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Artificial Intelligence as a Strategic Option for Developing and Improving Digital Banking Services

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Abstract:

The world is witnessing an accelerated digital transformation that has reshaped various sectors, foremost among them the banking sector, which has become a pivotal component of the digital economy. Adopting artificial intelligence technologies has become an inevitable choice to develop banking services, raise their efficiency, and meet the requirements of speed, accuracy, and security. The experiences of global financial institutions such as HSBC and JPMorgan have demonstrated the effectiveness of intelligent systems in analyzing data, detecting fraud, and predicting customer behavior, which has contributed to improved performance and enhanced service quality.

In Algeria, the pace of digitalization has accelerated, especially after the coronavirus pandemic, yet the use of artificial intelligence is still in its early stages. Despite the advantages it offers—such as faster processing of loan applications, more accurate assessment of creditworthiness, and stronger cybersecurity through real-time detection of suspicious activities—Algerian banks face challenges related to weak infrastructure, delays in the legislative framework, a shortage of skilled professionals, and resistance to change. Therefore, investing in updating laws, supporting innovation, and developing human resources remains a fundamental pillar for making artificial intelligence a strategic entry point to achieve sustainable banking transformation and future financial competitiveness.

Keywords: Artificial Intelligence; Digital Transformation; Digital Banking Services; Cybersecurity; Banking Governance.

INTRODUCTION

The world today is experiencing profound digital transformations across various sectors, and the banking sector is among the most affected by this technological wave. Banks are no longer merely traditional financial institutions; they have become a key factor in the modern digital economy. With customers' growing demands for speed, security, and accuracy, it has become necessary for banking institutions to adopt modern technological tools—foremost among them artificial intelligence¹—in order to develop their services and improve their operational efficiency.

Global experiences have shown that integrating artificial intelligence into banking operations helps raise performance levels and enhance the customer experience, while also contributing to cost reduction and stronger financial security. Major banks in Europe, Asia, and the United States—such as HSBC and JPMorgan—now rely on intelligent systems to analyze data, detect fraud, and predict customer behavior.

In Algeria, some banks have begun taking initial steps in this direction, especially after the COVID-19 pandemic accelerated the need to shift toward electronic services². However, this transformation still faces technical, regulatory, and human challenges that limit its effectiveness. Hence, the importance of studying artificial intelligence as a strategic option for modernizing the Algerian banking system and examining the extent to which it can support digital services and achieve intelligent banking transformation.

Accordingly, the following research question can be raised:

To what extent can artificial intelligence technologies contribute to developing and improving digital banking services in Algeria?

To answer this question, the study was divided into two main sections. In addressing this issue, the research relied on analyzing the importance of integrating digital technologies to improve performance and enhance the customer experience on the one hand, and reviewing the state of banking innovation in Algeria between challenges and prospects for adopting sustainable digital strategies on the other hand. The study adopted descriptive, analytical, and inductive approaches to diagnose the reality of banking innovation in Algeria and to infer the extent to which banks are capable of adopting sustainable digital strategies.

THE FIRST TOPIC: THE IMPORTANCE OF INTEGRATING DIGITAL TECHNOLOGIES IN IMPROVING BANKING PERFORMANCE

In light of the rapid technological transformations the world is witnessing today, integrating artificial intelligence into banking transactions and services has become an indispensable strategic option for developing the financial sector and ensuring its continuity in a changing digital environment. Artificial intelligence is not merely a technical tool; it is a digital intellectual system that is reshaping how banks operate—from service delivery to investment decision-making.

Digital transformation in the banking sector represents a real revolution in the concepts of banking service. The relationship between the bank and the customer is no longer confined to the traditional framework; it has moved to a more flexible and intelligent virtual space. In this context, artificial intelligence has emerged as one of the most important drivers of this transformation, given its capabilities in analysis, prediction, and self-learning, which has enabled banks to provide personalized and precise services aligned with each customer's individual needs.

First requirement: Artificial Intelligence as a Tool to Raise Efficiency and Achieve Effective Performance

Artificial intelligence has today become a fundamental pillar of the digital transformation of the banking sector, thanks to the accurate analytical capabilities it provides, which help in making more efficient financial decisions. Banks now deal daily with enormous volumes of data that require fast and intelligent processing—something modern algorithms and machine-learning tools can deliver.

