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The Role of FinTech in Enhancing Banking Services: Insights from the National Bank of Algeria

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Abstract:
This study examines the role of financial technology (FinTech) in enhancing banking services in Algeria, with a focus on the National Bank of Algeria (BNA), an institution in the early stages of digital transformation. It explores FinTech's main concepts, tools, and applications in banking, emphasizing its contribution to service quality and financial performance. Using a descriptive and analytical approach, the study analyzes data and indicators specific to BNA, covering electronic payments, bank cards, ATMs, and mobile banking applications. Findings show that FinTech has become a central driver of improved banking operations by accelerating transactions, reducing costs, and expanding customer access. The results indicate that BNA has made notable progress in adopting digital solutions; however, fully realizing the benefits requires further investment in digital infrastructure, adaptation of the legal framework, and development of specialized human resources to sustain and expand the digital banking transformation.

Keywords: FinTech, banking services, National Bank of Algeria, Algeria
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1. Introduction:

In recent decades, the world has experienced profound economic and technological transformations that have compelled various sectors to reconsider their traditional practices. The financial sector has been among the most affected by this new dynamic, undergoing a qualitative shift with the emergence of financial technology (FinTech), which has come to represent a genuine revolution in the field of banking and financial services. By integrating advanced digital tools such as artificial intelligence, blockchain, and big data analytics, FinTech has enabled the redesign of banking services to make them more flexible, efficient, and inclusive.

This digital transformation has helped to overcome many of the classical constraints of banking, whether related to time or cost. It has paved the way for the entry of new players into the financial services landscape and expanded the customer base through innovative solutions tailored to the expectations of a digitally connected generation. Closely tied to the spread of smartphones and high-speed internet, this transformation has facilitated access to a wide range of banking services at lower costs and with simplified procedures. As a result, it has significantly improved user experience and contributed to enhancing financial inclusion, particularly in areas underserved by traditional banking coverage.

Amid escalating economic challenges in the post-pandemic period, FinTech has become a core element in strategies for improving banking performance. Banks can no longer rely solely on conventional operational models; instead, they are increasingly required to adopt integrated digital solutions that ensure faster service delivery, data security, and reduced operational costs, all while meeting regulatory requirements and maintaining financial system stability.

In this context, Algerian banking institutions have begun to recognize the potential of FinTech as a lever for modernizing the financial system and improving service quality. In recent years, the national banking sector has witnessed accelerated efforts in this direction, ranging from the launch of electronic payment services and the expansion of digital banking outlets to strengthening the infrastructure for digital finance. The National Bank of Algeria (BNA) stands out as a leading actor in this process, having initiated a series of technological projects aimed at digitizing services, improving customer relations, and upgrading internal information systems in line with international best practices.

Building on this, the present study seeks to analyze the role of FinTech in enhancing banking services, with a focus on the experience of the National Bank of Algeria. Specifically, it examines the effectiveness of digital tools and assesses their impact on the quality of banking services.

1.2. Main Research Question

Based on the above, this study raises the following main research question:

- **Does financial technology play a role in improving banking services in the bank under study?**

Based on that, the following sub-questions are derived:

- Does the bank's adoption of electronic payment services, mobile banking, and remote banking applications contribute to enhancing customer experience?
- Does the bank's adoption of financial technology, alongside the growth in deposit accounts, contribute to improving the quality of banking services?
- Does the bank's adoption of financial technology, in parallel with the evolution of liquidity indicators, contribute to improving the quality of banking services?
- Does the bank's adoption of financial technology, in parallel with the evolution of profitability indicators, contribute to improving the quality of banking services?

1.3. Research Hypotheses

To answer the Research Questions, the study suggests the following hypotheses:

- **Main Hypothesis**:

  The adoption of financial technology has a positive effect on the quality of banking services at the National Bank of Algeria.

- **Sub-Hypotheses**:

- The adoption of electronic payment services, mobile banking, and remote banking applications positively affects customer experience at BNA.
- The adoption of financial technology is associated with growth in deposit account volumes at BNA.
- The adoption of financial technology is associated with improvements in liquidity indicators at BNA.
- The adoption of financial technology is associated with improvements in profitability indicators at BNA.

2. Conceptual Part:

2.1. FinTech

2.1.1. Evolution of FinTech

The concept of financial technology (FinTech) emerged following the spread of the internet and smartphones, which created a need for easier and faster financial solutions for both individuals and businesses. Initially, FinTech addressed basic financial problems by enabling customers to carry out banking transactions online through computers or mobile devices. Over time, it expanded into areas such as digital investment platforms, insurance, e-commerce, trading, and fraud prevention. (Zaaf, 2019, pp. 3, 4)

The evolution of FinTech can be divided into three main phases: (Haddadi & Beradi, 2018, p. 7)

- **First Phase (1950–1965):** Marked by technological innovations like the installation of the first transatlantic cable and the invention of the automated teller machine (ATM). These developments laid the groundwork for financial globalization.
- **Second Phase (1965–2008):** During this period, FinTech became embedded in traditional financial services, supporting the development of electronic payments, clearing systems, ATMs, and online banking services.
- **Third Phase (2008–present):** Following the global financial crisis, new FinTech startups emerged, offering innovative products and services directly to businesses and consumers. This phase has been characterized by rapid innovation in mobile banking, peer-to-peer lending, blockchain, and other disruptive technologies.

2.1.2. Definition of FinTech

There are many definitions of financial technology (FinTech), among which are the following:

- Financial technology is a major process of innovation in financial instruments, techniques, institutions, and new financial markets. This process continuously evolves and adapts to advances in information and modern technologies.
- Financial technology is a wide variety of electronic financial services that are characterized by convenience and affordable prices compared to traditional services. It contributes to serving low-income individuals and improving their economic situation. (Houma, 2018, p. 2)
- Financial technology refers to innovative services and products provided through technology, such as mobile phones, as well as the use of encrypted digital currencies like Bitcoin and Blockchain as alternatives to traditional currencies. (Lee Kuo Chuen & Guan Siew Teo , 2015, p. 7)

From the above, the researcher concludes that financial technology can be defined as: a set of financial innovations supported by technology, aimed at developing financial services through new business models, applications, and products that enhance efficiency and provide innovative solutions to meet the needs of financial markets and institutions in a more advanced and effective manner compared to traditional systems.

