

The Uses of Artificial Intelligence in the Algerian Banking Sector (Analytical Study for the Period 2016-2023)

Slama Wafa¹, Diaf Oulia², Hani Lidia³, Ammari Samir⁴

¹University of 20 August 1955 Skikda (Algeria), w.slama@univ-skikda.dz

²University of 20 August 1955 Skikda (Algeria), o.diaf@univ-skikda.dz

³University of 20 August 1955 Skikda (Algeria), econome.cem.tefahi.m.21@gmail.com

⁴University of 20 August 1955 Skikda (Algeria), Email: s.ammari@univ-skikda.dz

ARTICLE INFO

Received: 03 Oct 2025

Revised: 10 Nov 2025

Accepted: 18 Nov 2025

ABSTRACT

the study aims to highlight the uses of artificial intelligence in the Algerian banking sector by tracking the most important developments in the banking services provided in Algerian banks and the impact of artificial intelligence on the quality and nature of these services during the period from 2016-2023, the study found that remote banking activity depends in essence on what is produced by artificial intelligence, information technology, modern means and systems, and also showed us that these services have become in great demand by various groups of society, although some still prefer traditional methods of banking due to a lack of awareness of technology and how deal with it.

Keywords: artificial intelligence, banking sector, banking services.

INTRODUCTION

Artificial intelligence has contributed to the emergence of fundamental changes in the nature of the work of banks, and it is known that the latter is one of the most prominent sectors that are affected and respond to external changes, which led to a review of the quality of banking services offered, and an attempt to develop them to keep pace with technological developments in all fields, relying on electronic banking systems and artificial intelligence products of modern and advanced means, to provide services consistent with the wishes of consumers in the right place and time as a decisive factor for staying in the market, and owning a quality improvement system. As the technological progress in the banking field and the widespread use of the internet and modern electronic payment methods, banks have found themselves forced to move in the direction of integrating all the artificial intelligence tools and systems in their activity in order to prepare for new requirements and enter the modern digital economy.[5]

The problem of studying:

Despite the global progress in the field of artificial intelligence, the Algerian banking sector is still in its early stages and faces various challenges, and in this regard, the Algerian government has recently taken steps to modernize the financial sector, including the introduction of electronic payment systems, and the development of new financial technologies, and from here our research is based on the following main problematic:

How Algerian banks have benefited from artificial intelligence to improve their services and increase their efficiency?

The importance of studying:

The banking landscape has changed since the mid-nineties through the adoption of innovative information technologies. In this context, Algerian banks are reevaluating their business services to enhance customer experience and maintain competitiveness. Moreover, the rapid increase in artificial intelligence technology has revolutionized financial services because it has changed traditional financial systems and created new opportunities for financial inclusion, innovation and efficiency.

Study methodology:

The study is based on a descriptive analytical approach, highlighting the most important developments in banking services in Algeria based on artificial intelligence during the period 2016-2023.

1. The concept of artificial intelligence

Copeland and Proudfoot (1993) define Copeland and Proudfoot as "the process of developing computer systems capable of performing tasks that usually require the use of human intelligence, such as visual perception, speech recognition, decision-making, and translation". (Al-Munaim and Ismail, 2021, page 7).

The Arab-British Academy for higher education defined artificial intelligence as "a name given to a set of new methods for programming accounting systems, which are used to develop systems that simulate certain levels of human intelligence, and allow them to deduce facts and laws represented in computer memory." (Ayad, Mouloudi Abd elghani, Ahmed Halali, & Bishr Muhamed, 2021, p. 10)

Artificial intelligence has also been defined as "a reference to systems that display intelligent behavior by analyzing their environment and taking actions with a certain degree of autonomy to achieve specific goals". (Boucher, 2020, p. 4)

From here it becomes clear that artificial intelligence is to make a computer think intelligently approaching human intelligence.

