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Impact of Artificial Intelligence Indicators on Cash Credit in the Iraqi Banking Sector for the Period 2017-2023

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Abstract : The research aims to demonstrate the importance of artificial intelligence in improving the performance indicators of the banking sector by finding the impact of artificial intelligence indicators in the banking sector Represented by (Asia Cell Hawala, Zain Cash, Electronic portfolio, POS, POC) on some banking indicators represented by cash credit during the study period 2017/2023, as artificial intelligence embodies modern banking software and technologies that seek to perform tasks associated with human intelligence. This contributes to improving banking performance levels through the creation of computer technology that can perform actions similar to those of a human being, interpret structured and unstructured data, and process information derived from data provided by artificial intelligence. Artificial intelligence works through several modern technologies and software with several applications in the banking sector by making loan and credit decisions accurately, in addition to increasing the ability of banks to create better credit models. The (Eviews12) program was used to find the impact of artificial intelligence indicators on cash credit in the Iraqi banking sector with (quarterly data) for the period 2017/2023 ،The study reached the most important conclusions, which are the existence of a significant impact of artificial intelligence on cash credit in the Iraqi banking sector for the period 2017/2023, as a result of improving credit operations by opening better credit routes using modern software, in addition to increasing the ability of credit to better predict results.

Keywords: Artificial intelligence, cash credit, banking sector.

INTRODUCTION: Artificial intelligence (AI) is defined as software systems, and possibly hardware, designed by humans. AI systems can acquire data, interpret the structured or unstructured data collected, apply logic to knowledge, or process information derived from this data and determine the best course of action to achieve a specific goal. AI systems can either use symbolic rules or learn a digital model. They can also adapt their behavior by analyzing how the environment has been affected by their past actions. The credit process is a relationship that links the present to the future. Credit is one of the most important operations practiced by banks, through which they generate revenue. Cash credit is defined as a relationship between a creditor (customer) and a debtor (bank) based on trust. This relationship is based on the exchange of goods, services, or money in exchange for a pledge by the debtor to pay a certain amount in the future, on a predetermined due date. Payment is often in cash. Cash credit is also defined as the bank's provision of financing, i.e., credit facilities to various economic sectors. From here, we can say that banks, as financial institutions, play a vital role in securing financing for productive projects through Granting cash credit. The relationship between artificial intelligence and banking credit is a renewable and diverse one, as artificial intelligence plays a significant role in improving banking operations, increasing efficiency, and reducing risks.

Research Objective:

The research aims to demonstrate the importance of artificial intelligence in improving banking sector performance indicators by examining the impact of artificial intelligence indicators on some banking indicators, particularly cash credit, during the study period (2017/2023). Artificial intelligence embodies modern banking software and technologies that seek to perform tasks associated with human intelligence, contributing to improving banking performance levels by making accurate loan and credit decisions.

Research Problem:

The main research problem is:

Is there a statistically significant moral impact of artificial intelligence indicators on cash credit in the Iraqi banking sector for the period 2017/2023؟

This research is divided into several sub-problems, as follows:

1- Is there a statistically significant moral impact of the Asiacell Hawala indicator on cash credit in the Iraqi banking sector for the period 2017/2023؟

2- Is there a statistically significant effect of the Zain Cash Index on cash credit in the Iraqi monetary sector for the period 2017/2023؟

3- Is there a statistically significant effect of the e-wallet index on cash credit in the Iraqi banking sector for the period 2017/2023؟

4- Is there a statistically significant effect of the POS index on cash credit in the Iraqi banking sector for the period 2017/2023؟

5- Is there a statistically significant effect of the POC index on cash credit in the Iraqi banking sector for the period 2017/2023؟

Research Hypothesis:

- There is no statistically significant effect of the Asiacell Hawala Index on cash credit in the Iraqi banking sector for the period 2017/2023.
- Is there no statistically significant effect of the Zain Cash Index on cash credit in the Iraqi monetary sector for the period 2017/2023؟
- Is there no statistically significant effect of the e-wallet index on cash credit in the Iraqi banking sector for the period 2017/2023؟
- Is there no statistically significant effect of the Point of Sale (POS) index on cash credit in the Iraqi banking sector for the period 2017/2023؟
- Is there no statistically significant effect of the Point of Sale (POC) index on cash credit in the Iraqi banking sector for the period 2017/2023؟

Importance of the Research:

The importance of the research lies in:

- Explaining the role of artificial intelligence in cash credit.
- Analyzing artificial intelligence indicators in the Iraqi banking sector for the period 2017/2023.
- Analyzing cash credit in the Iraqi banking sector for the period 2017/2023.
- Measuring the Impact of Artificial Intelligence Indicators on Cash Credit in the Iraqi Banking Sector for the Period (2023/2017)

Research Limits:

1- Spatial Limits: Represented by the Iraqi banking sector.

2- Temporal Limits: Covered the period(2023/2017)

3- First Topic: Artificial Intelligence in the Iraqi Banking Sector and Cash Credit

Definition of Artificial Intelligence

The beginning of artificial intelligence dates back to the shift from traditional programming systems after World War II to the development of computer programs characterized by simulating human intelligence in running games and developing solutions to some puzzles. This, in turn, led to larger simulation systems that later crystallized and became artificial intelligence systems. Initially, many scholars differed in their interpretation of artificial intelligence systems. Some considered them a branch of engineering design, while others considered them related to the science of simulating human thought systems. In reality, artificial intelligence is nothing more than a simulation of human intelligence methods and a simulation of how to use their acquired experience in a specific field, as well as the ways in which they understand different languages and how to recognize images and speak. This led to the development and emergence of design techniques and programs that transform computers into machines with artificial intelligence or operate. Works characterized by human intelligence and expertise (Sharqawi, 2011:14).