2.1.3. The Importance of FinTech

FinTech contributes to the following: (Harfoush, 2019, p. 727)

- **Developing institutional capacities:** FinTech establishes a link between the financial sector and technology, where cooperation with financial regulatory authorities on innovation-related issues helps strengthen institutional capacities and create conditions for an integrated framework;
- **Improving the quality of financial services:** FinTech plays a significant role in enhancing the quality of financial services, contributing to higher efficiency while reducing costs and transaction time;
- **Diversifying economic activity:** FinTech can contribute to diversifying economic activity and reinforcing financial stability;
- **Promoting financial inclusion:** By enabling financially excluded groups to access financial services, FinTech enhances financing opportunities, particularly for small and medium-sized enterprises.

2.1.4 Segments of FinTech

FinTech can be divided into eight industry segments: (Lavrinenko,, Čižo, Ignatjeva, & Krukowski, 2023, p. 2)

- Payments and money transfers;
- Digital banking;
- Digital wealth managers, including roboadvisors;
- Capital markets innovations, including algorithmic trading, high-frequency traders, and market analytics;
- FinTech lending, including P2P and marketplace lenders;
- Equity crowdfunding;
- InsureTech, which refers to innovations in the insurance industry;
- PropTech, which refers to innovations in the property and real estate industry.

The emerging technologies that are being used across the above industry segments in FinTech include blockchain and distributed ledger technology (DLT), biometrics, quantum computing, cloud computing, open-source computing and APIs, big data analytics, machine learning (ML) and AI, Internet-of-Things (IoT) technology, and cybersecurity among others

2.1.5. Emerging Technologies in FinTech

The rapid growth of financial technology has given rise to innovative tools that have transformed financial and banking services, enhancing efficiency, security, and transparency. Among the most important are:

- **Artificial Intelligence (AI) and Machine Learning (ML):** AI is defined as the science of developing intelligent machines capable of processing data, generating knowledge, and guiding behavior toward set goals. (Belkacemi, 2022, p. 272)

Its main features include adaptability to complex situations, learning from past experiences, and quick response to new conditions. Functions range from natural language processing and image recognition to data analytics and robotics. In finance, AI improves efficiency, automates decisions, strengthens competitiveness, and supports areas such as trading, asset and risk management, fraud detection, and predictive analytics. (Mohammed Rabie, 2024, p. 3001)

ML, a subfield of AI, enables algorithms to learn and adapt from data without explicit programming, making it ideal for pattern recognition, anomaly detection, and predictive modeling in financial operations. (Ben Turk , 2021, p. 537)

- **Blockchain:** It is a decentralized, immutable digital ledger that records transactions in inked blocks. Its key features include shared records, multi-party consensus, independent verification, and resistance to tampering. Applications go beyond cryptocurrencies like Bitcoin to include startup

financing, intellectual property protection, healthcare record management, and secure data exchange in transport and supply chains. (Hajrioua, 2024, p. 28)

- **Smart Contracts:** they are self-executing agreements coded on decentralized networks (e.g., blockchain). They automatically enforce terms once predefined conditions are met, eliminating the need for intermediaries and ensuring trust between parties. Key characteristics include programmability, decentralization, and automation. Use cases include banking services, electronic medical records, IoT data management, real estate, and waste management systems. (Ben Slimane & Zemmouli, 2020, p. 28)
- **Big Data:** It refers to large, fast, and diverse datasets processed with advanced technologies to extract actionable insights. (De Caria, 2019, p. 737) Its characteristics (volume, velocity, variety, veracity) make it a vital tool for institutions to identify opportunities, support decision-making, and improve operational performance beyond the capabilities of traditional methods. (Mokrani, 2022, pp. 779-780)

2.2. Banking Services

2.2.1. Banking Services Definition

A banking service is defined as a set of operations of a utilitarian nature, in which intangible elements prevail over tangible ones, and which are perceived by individuals and institutions through their utility and value. These operations serve as a source for meeting their current and future financial and credit needs, while at the same time contributing to the bank's profitability through a reciprocal relationship between the two parties. (Toumi & Solah, 2012, p. 81).

It is also defined as non-material products offered by the bank to its clients. For customers, banking services are considered a source for fulfilling part of their needs and desires, while for the bank they represent a source of profit and the achievement of strategic objectives. In modern marketing perspectives, the scope of banking services has expanded, as their value lies primarily in the customer experience associated with them. (Ben ahmed, 2012, pp. 13-14)

Furthermore, it is an activity, or set of activities, whose essence is intangible, provided by the bank to its clients to satisfy their needs and wants. Their production may or may not be linked to a physical product, and they do not result in any transfer of ownership. (Aichouch, 2009, p. 24)

From these definitions, we conclude that banking services are a set of intangible operations and activities provided by banks to their clients with the aim of satisfying their financial and credit needs, without involving a transfer of ownership. They are characterized by their utility, perceived by individuals and institutions through their economic value and the experience they provide, making them a key means for achieving the bank's strategic objectives and enhancing its profitability.

2.3. The Role of FinTech in improving and Developing Banking Services

The adoption of financial technology contributes to several improvements in banking services, the most important of which are: (Tebabiya, p. 539)

- **Digitization of Payments:** The rise of the digital economy has accelerated the automation of electronic payments, supporting the integration of the informal economy into the formal one.
- **Product Innovation and Cost Reduction:** FinTech enables banks to develop innovative products and services, improve quality, and lower costs, particularly through electronic payment solutions.
- **Customer Satisfaction and Financial Inclusion:** FinTech supports strategies that enhance customer satisfaction, extend services to new client segments, expand market share, and promote financial inclusion, all while improving operational efficiency and risk management compliance.
- **Access to Credit and Poverty Reduction:** Digital transformation facilitates access to credit and financial services, helping reduce poverty, support entrepreneurship, and provide individuals with stable income opportunities.