2. application of artificial intelligence in banks

Artificial intelligence is used in banks in several areas that can be summarized in the following points: (Institute of Banking Studies, 2021, page 7_8)

- Open a new account and open a deposit.
- Transfer between accounts and local and external transfers.
- Credit card payment and mobile bill payment.
- From the financial side, artificial intelligence takes care of personal financial management, which helped banks complete routine repetitive operations and improve internal workflow.
- Automated processes can solve queries that need to be decided as Chatbot chatbots can understand natural language while communicating with customers and respond like a human. (Kochhar, Purohit, & Chutani, 2019, p. 130).
- Most of the major banks around the world are switching from rule-based software systems to artificial intelligence-based systems, which are more powerful and smarter in the fight against money laundering in the coming years, and these systems are set to become more flexible, accurate and fast,

with constant innovations and incarnations in the field of artificial intelligence.(The rich and the deadosh, 2022, page 312)

- Chatbots or virtual assistants are new tools designed to simplify human-computer interaction, and are considered a model of artificial intelligence in the banking sector as they replace the receptionist in banks. These AI-powered machines provide high-level, personalized digital experiences for customers.(Kaur & others, 2020, p. 583)

3. Banking services under artificial intelligence

In recent years, the Algerian government has shown great interest in the development of digitization in all fields, including the financial and banking sector, in order to seek to accelerate economic growth and improve financial inclusion in the country, and in this part we will try to present the most important electronic banking services used for artificial intelligence in Algeria and its development since 2016 to 2023.

3.1 automated taller machine (ATM)

It is a service that requires the availability of a network of communications connecting all branches of one bank or all branches of banks, where the ATM can serve the customer at any time it wants(Safar, 2006, p.160). where they represent mechanisms for providing self-service to him.

They are distinguished by their ability to perform many tasks such as providing account information, accepting deposits, withdrawing previously approved loans, as well as transferring funds.

Algeria has known a remarkable development in the number of ATMs, which is shown in the table below

Table No. 01: total number of bank ATMs operating in Algeria

The years	2016	2017	2018	2019	2020	2021	2022	2023
The total number of devices	1370	1443	1441	1621	3030	3053	3658	3848

Source: <https://giemonetique.dz/ar/activite-retrait-sur-atm> , accessed on 10-04- 2025.

The table clearly shows the increase in the number of ATM machines during the study period, as the number of banking devices operating in 2018 increased by 5.32% compared to 2016, reaching 3843 ATMs in 2023, an increase of 167.03% compared to 2018, This is due to the efforts of the state to harness devices on all postal centers and banking agencies in order to leak the electronic payment system in Algeria, especially in light of the corona pandemic, as part of the health protocol to avoid with the strong customer acceptance of this mechanism, the number continued to increase until 2023 at the same pace, but it remains minimal In comparison with the population density increased.

The following table shows the total number of ATM withdrawal transactions and the total amount of withdrawals from 2016 to 2023

Table No. 02: ATM withdrawal activity

The years	Total number of withdrawal transactions	total amount of withdrawal transactions
2016	6868031	98822524500.00
2017	8310170	162398291000.00
2018	8833913	136233452000.00
2019	9929652	164116233000.00
2020	58428933	1073004953000.00
2021	87722789	1728937064000.00
2022	128035361	2182896695000.00
2023	174415895	3262245367500.00

Source: <https://giemonetique.dz/ar/activite-retrait-sur-atm> , accessed on 15-04- 2025.

According to the table, we note a significant increase in ATM withdrawal transactions from 2016 to 2019, and then it developed 5-fold in 2020 with 58428933 transactions, while it amounted to 9929652 during 2019, and this is due to the accession of Algeria post to the automated cash pool and the exchange of transactions between the bank / gold card, which became effective since 05/01/2020, statistics increased regarding the activity of withdrawing from ATMs using cards, and people became cardholders gold postal account holders are able to access their funds from Bank dispensers.