The European Union's draft Artificial Intelligence Law defines AI systems as "software developed using one or more technologies and methods that can achieve a specific set of human-defined goals or generate outputs such as content, predictions, recommendations, or decisions that impact the environments with which they interact" (Apr 21, 2021).

It can be defined as the intelligent imitation of human behavior using robots or machines with an integrated system that enables them to solve problems and make decisions by creating and designing computer programs that mimic human intelligence in all areas of life, whether economic, financial, or scientific.

The Importance of Artificial Intelligence:

The importance of artificial intelligence is multifaceted and cannot be enumerated in brief points. In this study, we will highlight its most prominent aspects as follows: (Al-Shanqeeti, 76: 2020)

1- Contributing to the preservation of human expertise by transferring it to smart machines.

2- Facilitating the use of machines and making them accessible to all.

3- It plays an important role in health, learning, and security.

4- It helps smart systems make accurate, independent, and objective decisions.

5- Through smart machines, the amount of risks and psychological pressures on humans will be reduced, making them more productive.

The Concept of Cash Credit

The credit process is a relationship that links the present with the future. Credit is one of the most important operations a bank engages in, through which it generates its revenue. Bank credit is defined as a relationship based on trust between a creditor (customer) and a debtor (bank). This relationship is based on the exchange of goods, services, or money in exchange for the debtor's pledge to pay a specific amount in the future, at a predetermined due date. Payment is often in cash. Bank credit is also defined as the bank's provision of financing, i.e., credit facilities to various economic sectors (Khalil, 1981: 127). From here, we can say that banks, as financial institutions, play a vital role in securing financing for productive projects by granting cash credit. Researchers have provided numerous definitions of the concept of cash credit, including:

It is defined as short-term bank loans that companies can obtain from banks as a source of short-term financing (Amin, 2013:246). It is also defined as the exchange of cash value for an equal term value, along with the amount of interest due from the loan recipient, under the terms and conditions of a promise to repay the credit provider. Cash credit includes banking services provided to individual and corporate customers (in the form of financing provided to them, provided that guarantees are obtained from the beneficiary to repay the funds, interest, and expenses in one lump sum or in installments on predetermined dates. These guarantees ensure that the bank will recover its funds in the event that the beneficiary defaults without any significant losses) (Henger, 2008:56).

Cash credit can be defined as the process of borrowing sums from a bank by natural or legal persons for a specified period, with different types and terms, and at different interest rates that must be repaid to the bank along with the installments of the credit granted.

Advantages of Using Cash Credit Cash Credit in the Banking Sector:

1- Improving Credit Assessment: Artificial intelligence contributes to improving credit assessment, as it can study customers' financial and social data to provide a better assessment of credit risks, as well as address debts arising from credit (Salima Ben Aicha, 2024: 18).

2- Fraud Detection: Artificial intelligence plays a prominent role in fraud detection, as it processes banking activities to identify possible fraud patterns (Abu Zaid et al., 2022: 41).

3- Improving Customer Service: Artificial intelligence helps improve customer service by providing better service to customers by responding to their inquiries and providing support. Artificial intelligence also contributes to studying marketing credit services by diversifying marketing channels for different types of credit, according to customer needs and desires, thus achieving increased sales of credit products (Sharaf Al-Din, 2023: 64).

4- Reducing Expenses: Artificial intelligence contributes to reducing expenses by automating and improving banking operations and making credit more efficient. Artificial intelligence can increase protection by raising the current level of protection through automatic threat detection (Chris Harman, 2006: 29).

5- Improving credit operations: Artificial intelligence improves credit operations by opening up better credit operations through modern software, as well as enhancing the customer experience by providing personalized and efficient services (Sharaf Al-Din, 2023: 64).

6- Increasing protection: Artificial intelligence is capable of analyzing numbers by analyzing customers' financial and social data, which helps understand their level of economic activity and their ability to repay credit, as well as analyzing credit effectiveness (Saleh et al., 2024: 108).

7.Better customer experience: Artificial intelligence helps create credit models that can more accurately predict credit risks. Artificial intelligence contributes to analyzing numbers, as it can help improve customer compliance with financial regulations and laws. Artificial intelligence also contributes to reducing the human factor in implementing credit services, especially in routine operations, as well as reducing labor costs (Al-Jawazneh, 2023: 45).

Banking Indicators Concepts:

Asiacell Hawala :

is an electronic wallet available on smartphones through which Iraqi financial transactions can be sent and received, credit recharged, and individual bills paid electronically. The wallet can also be used for online shopping or in

traditional Iraqi stores that accept the Asiacell Hawala wallet for payment. We can learn about the information related to the Asiacell Hawala wallet, as there are a group of positives that result from using this
The system and secure way to conduct is represented by the following: https://www.mrabood.com/2012/12/asia:

Zain cash

The Zain Cash electronic wallet service, activated on mobile phones, provides the user with a convenient cash transactions and monthly payments. It has become possible to use the mobile phone to pay bills, transfer money locally, recharge prepaid card lines, and provide many other benefits and services at any time and from anywhere.
This service is characterized by being safe and easy to use, as all electronic financial transactions are carried out smoothly and with absolute confidentiality. It also saves **subscribers** time and effort and allows them to conduct payments and transfers from anywhere, even during international roaming.

electronic potifolio

An electronic potifolio or digital wallet is a means of storing and managing digital currencies. An electronic wallet stores the private and public keys used in digital currency storage and transfer operations. It allows individuals to send and receive digital currencies, view balances, and conduct necessary transactions. Electronic wallets vary in form and interface; they can be smartphone applications, computer programs, or even websites. Electronic wallets usually require creating a strong and secure password to access the wallet and protect digital assets.