- **Greater Accessibility and Inclusion of Women**: FinTech expands access to financial services at lower cost, provides more suitable financial products for underserved groups, and helps overcome barriers faced by women in accessing credit and financial services.
- **Digital Identity and Government Support:** Digital identity systems reduce customer onboarding costs, while mobile payments and distributed ledger technologies expand access to loans, credit, and aid distribution.
- **SME and Business Financing**: FinTech supports SMEs by enabling direct financing from investors through tools such as crowdfunding and marketplace lending. It also enhances risk assessment, improves distribution channels, reduces costs, and broadens investment options, while offering affordable advisory services such as investment guidance.

3. FinTech Adoption in the Algerian Banking Sector:

The following data on FinTech adoption in the Algerian banking sector are sourced from GIE Monétique during the period 2018-2025. (GIE Monetique, 2026)

3.1.1. ATM withdrawal activity:

Table 1. Evolution of ATM Withdrawal Activity in Algeria (2018-2025)

Year	Number of ATMs	Number of ATMs Withdrawal Transaction	Total Amount of Withdrawal Transaction
2018	1 441	8,833,913	136,233,452,000 DZD
2019	1 621	9,929,652	164,116,233,000 DZD
2020	3 030	58,428,933	1,073,004,953,000 DZD
2021	3 053	87,722,789	1,728,937,064,000 DZD
2022	3 658	128,035,361	2,182,896,695,000 DZD
2023	3 847	174,415,895	3,262,245,375,000 DZD
2024	3 942	197,323,075	3,691,600,492,000 DZD
2025 (**feb**)	4072	17,364,708	3,305,975,855,000 DZD

Source: Prepared by the researcher based on GIE Monetique

The table above shows the evolution of Automated Teller Machines (ATMs) in Algeria from 2018 to the first quarter of 2025. The number of machines increased from 1,441 in 2018 to 3,972 by February 2025, reflecting the expansion of ATM networks and the broader digital transformation of the banking sector.

By 2024, ATMs had reached 30,942 units, with continued growth in early 2025 to 4,072 machines, highlighting increased accessibility and reliance on ATMs for daily transactions.

Withdrawal activity also grew markedly. In 2018, around 8.8 million withdrawals were recorded, rising to 174 million in 2023 and 197 million in 2024, with 50 million withdrawals in the first quarter of 2025. Correspondingly, total withdrawal amounts expanded from 136 billion DZD in 2018 to over 3.69 trillion DZD in 2024, with about 3 trillion DZD by February 2025.

Key drivers of this growth include:

- Expansion of digital infrastructure, with banks investing in ATM networks across the country;
- Awareness campaigns promoting the benefits of electronic payments;
- COVID-19 impacts, which increased demand for remote and contactless transactions;
- Enhanced ATM services, including cash withdrawals, bill payments, and money transfers;
- Rising digital literacy, driven by smartphone and financial app adoption.

These trends demonstrate a sustained shift toward digital banking in Algeria, with ATMs playing a central role in facilitating daily financial operations and reinforcing public reliance on electronic payment systems.

3.2. Payment activity via electronic payment terminal

Refers to transactions carried out in commercial outlets using Electronic Payment Terminals (TPEs) with bank cards.

Table 2. Evolution of Electronic Payment Terminal Activity in Algeria 2018-2025

Year	Number of Electronic Payment Terminals	Number of Payment Transactions via Terminals	Total Amount of Payment Transactions
2018	15397	190898	1335334130.76
2019	23762	274624	1916994721.11
2020	33945	7110777	4733820043.01
2021	37561	201500529	15113249499.92
2022	46263	207120884	19343056538.17
2023	530191	309907165	31518739249.37
2024	680140	505790708	4453958073.88
2025 (**feb**)	75559	60950079	635512812.96

Source: Prepared by the researcher based on GIE Monetique

The table above shows a steady increase in Electronic Payment Terminals (TPEs) in Algeria from 2018 to February 2025, rising from 15,397 terminals in 2018 to 75,559 by February 2025. This growth reflects the expansion of digital payment infrastructure, aligned with state policies promoting electronic payments across commercial and service sectors.

Payment activity through TPEs also grew significantly. In 2018, around 190,898 transactions were recorded, increasing sharply to 711,777 in 2020 due to COVID-19–driven shifts toward contactless payments and expanded terminal deployment. By 2021, transactions exceeded 21 million, reaching 27 million in 2022 and 55 million in 2024, indicating rising public adoption and integration into the digital economy.

Transaction values mirrored this trend. Total amounts rose from 1.3 billion DZD in 2018 to 4.7 billion DZD in 2020, then surpassed 15 billion DZD in 2021 and 19 billion DZD in 2022, reaching 44 billion DZD in 2024. In the first quarter of 2025, transaction values totaled about 6 billion DZD, demonstrating continued growth in digital payments.

Key drivers include:

- Expansion of TPE networks by banks and Algeria Post;
- COVID-19 effects and social distancing, increasing reliance on electronic payments;
- Liquidity constraints pushing citizens toward card-based payments;
- Interoperability of Algeria Post with the banking system, facilitating smoother transactions for a wider customer base.

These trends highlight the growing adoption of electronic payments in Algeria and the critical role of TPEs in supporting the country's digital financial transformation.

3.1.2. Online payments

Online payment activity involves the use of bank cards to settle bills and obligations through various e-commerce websites. According to the Electronic Payment Group's website, there are 475 web merchants registered in the electronic banking payment system.

