
Digital Transformation as a Driver for Developing the Banking Infrastructure in Algeria: An Analytical Study (2019–2025)

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Received: 17/02/2026.

Accepted: 25/03/2026

Published: 25/05/2026

Abstract:

This study examines digital transformation as a tool for developing Algeria's banking infrastructure (2019–2025) to align with global practices. Using a descriptive-analytical approach based on Central Bank reports, it analyzes the evolution of electronic payment systems and digital banking services:

The results show a significant increase in the adoption of ATMs, POS terminals, and transaction volume, reflecting the integration of digital services into daily behavior and enhanced confidence in non-cash payments. Despite these gains, the system still faces challenges like incomplete modernization and limited ICT infrastructure, placing Algeria in mid-to-late global ranks. The study offers insights to enhance banking competitiveness amid rapid technological challenges.

Keywords: Digital Transformation, Banking Infrastructure, Electronic Payment, Digital Financial Services, Algerian Banking System.

Jel Classification Codes: G21, O33, E42..

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1. Introduction:

The global banking sector is undergoing a profound structural shift driven by digital transformation, moving from traditional physical operations to integrated electronic ecosystems. This transition is no longer a strategic option but a fundamental necessity for enhancing operational efficiency and fostering financial inclusion. In Algeria, the government has launched ambitious initiatives to modernize its financial infrastructure and align with international standards. However, the path toward a fully digitalized banking system faces a complex interplay of infrastructural growth and persistent structural challenges. This study examines these dynamics by analyzing the evolution of digital banking tools and their impact on the Algerian economy from 2019 to 2025.

1.1 Research Problem :

This study addresses the following central problem To:

what extent has digital transformation contributed to the development and modernization of the banking infrastructure in Algeria during the period 2019–2025?

1.2 Sub-questions:

- What is the theoretical framework for digital transformation in the banking sector?
- How have electronic payment and settlement systems (such as ARTS and ATCI) evolved in Algeria?
- What is the current status of digital banking infrastructure, specifically regarding ATMs and POS terminals?

1.3 Hypotheses:

- Digital transformation acts as a primary driver for improving banking operations and enhancing the efficiency of the Algerian financial sector.
- There is a positive trend in the adoption of electronic payment methods among Algerian individuals and businesses, reflecting increased confidence in non-cash transactions.

1.4 Research Importance: The importance of this study stems from the following points:

- It provides an up-to-date analytical framework for the digital transformation process in the Algerian banking sector (2019–2025).
- It offers insights for policymakers and financial authorities in Algeria to evaluate the effectiveness of digital payment strategies.
- It highlights how digital infrastructure can bridge the gap between traditional banking and the unbanked population in Algeria.
- Demonstrates the role of non-cash transactions in building a more secure and flexible national economy.

1.5 Research Objectives: The study aims to achieve the following:

- To analyze the current state of digital banking infrastructure (ATMs, POS, and Electronic Payment Systems) in Algeria.
- To track the quantitative and qualitative growth of digital transactions over the period 2019–2025.
- To investigate the impact of external factors, such as the COVID-19 pandemic and government digitalization initiatives, on banking behavior.
- To identify the technical and structural barriers preventing the full modernization of the Algerian financial system.

1.6 Research Methodology:

The study adopted a descriptive-analytical approach to build the theoretical framework and analyze the conceptual dimensions of digital transformation. Furthermore, it adopts a Case Study methodology applied to the Algerian banking sector. This involves a longitudinal analysis of empirical data and official indicators from 2019 to 2025, provided by the Bank of Algeria and GIE Monétique, to evaluate the actual progress and performance of the national banking infrastructure.

2. Theoretical Framework for Digital Transformation

2.1 Definition of Digital Transformation

Several definitions have addressed digital transformation, among which the most prominent are the following:

Digital transformation is defined as the process of converting government institutions or private-sector organizations into a model that relies on digital technology in delivering services, manufacturing products, and managing human resources.

Digital transformation is based on formulating a digital strategy starting from diagnosing the current situation and identifying the gap between existing digital capabilities and what they should be in the future. This is followed by implementing the strategy through allocating the necessary resources—whether financial, human, or in terms of equipment and machinery—while monitoring its execution and continuously evaluating its outcomes. (Hannachi, 2022, p. 145)

Digital transformation in business or governments involves making radical changes in the business model, procedures, and processes, and it may extend to changing the product itself or the entire method of service delivery. (Al-Masri, 2024, p. 13)

Global consulting firms have also defined digital transformation, including:

IDC: It defined it as the continuous process undertaken by organizations to adapt to the requirements of their customers and markets (the external ecosystem) by leveraging digital capabilities in order to innovate

new business models, products, and services characterized by digital and manual business chains and enhanced customer experiences, while simultaneously improving operational efficiency and organizational performance. (Slaimi & Bouchi, 2022, p. 948)

Digital transformation in banking refers to the comprehensive adoption and integration of advanced digital technologies - such as mobile platforms, cloud computing, artificial intelligence, and data analytics - across all banking functions to fundamentally reshape how banks operate, engage with customers, and deliver value, enabling greater efficiency, innovation, and customer-centric services. (Shanti, Siregar, Zulbainarni, & Tony, 2023, p. 65)

Accenture Corporation: The success of today's businesses requires a customer-centric digital transformation that begins by prioritizing an excellent and relevant customer experience, and by mobilizing organizations, processes, and technological capabilities to achieve this.

Conceptual Review Digital transformation is a widely recognized concept in the fields of business and technology, which entails the extensive incorporation and application of digital technologies with the aim of fundamentally modifying business processes, enhancing customer experiences, and adjusting to changing market requirements . (Hwang, 2024, p. 1409)

Based on all the previous definitions, digital transformation can be concluded as a process of renewal, change, and transition from an outdated, non-digital, paper-based state to an improved state fully reliant on modern software and technologies within organizations. This transformation aims to facilitate the execution of daily operations and to make the conversion of traditional organizational processes into modern forms easier and more accurate.

Enhancing Customer Experiences Digital transformation has also significantly enhanced customer experiences in finance. Online banking, mobile apps, and personalized financial services offer convenience and flexibility, allowing customers to manage their finances at any time and from anywhere. With data analytics, financial institutions can provide customized offerings based on individual customer needs, fostering a more customer-centric approach to finance. (Rivera, 2025, p. 02)

2.2 The Historical Development of Digital Transformation in the Banking Sector :

The banking sector has undergone significant technological evolution over the past decades, reshaping the way financial services are delivered. Understanding the historical development of digital transformation in this sector provides insight into the shift from traditional banking practices to modern, technology-driven operations. We can summarize the development as follows: (Delorme & Djellalil, 2015, p. 12)

Digital transformation in the banking sector has evolved progressively over several decades. During the **1960s to the 1980s**, banks introduced computer systems to automate internal operations such as

accounting and transaction processing, which enhanced efficiency and reduced operational errors. In the **1990s**, the emergence of the internet enabled banks to provide online services, allowing customers to access their accounts remotely and marking the beginning of e-banking, which significantly changed the delivery of financial services.