Banking institutions use these tools to analyze banking transactions and detect unusual patterns. For example, banks such as HSBC and JPMorgan rely on intelligent systems to analyze data in real time, which has enabled them to significantly reduce cases of financial fraud³. Artificial intelligence technologies are also used to assess customers' creditworthiness more accurately by studying their financial and digital behavior rather than relying only on traditional criteria⁴.

In Algeria, some banks have begun introducing these applications on a limited basis, such as the Banque Extérieure d'Algérie and Al Salam Bank, both of which have started using data-analysis tools to improve electronic services and monitor banking operations. Although these experiences remain modest, they represent a first step toward building a smart bank that relies on modern technology in managing its services.

Artificial intelligence has come to simulate the way humans think when making decisions, especially in banks. In the past, when a customer applied for a loan (such as a housing loan or a car loan), they would wait several days while bank employees manually reviewed the file to determine whether the customer was eligible.

Today, thanks to artificial intelligence, the customer can submit an application online, and an intelligent computer program analyzes it immediately by reviewing the customer's financial history, previous records, and other factors. Based on that, the system issues a fast and accurate decision to approve or reject the loan, saving time and effort for both the bank and the customer⁵.

Second requirement: Artificial Intelligence as a Guarantee of Banking Security and the Building of Digital Trust

The importance of artificial intelligence is not limited to improving internal performance; it also extends to strengthening cybersecurity, which is a fundamental element for the success of any digital banking experience. With the growing volume of electronic transactions, the risks of hacking and fraud have become a real threat to banking institutions.

For this reason, global banks rely on intelligent systems to detect suspicious transactions in real time, such as the “Falcon Fraud Manager” system, which analyzes financial behavior patterns and issues alerts when any abnormal activity is detected. This type of system has helped banks significantly reduce losses resulting from fraud.

In Algeria, some banks—such as the National Bank of Algeria and Al Salam Bank—have moved toward developing electronic monitoring systems that rely on artificial intelligence to detect breaches and attempts at fraud⁶. These efforts have also contributed to raising awareness within the banking sector about the importance of cybersecurity as part of modern financial governance.

In addition, artificial intelligence can improve the customer experience by providing personalized services, such as virtual assistants or intelligent chatbots that help customers carry out their transactions easily⁷. For example, banks use chatbot technology—intelligent programs that rely on artificial intelligence to communicate with customers and answer their questions automatically and instantly⁸.

This technology has helped banks to:

- Facilitate communication with customers without requiring staff to be present at all times.
- Collect and analyze customer data quickly and accurately to improve services.
- Reduce pressure on employees and save time and costs.
- Attract new customers and retain existing ones thanks to fast responses and high service quality.

In short, chatbot technology has made banking services smarter and more efficient, contributing to higher customer satisfaction and improved overall bank performance⁹.

THE SECOND TOPIC: THE REALITY OF BANKING INNOVATION IN ALGERIA BETWEEN CHALLENGES AND THE PROSPECTS OF DIGITAL TRANSFORMATION

Artificial intelligence applications are among the fundamental pillars for modernizing and developing the banking sector in Algeria, given their effective role in improving the quality of banking services and facilitating financial transactions. With the accelerating shift toward digitalization, Algerian banks have begun to invest increasingly in artificial intelligence technologies to strengthen their competitiveness and raise operational efficiency. However, this promising path faces a set of challenges that may limit the spread and sustainability of these technologies, which makes it necessary to develop effective future strategies to address and overcome them in a way that ensures the building of an integrated digital banking system.

First requirement: Challenges Facing Banking Innovation in Algeria

Digital transformation in the banking sector is one of the essential pillars for advancing the national economy and keeping pace with the requirements of financial globalization. However, in Algeria this path is still surrounded by a number of challenges that hinder a smooth transition toward a modern banking model based on innovation and financial technology. These challenges appear at several levels—technical, institutional, and regulatory—making digital transformation a strategic issue that requires a comprehensive vision and genuine commitment from both banking actors and regulatory bodies.

The first of these challenges is the limited technological infrastructure and weak investment in digitalization. Many Algerian banking institutions still rely

on old, non-integrated information systems, which makes data exchange slow and prone to errors. In addition, the limited availability of high-speed internet—especially in inland regions—reduces the effectiveness of electronic banking services. For example, many customers still face difficulty making transfers through banking applications or using bank cards online, which negatively affects users' trust in digital platforms¹⁰.