Table 3. Evolution of Online Payment Activity in Algeria 2018-2025

Period	Total Numbers of P2P Transfers	Total Amount of P2P Transfers	Total Amount of Mobile Payment Transactions	Total Number of Mobile Payment Transactions
Jan–2025	3611466	48176893347.56	5276273518.35	1335334130
Feb–2025	3577113	49601476544.81	3725956918.73	4870175

Source: Prepared by the researcher based on GIE Monetique

The table above shows a marked increase in online payment transactions in Algeria from 2018 onward. In 2018, there were 176,982 transactions totaling around 332 million DZD. Growth accelerated sharply during the COVID-19 pandemic, with 4.6 million transactions in 2020, totaling over 5.4 billion DZD.

The trend continued in 2021 and 2022, with payment volumes reaching 11 billion DZD and 18 billion DZD, respectively, reflecting the expansion of e-commerce and digital services. In 2024, total payment amounts declined to 5.2 billion DZD, and by February 2025, transactions numbered 1,378,685 with a value of approximately 4.9 billion DZD, likely due to seasonal or temporary economic factors.

Mobile payment activity also shows strong adoption. In January 2025, peer-to-peer (P2P) transfers reached 3.6 million transactions worth over 48 billion DZD, increasing to 49.6 billion DZD in February despite a slight drop in transaction count. Mobile payments totaled 6.3 million transactions valued at 5.2 billion DZD in January, declining to 4.8 million transactions worth 3.7 billion DZD in February.

This highlight the growing importance of digital and mobile payment solutions in Algeria, indicating a clear shift toward electronic transactions as a core component of the country's digital economy, while also signaling the need for strategies to stabilize and sustain growth in this sector.

3.1.3. Benefits of Adopting FinTech in the Algerian Banking Sector

Benefits and Obstacles of Adopting Financial Technology in the Algerian Banking Sector

Despite the multiple challenges accompanying the integration of financial technology, international evidence highlights its importance as a strategic option for improving bank performance and enhancing the inclusiveness of financial services. This digital transformation is expected to bring about a qualitative shift in the way services are delivered and in the expansion of their scope, pushing banks to accelerate their engagement in this process. At the same time, it requires regulatory authorities to keep pace with this transformation through appropriate support and oversight.

The Algerian banking sector suffers from a relatively slow pace of development, which makes the adoption of financial technology a significant opportunity that must be seized. The main benefits can be summarized as follows: (Hammouch, Aamani, & Ben Ali, 2021, p. 150)

- **Enhancing financial inclusion:** Digital services, particularly through mobile phones, help overcome geographical barriers and reduce costs, thereby improving the speed and quality of services;
- **Facilitating the financing of small and medium-sized enterprises (SMEs):** By relying on direct lending platforms that provide alternative sources of financing, beyond the complexities of traditional bank lending;
- **Encouraging the use of electronic payments:** Which helps reduce dependence on cash, simplify commercial transactions, and lower the associated costs;
- **Improving international banking correspondence mechanisms:** Thanks to innovative payment solutions that enhance the efficiency of cross-border transfers;
- **Improving the quality of financial services:** Artificial intelligence tools, such as robo-advisors, enable personalized services and more effective customer support;
- **Reducing transaction costs and execution time:** Through digital solutions that are more efficient compared to traditional transfer models;
- **Strengthening risk management:** By using regulatory technology (RegTech) applications that digitize compliance with rules such as anti-money laundering and identity verification.

However, the adoption of these solutions is accompanied by a number of risks, most notably:

- Cybersecurity threats and digital fraud risks;
- Insufficient legal protection for consumers operating outside the framework of traditional banking;
- The impact of new competition on the revenues of conventional bank;
- An increase in traditional risks such as credit and liquidity risks in the absence of strict regulatory frameworks.

3.3. Analyzing the Impact of FinTech on Banking Services at the National Bank of Algeria (BNA)

In this research, the focus will be on examining the state of financial technology within the National Bank of Algeria (BNA) during the period 2018–2022, as one of the leading public banks in Algeria that has begun to embrace the digital transformation.

3.3.1. Overview of the National Bank of Algeria (BNA)

3.3.1.1. The Establishment of the National Bank of Algeria (BNA)

The National Bank of Algeria (BNA) was founded on January 13, 1966, where it carried out a wide range of banking activities, initially focusing on financing the agricultural sector. The bank later underwent restructuring, which resulted in the creation of a specialized institution, the Agriculture and Rural Development Bank, with the primary mission of financing and developing the agricultural sector.

Over the years, the BNA was affected by several significant legal reforms, most notably Law No. 88-01 of January 12, 1988, which aimed at directing economic enterprises towards self-financing. This law led to three major changes:

- The withdrawal of the Treasury from financial transactions and the decentralization of resource allocation;
- Granting enterprises the freedom to choose their banks;
- Granting banks the autonomy to make financing decisions for enterprises.

Later, Law No. 90-10 of April 14, 1990, concerning money and credit, brought about a fundamental transformation of the banking system in line with the country's new economic orientations. This law mandated the shift of public enterprises from state financing to self-financing. Like other banks, the BNA became a legal entity carrying out regular banking activities, including resource mobilization, lending operations, and the provision and management of payment instruments on behalf of its clients.

The National Bank of Algeria was the first bank to receive its official license after deliberations by the Monetary and Credit Council on September 5, 1995. The bank also experienced successive capital increases, rising from 14.6 billion DZD in January 2009 to 41.6 billion DZD, and later in January 2018 to 150 billion DZD. Furthermore, the BNA launched Islamic banking services within its portfolio to align with modern banking developments (BNA, 2026)

3.3.1.2. Definition of the National Bank of Algeria (BNA)

The National Bank of Algeria (BNA) is an Algerian banking institution established following the nationalization of several foreign banks. It has been responsible for financing the public sector as well as economic, industrial, and commercial sectors, in addition to strategic areas, particularly agriculture. The bank has also given special attention to the private sector by supporting national private enterprises.