Pos

A point-of-sale system aims to serve the customer through a series of steps that culminate in a successful purchase. It begins with selecting the products to be purchased physically or displayed on a digital shopping cart. The point-of-sale system then calculates the total price of these products, including taxes and other expenses or discounts. The customer then pays in cash, using credit cards, or via electronic payment methods. The system concludes with the completion of the transaction by calculating the remaining balance.

Poc

It is the device whose primary function is cash advance, which is a function performed by the device to collect money from the card in exchange for cash payment by the executor according to the instructions of the Central Bank, with a commission for the cardholder not exceeding 6,000 dinars per million.
POC devices are very few compared to POS devices, and their functions are only used to withdraw large amounts of cash. However, in Iraq, due to the emergence of an incorrect electronic payment culture, we see that the most common devices are POC devices. The greater spread of points of sale and the disappearance of the use of cash withdrawal points, along with the necessity of deploying automated teller machines by financial institutions to enable cardholders to withdraw cash when needed.

The Relationship of Artificial Intelligence to Cash Credit:

The relationship between artificial intelligence and cash credit is a dynamic and diverse one. AI plays a significant role in improving banking operations, increasing efficiency, and reducing risks (Qarariyya and Fathiyya, 36:2024). AI helps banks examine data on borrowing customers, such as their credit history, financial estimates, economic activities, and creditworthiness. This data allows banks to identify the potential risks of each customer, which contributes to providing personalized credit services to each customer (Al-Tamimi, 41:2024). AI also contributes to assessing the customer's situation by examining their old data and comparing it with recent data. It also predicts credit outcomes when re-examining the customer's financial situation and assessing their ability to fulfill their obligations to the bank by examining their actual need for the amount of credit granted (Talhi, 87:2023). Section Two: Analysis of Artificial Intelligence Indicators in the Iraqi Banking Sector and Cash Credit for the Period 2017/2023
The following table represents artificial intelligence indicators in the Iraqi banking sector for the period 2017/2023

Table (1)

Artificial Intelligence Indicators in the Iraqi Banking Sector for the Period 2017/2023 (Amounts in Millions of Dinars)

years	Value (Asiacell Transfer)	Growth rate % (Asiacell Transfer)	Value (Zain Cash)	Growth rate % (Zain Cash)	Value (electronic wallet)	Growth rate % (electronic wallet)	Value (Pos)	Growth rate %(Pos)	Value (Poc)	Growth rate %(Poc)
2017	26002	-----	18705	-----	222442	-----	918	-----	5,143	0
2018	54040	108	33660	80	271906	22	2200	140	6625	29
2019	48292	(-11)	72144	114	403797	50	2226	1	11677	76
2020	63872	32	55528	(23)	1226235	204	7540	239	13796	18
2021	17899	(72-)	88945	60	2107265	72	8329	10	14704	7
2022	5909	(67-)	91627	03	2970390	41	10718	29	17610	20

2023	2808	52	270853	196	4980427	68	23066	115	17610	0

Source: Central Bank - General Directorate of Statistics and Research / Annual Statistics for the years 2017-2023

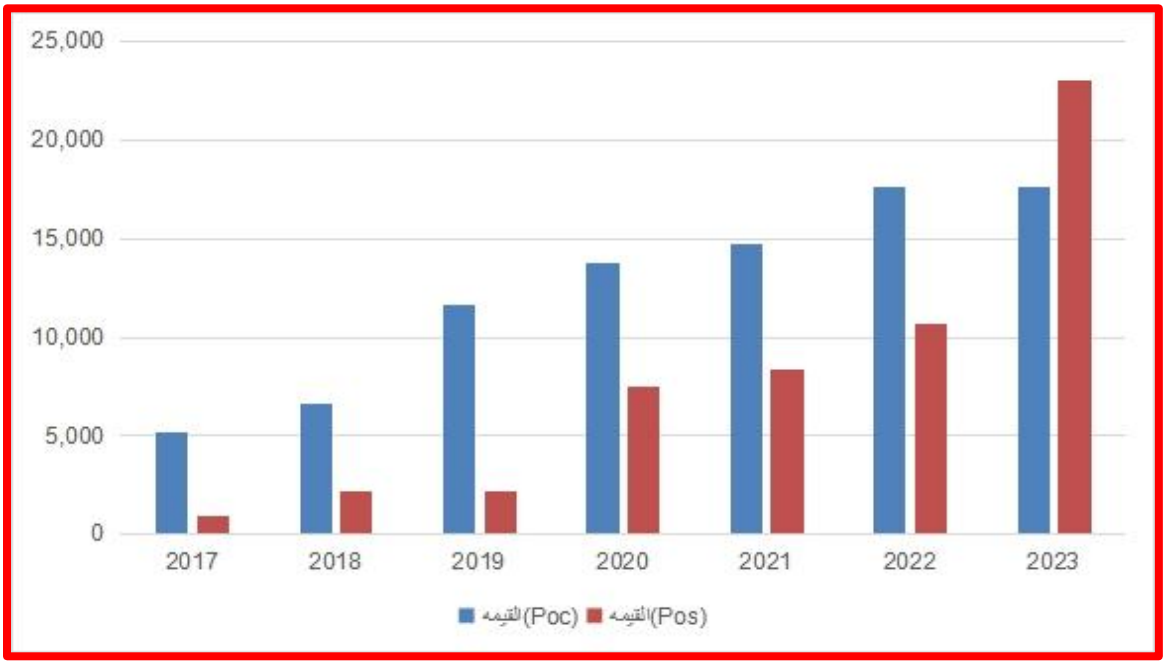
A. Growth rate = Current year - Previous year / Previous year x 100%

