
Evaluating Digital Transformation in the Algerian Banking Sector: A SWOT Framework for Financial Innovation Opportunities and Strategic Challenges

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Abstract:

Digital transformation is reshaping banking operations and customer experiences worldwide, with significant implications for emerging economies. In Algeria, public banks have gradually begun adopting digital financial services, supported by regulatory reforms related to electronic transactions and digital trust. However, despite these efforts, the pace of digital transformation remains limited due to persistent challenges in technological infrastructure, innovation capacity and customer digital readiness.

This study employs a SWOT analytical framework to assess the internal and external factors influencing digital transformation in Algerian banks. The analysis identifies key strengths, weaknesses, opportunities, threats and provides strategic insights aimed at enhancing financial innovation, improving service delivery and expanding digital financial inclusion. The findings offer practical implications for bank managers and policymakers seeking to accelerate digital banking development in Algeria.

Keywords: digital transformation; banking sector; financial innovation; SWOT analysis.

Jel Classification Codes: G21, O33, L86.

1. Introduction :

Digital transformation has become one of the most prominent developments shaping the contemporary banking industry. Rapid technological advancements and the increasing use of digital financial services have fundamentally altered traditional banking models worldwide. Banks are increasingly shifting toward digital platforms to enhance operational efficiency, improve customer experience and expand access to financial services. In emerging economies, digital transformation plays a crucial role in modernizing financial systems and supporting sustainable economic development through greater financial inclusion.

1.1 Research Problem

Despite the growing importance of digital transformation, its implementation within the Algerian banking sector remains limited and uneven. The sector is largely dominated by public banks, which often face structural rigidities, outdated technological infrastructure and resistance to organizational change. Although regulatory reforms supporting electronic transactions and digital trust have been introduced, their practical application remains insufficient. In addition, low levels of digital literacy and customer readiness continue to hinder the widespread adoption of digital banking services. This situation raises a fundamental research problem regarding the ability of Algerian banks to successfully implement digital transformation and fully benefit from its potential advantages.

1.2 Research Hypotheses

Based on the research problem and theoretical framework, the study proposes the following hypotheses:

- **H1:** Digital infrastructure positively influences the development of digital banking in Algeria.
- **H2:** Regulatory support and government policies significantly facilitate digital transformation in the banking sector.
- **H3:** Technological and behavioral constraints such as cybersecurity readiness, internet quality and customer trust adversely affect the adoption of digital banking.
- **H4:** External factors, notably restrictions on foreign bank entry, limit competitiveness and innovation in digital banking.

1.3 Research Objectives

The main objective of this study is to analyze the digital transformation process in Algerian banks by identifying the key internal and external factors influencing its implementation. Specifically, the study aims to:

- Examine the current state of digital transformation in the Algerian banking sector.
- Identify strengths and weaknesses related to internal organizational factors.

- Analyze external opportunities and threats affecting digital banking development.
- Provide strategic insights to enhance financial innovation and digital financial inclusion.

1. 4 Research Methodology

This study adopts an exploratory and strategic analytical approach to examine the dynamics of digital transformation in the Algerian banking sector. Given the complexity of the phenomenon and the limited availability of primary micro-level data in emerging financial systems, the research relies on a mixed qualitative–quantitative design grounded in secondary data and structured analytical tools.

The empirical basis of the study is derived from recent sectoral statistics (2020–2024), including official reports issued by the Bank of Algeria, regulatory documents, and international institutional publications. In particular, quantitative indicators related to digital payment infrastructures—such as the Real Time Gross Settlement System (ARTS) and the Automated Transfer and Compensation System (ATCI)—are used to capture the evolution of digital financial activity and support an evidence-based assessment of sectoral trends.

Rather than employing advanced econometric modeling, the study utilizes a semi-quantitative analytical framework based on an extended SWOT approach. This framework is designed to move beyond purely descriptive analysis by introducing a structured evaluation mechanism that combines qualitative insights with quantitative scoring.

Each identified factor (strengths, weaknesses, opportunities, and threats) is assessed using two parameters:

- A relative weight (0–1) reflecting its strategic importance,
- A performance score (1–5) indicating its current effectiveness.

The overall contribution of each factor is then calculated through a weighted scoring method, allowing for a comparative assessment across internal and external dimensions.

The assignment of weights and scores is based on a triangulation process that combines:

- (1) insights from recent academic literature on digital banking and financial innovation,
- (2) contextual analysis of the Algerian banking environment, and
- (3) interpretation of available statistical indicators.

This approach enhances analytical consistency while acknowledging the inherent constraints related to data availability.

It is important to note that the research hypotheses in this study are not intended for strict econometric testing, but rather serve as analytical propositions that guide the structuring of the assessment and the

interpretation of results. This positioning is consistent with exploratory research traditions, where the objective is to generate structured insights and strategic understanding rather than to establish causal inference.