Today, by combining its extensive expertise with its commitment to development and modernization, the BNA operates across the entire national territory, offering a wide and modern range of banking and insurance products and services tailored to current market needs. The bank ensures the well-being and satisfaction of its clients while continuously modernizing to guarantee service quality. (BNA, 2026)

3.3.2. The Main Electronic Banking Services Offered by the BNA

The following section highlights the main electronic banking services provided by the National Bank of Algeria: (BNA, 2026)

- **Online and Mobile Banking Services (BNA.net)**

Through its electronic platform BNA.net, the National Bank of Algeria provides clients with the possibility to access and manage their bank accounts remotely with ease and convenience. This service is available via:

  - Web platform through the following link: https://ebanking.bna.dz/customer

- **Mobile Banking Application (BN@tic)**

The BN@tic mobile application, available for download on both Play Store and App Store, provides customers with secure and continuous access to banking services. This service is available

24/7 throughout the week and is designed for the benefit of individual clients, professionals, and businesses.
Furthermore, this service is offered within a package of electronic banking solutions, namely:

- Net Package;
- Net+ Package.

- **The Bank Card**

The bank card of the Banque Nationale d'Algérie (BNA) is a debit card linked to a bank account. It is valid for three years and serves as a practical and secure tool to facilitate a wide range of daily financial transactions. This card enables its holder to perform various banking operations, including:

- Cash withdrawals from ATMs and automated teller machines distributed across the banking network;
- Online electronic payments;
- Point-of-sale payments through Electronic Payment Terminals (TPE);
- Balance inquiries on the bank account;
- Execution of financial transfers through BNA's ATMs;
- Access to an additional package of services available via ATMs.

The debit card also ensures continuous access to funds 24/7, with enhanced security through an SMS notification service that provides instant alerts regarding account balances and completed transactions.
Moreover, BNA offers its debit card in different versions tailored to customers' income levels, namely:

- Classic Debit Card;
- Gold Debit Card.

- **Automated Teller Machines (DAB) and Bank ATMs (GAB)**

The Banque Nationale d'Algérie (BNA) provides its clients holding CIB payment cards with access to Automated Teller Machines (DAB) and Bank ATMs (GAB), enabling them to perform banking operations conveniently 24/7, from anywhere.
Currently, BNA operates an extensive national network consisting of 171 DAB devices and 100 GAB devices distributed across the country.

- **Functions of the DAB (Distributeur Automatique de Billets)**
  - Cash withdrawals from current or savings accounts;
  - Balance inquiries;
  - Activation of electronic payment service (SMS OTP) via mobile number entry;
  - Activation of the payment card;
  - PIN code change;
  - Balance inquiries through the shared interbank network;
  - Transfers between BNA accounts (within branches);
  - Mobile credit top-up and bill payments;
  - Printing of mini-statements for transactions executed using the bank card.
- **Functions of the GAB (Guichet Automatique de Banque)**
  - Cash withdrawals and deposits;
  - Display of transaction history;
  - Money transfers to BNA accounts;
  - Balance inquiries.
- **Electronic Payment Service**

The National Bank of Algeria provides its clients with an electronic payment service, enabling them to settle bills and access various services through accredited websites. This service is characterized by:

- Security: It offers a high level of protection that safeguards users' rights;
- Simplicity: Thanks to streamlined procedures and user-friendly features;

- Constant accessibility: Available at any time and from any place (24/7);
- Convenience: Saves time and effort, while avoiding the need to visit branches or payment centers.

- **Mobile Payment Service (Wimpay)**

The National Bank of Algeria has launched the Wimpay.bna application as an innovative and secure mobile payment solution. This service allows users to conduct payments and transfers both within the bank and between banks, with near-instant transaction processing. It contributes to accelerating settlements and providing a comprehensive overview of financial operations.

- **Ihtiyati Service**

"Ihtiyati" is an electronic banking service specifically designed for taxpayers, including both individuals and businesses. It aims to simplify the payment of tax obligations online through an integrated package of solutions, including:

- Opening a subsidiary "Ihtiyati" account linked to the client's main account;
- A "Tax Business Card" dedicated to electronic payments via the "Moussahabatak" platform of the General Directorate of Taxes.
- Access to various electronic banking services through:
    - Pack Net;
    - Pack Net+;
    - Pack EDI.

These solutions enable clients to settle their taxes through several channels, primarily:

- Electronic payment using the "Tax Business Card" via the "Moussahabatak" platform.

- **E-Trade BNA Service**

The E Trade BNA service is one of the advanced digital solutions offered by the National Bank of Algeria to clients engaged in foreign trade. It enables users to:

- Monitor foreign trade operations;
- Send and receive banking documents and messages;
- Receive instant notifications regarding completed transactions.

The covered operations include:

- Documentary credits;
- Document collection;
- Free transfers;
- International guarantees.

Depending on the type of client, the service provides:

- Individual clients: Access to foreign trade messages and documents.

Professionals and businesses:

- Monitoring operations via SWIFT;
- Sending and receiving banking messages;
- Receiving instant notifications.

Subscription requires prior enrollment in one of the National Bank of Algeria's electronic banking services, either BNA.net or the BN@tic mobile application.

3.3.3. An Analysis of the State of Financial Technology at the National Bank of Algeria (BNA)

In this section, we shed light on how the National Bank of Algeria (BNA) has integrated digital tools and modern technologies within its banking system. This analysis relies on both quantitative and qualitative indicators to assess the progress achieved in digital transformation over recent years and its reflection on the quality and accessibility of banking services.

- **Evolution of Bank Payment Cards (CIB – Carte Interbancaire) during the period 2018–2022**

The CIB card is a key non-cash payment instrument that has streamlined banking transactions by providing clients with convenient, secure, and efficient access to cash withdrawals and electronic payments.

The National Bank of Algeria has focused on expanding its CIB card customer base by simplifying acquisition procedures, ensuring compatibility with multiple payment services, and promoting its practical advantages for daily purchases and administrative transactions.

Rising demand for electronic payments has led the bank to intensify awareness campaigns and offer complementary services to encourage card usage. This strategy has produced measurable growth in CIB card issuance between 2018 and 2022, reflecting the effectiveness of BNA's digital transformation efforts.