B. Values in parentheses (negative values)

C. Growth rate calculated by researchers

Table (1) shows that the value of amounts traded within the Asiacell Hawala system in 2017 amounted to 26,002 million dinars. The value of amounts transferred in 2018 increased to 54,040 million dinars, a growth rate of 107%, due to citizens' demand for the financial services provided by the Asiacell Hawala system. In 2019, the value of amounts traded decreased to 48,292 million dinars, a growth rate of -10.631, due to the newness of this activity. In 2020, the value of amounts traded increased to 63,872 (32.26) million dinars, with a growth rate of (32.26) as a result of the increased demand of citizens for these services. As for the years 2021-2023, the value of the traded amounts decreased to (17899), (5909) and (2808) million dinars, with growth rates of (-71.987), (-66.971) and (52.485) respectively, as a result of the multiplicity of services of modern electronic systems in financial transactions. The table shows that the value of the traded amounts within the Zain Cash sales system amounted in (2017) to (18705) million dinars, and the value of the traded amounts increased in (2018) to (33661) million dinars, with a growth rate of 80%, as a result of the citizens' demand for this system. The value of the traded amounts also increased in (2019) to (72145) million dinars, with a growth rate of 114%, as a result of the Central Bank of Iraq's orientations to enhance electronic financial services. In the year (2020) The value of the Zain Cash sales system's traded amounts decreased to (55,528) million dinars, with a growth rate of (23%). In (2021), the traded amounts increased to (88,945) million dinars, with a growth rate of 60%, as a result of the development of electronic systems and the increased demand of citizens for this system. In (2022), the traded amounts increased slightly to (91,927) million dinars, with a growth rate of 3%. In (2023), the increase in the traded amounts was large, with a growth rate of 196%, amounting to (270,853) million dinars, as a result of the widespread use of this system by citizens on its services and the increased ability of it to compete with other electronic service systems. The table shows that the number of electronic wallets within the electronic wallets service reached (222,442) wallets in (2017), and the value of the amounts traded increased in (2018) to (271,906) wallets, with a growth rate of (22%) as a result of citizens' interest in this system. The number of electronic wallets also increased in (2019) to (403,797) wallets, with a growth rate of (49%) as a result of the Central Bank of Iraq's orientations to enhance electronic financial services. In (2020), the number of electronic wallets increased to (1,226,235) wallets, with a growth rate of (204). In (2021), the number of electronic wallets increased to (2,107,265) wallets, with a growth rate of (72%) as a result of the development of electronic systems and the increase in citizens' interest in this system. In (2022), the number of electronic wallets also increased by (2970390) wallets with a growth rate of (41%), while in the year (2023) the increase in the number of electronic wallets was large with a growth rate of (68%) and an amount of (4980427) wallets as a result of the expansion of the use of this system by citizens on the services of this system, and it is clear from the table that the points of sale (pos) reached (918) points in (2017), and the points of sale increased in (2018) to (2200) points, with a growth rate of (140%) as a result of citizens' demand for this system, and the points of sale also increased in (2019) to (2226) points with a growth rate of (1%) as a result of the Central Bank of Iraq's directions to enhance electronic financial services, and in the year (2020) the points of sale increased to (1226235) points, with a growth rate of (239%), and in the year (2021) the points of sale also increased to (8329) points, With a growth rate of (10%) as a result of the development of electronic systems and the increase in citizens' demand for this system, in the year (2022) the number of points of sale also increased by (10,718) points, with a growth rate of (29%), while in the year (2023) the increase in points of sale was large and with a growth rate of (115%) and by (23,066) points as a result of the expansion of the use of this system by citizens on the services of this system. It is clear from the table that the number of points of sale (POC) reached (5,143) points in (2017), and the number of points of sale increased in (2018) to (6,625) points, with a growth rate of (29%) as a result of citizens' demand for this system, and the number of points of sale also increased in (2019) to (11,677) points, with a growth rate of (76%) as a result of the Central Bank of Iraq's directions to enhance electronic financial services, and in the year (2020) the number of points of sale increased to (13,796) points, with a growth rate of (18%), and in (2021) the number of points of sale also increased to (14,704) points, with a growth rate of (7%) due to the development of electronic systems. In (2022) and (2023), the number of points of sale amounted to (17,610) points, with a growth rate of (19%) and (0%) due to the widespread use of this system by citizens on its services.

Figures (1-2)
show the indicators of artificial intelligence in the Iraqi banking sector for the period 2017/2023, represented by (Asia Cell Transfer, Zain Cash, Electronic Wallet, POS, POC).