We also note the increase in the amount of withdrawals from devices starting from 2020 by more than 1.073 billion Algerian dinars, and this continued until 2023, where it increased by 49.44% compared to 2022.

This is due to the change in the behavior of customers towards non-cash transactions in order to adapt to the current situation, as they prefer to withdraw cash from ATMs to avoid friction with people, starting from 2020 as a healthy behavior and then evolved into a preference for easy transaction with the withdrawal machine and gain time.

3-2 smart cards

the smart card is one of the latest versions in the world of information technology embraced by the electronic banking industry, the " Smart Card" card contains an electronic chip integrated into a card similar in size to a magnetic plastic payment card, stores on this chip electronic information and some programs protected by some advanced protection systems, and the smart card forms an integrated system to serve a lot of different applications.(Farouk, 2012, page 580).

According to the data of the automated cash pool, the number of CIB cards in 2023 reached 4022203, while the number of gold cards reached 12487304 cards, where the number of bank cards increased by 40.90% and the Gold Card by 84.54% during 2023 compared to 2020, and yet this increase remains weak compared to the number of residents and employees.

The Gold Card also occupies the lead in the percentage of transactions with 76% compared to only 24% for using the CIB card, which indicates that people get more Postal Accounts than they get bank accounts, and this is due to personal preferences and operating conditions.

The development in the use of Cards will continue only in 2024, the forecasts of the automated cash pool will estimate the increase in cards by 5% for the Gold Card with a total of 13,140,100 cards, and 2% for the bank card with a total of 4,104,326 cards until April 2024, As for electronic clearing via bank card, it was included in the Automated Clearing System in October 2006 And this is for all banks.(Con, 2017, page 386), where transactions via cards recorded a significant development from 2017 to 2019 in terms of transaction volume and value, where transactions increased by 19.98% in terms of volume and 27.25% in terms of value in 2018, reflecting significant efforts in the field of using this card due to the efforts exerted by the automated cash pool in the framework of upgrading the card services and strengthening its use, in addition to the issuance of the law on electronic commerce in May 2018, which allows the average presence of intensive e-commerce sites for the goods and services sector and the resulting wide use of online payment(report Annual of the Bank of Algeria for economic and Social Development, 2018).

Transactions using cards and transfers processed by the electronic clearing system in 2022 were the most frequently used, equal to 53.11% and 32.42%, respectively, of the total volume of mutual means of payment. The electronic clearing system for payments for the general public during 2023 processed the equivalent of 75 million payment transactions, worth 22958 billion dinars, compared to 55 million transactions worth 20565 billion dinars during 2022, a significant increase of 35.6% in volume and 11.6% in value.

Transactions using cards and transfers processed by electronic clearing in 2023 were the most used by 62.6% and 26.4%, respectively, compared to the total volume of mutual means of payment.(Algeria, 2024, P. 74), this is as shown in the table below.

Table No. 03: means of payment used in Algerian banks in 2023

Payment methods	cheques	commercial papers	transfers	deductions	card transactions
percentage	11	0	27	0	62

Source: Bank of Algeria, annual report on economic and monetary development, 2023

From year to year, electronic payment methods strengthen their dominance in the payments market, unlike traditional paper means (checks, commercial papers).

3.3 mobile banking

It is a platform for conducting banking transactions through a mobile device, that is, an extension of internet banking services by using a mobile device with features.(Matthew, 2020).

This type of Service is based on applications that the bank puts at the disposal of its customers and are downloaded to the mobile phone for communication between the client and the bank. With the expanded use of mobile phone and its spread in Algeria, mobile banking services have emerged as a convenient and affordable way for customers to manage their financial affairs, and phone banking applications have become widespread in Algeria, where many banks offer their customers the ability to conduct a variety of transactions from their mobile devices, including account balance queries, money transfers, and Bill Payments, where local development bank BDL was the first public Public

Bank to launch a mobile banking service at the beginning of 2016, and on the other hand, Bnp Paribas Algeria and Gulf Bank were the first two institutions two companies have taken a step towards mobile technology Mobile.