The second obstacle lies in the slow pace at which the legislative and regulatory framework keeps up with digital financial developments. Algerian laws related to banking activity and electronic payments are still in the early stages of development, despite efforts by the Bank of Algeria to issue new instructions regulating mobile payments. However, the absence of clear legislation covering financial artificial intelligence, blockchain-based transactions, and digital financing makes banks hesitant to adopt innovations for fear of falling into a legal vacuum or being exposed to regulatory risks.

In addition to this, there is a shortage of technical competencies and qualified personnel in fields such as artificial intelligence, data analysis, and cybersecurity. Digital transformation does not rely on technology alone, but also on the human element capable of managing and developing it¹¹. In Algeria, universities and financial institutes still provide traditional training that is far removed from the requirements of the digital era, which often leads banks to rely on foreign expertise or ready-made imported solutions that do not always fit the specific characteristics of the local market.

Another major obstacle is resistance to change within traditional banking institutions, as some banking administrations still view digitalization as merely a costly technological option rather than a long-term strategic investment. This conservative mindset hinders the integration of new technologies and limits the spirit of innovation within administrative teams, especially in the absence of programs that encourage employees to adopt digital transformation or develop their skills in financial technology.

Another challenge that cannot be overlooked is the weak level of trust among users in electronic banking services. Many customers still prefer direct cash transactions due to fear of cyberattacks, technical errors, or insufficient technical support. Statistics show that the rate of bank card usage in Algeria remains modest compared to other Arab countries such as Morocco or the United Arab Emirates, despite the relative expansion of electronic payment points in recent years.

It is clear that digital banking transformation in Algeria is still in its foundational stage, and that overcoming these challenges requires a comprehensive restructuring of the banking system based on investment in technology, developing human resources¹², and updating legislation in a way that ensures a secure and innovative digital financial environment. The future of banking in Algeria will not be built on traditional competition, but on the ability to adapt quickly to the digital revolution and turn it into a tool for growth and economic sustainability.

Second requirement: Prospects for Adopting Sustainable Digital Strategies

The Algerian banking sector is witnessing a gradual shift toward digitalization, driven by global transformations in financial technology and the need to improve the quality of services provided to citizens. While technical and institutional challenges still persist, the opportunities available for adopting sustainable digital strategies appear promising, provided that a comprehensive national vision is in place—one that integrates financial innovation at the core of the banking system. The most important prospects can be outlined through a set of strategic pathways that lay the foundation for a smart and advanced banking future.

First, adopting the “smart bank” model represents a pivotal step in modernizing the Algerian banking sector. This model is based on leveraging big data¹³ and predictive analytics to deliver customized services that match the needs of each customer. Through advanced algorithms, a bank can analyze customers’ financial behavior and propose products or loans suited to their purchasing power and credit history. For example, banks such as HSBC and Citibank rely on artificial intelligence models that anticipate market shifts and guide their investment decisions accordingly, ensuring financial efficiency and stable profits. Applying this approach in Algeria would create a smarter and more interactive banking experience for customers.

Second, open innovation and collaboration with financial technology companies stand out as key drivers of digital transformation. Instead of relying solely on internal solutions, Algerian banks can enter partnerships with startups in areas such as electronic payments, data analytics, and digital insurance to develop new financial services that respond to the needs of modern customers. For instance, Arab banks such as Al Rajhi Bank have succeeded in building integrated digital banking ecosystems through cooperation with FinTech platforms to offer mobile payments and electronic wallets. In Algeria,

encouraging this type of collaboration would accelerate the transition toward a digital economy based on shared innovation.

Third, strengthening cybersecurity is a fundamental condition for achieving digital sustainability. Every expansion of electronic services is accompanied by a rise in the risks of breaches and cyberattacks. Therefore, Algerian banks should invest in intelligent protection systems based on artificial intelligence and behavioral analytics to detect intrusion attempts in real time¹⁴. In the Algerian context, some banks have begun testing advanced security analysis tools, especially after launching electronic payment applications, which indicates growing awareness of the importance of digital security as a driver of trust and sustainability¹⁵.

Fourth, financial innovation cannot be achieved without reforming the legal and regulatory framework. Digital transformation requires flexible legislation that encourages financial experimentation and keeps pace with technical developments, such as blockchain and national digital currencies. Algeria can draw on the experiences of advanced countries in this field, which have established integrated legal frameworks for mobile payments, enabling the inclusion of broad segments of citizens within the financial system. Amending Algerian legislation to facilitate electronic banking services would be a crucial step toward building a digital environment that encourages safe and sustainable innovation¹⁶.