In the **2000s**, the rapid spread of smartphones accelerated the development of mobile banking and digital services. Mobile applications made banking more accessible and convenient, while banks expanded their offerings to include services such as SMS notifications, mobile payments, and digital wallets. The **2010s** witnessed a major shift with the integration of Big Data, artificial intelligence, and the growing influence of fintech. Big data analytics allowed banks to better understand customer behavior and tailor services accordingly, while predictive tools improved fraud detection and risk management. AI further contributed through chatbots, automation of back-office tasks, and advanced analytics for credit scoring and investment decisions. Meanwhile, fintech firms introduced disruptive innovations, intensifying competition and forcing traditional banks to accelerate innovation.

In the **2020s**, blockchain technology gained importance in securing transactions, facilitating cross-border payments, and supporting digital identity solutions. At the same time, open banking frameworks—supported by regulations such as **PSD2** in Europe—encouraged banks to share financial data through APIs, promoting innovation and enabling new digital financial services.

Overall, this continuous digital evolution has led to improved customer experience through faster, safer, and more personalized services, enhanced operational efficiency through automation and advanced analytics, and increased competitive pressure due to the entry of fintech and major technology companies. It has also strengthened operational risk management, as banks increasingly rely on technologies such as fraud detection systems, real-time monitoring, and data-driven risk analytics to improve governance and control mechanisms.

Finally, digital transformation should be viewed as a dynamic and constantly evolving phenomenon. The rapid pace of technological change—driven by factors such as Moore’s Law—often progresses faster than organizational adaptation, which is shaped by human and institutional constraints. Nevertheless, consumers tend to adopt digital innovations at remarkable speed, as new digital actors focus on designing accessible user experiences for broad audiences. This creates a major challenge for organizations: reducing the number of firms and individuals who may fall behind, become marginalized, or disappear altogether.

Digital transformation is characterized by a set of features, the most important of which are as follows: (Ben Saïd, 2022, p. 316)

- **Excellence:** Possessing all the necessary elements of uniqueness to achieve a competitive advantage.

- **Networked Organizational Structure:** Due to the specific nature of its work and its connections with numerous organizations locally and globally.
- **Adaptability:** The ability of institutions to adjust to a business environment characterized by rapid change and diversity.
- **Heavy Reliance on Intangible Assets:** Including intellectual property, software development, and algorithms used in producing and delivering services.
- **Customer and User Participation in Value Creation:** Digital platform institutions interact with their customers by analyzing behavior and increasing revenues.
- **Saving Money, Time, and Effort:** For all parties engaged in electronic transactions.
- **Transparency in Transactions**
- **Elimination of Bureaucracy:** Facilitating work division and specialization.
- **Emphasis on Total Quality Management:** In its modern concept.
- **Creating an Information Society:** Capable of handling technical data and keeping pace with the information age.

2.3 Drivers of Digital Transformation in the Banking Sector

Digital transformation in banking is driven by several key motivations that help banks remain relevant and competitive in a rapidly evolving financial landscape: (Al-Murshidi & Mahdi, 2025, p. 280)

- **Enhancing Operational Efficiency:** Banks adopt digital technologies to automate routine processes, reduce operational costs, and improve service delivery speed, enabling more efficient resource utilization.
- **Improving Customer Experience:** Digital transformation enables personalized services, faster transactions, and 24/7 banking access, which significantly enhances customer satisfaction and loyalty.
- **Increasing Competitiveness:** With FinTech innovations and new market entrants, traditional banks must adopt digital strategies to remain competitive and meet evolving customer expectations.
- **Supporting Financial Inclusion:** Digital channels allow banks to reach underbanked and remote populations more effectively, expanding access to financial services and promoting inclusion.
- **Regulatory Compliance and Risk Management:** Advanced digital systems help banks comply with evolving regulations, improve transparency, and bolster cybersecurity, reducing operational and systemic risks.

2.4 Effects of Digital Transformation on Banking Efficiency and Operations

Studying the effects of digital transformation provides an understanding of how technology improves processes and enhances the overall performance of banks. The most significant effects can be summarized as follows: (Ononiwu, Onwuzulike, Shitu, & Ojo, 2024, p. 465)

- Digital transformation in banking enhances operational efficiency, customer experience, and cost management, particularly in developing economies where traditional banking faces inefficiencies and high operational costs.
- Automation and AI-driven tools streamline workflows, handle repetitive tasks, reduce processing time, and minimize human errors, improving productivity and resource allocation. (Agwu, 2020, p. 127)
- Migrating from physical branches to digital platforms lowers overhead costs related to staffing, real estate, and infrastructure while enabling remote service delivery.
- Mobile banking, online platforms, and self-service options enhance accessibility, allowing customers to transact conveniently and fostering loyalty, especially in regions with limited branch presence.
- Advanced analytics and AI improve risk management by monitoring transactions in real-time, detecting anomalies, and predicting potential credit risks (Klus et al., 2019).
- Blockchain technology strengthens transaction security and transparency, reducing fraud and cyberattack risks.
- Digital platforms enhance operational resilience, enabling banks to adapt to market changes and maintain service continuity during crises, such as the COVID-19 pandemic .
- Scalability of digital infrastructure allows rapid expansion of services without significant physical investments, giving banks a competitive edge.
- Workforce transformation occurs as technology reduces traditional roles but creates demand for skilled professionals in data analytics, digital platform management, and innovation.
- Workforce reskilling and upskilling initiatives are necessary to align human capital with digital-first operations.
- Despite benefits, challenges remain, including high investment costs, cybersecurity needs, and infrastructure gaps in developing economies.
- Regulatory inconsistencies and evolving legal frameworks can hinder implementation and expose banks to operational risks.

2.5 Requirements for Digital Transformation:

One example of a theoretical framework is the Technology Acceptance Model (TAM) which was introduced by Davis (1989). The Technology Acceptance Model (TAM) is a theoretical framework that centers on the examination of how individuals and organizations accept and utilize technology. The

proposition suggests that the perceived usefulness and perceived simplicity of use play significant roles in shaping the acceptability and utilization of technology. When applied within the financial services sector, the Technology Acceptance Model (TAM) can be utilized to evaluate the perceptions of consumers and workers regarding the utility and user-friendliness of digital technologies.