In 2018, Natixis Banksy launched, the first mobile bank in Algeria, which allows customers to open a bank account remotely, check their balance, download personal data, transfer money to other accounts, and open accounts in foreign currency.

The National Bank of Algeria BNA also launched the wimpay- BNA mobile payment application in March 2021, followed by Al Baraka Bank in November 2021, the M-PAY application, and other banks introduced mobile payment applications and other digital services that allow users to track expenses and receipts in real time and access transaction records at any time (OUAZZANI IBRAHIMI Meriem, 2024) .

The following table shows the development of telephone payment transactions during the years 2022, 2023

Table No. 4: total value of telephone payment transactions

The years	Nov2022	Dec2022	2023
Number of transactions	2019180	2165941	39283478
Total value	1462237873.38	149136748.36	27855521037.78

Source: <https://giemonetique.dz/activite-paiement-par-mobile>

According to Table No. 04 and the previous table, mobile payment operations licensed by Bank of Algeria recorded a significant volume estimated at 4.185 million transactions with a total value of 2.954 billion dinars, and this development continued to reach by the end of 2023 to about 39 million transactions with a total value of about 28 billion dinars, and this is explained by the continuous efforts to develop electronic payment in Algeria and the increase of the mobile internet in Algeria by 1.8 million, or 3.8% between 2022 and 2023, according to the annual report of the international consulting agency, but it is not enough Compared to the extraordinary levels of mobile phone usage in Algeria, telecommunications accounted for 107.2% of the total population in January 2023.

3.4 Online banking

The Bank of Algeria has published the list of licensed banking products and services in law 01-2020 dated March 15, 2020, which defines the general rules of the conditions applicable to banking operations according to the Bank of Algeria, as for digital banking services, they include inquiry about the current account, savings, deposits, treasury bills, loans, checks, foreign exchange rates, consulting and printing account history, downloading account statements, transactions and transfers between accounts and between banks, Bill Payment and ordering bank cards and checks(AMRANE & DAMENE, 2023, P. 222).

Since October 2016, online payment by bank card has become practical in Algeria and this service has been opened at the first stage for large billing operators : water and energy distribution companies (gas and electricity), fixed and mobile telephones, insurance companies, Air Transport and some departments.

The table below shows the total online payment transactions in Algeria from 2016 to 2023

Table No. 5: total online payment transactions in Algeria from 2016 to 2023

The years	2016	2019	2020	2023
total online payment transactions	7366	202480	4593960	15351364

Source: <https://giemonetique.dz/ar/qui-sommes-nous/activite-paiement-sur-internet/>

The volume of transactions has been increasing continuously over the years, as the volume of transactions began in 2016 with 7366 transactions and increased to 15351364 transactions in 2023, which is a very significant increase. It also notes the sudden increase in 2020 compared to 2019, where 4593960 transactions were recorded compared to 202480 transactions in 2019, according to the report of the Bank of Algeria for the year 2020 and according to the statistics of the automated cash pool, 71 merchants were approved compared to 45 merchants at the end of 2019, and online payments were recorded at a value of 5.424 billion dinars ,and online card payments recorded an average value of 1180.62 dinars for the operation.

This can be explained by the covid-19 pandemic, which led to an increase in online transactions as people switched to remote work and to e-commerce.the number of e-commerce sites in 2020 was estimated at 48 sites and increased in the first half of 2021 to 105 sites with an increase of 118.75% and an increase in transactions estimated at 70.25%. on the other hand, home delivery services purchased online witnessed a significant growth in the country during the quarantine period.

The year 2023 saw an increase in the percentage of transactions with 69.66% of the total transactions, as online payment relied mainly on the telecommunications sector, which includes fixed and mobile phones with 54.72% of transactions, and the lowest transaction percentage was allocated to the insurance sector with 0.25%.