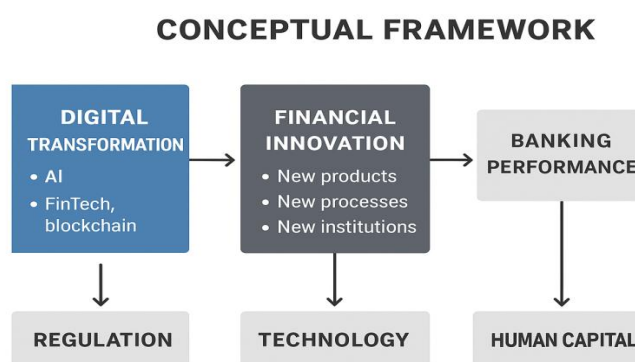
Overall, the adopted methodology provides a coherent and context-sensitive framework for analyzing digital transformation in the Algerian banking sector, while balancing analytical rigor with practical feasibility in a data-constrained environment.

2. Literature Review: Digital Transformation and Financial Innovation

2.1 Concept of Digital Transformation in Banking Sector

Digital transformation in banking denotes more than the deployment of new IT systems: it is a systemic, strategy-level shift in how banks create value, reconfigure processes and business models and interact with customers and ecosystem partners. Scholars conceptualize digital finance as an interplay of business functions, enabling technologies and the institutional environment a “ Digital Finance Cube” that captures how technologies (AI, cloud, APIs), business models (platforms, embedded finance) and institutions co-evolve. (Gomber, 2007) Digital transformation also implies organizational change (new governance, agile processes, capability building) rather than one-off projects and therefore must be studied at the levels of technology impact, compartmentalized adaptation and systemic co-evolution. (Hanelt, 2021)

Fig N° 1: Conceptual framework



Source: Author's own elaboration based on the preceding analysis

2.2 Drivers of Digital Transformation in Emerging Economies

In emerging market, the principal drivers of banking digitalization combine demand-side and supply-side factors: (a) rising mobile/Internet penetration and Smartphone use; (b) policy and regulatory incentives (e-KYC, digital ID, PSD-type reforms); (c) cost-efficiency pressures in legacy banks models and (d) private-sector entrants (FinTechs, bigtech platforms) that create competitive pressure and new distribution channels. The world Bank's

Digital Financial Services report summarizes these binding constraints and enablers (legal/regulatory frameworks; payment and credit infrastructure; digital ID and government platforms) and shows how they jointly determine the pace at which countries move from cash-based to fully digital DFS ecosystems. (Pazarbasioglu, 2020, p. 6)

2.3 Digital Financial Services: Online Banking, Mobile Banking, and E-Payments

Digital financial services (DFS) in banking span online retail banking portals, mobile-first applications, e-wallets, card and merchant acquiring systems and platform-based payments. Empirical and review studies show that DFS adoption improves cost structure and customer reach but requires robust payments rails and interoperable architectures to scale. (Pazarbasioglu, 2020) Mobile-money experiences in developing markets highlight that payments are often the entry point for broader digital finance (remittances, micro-credit, micro-insurance), while bank-led apps yield greater cross-selling potential. (Osei, 2023, p. 30) In the Algerian context, academic field studies document initial progress in e-payments and mobile channels but also emphasize gaps in interoperability, merchant acceptance and trust that limit transaction volumes. (Ben Oudina Bouhafs, 2024, p. 111)

2.4 Financial Innovation: Concepts and Mechanisms

Financial innovation refers to new products, processes or organizational forms that alter how financial intermediation is performed. The literature highlights a duality: innovation can foster growth and improve allocation (the bright side) but also raise systemic fragility if risk governance lags (the dark side)- a finding confirmed across cross-country studies. Mechanisms through which digital transformation drives financial innovation include alternative data underwriting (digital credit), platform-enabled distribution (embedded finance) and algorithm risk models; yet these mechanisms require sound data governance, model validation and regulatory oversight to avoid consumer harm and concentration risks. The SWOT approach benefits from linking each identified innovation mechanism to its potential systemic benefits and risks. (Beck, 2016, p. 32)

2.5 Digital Trust, Cybersecurity and Customer Readiness

Digital trust and cyber-resilience are foundational for DFS adoption: customers adopt remote channels only when consumer protection rules and redress mechanisms exist. International supervisory guidance and studies emphasize board-level cyber governance, testing, incident-response arrangements and sector-wide cooperation to contain systemic cyber risk (BIS/FSI summaries, CPML guidance). On the demand side, adoption models (UTAUT and extensions) consistently show that performance expectancy, facilitating conditions, perceived security and digital literacy are major predictors of use. See (Commissions., 2016), (Institute, 2021), (Bank for International Settlements, 2022)

3. The Algerian Banking Sector in the Digital Age

3.1 Structure and Characteristics of the Algerian Banking System

The banking system in Algeria has long been dominated by public-sector banks, which hold the lion's share of assets and deposits. Private and foreign banks exist but maintain relatively limited market share. This structural dominance translates into a traditional banking model: branch-based networks, paper-heavy procedures, and limited geographic coverage in rural areas. Despite this legacy, recent years have seen emerging signs of change. Studies indicate that between 2013 and 2023, some banks began adopting digital tools and rethinking their service models-suggesting a gradual transition from purely physical banking toward hybrid or digital-led operations. However, the entrenched structure and institutional inertia remain major constraints on speed and depth of transformation. (Loughton, (2025, July 16).)