With technological advancement and the development of communication systems, digital systems have become an integral part of administrative operations. In this context, digital transformation requires specific requirements and clear steps to ensure success. The main requirements include: (Mokhtar & Boukerris, 2022, p. 856)

- **Information Technology Infrastructure:** This refers to the shared technological resources that provide the foundation for advanced and modern information system applications within an organization. It includes investment in hardware, software, and IT services.
- **Human Requirements:** Human resources are a fundamental element for the success of digital transformation, providing qualified and trained personnel with advanced digital skills in IT usage, data analysis, and effective decision-making. Personnel must have a full understanding and strategic vision of the necessity of transitioning toward digitalization.
- **Economic and Institutional System:** This involves developing systems and services and updating legislative frameworks that support digital transformation for both the private sector and government institutions. Digital transformation also requires protective software to safeguard computers against damage and hacking, as well as guarantees for the security and protection of personal and institutional data.
- **Procedural Requirements:** Digital transformation necessitates a comprehensive information security strategy that ensures data protection and quality, establishes strict controls to prevent data theft, protects privacy, and ensures the safe use of information—essential requirements for successful transformation.
- **Creativity and Innovation:** Advanced countries, through their various organizations, have maintained their positions and continuity by emphasizing creativity, innovation, and development, which significantly contribute to further technological discoveries and new products.

2.6 Key Risks of Digital Transformation in Banking

While digital transformation is essential for business organizations, its risks at both national and international levels cannot be overlooked. These risks are numerous, diverse, and strategic, most notably the vast digital divide between technologically dominant global powers and countries adopting digitalization. The main risks can be summarized as follows (Malah & Ammamra, 2024, p. 148):

- **Global control over information:** Information dominance may be concentrated within institutions that govern knowledge- and technology-driven societies.
- **Inability to meet telecommunication demands:** Delays in expanding and completing wired and wireless communication infrastructure can impede digital adoption.
- **Digital divide and low ICT awareness:** Differences between countries and weak awareness of information and communication technologies hinder the development of intellectual capital.
- **Data security risks:** Technology collects and stores massive amounts of data, which may pertain to individuals or organizations, making the protection of such data challenging.
- **Privacy concerns:** Maintaining personal privacy has become increasingly difficult worldwide, alongside risks of personal data theft or unauthorized sale.
- **Plagiarism and copyright issues:** Digital media can be easily copied and reproduced, while copyright laws remain difficult to enforce due to lagging legislation.
- **Anonymity risks:** Digital technologies provide users with extensive opportunities to hide their identities.
- **Cyberattacks:** Hacking tools have become cheaper, more accessible, and more powerful, enabling even moderately skilled hackers to inflict significant damage at a fraction of previous costs.

The integration of digital transformation projects within the financial services industry is accompanied by a multitude of problems and constraints that necessitate thorough examination. The issue of regulatory compliance is of utmost importance for financial institutions, since they are required to navigate an intricate network of laws and regulations that exhibit variations across different areas and jurisdictions (International Monetary Fund, 2019). The fulfillment of compliance requirements necessitates the commitment of substantial resources and the modification of internal procedures in order to assure conformity with legal standards.

The field of cybersecurity presents an additional significant obstacle. Financial institutions are very susceptible to cyberattacks as a result of the sensitive nature of the data and transactions they handle. The protection of digital assets and consumer information is of utmost importance, requiring significant expenditures in cybersecurity solutions and ongoing surveillance of emerging risks. The presence of cultural resistance within companies can also serve as an impediment to transformation, there is a tendency for employees and management to exhibit hesitancy about adopting digital transformation due to perceived disruptions and unfamiliarity associated with it. The imperative to overcome this resistance necessitates the transformation of organizational culture in order to cultivate innovation, adaptability, and collaboration.

3. Evolution of Payment and Settlement Systems in Algeria's Banking Sector

Digital Transformation as a Driver for Developing the Banking Infrastructure in Algeria:

The Algerian banking sector has witnessed the combined efforts of national and international stakeholders to develop and modernize its payment systems, aiming to facilitate the execution of various financial and banking operations between individuals and institutions, ensure their timely settlement, reduce associated risks, and enhance transparency. This, in turn, supports the promotion of financial inclusion by continuously providing appropriate financial services and products. Advanced electronic banking payment systems have been implemented, with all systems adhering to the security, transparency, and efficiency standards established by the Committee on Payment and Settlement Systems at the Bank for International Settlements.

3.1 Algeria's Real-Time Gross Settlement System (ARTS)

The Real-Time Gross Settlement system for large-value and urgent payments (ARTS) is a gross settlement system in which transfers are processed continuously and immediately, without delay, and on a gross basis. It is also defined as: "an interbank payment system for large-value or urgent transactions exceeding one million dinars, with transfer orders executed in real time." The Real-Time Gross Settlement system is used by Algerian banks as a mechanism to facilitate the execution of transactions (Zeghdar & Hamid, 2015, p. 13).

Based on official data from the annual reports of the Bank of Algeria, data were collected regarding the evolution of the volume and value of transactions processed through the ARTS system during the period 2019–2024, as illustrated in the following table:

(1): Evolution of the Volume and Value of Transactions through the Real-Time Settlement System (ARTS) during the Period (2019–2024)