By the end of 2023, the number of commercial websites involved in the online payment system by interbank card at the national level continued to rise to 475 customers. The number of e-merchants currently reaches 510 merchants involved in the bank's electronic payment system ‘This is especially true for major billing companies such as the Algerian Water Corporation and sonelgazo telecom Algeria, as well as mobile phone operators, insurance companies and air transport.

Through the above, it is clear the attempt to develop alternative means of payment via the internet in order to keep abreast of global developments, and this development has been in vogue since 2020, where customers and merchants have turned to facilitating daily transactions without the need for mobility and instant payment using cash, and this development has continued to the present day to include larger areas with work to reduce liquidity circulation and the development of dealing with bank cards, despite the fact that this technology is modern at the national level so that electronic payment processes modernize the banking system and strive towards digital transformation in the financial sector in Algeria.

3.5 Electronic payment devices (TPE)

The electronic payment terminal is a device used for the payment process using the card, and it is connected to the specialized services of the bank, and the merchant can also register the payment in his electronic payment terminal, and there are two types of payment devices:

- Payment device connected to the electronic chip reading unit (PIN-PAD) for large areas.
- Mobile payment device for small spaces.(Ibrahim, 2020, p. 304) SATIM offers merchants a solution for close payment through a bank card to accept financial transactions on electronic payment

terminals, and this solution allows transaction security via the EMV standard, protecting people against theft and assault, and money forgery through the use of a secret number, where the collected amounts are paid directly and automatically to the merchant's account in a very short time.(SATIM, 2025) The following table shows the development of payment activity through the electronic payment device during the period from 2016 to 2023.

Table No. 6: Electronic payment activity via TPE

The years	The total number of operating electronic payment terminals
2016	5 049
2017	11 985
2018	15 397
2019	23 762
2020	33 945
2021	37 561
2022	46 263
2023	53 191

Source: <https://giemonetique.dz/ar/qui-sommes-nous/activite-paiement-sur-internet/>

According to tables No. 5 and 6, it is noted that during the period 2016-2023, the number of electronic payment terminals operating increased from 5049 devices in 2016 to 53191 devices in 2023, where it increased by 14.99% compared to the previous year, due to the increase in the number of merchants involved in the electronic payment banking system. There are currently 510 traders, up from 219 in 2022, where this increase is considered significant, but it remains far from the expected results by the government authorities through the electronic commerce Law issued in May 2018(Annual Report of the Bank of Algeria for economic and monetary development for the year 2022).

4-Study results

The use of artificial intelligence will play a positive role in the modernization of the financial sector in Algeria by improving risk management, as well as the services of banks and insurance companies for customers, but despite the efforts made in the banking sector to transfer many modern technologies and take advantage of artificial intelligence technology, which is working on the development of electronic banking services, especially with the beginning of 2020 and the subsequent changes, these efforts remain insufficient, and this is due to many factors:

- Poor infrastructure needed to develop these technologies;

- Insufficient electronic withdrawal and payment devices compared to the population density and not available to everyone;
- The lack of confidence of the merchant and the customer in modern payment methods and his preference for paper money;
- Lack of legal texts governing electronic banking;
- The lack of demand of individuals for online banking and their tendency to traditional methods and direct dealing with the bank;
- The novelty of dealing with the bank card in online or mobile payment and electronic payment device, as it is in its early stages.

CONCLUSION:

Through this study, we touched upon the reality of artificial intelligence and the degree of its adoption in the Algerian banking sector, where it was highlighted the electronic banking services provided by Algerian banks, which artificial intelligence enters into their development, and the efforts exerted by the state to develop and work to provide them, and make them available to the population in order to keep pace with digital development and strive to achieve financial inclusion, and upgrading banking services by applying artificial intelligence technologies, which has revolutionized customer service at the international level.