Fifth, investing in the development of digital human resources and adopting change management is the foundation of every successful transformation. Human competencies are the real engine of any digital strategy. Therefore, Algerian banks should develop specialized training programs in artificial intelligence, data analysis, and cybersecurity, in cooperation with universities and research centers. They should also embed a new digital culture within banking institutions—one that values initiative and rewards innovation.

The use of mobile applications for financial transactions in Algeria remains relatively limited despite the spread of smartphones. It has been found that topping up phone and internet credit is the most common use at 36.2%, followed by money transfers and bill payments at 17.1%, while 28.2% of respondents do not use online financial applications at all¹⁷. Therefore, it is necessary for Algerian banking institutions to promote digital financial literacy and develop more electronic services in order to align supply with demand, strengthen trust in online financial transactions, and move toward a banking model that is more responsive to customers' needs. This should be expanded to include artificial intelligence

services and payments via QR codes, so that Algerian banks can become a model to follow in adopting sustainable financial innovation within the Algerian market.

Moving toward sustainable digital banking strategies in Algeria requires harmony between technology, legislation, and human capital. The future of Algerian banking will not be built solely on technical digitalization, but on a comprehensive vision that places innovation at the heart of financial policies and ensures sustainability, transparency, and trust as essential elements in the relationship between the bank and its customers.

CONCLUSION

Artificial intelligence today represents a decisive strategic bet for modernizing the Algerian banking system and integrating it into the global digital economy. Every investment in this field is an investment in a more sustainable, transparent, and competitive financial future, strengthening the position of Algerian banks as key actors in the path of digital economic development. This requires the state to adopt and integrate artificial intelligence across financial institutions—especially banks. Accordingly, the following proposals should be considered:

- **Improve the legal and regulatory framework:** Updating and developing the legislative and regulatory system is an essential step to protect users and strengthen trust in artificial intelligence applications within the banking sector. The absence of clear legislation regulating bank cards and electronic transactions may lead to legal disputes and practical complications. This requires the legislator to enact precise legal texts that define the nature of these transactions and clearly allocate legal responsibilities among the various parties.
- **Invest in technical infrastructure:** Public authorities should work to develop a strong digital infrastructure that supports artificial intelligence applications in banking by expanding internet coverage, improving service quality, and increasing electronic payment points by providing merchants with modern payment devices free of charge. Incentive mechanisms should also be established to encourage merchants and consumers to use electronic payment systems and build confidence in them.
- **Develop human resources:** Training human resources is a fundamental pillar for the success of digital transformation in the banking sector. Therefore, continuous training programs should be prepared for all stakeholders in banking institutions—employees and merchants—to enable

them to interact efficiently with modern digital systems and improve the quality of services provided to customers.

- **Strengthen banking culture:** Banking digitalization requires building a digital financial culture among individuals and institutions. This can be achieved through awareness campaigns and by simplifying procedures related to the use of electronic payment tools, along with reducing or eliminating certain fees for issuing and activating bank cards, which would encourage citizens to adopt them in daily transactions.
- **Enhance cybersecurity:** Protecting electronic banking transactions and users' data is a top priority, which requires adopting strong cybersecurity strategies. This includes enacting legislation to combat cybercrime and banking fraud and providing a legal framework that ensures the safety of users in electronic payment activities, especially online.
- **Modernize information systems:** Banking institutions must update their information systems periodically to keep pace with technological developments and ensure operational flexibility and service continuity. These systems should be capable of adapting to modern innovations in artificial intelligence and electronic payments.
- **Develop an integrated digital architecture:** It is necessary to establish a secure and efficient digital infrastructure that links banking databases with artificial intelligence systems, ensuring fast transaction processing and high-quality services for customers.
- **Reform the legal system governing financial innovation:** It is advisable to issue new legal texts that define the regulatory framework for financial artificial intelligence and electronic payment technologies, providing a clear legal environment that encourages innovation in the financial domain.
- **Establish a national center for research in financial artificial intelligence:** It is proposed to create a national center dedicated to research and development in financial artificial intelligence, working to innovate local technological solutions that fit the specific characteristics of the Algerian market and reduce technological dependence on external sources.
- **Develop specialized banking competencies:** Advanced training programs should be launched in artificial intelligence, data science, and cybersecurity to ensure the preparation of banking professionals capable of managing digital transformation efficiently.

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