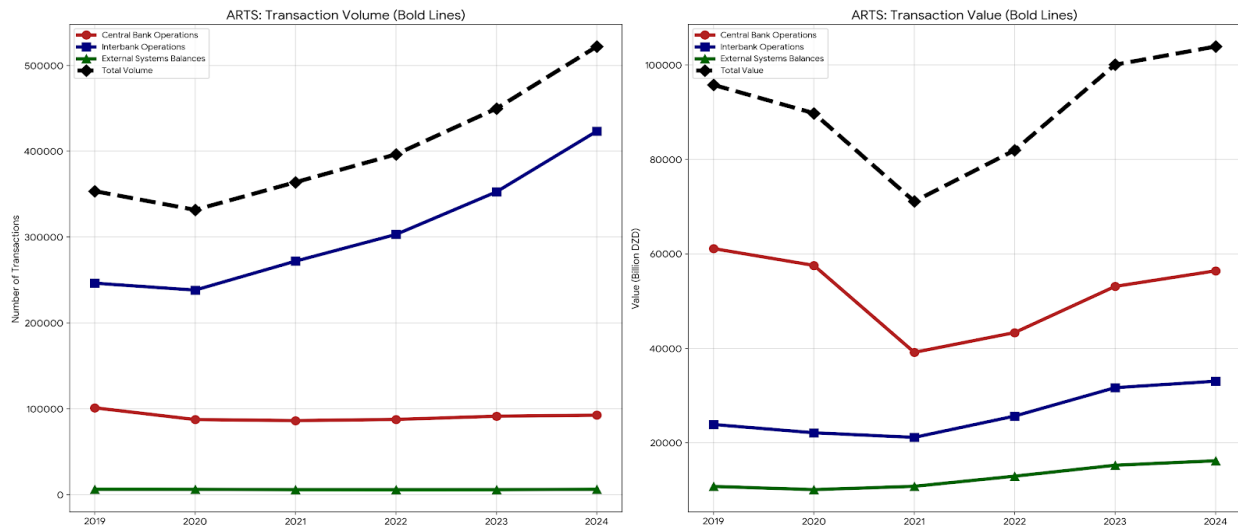
Value: Billion Algerian Dinars

2024	2023	2022	2021	2020	2019		
92513	91302	87555	86168	87418	101081	Volume	Central Bank Operations
56398.838	53107.775	4333.454	39146.724	57547.797	61113.94	Value	
423326	352608	303023	271943	238204	246264	Volume	Interbank Operations
33031.277	31671.930	25658.267	21150.262	22121.955	23877.05	Value	
6095	5776	5765	5783	6050	6110	Volume	External Systems Balances
16197.571	15252.315	12937.419	10793.159	10088.687	10768.29	Value	
521934	449686	396343	363894	331672	353455	Volume	Total Processed
16.07%	13.46%	8.92%	9.71%	-6.16%			

103873.739	100032.020	81929.140	71090.145	89758.439	95759.28	Value	Transactions
3.84%	22.10%	15.25%	-20.80%	-6.27%			

Source: Prepared by the author based on the Bank of Algeria's annual reports (2019–2024).

Figure (1): Evolution of the Volume and Value of Transactions through the Real-Time Settlement System (ARTS) during the Period (2019–2024)



Source: Prepared by the author based on Table (1)

Based on the data presented in Table (1), the total volume of transactions processed by the system decreased during the period 2019–2021 due to a 1.43% decline in central bank operations and a 4.41% reduction in external system balances. In contrast, the period 2022–2024 witnessed an increase in transaction volumes, primarily due to the significant rise in interbank operations, which accounted for 74% to 81% of total transactions, followed by central bank operations, representing 17% to 23% of total transactions. Regarding transaction values, there was a decline during 2020–2021, followed by a gradual increase in the remaining years of the study, reflecting the country's economic conditions and the situation of market participants. This trend is particularly attributed to the noticeable increase in interbank operations and external system balances, as well as the marked rise in central bank operations, which exceeded half of the total.

It can be concluded that the increase in transaction volumes associated with the ARTS system is linked to the extent of digital transformation achieved in the Algerian banking sector and the availability of the necessary technologies.

3.2 The Interbank Electronic Clearing System in Algeria (ATCI):

The ATCI system is an electronic clearing system specialized in processing and settling all payment instruments circulated among the general public. This includes bank checks, commercial papers, transfers and

Digital Transformation as a Driver for Developing the Banking Infrastructure in Algeria:

direct debits, card-related transactions, as well as other electronic payment methods. The system is managed by the Interbank Pre-Clearing Center, which is one of the branches affiliated with the Bank of Algeria. It was established as a joint-stock company, with its capital open to banks. The ATCI system is limited to processing financial transactions with a nominal value of less than 1 million Algerian dinars.

Clearing operations in Algeria have become fully electronic to facilitate processes and save time. Banking institutions witnessed the launch of automated clearing operations in 2006, with the system relying on scanners to exchange all payment instruments.

The following table presents the volume and value of transactions processed through the electronic clearing system:

Table (2): Evolution of the Volume and Value of Transactions Processed via the ATCI Electronic Clearing System during the Period: (2019–2024)

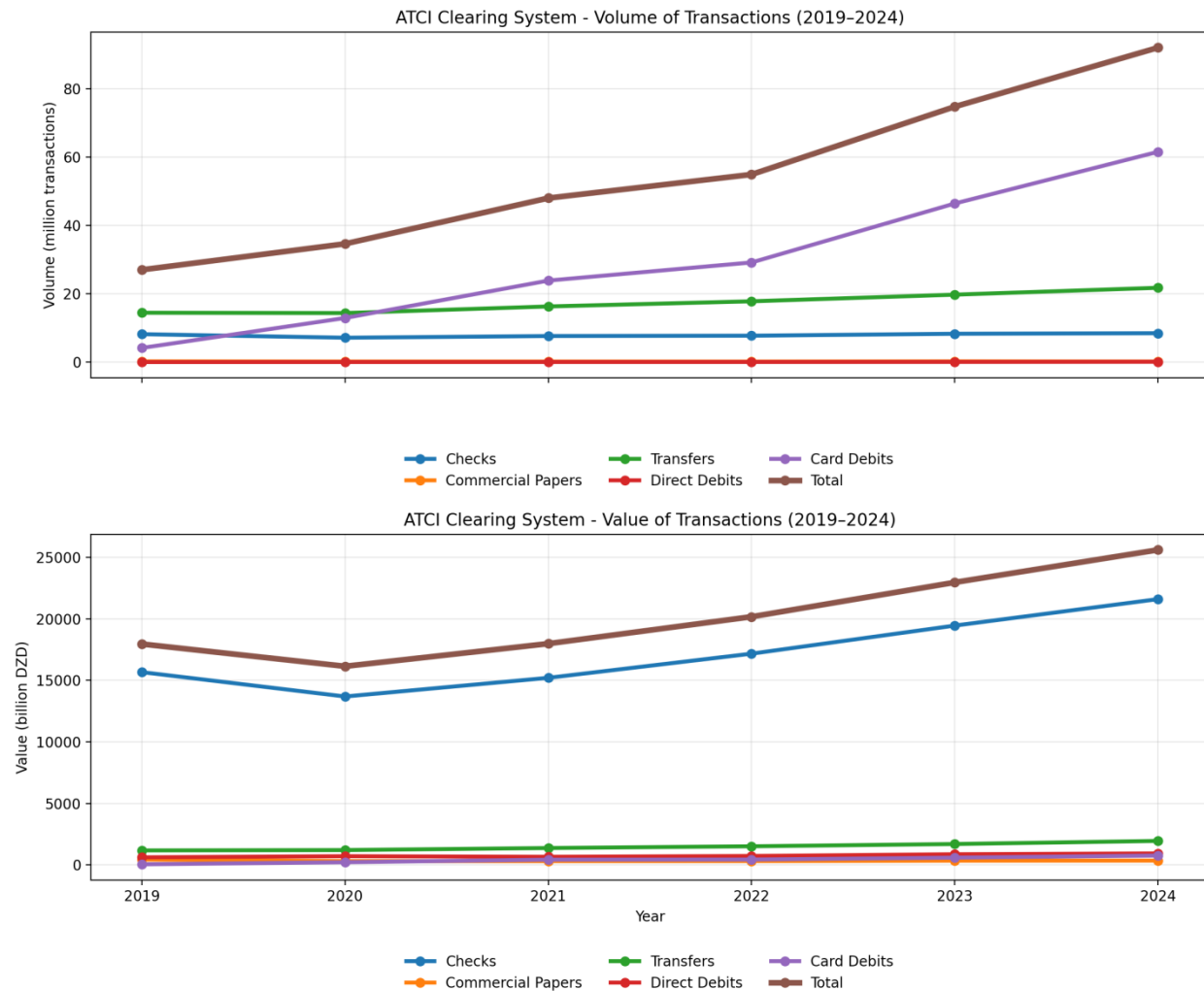
Volume: million transactions; Value: billion DZD