We have also found out that these services have become in great demand by various segments of society, although some still prefer traditional methods of banking due to the lack of awareness of technology and how to deal with it, and distrust, especially in developing countries such as Algeria, and we have recorded through our study that the year 2020 expressed a development in the field of electronic banking services due to the policies adopted to confront the biological crisis, which resulted in changes in the behavior of customers, and this development and the pursuit of improving the quality of services continued.

LIST OF REFERENCES

- [1] Godfred Matthew, (2020) . **Mobile banking adoption among the Ghanaian youth**. journal of african busines.
- [2] Khyati Kochhar, HarashPurohit, and RavishaChutani. (2019). **The rise of Artificial intelligence in Banking Sector**,. the 5th international conference on educational research and practice(ICERP),educating the digital society: integrating humanistic and scientific value.Malaysia.
- [3] Lila Ayad, Mouloudi Abdelghani, Ahmed Halali, and Bishr Mohamed. (2021). **Artificial Intelligence as One of the Development Strategies for Business Organizations “Toyota Model”**. Applications of Artificial Intelligence in Business, Education and Healthcare.
- [4] Navleen Kaur, and others. (June, 2020). **the influence of artificial intelligence on the banking industry and how AI is changing the face of modern day banks**.International Journal of Management ,11(6).
- [5] Abhishake Reddy Onteddu. (2021). AI and Deep Learning-Based Intelligent Drug Recommendation System for Patient Health Monitoring in IoT-Enabled Healthcare. Journal of Informatics Education and Research, 1(3).
- [6] OUAZZANI IBRAHIMI Meriem. (2024). **l’intelligence Artificielle dans le secteur bancaire**. Revue du contrôle de la comptabilité et de l’Audit ,8(1).

- [7] Philip Boucher. (2020). **Artificial intelligence: How does it work, why does it matter, and what can we do about it? Scientific Foresight Unit (STOA)** , EPRS | European Parliamentary Research Service.
- [8] REFAFA Ibrahim. (Decembre, 2020). **La monétique en Algérie, développement et perspectives.** Journal d'études en économie et management (volume 03(N°06)
- [9] Samra AMRANE, and Ouahiba DAMENE. (2023). **Fintech Adoptin in the Algerian banking sector : Reality and challenges.**, Journal of economic integration 11(5).
- [10]_ SATIM. (2025),<https://www.satim.dz/index.php/fr/services-cib/operations-de-paiement>
- [11] Ahmed Safar. (2006). **Electronic banking in the Arab countries:** The modern Book Foundation.
- [12]-monetary gathering- cartes- Lebanon-<https://giemonetique.dz/>
- [13] Bank of Algeria. (2024). Annual report 2023 economic and monetary development.
- [14] Bank of Algeria. (2018). Annual report of the Bank of Algeria for monetary economic development - Hariri Abdul Ghani, and Hajra didoush . (Joan, 2022). **The application of electronic banking and artificial intelligence in the savings and Reserve Bank**, a case study of the regional directorate in Chlef. (Hassiba bin Bouali University, Editor) Journal of management and development for research and studies, 11(1).
- [15] Steve Whelan. (No date). ATM machines. (CGAP). Retrieved from https://www.findevgateway.org/sites/default/files/publications/files/mfg-ar-atm-machines-22645_0.pdf
- [16] Ghandour Ghassan Farouk. (2012). **Electronic payment methods and their importance in the settlement of payments between mutual parties.** Journal of Damascus University of economic and Legal Sciences(1).
- [17] Fatiha con. (Avril, 2017). The electronic clearing system as a mechanism for the development and modernization of payment methods in Algeria. Algerian Journal of Economics and Finance(7).
- [18] The World Bank Group, from <https://data.albankaldawli.org/indicator/FB.ATM.TOTL.P5?locations=DZ>.
- [19] Institute of Banking Studies. (2021). **Artificial intelligence.** Illuminations, 13(4).
- [20] HIba Abd el Moneim, and Mohamed Ismail. (2021). **The economic repercussions of the fourth industrial revolution (artificial intelligence).**A series of Economic Studies.