Figures (1-2) show indicators of artificial intelligence in the Iraqi banking sector for the period 2017/2023.

Source: Prepared by the researchers based on Table (1).

Analysis of cash credit in the Iraqi banking sector for the period 2017/2023.

Cash credit in the Iraqi banking sector refers to banks granting credit facilities and cash loans to individuals, institutions, and various economic sectors. Cash credit is a vital tool in stimulating economic activity and providing the liquidity needed to finance investments, operational, and consumer projects.

Table (2) shows the development of cash credit in the Iraqi banking sector for the period (2017-2023).

Table (2)
Development of cash credit in the Iraqi banking sector for the period (2017-2023) (million dinars)

Year	value	Growth rate%
2017	37,952,829	-----
2018	38,486,947	104
2019	42,052,511	903
2020	49,817,737	19
2021	52,971,508	6
2022	60,576,391	14
2023	69,252,894	14

Source: Central Bank - General Directorate of Statistics and Research / Annual Statistics for the years (2017-2023)

- **Growth rate = Current year - Previous year / Previous year x 100%**
- **Growth rate calculated by researchers**

Table (2) shows that the value of circulating credit amounts reached (37,952,829) million dinars in 2017. The value of circulating amounts increased in (2018) to (38,486,947) million dinars, a growth rate of (104%), as a result of raising the credit ceilings for Iraqi banks according to the Central Bank of Iraq Law (56) of 2004. The value of circulating amounts also increased in (2019) to (42,052,511) million dinars, a growth rate of (903%). In (2020), the value of circulating credit amounts rose to (49,817,737) million dinars, a growth rate of (19%), as a result of the increase Total deposits in the banking sector, which in turn led to an increase in banks' cash reserves and, consequently, an increase in their credit capacity. In 2021, current amounts increased to 52,971,508 million dinars, a growth rate of 6%. In 2022, current amounts increased to 60,576,391 million dinars, a growth rate of 14%. This was due to banks granting various loans to large segments of citizens, as well as the increased need for bank credit among economic sectors. In 2023, the increase in current amounts was significant, with a growth rate of 14%, amounting to 69,252,894 million dinars, due to the increase in credit activity of Iraqi banks.

Figure (3)
shows cash credit in the Iraqi banking sector for the period 2017/2023.

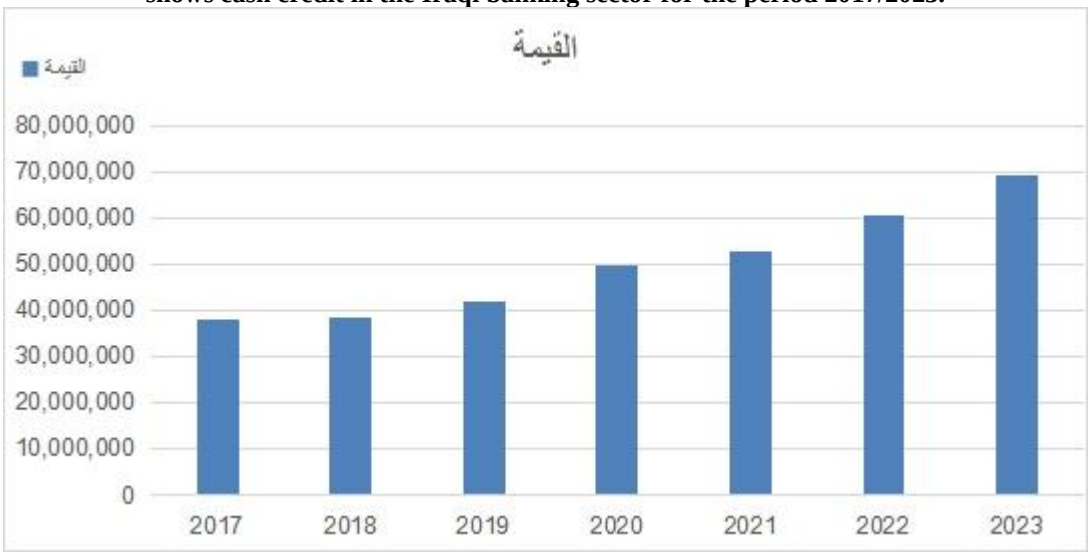


Figure (2) Cash Credit in the Iraqi Banking Sector for the Period 2017/2023
Source: Prepared by the researchers based on Table (2)

Section Three: Measuring the Impact of Artificial Intelligence Indicators on Cash Credit in the Iraqi Banking Sector for the Period 2017/2023

According to the current standard model, we note that there are five independent variables (Asia Hawala, Zain Cash, e-wallet, points of sale, and cash payment points) that affect the dependent variable representing the cash credit index. The symbols of these variables will be used in formulating this mathematical model according to the following model:

$$BC = \beta_0 + \beta_1(AH)_i + \beta_2(Z.C)_i + \beta_3(E.W)_i + \beta_4(P.O.S)_i + \beta_5(P.O.C)_i + \epsilon_i \quad , i = 1,2.....1$$

β_0 (**Bank Credit**) It is cash credit.

The constant and vector terms (β_0, β_1, β_2, β_3, β_4, β_5) represent the estimated parameters of the above model.

AH (Asia Hawala), (Zain Cash), Z.C (Zain Cash), E.W (Electronic Wallets), (Point of Sale), (POS), (POC), (Point of Cash) Cash Payment Points

ϵ_i is the random error term distributed according to a normal distribution with a mean equal to zero and a variance equal to σ^2.