3.2 Regulatory Framework for Digital Banking in Algeria: Structure and Analytical Implications

On November 21, the Bank of Algeria introduced a comprehensive regulatory framework governing digital banks, with the objective of modernizing the national financial system while maintaining regulatory oversight and ensuring financial stability. Within this framework, a digital bank is defined as a fully licensed banking institution that delivers its services exclusively through digital channels, without relying on traditional physical branch networks.

A central pillar of this framework lies in the regulation of ownership structure and foreign participation, which has significant analytical implications for market dynamics. Foreign banks are prohibited from establishing branches or wholly owned subsidiaries in the digital banking segment. Instead, each digital bank must include at least one domestic Algerian bank holding a minimum of 30% of the capital, while no single shareholder may exceed a 30% ownership threshold.

From an analytical perspective, this regulatory design reflects a deliberate policy trade-off. On the one hand, it strengthens financial sovereignty by ensuring that strategic decision-making remains domestically anchored, thereby reducing exposure to external shocks and limiting risks associated with volatile foreign capital flows. This is particularly relevant in digital banking, where data governance and technological infrastructure constitute critical components of financial stability.

On the other hand, this restriction introduces structural limitations on competition and innovation. Empirical insights from emerging markets suggest that foreign bank participation is often associated with higher levels of technological diffusion, efficiency gains and product innovation. Consequently, restricting foreign entry

may reduce competitive pressure on domestic banks, potentially slowing the adoption of advanced digital solutions and limiting the overall dynamism of the financial ecosystem.

The operational framework further reinforces national control through strict localization requirements. Digital banks must maintain a local headquarters responsible for administrative functions and customer relations, while core banking systems and backup infrastructures must be hosted within Algeria. These measures enhance data sovereignty and cybersecurity resilience, yet they may also increase operational costs and technological constraints, particularly for new entrants.

In terms of authorized activities, digital banks are permitted to accept public deposits, provide financing exclusively to small and medium-sized enterprises (SMEs), offer Sharia-compliant financial services and deliver digital payment solutions. This targeted orientation aligns with national development priorities, particularly in promoting financial inclusion and supporting productive sectors. However, limiting lending activities to SMEs may also restrict revenue diversification and affect long-term profitability.

The framework also introduces prudential safeguards aimed at mitigating systemic risks. Deposit concentration is capped at 1% per customer, reducing dependency on large depositors, while credit allocation remains restricted to SMEs. Although these measures enhance financial stability, they may constrain balance sheet expansion and limit economies of scale.

A key feature of the regulatory model is its dynamic flexibility. After a five-year period, digital banks are required to increase their capital to 150% of the statutory minimum, while the Bank of Algeria retains the authority to grant regulatory exemptions based on institutional performance. This mechanism suggests a gradual liberalization approach, allowing regulators to reassess market conditions and potentially relax constraints as the sector matures.

Overall, the Algerian regulatory framework for digital banking embodies a cautious and state-centered approach that prioritizes stability and sovereignty over rapid liberalization. While this model is likely to ensure short-term resilience and controlled development, its long-term effectiveness will depend on the capacity of domestic banks to innovate, compete and adapt to the evolving demands of the digital financial landscape. In this context, the restriction on foreign bank entry emerges as a double-edged policy instrument—simultaneously protecting the national financial system while potentially limiting its integration into global innovation networks. (Algeria News Gate, (2025, November 21))

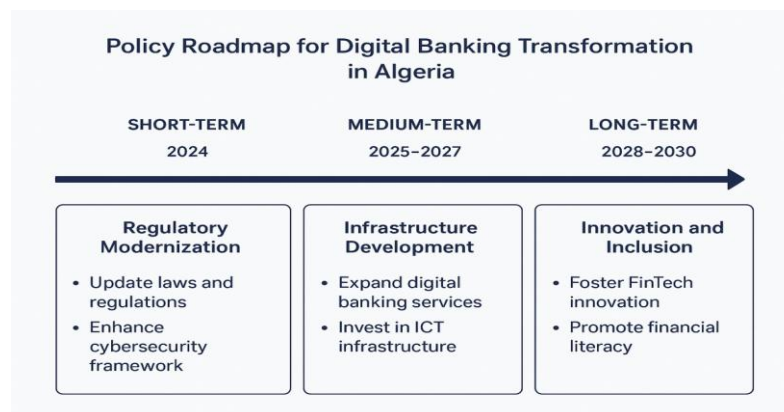
3.3 Government Reforms Supporting Digitalization

Algeria has recently intensified efforts to modernize its financial system and promote digital transformation; the creation of the National Payments Committee (CNP) marks a key step, as it is responsible for

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expanding electronic payment methods, reducing cash dependence, and improving transaction security and transparency. (Saada, (2024, April 7)) In line with 2023 Monetary and Banking Law, the Bank of Algeria has also introduced new regulation enabling the entry of digital banks, payment service providers, merchant banks and currency exchange offices. These reforms aim to accelerate the digitalization of banking services, support online payments and e-commerce and strengthen the legal and technological of a fully digital financial ecosystem. (Algérie Invest, 2024)

Fig N° 02: Policy Roadmap for digital banking transformation in Algeria



Source: Author's adaptation based on Algérie Invest (2024)

3.4 Current State of Digital in Algerian Banks

Digitalization in the Algerian banking sector has progressed significantly over the past decade, driven by a combination of regulatory reforms, technological modernization and increasing demand for digital financial services. Empirical evidence indicates that between 2013 and 2023, Algerian banks achieved noticeable improvements in key performance indicators, including profitability, liquidity and operational efficiency, largely due to the adoption of digital tools and electronic payment systems.