2024	2023	2022	2021	2020	2019		
8.461	8.301	7.742	7.642	7.144	8.18	Volume	Checks
21596.690	19447.606	17165.394	15203.428	13685.722	15664.35	Value	
0.175	0.222	0.160	0.170	0.172	0.22	Volume	Commercial Papers
352.586	348.639	316.711	312.111	311.425	435.57	Value	
21.761	19.750	17.805	16.297	14.361	14.45	Volume	Transfers
1952.390	1701.015	1516.462	1375.465	1208.496	1179.58	Value	
0.103	0.067	0.048	0.042	0.032	0.02	Volume	Direct Debits
934.542	868.468	728.929	661.355	712.262	618.92	Value	
615.62	46.436	29.173	23.867	12.920	4.15	Volume	Card Debits
763.593	592.803	438.833	427.758	222.411	52.34	Value	
93.114	74.776	54.928	48.018	34.629	26.815	Volume	Total Transactions via Clearing
24.52%	36.14%	14.39%	38.66%	29.14%			
25599.801	22958.531	20166.329	17980.117	16140.316	17950.76	Value	
11.50%	13.85%	12.16%	11.40%	-7.63%			

Source: Prepared by the author based on the Bank of Algeria's annual reports (2019–2024).

<https://www.bank-of-algeria.dz/ar/%D8%A7%D9%84%D8%AA%D9%82%D8%A7%D8%B1%D9%8A%D8%B1-%D8%A7%D9%84%D8%B3%D9%86%D9%88%D9%8A%D8%A9/>

Figure (2) : Evolution of the Volume and Value of Transactions Processed via the ATCI Electronic Clearing System during the Period: 2019–2024



Source: Prepared by the author based on Table (2)

Analysis of the data presented in Table (2) shows that the volume of transactions processed through the ATCI electronic clearing system experienced gradual growth during the study period. The total number of processed transactions reached 48.018 million in 2021, compared to 34.629 million in 2020, representing a notable increase of 38.7% in terms of volume.

In 2024, the system processed approximately 93 million payment transactions, with a total value of 25,599 billion dinars, compared to 75 million transactions valued at 22,958 billion dinars in 2023, reflecting a significant increase of 24.5% in volume and 11.5% in value.

During the study period, card payments and transfers processed through the electronic clearing system were the most frequently used payment instruments in terms of total volume. It is important to highlight that

these electronic-based instruments continue to consolidate their dominance in the payment market, particularly in volume, unlike traditional payment methods such as checks and commercial papers, whose usage has increased only marginally year by year. Commercial papers, including bills of exchange and promissory notes, which remain paper-based, are particularly vulnerable to rejection.

As of April 2025, Algeria had 20,498,350 active bank cards, including 16,189,017 “Dahabia” cards issued by Algérie Poste and 4,309,333 interbank (CIB) cards issued by commercial banks. The country also had 4,577 ATMs and 77,576 POS terminals in service.

3.3 Algeria for Electronic Banking Services (AEBS)

One of the most important payment systems in the Algerian banking sector is online banking, known as Algeria for Electronic Banking Services (AEBS). The company was established in January 2004, initially focusing on development and enhancement efforts aimed primarily at modernizing banking services and electronic payment systems. AEBS was created as a result of a partnership agreement between the French group DIAGRAM EDI, a leading company in electronic banking software and secure financial data exchange, and three Algerian institutions: MAGACT MULTIMEDIA, ANGINERING SOFT, and the Scientific and Technical Information Research Center (CERIST), forming a joint company named Algeria for Electronic Banking Services.

This company provides remote banking services, offering a range of highly secure services. It also manages the exchange of financial data for all banks and financial institutions, regardless of their client types, as it was established to meet the needs of financial institutions by providing services through multiple software solutions, thereby simplifying and securing electronic transactions (Harakat & Ben Guida, 2020).

4. Analysis of the Usage of Payment Channels and Digital Financial Services in Algeria

The Bank of Algeria issued a system stipulating the free provision of certain banking services to encourage the use of digital products. This initiative aims to motivate customers to adopt electronic payment methods on the one hand, and to incentivize banks to innovate and offer new products that align with contemporary technological developments on the other hand. (Bank of Algeria, 2020)