The relationship between the independent variables (Asia Hawala, Zain Cash, electronic wallet, points of sale, cash payment points) and the dependent variable (the cash credit index) can be described through a multiple regression model, as shown in the table below:

Table (3) shows the results of the regression coefficient between the artificial intelligence indicators (Asia Hawala, Zain Cash, electronic wallet, points of sale, cash payment points) and the cash credit index.

Dependent Variable: Bank Credit				
Method: Least Squares				
Date: 05/23/25 Time: 23:27				
Sample: 2017Q1 2023Q4				
Included observations: 28				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	2.90E+13	6.34E+11	45.81917	0.0000
Asia Hawala	86.92740	17.11649	5.078576	0.0000
Zain Cash	16.60292	2.584968	6.422874	0.0000
Electronic Wallets	8949183.	962724.8	9.295681	0.0000
Point of sale	4.89E+08	1.88E+08	2.608876	0.0160
(Point of Cash	6.33E+08	30732576	20.60224	0.0000
R-squared	0.965777	**Mean dependent var**		5.02E+13
Adjusted R-squared	0.939726	**S.D. dependent var**		1.11E+13
S.E. of regression	1.84E+11	**Akaike info criterion**		54.89900
Sum squared resid	7.43E+23	**Schwarz criterion**		55.18447
Log likelihood	-762.5860	**Hannan-Quinn criter.**		54.98627
F-statistic	197.0987	**Durbin-Watson stat**		0.719425
Prob(F-statistic)	0.000000			

Source: Researchers' preparation based on the 12Eviews program.

From the calculated F value (197.0987) and its corresponding probability value of (0.00000), which is significant at a significance level of 0.05, we conclude that the model studied between the artificial intelligence indicators (Asia Hawala, Zain Cash, e-wallet, points of sale, cash payment points) and the cash credit index is a significant model, meaning that this model is highly consistent with the available data on the phenomenon under study.

In addition, it is noted from the table above that the coefficient of determination (R^2) reached (96.6%) and the corrected coefficient of determination was (93.3%). This shows that the interpretability of the regression equation is very high, indicating that (93.3%) of the changes that arise in the monetary credit index are due to artificial intelligence indicators (Asia Hawala, Zain Cash, electronic wallet, points of sale, cash payment points), and we note that the remaining (6.7%) is due to uncontrolled external factors. We find that the Asia Hawala index has a direct effect, meaning that when (Asia Hawala) increases by one unit, the banking credit index will increase by (86.92740), and that this variable has a significant effect, and this is clear through the (t) test for the beta value coefficient (B1), which reached (5.078576) and its probability value is (0.0000), which is evidence of the significance of the beta coefficient under the significance level of 0.05 when the rest of the variables are constant, as the spread of this service contributes directly to facilitating the transfer of funds, which may increase economic activity or demand for foreign currency. We find that the Zain Cash index has a direct effect, meaning that when (Zain Cash) increases by one unit, the banking credit index will increase by (16.60292), and this variable has a significant effect, and this is clear through the (t) test for the beta value coefficient (B2), which reached (6.422874) and its probability value is (0.0000) which is

evidence of the significance of the beta coefficient below the significance level of 0.05 when the rest of the variables are constant, the growth in the use of this digital service significantly enhances payment and transfer operations, which leads to a direct impact on the cash credit index, and this is an indicator of the shift in individuals' behavior towards digital financial services. We find that the electronic wallet index (Electronic Wallets) also has a direct effect, meaning that when the number of electronic wallets increases by one unit, the cash credit index will increase by (8949183), and this variable has a significant impact. This is evident through the t-test for the beta coefficient (B3) which reached (9.295681) and its probability value is (0.0000), which is evidence of the significance of the beta coefficient below the significance level of 0.05 when the rest of the variables are constant. This is considered a good indicator when relying on electronic wallets, which in turn increases the speed and flexibility of banking operations, and may reduce the use of traditional cash. We find that the point of sale indicator also has a direct effect, meaning that when the point of sale increases by one unit, the cash credit index will increase by (4.89× 〖10〗^8), which is equivalent in numerical form to (489000000), and this variable has a significant effect. This is evident through the (t) test for the beta coefficient (B4) which reached (2.608876) and its probability value is (0.0160), which is evidence of the significance of the beta coefficient under the 0.05 significance level when the rest of the variables are constant. We find that the point of cash index also has a direct effect, meaning that when the point of cash increases by one unit, the cash credit index will increase by (6.33× 〖10〗^8), which is equivalent in numerical form to (633000000), and that this variable has a significant effect, which is evident through the (t) test for the beta coefficient (B5) which reached (20.60224) and its probability value is (0.0000), which is evidence of the significance of the beta coefficient under the 0.05 significance level when the rest of the variables are constant.