A major institutional turning point was marked by the enactment of Monetary and Banking Law No. 23-09, which established the legal foundation for fully digital banks and introduced a regulatory framework paving the way for the potential implementation of a central bank digital currency. This legal evolution has accelerated the development of modern financial infrastructures and strengthened the digital transformation trajectory of the banking sector.

Among the most important technological advancements is the deployment of national payment systems, notably the Real Time Gross Settlement System (ARTS) and the Automated Transfer and Compensation System (ATCI). These systems play complementary roles in the financial ecosystem by supporting both high-value interbank transactions and large-scale retail payments.

In 2023, the ARTS system processed 449,686 transactions with a total value of 112,535.82 billion DZD, reflecting its central role in handling high-value real-time transfers. In contrast, the ATCI system handled approximately 74.77 million transactions amounting to 22,958.5 billion DZD, demonstrating its efficiency in managing a large volume of retail and bulk payments. This dual structure highlights the progressive modernization of Algeria's payment infrastructure and the increasing adoption of digital payment instruments.

Table N°1: Digital Payment Systems in Algeria (2023)

System	Transaction Value (billion DZD)	Transaction Volume	System Function
ARTS (Real Time Gross Settlement System)	112,535.82	449,686	High-value interbank transfers (real-time)
ATCI (Automated Transfer and Compensation System)	22,958.5	74.77 million	Retail payments and bulk transactions

Source: Author's elaboration based on Bank of Algeria, Statistical Data (2024)

The comparison presented in Table N°1 clearly illustrates the structural distinction between the two systems. While ARTS is designed for low-volume but high-value transactions within the interbank market, ATCI processes a significantly higher volume of lower-value transactions, reflecting the expansion of digital retail payment usage. This indicates a gradual shift toward a more inclusive and accessible financial system.

Further consolidation of the digital banking framework occurred through the 2024–2025 regulatory package, particularly Regulation 24-04, which specifies licensing conditions, governance rules, cybersecurity requirements and operational standards for digital banks. The regulation authorizes digital banks to offer a wide range of services, including deposit accounts, payment services, SME financing and Islamic banking products, while imposing prudential requirements such as a minimum national ownership threshold of 30%.

Despite these advancements, several challenges remain. These include infrastructural limitations, disparities in broadband quality across regions, cybersecurity vulnerabilities and relatively low levels of consumer trust in digital financial services. Academic and institutional studies emphasize the need for sustained investment in digital infrastructure, enhanced cybersecurity frameworks and improved financial and digital literacy to support broader adoption.

Overall, Algeria is steadily moving toward a more digitalized, efficient and financially inclusive banking system, supported by an evolving and increasingly comprehensive regulatory environment. (Algeria Invest, (16 septembre 2024)), (Algeria News Gate, Bank of Algeria introduces new framework for digital banking operations., (2025, November 21))

3.5 Barriers to Digital Transformation: Organisational, Technological, and cultural

Despite regulatory and service advances, several barriers continue to hamper full digital transformation in Algerian banking:

- **Organizational barriers:** Many public banks still operate under hierarchical, rigid governance structures, with slow decision-making, limited innovation culture and insufficient human resources skilled in digital banking.
- **Technological barriers:** Legacy IT infrastructure, lack of interoperable systems, fragmented payment rails and inadequate cybersecurity architecture hinder deployment of scalable digital services.
- **Regulatory-operational constraints:** Compliance requirements, limitations on foreign participation for digital banks, strict licensing and capital rules may constraint growth of new players.
- **Cultural and demand-side constraints:** Low digital literacy, customer preference for cash, lack of trust in digital channels and limited merchant acceptance of electronic payments impede adoption and usage.

These combined barriers mean that while the regulatory and institutional foundations for digital banking are being laid, practical obstacles-both internal and external- slow down the evolution of a fully digital banking ecosystem. (Algeria News Gate, Bank of Algeria introduces new framework for digital banking operations., (2024, November 23))

3.6 Customer Adoption and Digital Financial Inclusion in Algeria

Algeria has made notable progress in advancing digital financial inclusion, driven by recent regulatory reforms and institutional modernization. The establishment of National Payments Committee (CNP) in 2024 represents a major milestone in upgrading the national payments ecosystem. The committee is tasked with formulating a national strategy to expand electronic and written payment instruments, reduce dependence on cash and strengthen user trust-two long-standing challenges highlighted by the Bank of Algeria. Complementing this institutional development, Monetary and Banking Law No.23-09 and subsequent regulatory issuances have created an enabling environment for digital banking and promoted the diffusion of electronic payment tools across economic sectors.