4.1 Institutions Managing Electronic Transactions in Algeria

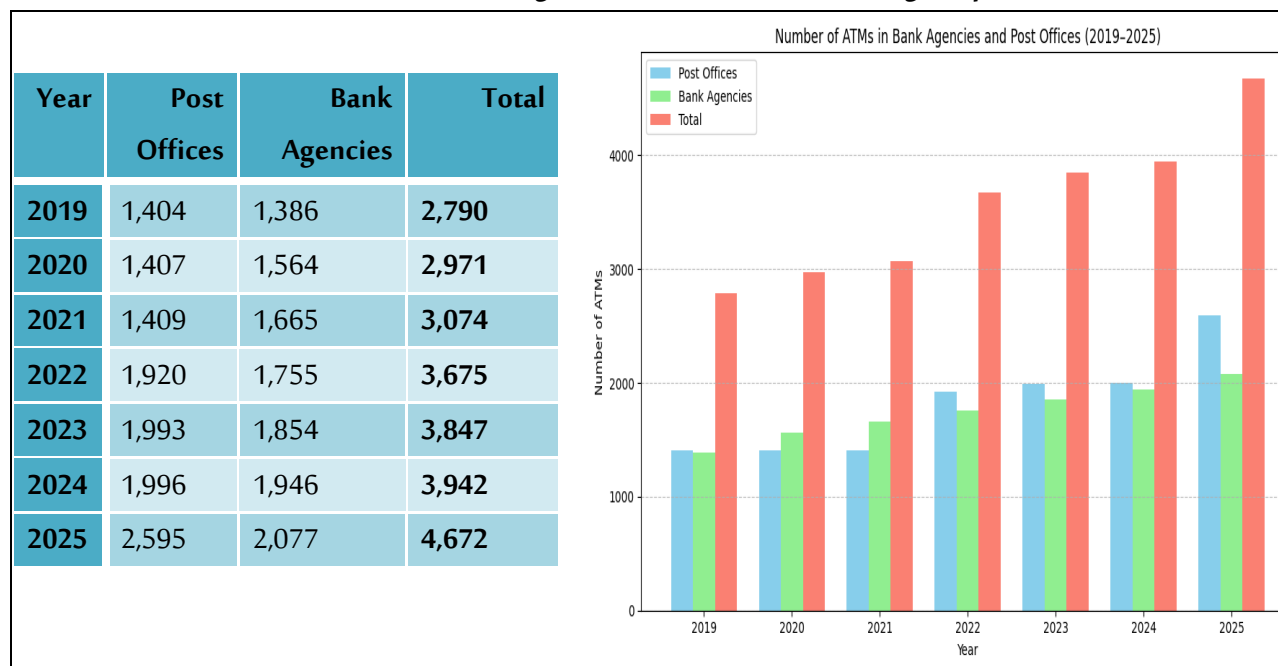
Establishing an effective electronic payment system is considered a priority by the Algerian public authorities. It forms part of the tools for modernizing the banking system. To enable Algerian banks to manage their liquidity more accurately and anticipate potential risks, supporting institutions for banking services management have been established in Algeria. These institutions responsible for managing electronic transactions include:

- ✓ **Automated Teller Machines and Interbank Relations Company (SATIM):** Established in 1995, SATIM is one of the technical tools accompanying the banking development and modernization program, particularly in promoting payment cards (Harakat & Ben Guida, 2020, p. 70). It is composed of eight Algerian banks.
- ✓ **Economic Interest Group for Electronic Banking (GIE Monétique Dz):** The Automated Payment Group was established in June 2014 to manage the strategy for developing electronic payments, aiming to generalize the use of modern payment methods, including payment cards and electronic payments. This group is tasked with organizing the electronic banking sector in Algeria. The Central Bank, as the monetary authority, participates in the management committee to ensure the security of the electronic payment system. The Automated Payment Group consists of 19 members, including 18 banks and the Algerian Post. Its main objective is to promote electronic payment usage nationwide (GIE Monétique, <https://giemonetique.dz>).
- ✓ **Banking Services Company (SSB):** This company works on deploying and generalizing electronic payment systems (TPE) across different geographical areas in the country to ensure comprehensive service coverage.
- ✓ **Interbank Monetary Network (RMI):** This is the secure technological infrastructure connecting Algerian banks under the management of the Automated Payment Group (GIE Monétique). The network enables the exchange of electronic transactions, such as using the CIB bank card for withdrawals and payments through various bank terminals.
- ✓ **the National Payments Committee** was established under the new monetary and banking law enacted on June 21, 2023. The committee's mission is to implement a national strategy to develop non-cash payment systems (such as checks, bank cards, and bank transfers) with the goal of facilitating banking transactions and strengthening financial inclusion. According to Bouzerd, the plan revolves around five strategic pillars:
 - Adapting the regulatory framework for electronic payments
 - Modernizing electronic payment infrastructure
 - Developing innovative payment technologies
 - Accelerating the digitization of payment flows
 - Promoting financial literacy and digital payment culture

4.2 Evolution of Automated Teller Machines (ATMs) during the Period (2019–2025)

Table 3 shows the evolution in the number of Automated Teller Machines (Distributeur Automatique de Billets – DAB) and Cash Withdrawal Terminals (Guichet Automatique de Banque – GAB) belonging to banking agencies and postal institutions:

Table (3): Number of ATMs in Bank Agencies and Post Offices during the period (2019–2025)



Source: by the author based on:

- (People's Democratic Republic of Algeria Ministry of Post and Telecommunications);

<https://www.mpt.gov.dz/figures-and-indicators/>

- (Number of ATMs (DAB) and Cash Withdrawal Terminals (GAB), 2023)

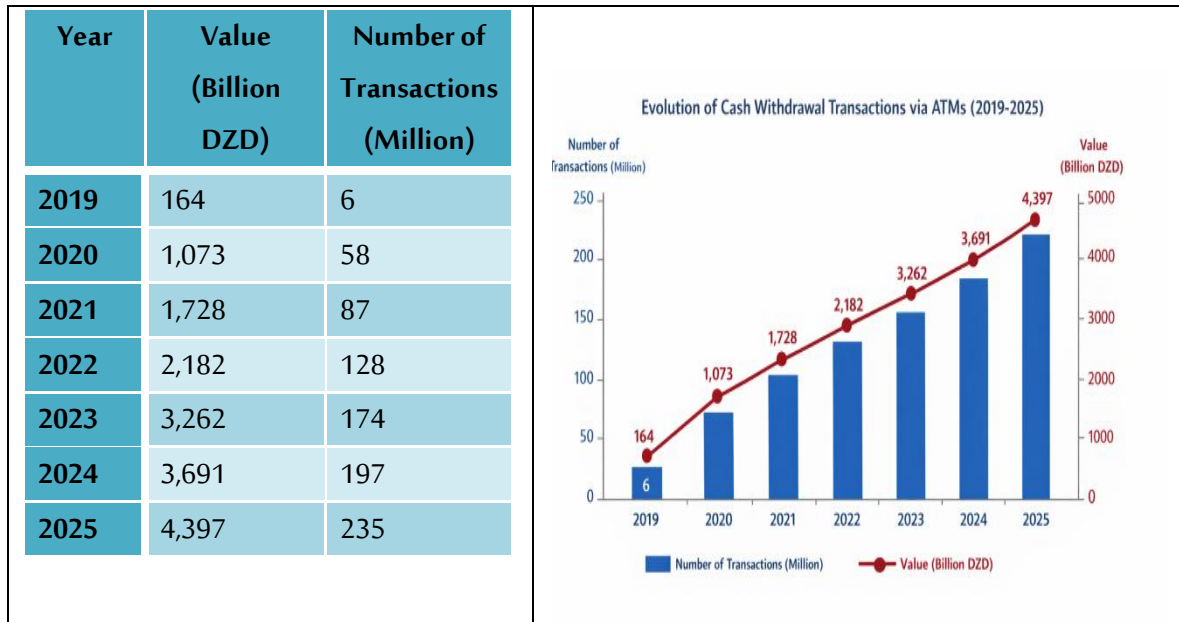
<https://www.bank-of-algeria.dz/nombre-dab-gab/>