Based on the results shown above, and specifically the t-value, we find that all artificial intelligence indicators (Asia Hawala, Zain Cash, e-wallet, points of sale, and cash payment points) were statistically significant at 0.05. Therefore, the hypothesis stating "There is a statistically significant impact of artificial intelligence indicators (Asia Hawala, Zain Cash, e-wallet, points of sale, and cash payment points) on the banking sector, represented by cash credit, for the period (2017-2023)" is accepted. The hypothesis stating "There is no statistically significant impact of artificial intelligence indicators (Asia Hawala, Zain Cash, e-wallet, points of sale, and cash payment points) on the banking sector, represented by cash credit, for the period (2017-2023)" is rejected. 1. The Impact of the Independent Variable (Asiacell Hawala) on Cash Credit

According to the current standard model, we note that there is one independent variable, represented by Asiacell Hawala, that affects the dependent variable, the bank credit index. The symbols of these variables will be used to formulate this model mathematically according to the following model:

BC=0+1(AH)i+i, i=1,2…..28

Where:

(Bank Credit) BC is cash credit

0 is the constant term and vector (1) represents the estimated parameter for the above model

(Asiacell Hawala) AH Asiacell Hawala

i is the random error term, which is normally distributed with a mean equal to zero and a variance equal to 2

2. The Impact of the Independent Variable (Zain Cash) on Cash Credit

According to the current standard model, we note that there is one independent variable, represented by Zain Cash, that affects the dependent variable, represented by the bank credit index. The symbols of these variables will be used to formulate this model mathematically according to the following model:

BC=0+1(ZC)i+i ,i=1,2…..28

Where

(Bank Credit) BC is cash credit

The constant and vector term (1) represents the estimated parameter for the above model

(Zain Cash) Z.C Zain Cash

i The random error term, which is distributed according to a normal distribution with a mean equal to zero and a variance equal to 2

3- The effect of the independent variable (electronic wallet) on cash credit

According to the current standard model, we note that there is one independent variable (electronic wallet) that affects the dependent variable, which is the bank credit index. The symbols of these variables will be used to formulate this model mathematically according to the following model:

BC=0+1(EW)i+i ,i=1,2…..28

Where

(Bank Credit) BC is cash credit

The constant and vector term (1) represents the estimated parameter for the above model

(Electronic Wallets) EW The electronic wallet

i The random error term, which is distributed according to a normal distribution with a mean equal to zero and a variance equal to To 2

4- The Impact of the Independent Variable (POS) on Cash Credit

According to the current standard model, we note that there is one independent variable (points of sale) that affects the dependent variable, the bank credit index. The symbols of these variables will be used to formulate this model mathematically according to the following model:

BC=0+1(P.O.S)i+i , i=1,2…..28

Where

(Bank Credit) BC is cash credit

is the constant term and vector (1) represents the estimated parameter for the above model

(Point of sale) P.O.S Points of sale

i is the random error term, which is distributed according to a normal distribution with a mean equal to zero and a variance equal to 2

5- The Impact of the Independent Variable (POC) on Cash Credit

According to the current standard model, we note that there is one independent variable (cash payment points) that affects the dependent variable, the bank credit index. The symbols of these variables will be used to formulate this model mathematically according to the following model:

BC=0+1(P.O.C)i+i ,i=1,2…..28

Where

(Bank Credit) BC is the cash credit

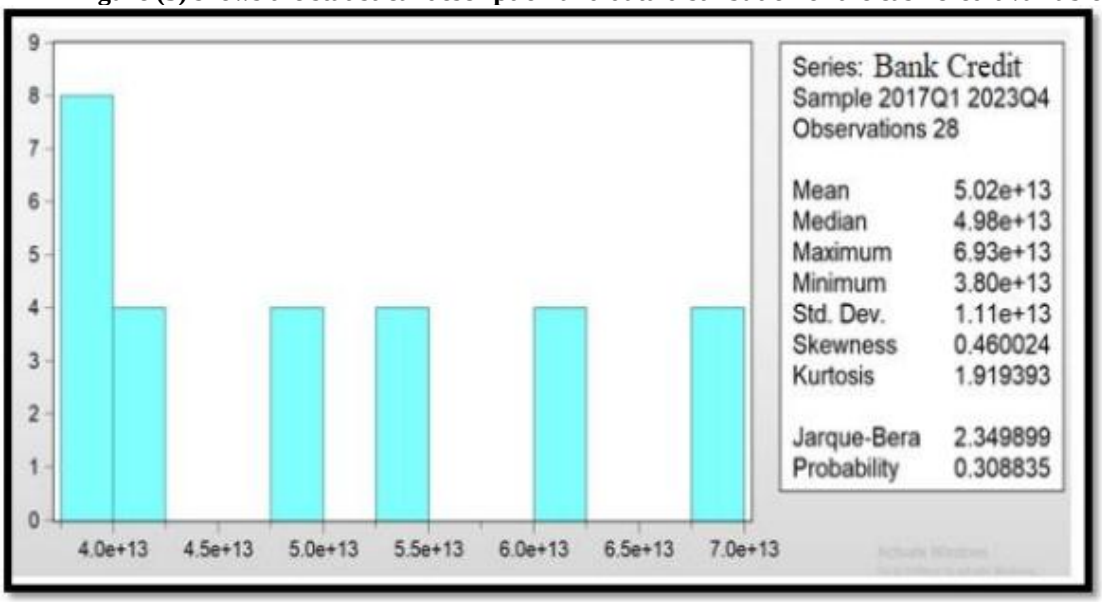
is the constant term and vector (1) represents the estimated parameter for the above model

(Point of Cash) P.O.C is the cash payment points

i is the random error term, which is normally distributed with a mean equal to zero and a variance equal to 2

The figure below shows the general statistical description of the bank credit variable and the normality test for the data for this variable.

Figure (3) shows the statistical description and data distribution of the cash credit variable.