Recent empirical evidence shows rising customer engagement with digital financial services, reflected in the high transaction volumes processed through the Real-Time Gross Settlement System (ATTS) and the Automated Transfer and Compensation System (ATCI) in 2023. Nevertheless, several constraints continue to limit broader adoption, including gaps in digital infrastructure, low levels of digital literacy and persistent mistrust among segments of the population.

Overall, the trajectory indicates that effective customer adoption requires continued investment in secure digital platforms, targeted awareness and literacy initiatives and improved accessibility of digital banking channels. These efforts are essential to supporting a more inclusive financial ecosystem and enabling a gradual transition toward a less cash-dependent economy in Algeria. (Saada, (2024, April 7))

4. Quantitative SWOT Analysis of Digital Transformation in Algerian Banks

Strengths (S) - Existing foundational digital infrastructure. - Government support for electronic transactions. - Expansion of e-payment services. - Growing interest in financial innovation within banks.	Weaknesses (W) - Limited digitalization in public banks. - Resistance to change and shortage of digital skills. - Cybersecurity vulnerabilities. - Slow pace of innovation compared to global standards.
Opportunities (O) - Rising internet and smartphone penetration. - National push toward financial inclusion and cashless payments. - Potential for partnerships with FinTech companies. - Ability to enhance regional competitiveness in digital finance.	Threats (T) - Increasing international competition. - Regulatory ambiguity in certain digital services. - cybersecurity and fraud risks - Digital literacy gaps among users.

4.1 Methodological Framework for SWOT Quantification

To enhance the analytical rigor and reduce subjectivity commonly associated with traditional SWOT analysis, this study adopts a semi-quantitative approach based on a simplified multi-criteria evaluation framework inspired by the Analytic Hierarchy Process (AHP).

The weighting and scoring of each factor were determined according to three main criteria:

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- Relevance in the literature (frequency and emphasis in prior studies on digital banking and financial innovation).
- Contextual significance within the Algerian banking sector.
- Expected impact on digital transformation performance.

Each factor was assigned:

- A weight (0–1) reflecting its relative importance within its category.
- A performance score (1–5) indicating its current effectiveness.

The weighted score was calculated as follows:

$$\text{Weighted Score} = \text{Weight} \times \text{Score}$$

This structured approach improves the objectivity of the analysis and aligns with recent studies integrating SWOT with multi-criteria decision-making techniques.

4.2 Strengths (S)

- **Existing Infrastructure and Initial Digital Banking Projects:** Algerian banks, particularly public institutions such as National Bank of Algeria (BNA) and External Bank of Algeria (BEA), have developed foundational digital banking services including online banking platforms, mobile applications, and ATM networks. This infrastructure provides a strong base for further digital expansion and innovation. (Almi, 2025, p. 82)
- **Government support for Electronic Transactions:** Regulatory frameworks, including Law No. 18-05 on electronic transactions and initiatives by the Bank of Algeria facilitate digital banking adoption and provide legal and operational support for electronic payment systems. (LaunchBase Africa, (2025, March 5).)
- **Growing Interest in Financial Innovation:** Algerian banks are increasingly aware of the importance of financial technology (FinTech) for customer engagement, operational efficiency and competitiveness. Initiatives include pilot digital projects, partnerships with FinTech start-ups and investment in innovative banking technologies. (Almi, 2025, p. 83)
- **Established Customer Base and Market Reach:** Although specific customer base studies in Algeria are limited online, national statistics reported by officials show millions of account holders and growth in electronic transactions, reflecting broad market participation that digital services can leverage. (Radio Algérie, (04/05/2023))

- **Early Adoption of Digital Payment Systems:** Several banks have implemented electronic payment solutions such as debit/credit cards, mobile wallets, and POP systems, which demonstrates an initial momentum toward digital transformation. (Algeria Invest, (16 septembre 2024))

4.3 Weaknesses (W)

- **Limited Technological Capabilities in Public Banks:** Many public banks still operate with outdated and underdeveloped IT infrastructure, which restricts their ability to compete regionally and internationally. (Samra, 2023, p. 225)
- **Resistance to Change and Digital Skill Gaps:** The process of adopting digital transformation is hindered by organizational resistance among employees and a significant shortage of staff with specialized digital and technological skills, resulting in slow progress in implementing modern banking technologies. (Bouacheria Kebir, 2023)
- **Weak Cybersecurity Measures and Digital Trust:** Cybersecurity remains a major challenge, as insufficient protection mechanisms expose banks to cyberattacks, data breaches and operational risks, ultimately undermining customer trust in digital financial services. (Samir, 2024)
- **Slow Adoption of Financial Innovation:** Although interest in financial products remains slow relative to regional competitors, limiting the sector's capacity for innovation and modernization. (Hamza, 2025)
- **Poor Integration Between Digital and Traditional Banking Services:** Several banks struggle to integrate digital channels with traditional operations, resulting in fragmented service delivery, inefficiencies and inconsistent customer experiences across platforms. (Boukrouh, 2022)