Table 3 shows that the total number of ATMs increased from 2,790 in 2019 to 4,672 in 2025, representing a growth rate of approximately 67.5% over seven years. It can be observed that post offices accounted for the majority of this growth, with their number rising from 1,404 in 2019 to 2,595 in 2025, reflecting an increase of about 84.8%, including a notable surge of around 36% between 2021 and 2022. This indicates significant expansion efforts, likely aimed at improving access to financial services in underserved areas. In contrast, bank agencies exhibited more steady and stable growth, with the number of ATMs increasing from 1,386 in 2019 to 2,077 in 2025, corresponding to a growth rate of approximately 49.9%. Relatively, the contribution of post offices to the total number of ATMs increased from about 50.3% in 2019 to 55.5% in 2025, reflecting the growing role of this infrastructure in enhancing financial inclusion. Consequently, the table clearly demonstrates a dynamic expansion of the digital banking infrastructure.

However, the national penetration rate remains low, estimated at 13.99 ATMs per 100,000 adults, compared to the global average of 40.42 ATMs per 100,000 adults in 2023. (Soualili, 2026)

4.3 Evolution of the Value and Volume of ATM Withdrawal Activity

Table (4): Evolution of the value and volume of cash withdrawal transactions conducted through automated teller machines (ATMs) during the period (2019-2025)



Source: by the author based on:

(GIE Monétique; Payment Activity on Electronic Payment Terminals)

file:///C:/Users/Hp/Desktop/ACTIVIT%C3%89_RETRAIT_SUR_ATM.pdf

The data on ATM withdrawals in Algeria between 2019 and November 2025 indicate a remarkable growth in both transaction volume and total value. The number of transactions increased from 6 million in 2019 to approximately 214 million in 2025, while the total value surged from 16.4 billion DZD to nearly 3,999 billion DZD. This trend reflects a significant expansion of banking activity and greater reliance on ATMs as a primary channel for cash access. Moreover, the average withdrawal per transaction rose substantially, signaling an increase in purchasing power and confidence in the banking system. The parallel growth of both transaction volume and value suggests improvements in financial infrastructure, the widespread adoption of bank cards, and the ongoing digital transformation of the financial sector. Economically, these trends highlight enhanced financial inclusion, increased liquidity circulation, and a move toward digitized banking services, reducing dependence on cash and supporting broader economic activity.

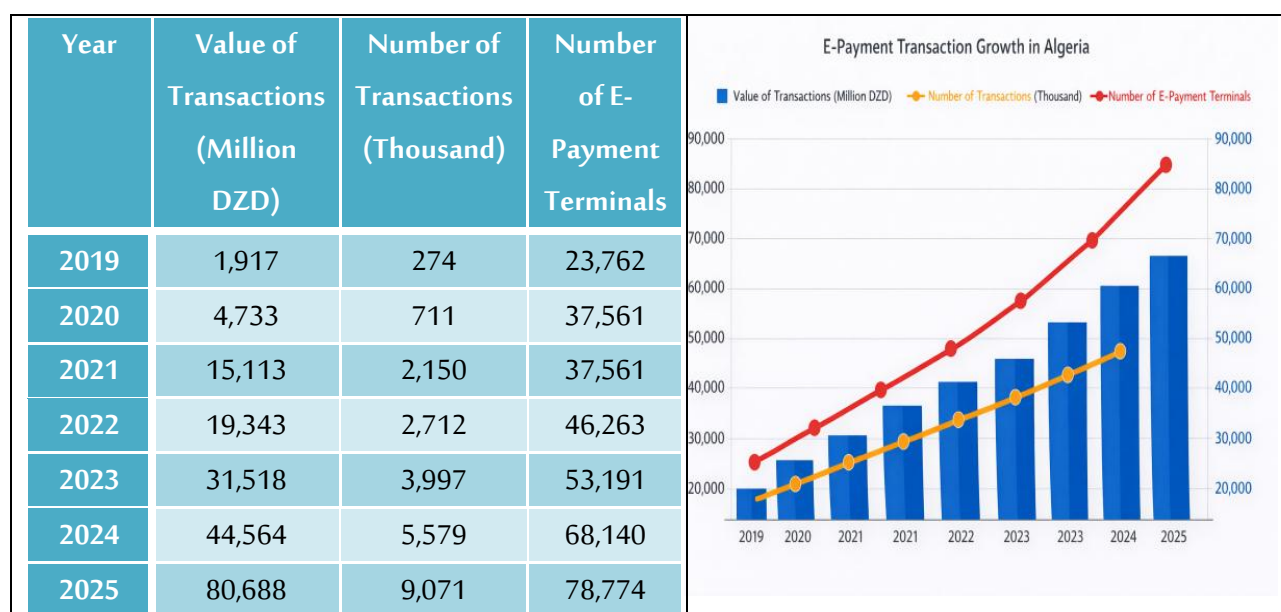
4.4 Evolution of Payment Activity on Electronic Payment Terminals

Digital Transformation as a Driver for Developing the Banking Infrastructure in Algeria:

Since October 2016, online payment using bank cards has become operational in Algeria. In its initial phase, this service was made available to major billers, such as water and energy distribution companies (gas and electricity), fixed and mobile telephony operators, insurance companies, air transport companies, as well as certain public administrations (GIE Monétique, 2026).

Electronic payment transactions are carried out through a network of electronic payment terminals, which experienced notable growth over the study period (2019–2025).

Table (5): Evolution of Payment Activity on Electronic Payment Terminals during the Period (2019–November 2025)



Source: by the author based on:

(GIE Monétique; Payment Activity on Electronic Payment Terminals)

<https://giemonetique.dz/ar/activite-paiement-sur-tpe/>

The electronic transaction activity witnessed a remarkable development during the study period, as the value of transactions rose from 1,917 million Algerian Dinars in 2019 to 80,688 million Dinars in 2025, representing an increase of approximately 42 times. This substantial growth reflects the rapid spread of electronic payment methods and the increasing reliance of consumers and institutions on digital transfers across various financial operations.

Moreover, the number of transactions increased from 274 thousand in 2019 to 9,071 thousand in 2025, corresponding to an increase of nearly 33 times. This trend indicates the growing dependence on

digital transactions in daily life, whether for shopping, bill payments, or banking operations, demonstrating heightened confidence in electronic payment systems and their flexibility compared to traditional cash.