Source: Researchers' preparation based on the Eviews12 program.

As shown in the figure above, we note that the average bank credit index for the years 2017-2023 (during the quarterly period) amounted to (3.02 x 1013), which is equivalent in numerical form to (30200000000000). The presence of a value of this magnitude indicates that the bank credit index has a clear and significant activity in the banking sector. The standard deviation of the bank credit index amounted to (1.11 x 1013), which is equivalent in numerical form to (1110000000000). From the standard deviation value, we note that there was fluctuation or volatility in bank credit over the time period. The skewness of this variable amounted to (0.460024), and this result is positive and approximately small, indicating that the years with values higher than the average bank credit values are not very

numerous. The skewness value was 1.919393, which is a relatively small value, indicating that bank credit values were close to each other during the study period, i.e., there were no sudden jumps. This means that the values of this indicator were stable throughout the study period.

To test the normal distribution of the bank credit index data, we will use the Jarque-Bera test. As shown in the figure above, we find that the value of the Jarque-Bera test was 2.349899, and its probability value was 0.308835. We find that the probability value is greater than 0.05, so the hypothesis that "the data related to the bank credit index are distributed according to a normal distribution" is accepted.

Correlationships between artificial intelligence indicators and the monetary credit index From the results shown below, we can identify the interconnected relationship between artificial intelligence indicators and the monetary credit index, as shown in the table below:

Table (3) shows the correlation between artificial intelligence indicators and the bank credit index.

Type and degree of relationship	Pearson's Correlation Coefficient (Significant)	--------	Artificial Intelligence Indicators
Strong direct relationship	(0.000) 0.698**	Cash Credit Index	Asiacell Transfer
Very strong direct relationship	(0.000) 0.867**	Cash Credit Index	Zain Cash
Very strong direct relationship	(0.000) 0.977**	Cash Credit Index	Electronic Wallet
Very strong direct relationship	(0.000) 0.958**	Cash Credit Index	Points of Sale
Very strong direct relationship	(0.000) 0.916**	Cash Credit Index	Cash Payment Points

**** This means that the correlation coefficient value is significant at 0.05 and 0.01.**

From the results presented in the table above, these relationships can be summarized as follows:

The relationship between the Asia Hawala Index and the Cash Credit Index is a strong, direct relationship, with the correlation coefficient value reaching 0.689. This result indicates that an increase in the Asia Hawala Index is accompanied by an increase in the Cash Credit Index value, and vice versa. We note that this correlation is significant at 0.05 and 0.01, as the significant value between these two indicators reached 0.000, which is much lower than 0.05 and 0.01. The relationship between the Zain Cash Index and the Cash Credit Index is a very strong, direct relationship, with the correlation coefficient value reaching 0.867. This result indicates that an increase in the Zain Cash Index is accompanied by an increase in the Cash Credit Index value, and vice versa. We note that this correlation is significant at 0.05 and 0.01. Because the significant value between these two indicators reached (0.000), which is much less than 0.05 and 0.01. The relationship between the electronic wallet index and the cash credit index is a very strong direct relationship, as the correlation coefficient value reached (0.977). This result indicates that an increase in the electronic wallet index is accompanied by an increase in the value of the cash credit index and vice versa. We note that this correlation is significant at 0.05 and also at 0.01. Because the significant value between these two indicators reached (0.000), which is much less than 0.05 and 0.01. The relationship between the point of sale index and the cash credit index is a very strong direct relationship, as the correlation coefficient value reached (0.958). This result indicates that an increase in the point of sale index is accompanied by an increase in the value of the cash credit index and vice versa. We note that this correlation is significant at 0.05 and also at 0.01. The significant value between these two indicators was 0.000, which is much lower than 0.05 and 0.01. The relationship between the cash payment points index and the cash credit index is a very strong direct relationship, with the correlation coefficient reaching 0.916. This result indicates that an increase in the cash payment points index is accompanied by an increase in the cash credit index, and vice versa. We note that this correlation is significant at 0.05 and 0.01, as the significant value between these two indicators reached 0.000, which is much lower than 0.05 and 0.01.

Conclusions:

1. Artificial intelligence embodies modern banking software and technologies that seek to perform tasks associated with human intelligence, contributing to improved levels of banking performance. This is achieved through the development of computer technology capable of performing actions similar to those of humans, interpreting structured and unstructured data, and processing information derived from data provided by artificial intelligence. This is reflected in banking performance through banking variables such as cash credit. 2. Artificial intelligence (AI) operates through several modern technologies and software applications in the Iraqi banking sector, including combating money laundering, conducting regulatory audits, and providing the required support to customers. It also analyzes massive amounts of data, automates automated banking operations with greater accuracy, increases protection, reduces risks, and improves bank performance.

3. The standard study revealed a significant impact of AI indicators in the Iraqi banking sector on cash credit during the study period. This was achieved by assisting AI in making accurate loan and credit decisions, as well as increasing banks' ability to create better credit models that are able to address credit risks and predict credit outcomes more accurately.

Recommendations:

1. The need to enhance modern AI applications in Iraqi banks by developing its role in various banking activities, such as problem-solving, decision-making, and task performance, thus improving banks' competitiveness.
2. Developing the skills of bank employees in dealing with various modern AI applications by providing training and development courses in this field.
3. Artificial intelligence can contribute to improving cash credit, borrowing, and financing operations through accurate assessment of credit risks and analysis of customers' creditworthiness.

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