The development is summarized in the following table:

Table 4. Evolution of CIB Bank Payment Cards at the National Bank of Algeria, 2018–2022

Year	Number of CIB
2018	234122
2019	248832
2020	278315
2021	258411
2022	346190

Source: Prepared by the researcher based on BNA Bank

The table shows a steady increase in issued bank cards over the period. The number rose from 234,122 in 2018 to 248,832 in 2019, an increase of about 6.3%, reflecting the early shift toward electronic payments supported by central bank initiatives.

In 2020, card issuance reached 278,315, growing over 11% due to COVID-19 restrictions, which accelerated the adoption of bank cards as a safer alternative to cash.

In 2021, the number declined to 258,411 (around 7%), likely due to delays in card renewals, temporary distribution issues, or market saturation among certain customers.

By 2022, card numbers rebounded to 346,190, an increase of roughly 34%, reflecting improved digital infrastructure, expanded ATM and payment networks, and intensified promotional campaigns by BNA.

This trend highlights the steady adoption of bank cards as a secure, modern payment tool and underscores the ongoing digital transformation of Algeria's banking sector.

- **Evolution of Electronic Payment Terminals (TPE) in the National Bank of Algeria during the period 2017–2021**

Electronic Payment Terminals (TPE) are considered among the most significant mechanisms adopted in the development of digital payment infrastructure. These devices have enabled merchants and service providers to accept electronic payments directly via bank cards, thereby reinforcing a culture of cashless transactions.

The National Bank of Algeria (BNA) has actively expanded its TPE network as part of a broader strategy aimed at strengthening the modern payment ecosystem and fostering a business environment that is increasingly open to financial technologies. This approach has contributed to facilitating commercial transactions, reducing operational costs, and enhancing transparency in financial operations.

Between 2018 and 2022, TPEs witnessed a remarkable increase in terms of both number and distribution, reflecting the bank's sustained efforts to keep pace with economic and societal transformations towards the adoption of digital payment solutions.

To better illustrate this evolution, the data are presented in the following table:

Table 5. Evolution of Electronic Payment Terminals (TPE) in the National Bank of Algeria 2018–2022

Year	Number of TPE
2018	3711
2019	4096
2020	5221
2021	6385
2022	7046

Source: Prepared by the researcher based on BNA Bank

The table above illustrates the evolution of the number of Electronic Payment Terminals (TPE) belonging to the National Bank of Algeria (BNA) during the period 2018–2022. These devices allow merchants to accept payments through bank cards, making them a key tool for promoting digital financial transactions and secure electronic payments.

The data show a steady increase in the number of terminals over the period, rising from 3711 terminals in 2018 to 7046 terminals in 2022, reflecting BNA's efforts to expand the electronic payment network and support digital transactions across commercial activities.

In 2018, the number of devices reached 3711, marking an initial stage in the bank's deployment of digital payment infrastructure. In 2019, the number increased to 4096, representing a growth of about 10.3%, which indicates a gradual expansion of electronic payment facilities in the domestic market.

A stronger increase occurred in 2020, when the number of terminals rose to 5221, an increase of more than 27% compared to the previous year. This growth is largely associated with the COVID-19 pandemic, which accelerated the adoption of electronic payments as a safer alternative to cash transactions.

The upward trend continued in 2021, with the number reaching 6385 terminals, reflecting a rise of nearly 22% compared to 2020. This expansion can be linked to the bank's efforts to encourage merchants to adopt electronic payments and to facilitate access to these devices.

By 2022, the number of TPEs reached 7046, the highest level during the study period, representing an increase of about 10.3% compared to 2021. This sustained growth reflects BNA's strategy to strengthen financial inclusion and expand the use of electronic payment solutions by supporting merchants and simplifying procedures related to the installation and use of TPE devices.

Overall, the expansion of electronic payment terminals demonstrates the growing adoption of financial technologies within the banking sector. The wider deployment of these devices supports the digital transformation of banking services by facilitating secure transactions, reducing reliance on cash, and improving the efficiency of payment systems.

- **Evolution of Electronic Teller Machines (DAB/GAB) at the National Bank of Algeria during the Period 2018–2022**

Electronic teller machines, whether dedicated ATMs (DAB) or multi-service teller machines (GAB), represent key mechanisms through which the National Bank of Algeria has invested to consolidate digital banking practices and provide more flexible and streamlined banking services. These devices serve as a connection point between the bank and its clients outside regular banking hours, saving time and reducing congestion in branches, while enabling clients to perform various transactions such as cash withdrawals, account balance inquiries, and even certain banking operations without the need for direct interaction with bank staff.

With the continuous increase in the number of users preferring electronic transactions, the bank has sought to expand the installation of these machines across all provinces, in both urban and suburban areas, to ensure comprehensive coverage and access to banking services for all client segments. The period from 2018 to 2022 witnessed a clear dynamism in this field, both in terms of the absolute number of machines deployed and their qualitative and functional development.

To better understand the scale of this development, the data are presented as follows:

Table 6. Evolution of Electronic Teller Machines (DAB/GAB) at the National Bank of Algeria 2018–2022

Year	Numbers of GAB	Numbers of DAB
2018	97	145
2019	98	130
2020	100	151
2021	100	160
2022	100	169

Source: Prepared by the researcher based on BNA Bank

The table above presents the evolution of electronic teller machines at the National Bank of Algeria during the period 2018–2022, including Automated Teller Machines (DAB) and multi-service banking machines (GAB). These technologies allow customers to carry out basic banking operations at any time without visiting bank branches.

The data indicate a differentiated pattern of expansion between the two types of machines. The number of GAB machines remained relatively stable, with 97 units in 2018, increasing slightly to 100 units in 2020, and remaining at the same level until 2022. This stability may reflect the bank's strategy to maintain an adequate service coverage or a shift toward other digital solutions.

In contrast, DAB machines show an overall upward trend despite a temporary decline at the beginning of the period. Their number decreased from 145 units in 2018 to 130 units in 2019, before increasing steadily to reach 169 units in 2022. This expansion reflects the bank's efforts to improve access to cash withdrawal services and extend its coverage, particularly in densely populated areas.