4.4 Opportunities (O)

- **Expansion of E-Payments and Fintech Ecosystems:** The rapid growth of electronic and mobile payment system in Algeria —such as interoperability platforms and Smartphone-based payment services — creates significant opportunities for banks to broaden their digital offerings and engage new customer segment. This expansion advances cashless transactions and supports partnerships with Fintech firms to build a more innovative financial ecosystem. (Saada, (2024, April 7))
- **Increasing Internet and Smartphone Penetration:** A larger share of the Algerian population now has access to mobile phones and the internet, laying a strong foundation for digital banking adoption. With high mobile connectivity and growing online engagement, banks can deploy digital financial products more efficiently and reach underserved or remote markets. (Africanenda Foundation, 2024)
- **Potential for Regional Competitiveness and Partnerships:** Reform-oriented policies and emerging digital infrastructure position Algerian banks to enhance regional competitiveness. Cross-border digital

payment systems and alliances with international financial institutions can bring technological expertise, broaden service portfolios and integrate Algerian banks more fully into global financial networks. Evidence from international assessments suggests that financial inclusion strategies and digital reforms can support broader competitiveness goals. (International Monetary Fund, 2024)

- **Government Initiatives Supporting Financial Inclusion:** Policy frameworks and national strategies aimed at increasing access to financially excluded populations. Digital finance can reduce barriers to financial service use, particularly for women and rural communities and contribute to broader economic inclusion goals. (Delort, (2021, February 22).)
- **Adoption of Innovative Banking Technologies:** Emerging technologies – including mobile wallets, interoperable QR-based payments, and digital banking platforms – open pathways for Algerian banks to improve operational efficiency, reduce costs and introduce differentiated financial products. The establishment of national platforms for instant and mobile payments illustrates growing technological capacity. (Saada, (2024, April 7))

4.5 Threats (T)

- **Intensifying International Competition and Technological Lag:** Algerian banks operate in an increasingly competitive global financial environment dominated by technologically advanced international banks and agile Fintech firms. The relative delay in adopting cutting edge digital solutions may weaken the competitive position of Algerian banks in cross-border services and advanced digital banking products, thereby limiting their ability to retain and attract customer in an open digital market. (Bouabdellah, 2022)
- **Regulatory Uncertainty and Slow Legal Adaptation:** Despite ongoing reforms, the pace of regulatory and legal adaptation to rapid technological change remains relatively slow. Gaps between innovation dynamics and regulatory updates – particularly concerning FinTech activities, data protection and digital banking models – create uncertainty for financial institutions and may discourage long-term digital investment and experimentation.
- **Cybercrime Risks, Data Breaches, and Erosion of Customer Trust:** The expansion of digital banking services exposes Algerian banks to heightened cybersecurity risks, including fraud, hacking and data breaches. Insufficient cybersecurity infrastructure and governance mechanisms can result in financial losses and reputational damage, while also undermining customer trust in electronic financial services – an essential pillar for successful digital transformation. (Bouabdellah, 2022)

- **Economic and Political Uncertainty:** Macroeconomic volatility and political uncertainty constitute external threats that may constraint bank's capacity to invest in advanced digital infrastructure. Periods of fiscal pressure or economic slowdown can shift priorities away from long-term digital transformation projects, slowing the diffusion of digital financial services across the banking system.
- **Customer Reluctance and Digital Literacy Gaps:** Although digital connectivity is expanding, segments of the Algerian population continue to face limited digital literacy, low confidence in electronic transactions and strong preference for cash-based payments. These behavioral and skills-related barriers reduce the adoption rate of digital banking services and weaken the overall impact of digital transformation strategies.

4.6 Justification of Assigned Weights

The weights attributed to each factor reflect their strategic importance based on empirical evidence and theoretical insights.

- Digital infrastructure (0.20) was assigned the highest weight due to its fundamental role in enabling digital banking services and its strong presence in the literature.
- Regulatory framework (0.15) reflects the significant influence of public policy in shaping digital financial ecosystems in emerging economies.
- Cybersecurity and customer trust (0.10–0.15) were emphasized as critical determinants of digital adoption, particularly in trust-sensitive financial environments.
- Opportunities related to financial inclusion (0.10) were weighted moderately due to their long-term strategic importance.
- Restrictions on foreign bank entry (0.05) were assigned a lower weight but remain strategically relevant due to their impact on competition and innovation.

This weighting structure ensures consistency between theoretical importance and contextual relevance.

Table N°2 presents the quantified SWOT analysis of digital banking in Algeria. The results highlight the relative importance and performance of each strategic factor affecting the digital transformation process.

Table N°2: Semi-Quantitative SWOT Matrix for Digital Transformation in Algerian Banks

Factor	Category	Weight (0–1)	Score (1–5)	Weighted Score
Digital Infrastructure	Strength	0.20	3	0.60
Regulatory Framework	Strength	0.15	4	0.60
SME Financing Orientation	Strength	0.10	4	0.40

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Cybersecurity Readiness	Weakness	0.15	2	0.30
Internet Quality	Weakness	0.10	2	0.20
Customer Trust	Weakness	0.10	2	0.20
Financial Inclusion Potential	Opportunity	0.10	4	0.40
FinTech Collaboration	Opportunity	0.05	3	0.15
Restrictions on Foreign Bank Entry	Threat	0.05	2	0.10

Source: Author's own elaboration based on study data (2020–2024).