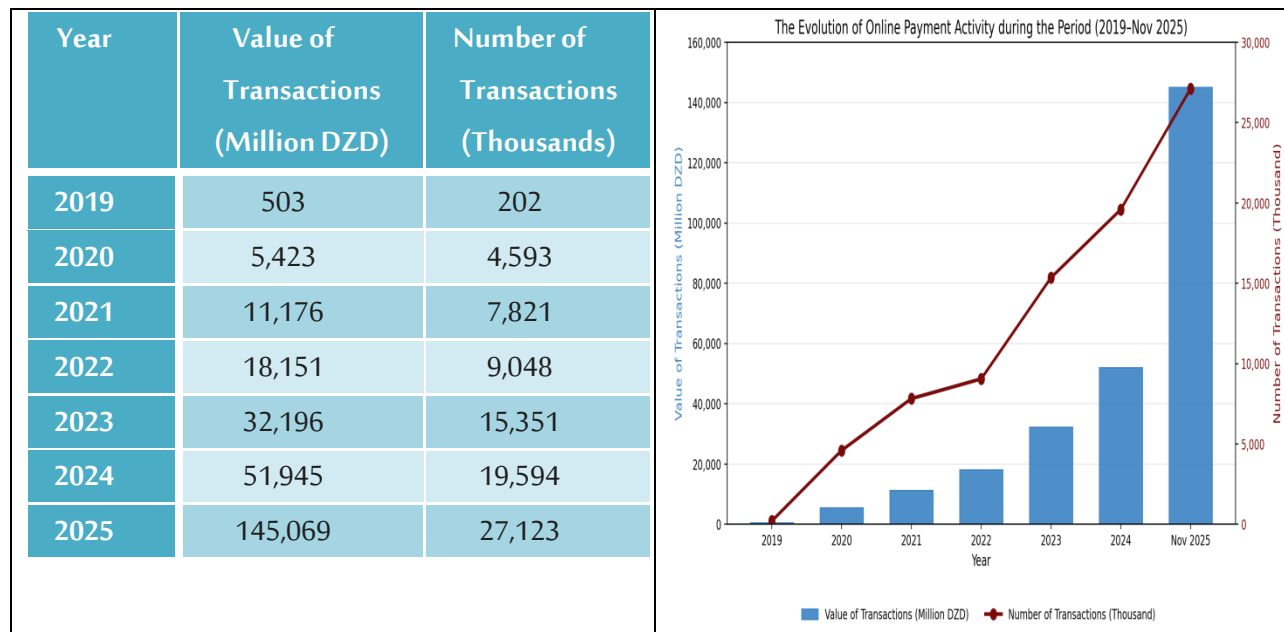
In terms of infrastructure, the number of e-payment terminals grew from 23,762 units to 78,774 units over the same period, representing an increase of approximately 3.3 times. This expansion in terminals highlights tangible efforts to strengthen digital transformation in the banking sector and to provide the necessary infrastructure to support electronic transactions, both in urban and rural areas.

According to the statement of the Minister of Trade, compared to more than 165 million production and service establishments registered in the commercial register, the number of electronic payment terminals currently in service remains limited, with an equipment rate estimated at only about 5%.

4.5 Evolution of Online Payment Activity

Online electronic payment is considered one of the most prominent manifestations of digital transformation, as it has witnessed a gradual expansion in usage in recent years. This activity reflects the growing reliance on digital services in commercial and financial transactions.

Table (6): Evolution of Online Payment Activity during the Period (2019–2025)



Source: by the author based on:

(GIE Monétique; Online Payment Activity)

<https://giemonetique.dz/activite-paiement-sur-internet/>

Table 6 illustrates the evolution of online payment activity in Algeria from 2019 to 2025. In 2020, transaction value jumped from 503 million DZD to 5,423 million DZD, nearly tenfold, while the number of transactions rose from 202 thousand to 4,593 thousand. Between 2020 and 2021, growth continued with

values reaching 11,176 million DZD and 7,821 thousand transactions. In 2022, transaction value increased to 18,151 million DZD and the number of transactions to 9,048 thousand.

The upward trend accelerated in 2023, with values at 32,196 million DZD and 15,351 thousand transactions. In 2024, transactions reached 51,945 million DZD and 19,594 thousand, reflecting sustained digital adoption. By 2025, an unprecedented surge occurred, with values hitting 145,069 million DZD and 27,123 thousand transactions.

COVID-19 health crisis has promoted its development by reducing travel and encouraging online orders. Starting in 2022, stadium ticket sales have been conducted exclusively online via interbank cards, which contributed to the increase in transaction volume. The growth in transaction volume over the past two years can also be explained by the integration of administrative services, including payment of registration fees for the BEM and baccalaureate exams, university enrollment fees, AADL rent payments, as well as tax payments.

5. Conclusion:

The study concluded that digital transformation has significantly modernized the Algerian banking infrastructure, fostering a transition toward an integrated electronic payment ecosystem. The analysis reflects a profound shift in financial behavior and economic efficiency, driven by the expansion of digital tools and government initiatives between 2019 and 2025. The results can be summarized as follows:

- Theoretically, digital transformation redefines banking from a physical presence to a digital-first model, significantly enhancing operational efficiency and resource allocation.
- Digital banking infrastructure acts as a fundamental catalyst for financial inclusion by lowering entry barriers and fostering a data-driven financial ecosystem.
- The analysis of data from the Bank of Algeria and GIE Monétique reveals the following significant results:
 - Infrastructural Expansion: The study observed a continuous increase in the deployment of Point-of-Sale (POS) terminals and Automated Teller Machines (ATMs), reflecting a shift in the daily economic behavior of Algerian citizens.
 - Resilience During Crisis: The COVID-19 pandemic acted as a catalyst, significantly reducing physical travel and accelerating the adoption of online ordering and electronic settlement systems.
 - Global Ranking Gap: Despite the domestic progress, the Algerian banking system still faces a "modernization gap," placing it in the mid-to-late ranks globally due to incomplete ICT infrastructure

recommendations:

- Complete Modernization of Infrastructure, Expedite the completion of the telecommunication and ICT infrastructure to reduce the digital divide and ensure seamless banking connectivity.
- Enhancing Cybersecurity, Invest heavily in advanced security software and continuous surveillance systems to protect institutional and personal data against evolving cyber threats.
- Promoting Digital Literacy, Launch national awareness campaigns to improve ICT awareness and foster a digital payment culture among all segments of society.
- Regulatory Framework Update, Continuously adapt the legal and regulatory frameworks to accommodate innovative payment technologies and fintech developments.
- Human Capital Development, Implement specialized training and upskilling programs for banking personnel to align their skills with modern digital-first operations.

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