Overall, the gradual development of electronic teller machines demonstrates the National Bank of Algeria's efforts to bring banking services closer to customers while easing pressure on traditional branches. The deployment of these devices also represents an important step in the integration of financial technologies, strengthening digital banking infrastructure and encouraging the adoption of self-service banking within the broader digital transformation of the Algerian banking sector.

- **Evolution in the Number of BNA.NET Remote Service Subscribers at the National Bank of Algeria**

Amid the rapid digital transformation in the banking sector, remote banking services have emerged as an essential tool for providing flexible and secure financial services. The BNA.NET platform is one of the pioneering initiatives adopted by the National Bank of Algeria to enable customers to perform transactions remotely without the need to visit a branch.

This service has effectively facilitated customer access by allowing account monitoring, fund transfers, bill payments, and other operations electronically, in line with the expectations of the digital generation and contemporary demands.

The service has shown a clear increase in the number of subscribers during the period from 2018 to 2022, reflecting the growing adoption of digital banking services.

To illustrate this development, we present the following:

Table 7. Number of BNA.NET Remote Service Subscribers at the National Bank of Algeria 2018–2022

Year	Number of Subscribers at BNA.NET
2018	41158
2019	58758
2020	65952
2021	105044
2022	120967

Source: Prepared by the researcher based on BNA Bank

The table above presents the evolution in the number of subscribers to the BNA.NET remote banking service offered by the National Bank of Algeria during the period 2018–2022. This electronic platform allows customers to access their accounts and perform various banking transactions remotely without visiting bank branches.

The data show a continuous increase in the number of users throughout the period. In 2018, the platform recorded 41158 subscribers, reflecting the bank's early efforts to develop digital banking services and provide more flexible alternatives for customers.

In 2019, the number of subscribers increased to 58758, representing a rise of approximately 43%, which indicates the growing demand for online banking services as customers increasingly relied on the internet and smartphones.

The number continued to grow in 2020, reaching 65952 subscribers, an increase of around 12.3% compared to the previous year. This growth can be partly linked to the COVID-19 pandemic, which encouraged the use of remote banking channels to reduce physical interactions.

A strong acceleration occurred in 2021, when the number of subscribers rose to 105325, corresponding to a growth rate of nearly 60% compared with 2020. This increase reflects the impact of digital awareness campaigns, the expansion of online services, and improvements in the bank's electronic infrastructure.

By 2022, the number of BNA.NET subscribers reached 120473, confirming the sustained upward trend observed over the previous years. This growth highlights the effectiveness of the bank's digital strategy aimed at expanding remote banking services and promoting secure, accessible, and continuous banking operations.

Overall, the expansion of BNA.NET subscriptions reflects the National Bank of Algeria's adaptation to the digital transformation of banking services and its efforts to support financial inclusion through modern electronic banking solutions.

- **Evolution of Transactions and Registered Users in the WIMPAY-BNA Application**

The WIMPAY-BNA application represents an advanced digital interface within the suite of innovative services launched by the National Bank of Algeria to promote electronic transactions via mobile phones. This application enables users to carry out payments and manage funds in real time, securely and efficiently.

With the increasing reliance on smart devices in daily life, the application has become an effective tool for bringing banking services closer to customers, aligning with the demands for speed, convenience, and lower costs.

Since its launch, the application has experienced gradual growth in its user base as well as a rising volume of transactions conducted through it, particularly during the period from 2018 to 2022. This reflects a positive adoption trend and the increasing engagement of customers with this modern type of banking service.

To illustrate this growth more concretely, it is presented in the following table:

Table 8. Evolution of Transactions and Registered Users in the WIMPAY-BNA Application of the National Bank of Algeria, 2018–2022

Year	Number of Transaction in WIMPAY	Number of Registered in WIMPAY
2021	4226	2046
2022	18079	20964

Source: Prepared by the researcher based on BNA Bank

The table above presents the evolution of registered users and transactions via the WIMPAY-BNA mobile application of the National Bank of Algeria during 2021 and 2022. This application enables customers to conduct financial transactions directly through mobile phones, providing convenient access to banking services without visiting branches.

In 2021, during its initial launch phase, the application had 2046 registered users and 4226 transactions executed. Which reflect the early adoption stage, limited customer awareness, and the gradual introduction of digital payment methods in Algeria.

By 2022, the application experienced significant growth, with 20964 users and 18079 transactions. This increase indicates higher user engagement, driven by improved application performance, an expanded user base, and bank-led awareness campaigns promoting mobile payments.

Overall, these numbers highlight a shift in customer behavior toward mobile banking and the growing acceptance of digital payment solutions. The WIMPAY-BNA application has established itself as an important component of BNA's digital banking ecosystem, supporting financial inclusion, enhancing service delivery, and advancing the bank's strategic goal of promoting electronic payment adoption in Algeria.

4. The Impact of FinTech on Banking Services at the National Bank of Algeria (BNA)

The banking sector in Algeria, like many digital systems worldwide, has witnessed substantial transformations due to the integration of digital technologies into banking operations, which has contributed to improving service quality and expanding the customer base. In this context, the National Bank of Algeria has sought to implement advanced digital solutions to meet the growing needs of customers and keep pace with changes in consumer behavior. These initiatives have clearly impacted banking performance indicators, particularly regarding the evolution of deposit volumes, liquidity levels, and profitability rates. This section highlights how these digital transformations have affected these core aspects of the bank's operations.

- **Evolution of Deposit Account Volumes**

The volume of deposits reflects the level of customer trust in a bank. The table below illustrate the evolution of deposit volumes at the National Bank of Algeria during the period from 2018 to 2022.

Table 9. Evolution of deposit volumes at the National Bank of Algeria, 2018–2022

Year	Deposits (DZD)
2018	2245263
2019	2582493
2020	2642958
2021	1862104
2022	2273624

Source: Prepared by the researcher based on BNA Bank

The table above presents the evolution of deposit volumes at the National Bank of Algeria from 2018 to 2022. Deposit volume reflects customer trust and forms the basis for the bank's lending and investment activities.