The results of the semi-quantitative SWOT analysis reveal a structural imbalance between enabling factors and persistent constraints in the Algerian banking sector.

On the internal dimension, strengths such as digital infrastructure and regulatory support achieved the highest weighted scores (0.60), indicating a solid institutional and technological foundation for digital transformation.

However, key weaknesses including cybersecurity readiness (0.30), internet quality (0.20) and customer trust (0.20) highlight critical operational and behavioral barriers that limit effective digital adoption. These constraints are particularly significant in emerging financial systems, where trust and system reliability are essential.

From an external perspective, opportunities related to financial inclusion (0.40) and FinTech collaboration (0.15) demonstrate strong potential for expansion. Nevertheless, structural threats especially restrictions on foreign bank entry may limit competitive dynamics, reduce innovation incentives and slow technological progress.

Overall, the findings confirm that while Algeria possesses a solid foundation for digital banking, the transition remains constrained by implementation challenges, resulting in a gradual rather than fully mature digital transformation process.

5. Discussion: Strategic Implications for Algerian Banks

5.1 Leveraging Existing Strengths to Support Digital Transformation

The findings suggest that Algerian banks possess foundational strengths—particularly in terms of existing digital infrastructure, regulatory support, and an established customer base—that can facilitate the gradual advancement of digital transformation. Rather than implying deterministic outcomes, these elements indicate favorable structural conditions that may support the expansion of digital services.

Building on current digital platforms (e.g., online banking, mobile applications, and ATM networks), banks can progressively enhance service delivery and integrate new technologies with limited structural disruption. In addition, the presence of regulatory frameworks governing electronic transactions provides a relatively stable environment for experimentation and innovation, while maintaining compliance. The existing customer base further represents a potential driver for adoption, especially if digital solutions are aligned with user needs and trust-building mechanisms.

5.2 Addressing Structural Weaknesses through Adaptive Strategies

The analysis highlights several internal constraints, including technological limitations, skill gaps, and cybersecurity concerns. These factors should be interpreted as operational challenges that may affect the pace and effectiveness of digital transformation rather than absolute barriers.

To mitigate these constraints, banks may consider gradual and context-adapted strategies such as:

- Progressive modernization of IT infrastructure and adoption of scalable digital systems;
- Investment in human capital through targeted training and digital capacity building;
- Strengthening cybersecurity frameworks, including preventive systems and user awareness initiatives;
- Encouraging organizational adaptation by fostering innovation-oriented structures, such as dedicated digital or FinTech units.

5.3 Exploiting Opportunities for Financial Innovation Exploring Opportunities for Financial Innovation

External factors identified in the analysis—such as increasing digital adoption, public policy support for financial inclusion, and the emergence of FinTech ecosystems—suggest the presence of strategic opportunities that may be leveraged by Algerian banks.

Potential areas of development include the expansion of digital payment solutions, enhancement of customer interaction through data-driven tools, and the exploration of secure transaction technologies.

5.4 Navigating External Constraints in the Digital Environment

The study also identifies external pressures, including cybersecurity risks, regulatory uncertainty, and evolving competitive dynamics. These elements represent environmental conditions that may influence strategic decision-making.

In response, banks may adopt adaptive approaches such as strengthening risk management practices, maintaining continuous engagement with regulatory authorities, and exploring collaborative arrangements with technological partners. Additionally, addressing user-related barriers—such as digital literacy and trust—remains essential for facilitating the broader adoption of digital financial services.

5.5 Consistency with National Financial Transformation Priorities

The insights derived from the SWOT framework appear broadly consistent with the orientations of Algeria's financial sector development policies, particularly those related to digital inclusion, modernization, and financial innovation.

Aligning institutional strategies with these broader policy directions may support objectives such as expanding access to financial services, improving operational efficiency, and enhancing the overall resilience of the banking system. Within this perspective, the SWOT-based analysis serves as a structured interpretative tool that informs strategic reflection rather than prescribing deterministic policy outcomes.

6. CONCLUSION

This study examined digital transformation in the Algerian banking sector using a semi-quantitative SWOT framework to identify strengths, weaknesses, opportunities, and threats, with a particular focus on financial innovation. In line with the exploratory nature of the adopted approach, the objective was not to establish causal relationships, but rather to provide structured and context-sensitive insights into the interaction between internal capabilities and external environmental factors. The findings indicate that Algerian banks benefit from foundational digital infrastructure, regulatory support, and a growing interest in innovative financial solutions, which together constitute key enabling conditions for gradual and incremental digital development. However, the analysis also reveals persistent structural constraints, including technological gaps, skill shortages, resistance to organizational change, and cybersecurity vulnerabilities, which may limit the effectiveness and pace of digital transformation if not strategically addressed.

