montecchi, M., Plangger, K., & Schau, H. J. (2022). Practice co-evolution: Collaboratively embedding artificial intelligence in retail practices. *Journal of the Academy of Marketing Science*, 1-22.
- Buch, C.M, & Goldberg, L.S, (2020). Global Banking: Toward an Assessment of Benefits and Costs. *Annual Review of Financial Economics*, 12, 141-175.
- Chanias, S.,Myers, M.D., & Hess, T. (2019). digital transformation strategy making in per-digital organizations: the case of financial services provider. *The Journal of Strategic Information Systems*, 28 (1).
- Feuerriegel, S., Shrestha, Y. R., von Krogh, G., & Zhang, C. (2022). Bringing artificial intelligence to business management. *Nature Machine Intelligence*, 4(7), 611-613.
- Hafeez, M., Rehman, S. U., Faisal, C. N., Yang, J., Ullah, S., Kaium, M. A., & Malik, M. Y. (2022). Financial efficiency and its impact on renewable energy demand and CO2 emissions: do eco-innovations matter for highly polluted Asian economies?. *Sustainability*, 14(17), 10950.
- Hislop, D., Coombs, C., Taneva, S., & Barnard, S. (2017). Impact of artificial intelligence, robotics and automation technologies on work. *Chartered Institute of Personnel and Development*, London.
- Hu, Y., Jiang, W., Dong, H., & Majeed, M. T. (2022). Transmission channels between financial efficiency and renewable energy consumption: Does environmental technology matter in high-polluting economies?. *Journal of Cleaner Production*, 368, 132885.
- Huang, K., Fu, T., Gao, W., Zhao, Y., Roohani, Y., Leskovec, J., ... & Zitnik, M. (2022). Artificial intelligence foundation for therapeutic science. *Nature Chemical Biology*, 18(10), 1033-1036.
- Huebner, J., Vuckovac, D., Fleisch, E., & Ilic, A. (2019). Fintechs and the new wave of financial intermediaries.
- Minh, D., Wang, H. X., Li, Y. F., & Nguyen, T. N. (2022). Explainable artificial intelligence: a comprehensive review. *Artificial Intelligence Review*, 55(5), 3503-3568.
- Zhang, Z., Ning, H., Shi, F., Farha, F., Xu, Y., Xu, J., ... & Choo, K. K. R. (2022). Artificial intelligence in cyber security: research advances, challenges, and opportunities.

- Artificial Intelligence Review, 55(2), 1029-1053.
17. Isik O., Jones C., & Siorova A., (2013). Business Intelligence Success: the Roles of BI Capabilities and Decision Environments. *Informator& Management*, 50.
 18. Khine, M. S. (2013). Application of structural equation modeling in educational research and practice. Sense Publishers.
 19. Kraus, S., Durst, S., Ferreira, J. J., Veiga, P., Kailer, N., & Weinmann, A. (2022). Digital transformation in business and management research: An overview of the current status quo. *International Journal of Information Management*, 63, 102466.
 20. Loonam, J., Eaves, S., Kumar, V., & Parry, G. (2018). Towards digital transformation: Lessons learned from traditional organizations. *Strategic Change*, 27(2), 101-109.
 21. Morris, D. (2008). Economies of scale and scope in e-learning. *Studies in higher education*, 33(3), 331-343.
 22. Moss, T., & Atre S., (2007). *Business Intelligence Roadmap*, Boston; Pearson Education Inc.
 23. Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy*, 48(8), 103773.
 24. Omari, o, (2008). Measuring Efficiency levels of Jordanian and U.A.E Banking industries: An Application of Data Envelopment Analysis, Master in international Business thesis, the university of Jordan.
 25. Omarini, A. (2017). The digital transformation in banking and the role of FinTechs in the new financial intermediation scenario.
 26. Pallant, J. (2011). *SPSS Survival Manual*. 4th ed., open university press, McGraw-Hill education.
 27. Partanen, J., MansouriJajae, S., & Cavén, O. (2017). Business Intelligence Within the Customer Relationship Management Sphere. In *Real-time Strategy and Business Intelligence* (pp. 123-147). Palgrave Macmillan, Cham.
 28. Razzaq, M.A., Kashif H.M., Qureshi, M.A., and Ullah. S., (2017). A Survey on User Interfaces for Interaction with Human and Machines. *International Journal of Advanced Computer Science and Applications*, vol. 8, no 7.
 29. Roger, L.M & David, D, (1993) *Modem money and banking*. 3rd ed, Macgrhill, New York, USA.
 30. Romi, S. (2016). Knowledge Management and its Relationship with Competitive Feature of Working Banks in Hebron. Unpublished Master Dissertation, Hebron University, Palestine.
 31. Sekar, M., & Gowri, M. (2015). Efficiency, Liquidity, and Profitability: Banking Performance Comparatistics. *SCMS Journal of Indian Management*, 12(4), 51.
 32. Shin. Dong Jin, Kim Brian H.S., (2013). Bank Consolodation and Competitiveness,: Empirical evidence from the Korean Banking Industey. *Journal of Asian Economics, 24.Technolgy Journal*, 12 (2).
 33. Shmatko, A., Ghaffari Laleh, N., Gerstung, M., & Kather, J. N. (2022). Artificial intelligence in histopathology: enhancing cancer research and clinical oncology. *Nature Cancer*, 3(9), 1026-1038.
 34. Stoffels, M., Smolnik, T., & Hedtke, C. (2019). Artificial Intelligence in the process industries-technology overview, case studies, and success factors. *Journal of Business Chemistry*, 16(1).
 35. Union of Arab Banks, Financial Technology and Artificial Intelligence in the Financial and Banking Sector, 2021, (30/5/20210), accessed: <https://uabonline.org/ar-financial-technology-and-artificial-intelligence>
 36. Varesi, L. (2015). Measuring Banking Efficiency during Crisis Period Using Data Envelopment Analysis: Western Balkan Countries Case. *Academic Journal of Interdisciplinary Studies*, 4(1), 261-261.
 37. Villar, A. S., & Khan, N. (2021). Robotic process automation in banking industry: a case study on Deutsche Bank. *Journal of Banking and Financial Technology*, 5(1), 71-86.
 38. Villata, S., Araszkieicz, M., Ashley, K., Bench-Capon, T., Branting, L. K., Conrad, J. G., & Wyner, A. (2022). Thirty years of artificial intelligence and law: the third decade. *Artificial Intelligence and Law*, 1-31.
 39. Young, R.D. (1997). Measuring Bank Cost efficiency: Don't count on Accounting ratios, *Financial Practice and education*, USA.
 40. Zuzana,1, (2009). Measuring bank efficiency, master thesis, Charles, university in prague.

41. Loh, H. W., Ooi, C. P., Seoni, S., Barua, P. D., Molinari, F., & Acharya, U. R. (2022). Application of Explainable Artificial Intelligence for Healthcare: A Systematic Review of the Last Decade (2011–2022). *Computer Methods and Programs in Biomedicine*, 107161.