From an external perspective, opportunities related to e-payment expansion, increasing internet and smartphone penetration, financial inclusion policies, and the emergence of FinTech ecosystems offer significant strategic potential. Nevertheless, external threats—such as international competition, regulatory uncertainty, cyber risks, and gaps in digital literacy—underscore the complexity of the transformation environment and the need for adaptive strategic responses. Overall, the results suggest that digital transformation in Algeria follows a gradual and path-dependent trajectory, where progress depends on the alignment between regulatory evolution, technological investment, and user adoption. Consistent with the methodological positioning of the study, these findings should be interpreted as analytical and strategic insights derived from a semi-quantitative framework, rather than as statistically validated causal evidence.

6.1 Summary of Key Findings

- **Foundational Strengths in Digital Infrastructure:** Algerian banks have developed basic digital infrastructures, including online banking platforms, mobile applications and ATMs, supported by

government policies for electronic transactions. These strengths facilitate initial steps toward comprehensive digital transformation.

- **Internal Challenges and Weaknesses:** Public banks face technological gaps, limited human capital in digital skills, resistance to organizational change and vulnerabilities in cybersecurity. These factors slow the adoption of innovative financial services and may reduce operational efficiency.
- **Opportunities for Growth and Innovation:** Rising internet and smartphone penetration, government initiatives for financial inclusion and the expansion of FinTech ecosystems provide significant opportunities. Banks can leverage these trends to develop e-payment solutions, AI-driven services and blockchain-based platforms to enhance competitiveness and customer reach.
- **External Threats:** International competition, regulatory uncertainty, cybercrime risks and gaps in digital literacy represent external threats that can hinder the success of digital transformation initiatives. Proactive risk management and alignment with regulatory frameworks are critical.
- **Strategic Implications:** The SWOT analysis indicates that leveraging strengths, addressing weaknesses, exploiting opportunities, and mitigating threats through strategic planning can accelerate digital transformation. Key strategies include infrastructure modernization, capacity building, cybersecurity enhancement and customer-focused innovation.
- **Contribution to Theory and practice:** The study demonstrates the applicability of the SWOT framework to the Algerian banking sector, providing both theoretical insights and practical recommendations for policymakers, regulators and bank managers aiming to enhance financial innovation and inclusion.

6.2 Contribution to Theory and Practice

- **Theoretical Contribution:** This study extends the literature on digital transformation in emerging economies by applying a SWOT framework to Algerian banking sector. It provides a systematic assessment of internal capabilities, external opportunities, and threats, linking digital transformation efforts to financial innovation. By combining organizational analysis with macro-level considerations such as regulatory frameworks and market trends, the research contributes a structured approach for evaluating digital readiness in similar emerging markets.
- **Practical Contribution:** The findings offer actionable insights for policymakers, regulators, and bank managers. Recommendations on infrastructure modernization, cybersecurity enhancement, capacity building and FinTech integration provide concrete guidance to accelerate digital banking initiatives. The proposed roadmap enables banks to strategically implement digital solutions while promoting financial

inclusion, improving operational efficiency, and enhancing competitiveness in regional and international markets.

6.3 Hypotheses Testing Based on Quantified SWOT Analysis

The results of the quantified SWOT analysis provide empirical insights that allow for the validation of the study's hypotheses.

Regarding H1, the findings indicate that digital infrastructure achieved a relatively high weighted score (0.60), reflecting its strong contribution to the development of digital banking services. This supports the hypothesis that infrastructure plays a positive and enabling role in digital transformation.

Concerning H2, regulatory support also obtained a significant weighted score (0.60), confirming the importance of legal frameworks and government initiatives in facilitating digital banking adoption. This result validates the second hypothesis.

In contrast, H3 is supported by the relatively low scores of key limiting factors, including cybersecurity readiness (0.30), internet quality (0.20), and customer trust (0.20). These results highlight the existence of structural and behavioral barriers that negatively affect the effective implementation of digital banking solutions.

Finally, H4 is confirmed by the identification of restrictions on foreign bank entry as a relevant external threat. Although its weighted score appears moderate (0.10), its strategic impact is significant, as it limits competitive pressure, reduces knowledge transfer and slows innovation within the domestic banking sector.

Overall, the findings suggest that while enabling factors are present, structural weaknesses and regulatory constraints continue to hinder the full development of digital banking in Algeria.

6.4 Future Research Directions

- **Longitudinal Studies:** Future research could track the evolution of digital transformation in Algerian banks over multiple years to assess the effectiveness of strategic initiatives and regulatory reforms.
- **Comparative Studies:** Cross-country comparative analyses with regional peers could identify best practices and benchmarks for successful digital banking adoption in emerging economies.
- **Integration of Emerging Technologies:** Investigating the practical adoption of blockchain, AI and other advanced technologies in banking operations would provide deeper insights into innovation capabilities and digital maturity.
- **Customer-Centric Research:** Examining customer adoption patterns, digital literacy and trust in electronic services can help banks design more effective digital products and financial inclusion strategies.

- **Regulatory Impact Assessment:** Analyzing the effects of regulatory changes on digital banking innovation and risk management could support evidence-based policymaking.

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