In 2018, deposits totaled 2,245,263 million DZD, establishing a substantial liquidity base. By 2019, deposits increased to 2,582,493 million DZD, highlighting the bank's effectiveness in attracting customer funds, likely supported by improvements in traditional banking services and branch expansion.

In 2020, deposits rose slightly to 2,642,958 million DZD, demonstrating resilience during the COVID-19 pandemic and reflecting early adoption of digital solutions that enabled customers to transact without visiting branches.

A sharp decline occurred in 2021, when deposits fell to 1,862,104 million DZD. This decrease may be linked to post-pandemic economic effects or behavioral shifts among depositors, including slower digitalization in certain services prompting some customers to explore alternative financial options.

By 2022, deposits recovered to 2,273,624 million DZD, supported by intensified digitalization efforts and the adoption of fintech solutions such as the WIMPAY-BNA application, which facilitated digital transactions and attracted digitally active customers, particularly helpnger users.

Overall, the data indicate that the expansion of digital channels coincided with periods of deposit growth, though macro-economic factors may also have contributed to these movements. Expansion of digital channels enhances accessibility, convenience, and security, helping the bank attract new customer segments and maintain financial stability. Continued investment in digital infrastructure and innovative services will be crucial for sustaining and growing deposit volumes in the future.

- **Evolution of Liquidity Ratios**

The liquidity ratios considered are as follows:

- Loans-to-Deposits Ratio (LDR) = Total Loans / Total Deposits;
- Cash-to-Deposits Ratio (CTD) = Cash / Total Deposits.

Table 10. Evolution of deposit volumes at the National Bank of Algeria, 2018–2022

Year	LDR%	CTD %
2018	**98.61**	15.02
2019	**95.49**	16.71
2020	**138.89**	10.74
2021	**104.97**	11.34
2022	**95.65**	15.45

Source: Prepared by the researcher based on BNA Bank

The table above presents the evolution of the Loan-to-Deposit Ratio (LDR) and the Cash-to-Deposit Ratio (CTD) at the National Bank of Algeria over 2018–2022, key indicators for assessing the balance between financing and liquidity and the impact of digital technology on bank operations.

In 2018, the LDR was 98.61% and the CTD 15.02%, indicating heavy reliance on deposits for lending while maintaining moderate cash reserves, reflecting limited digital adoption and dependence on traditional channels.

By 2019, early digital initiatives contributed to a decrease in LDR to 95.49% and a rise in CTD to 16.71%, thanks to electronic teller services and expanded withdrawal and payment points, which improved cash flow management.

In 2020, the LDR spiked to 138.89% and CTD fell to 10.74%, highlighting the limitations of the bank's digital infrastructure during the COVID-19 pandemic, which reduced operational efficiency and increased liquidity risks.

A recovery began in 2021, with LDR decreasing to 104.97% and CTD rising to 11.34%, reflecting the initial effects of digital adoption aimed at balancing lending and liquidity.

By 2022, further digital integration, including applications such as WIMPAY-BNA, improved these metrics, with LDR falling to 95.65% and CTD rising to 15.45%, demonstrating enhanced cash management, expanded deposits, and a more balanced financing approach.

These trends indicate that the trends in LDR and CTD ratios coincide with the bank's digital transformation efforts, though other macroeconomic variables were not controlled for in this analysis. The sensitivity of LDR and CTD to the level of digital adoption underscores the role of technology as a strategic tool for mitigating liquidity risks and ensuring sustainable growth in the banking sector.

- **Evolution of Profitability Ratios**

Profitability ratios are key indicators used to assess a bank's efficiency in generating maximum returns while maintaining liquidity and financial stability. The table above present the evolution of these ratios for the National Bank of Algeria over the study period. These indicators measure how effectively the bank employs its assets and shareholders' equity to achieve positive financial results, particularly in the context of the accelerating digital transformation within the banking sector.

Table 11. Evolution of deposit volumes at the National Bank of Algeria, 2018–2022

Year	ROA %	ROE %
2018	**1.16**	12.43
2019	**0.55**	6.37
2020	**0.67**	7.19
2021	**1.04**	10.16
2022	**0.87**	8.55

Source: Prepared by the researcher based on BNA Bank

In 2018, the Return on Assets (ROA) was 1.16% and the Return on Equity (ROE) was 12.43%, reflecting strong performance supported by a stable banking structure. At this stage, profitability was primarily driven by traditional banking activities, as the impact of digital technologies was minimal.

In 2019, both indicators declined, with ROA falling to 0.55% and ROE to 6.37%, due to limited innovation, continued reliance on conventional methods, slower revenue growth, and rising operating costs, while competitors began adopting digital solutions that enhanced efficiency.

The COVID-19 pandemic in 2020 brought exceptional challenges, yet ROA and ROE showed slight improvement to 0.67% and 7.19%, respectively. This was supported by the introduction of initial digital tools, enabling remote services that mitigated operational disruptions.

By 2021, digital transformation began to impact profitability more substantially. ROA increased to 1.04% and ROE to 10.16%, driven by the expansion of electronic banking services, digital payments, banking cards, and online transaction platforms, which improved efficiency, reduced costs, and enhanced customer satisfaction.

In 2022, ROA and ROE slightly declined to 0.87% and 8.55%, respectively. This reduction reflects high investment costs in digital infrastructure, which typically take time to yield full returns. However, with growing adoption of digital tools and increasing electronic transaction volumes, profitability is expected to improve over the medium term.

These trends show that the improvement in profitability indicators from 2020 onward coincides with accelerated digital adoption at BNA, suggesting a positive association, though this relationship is not tested through regression analysis and self-service channels, and allowed the bank to invest in innovative tools such as payment platforms, cybersecurity, and intelligent customer interaction.

Additionally, digitalization has improved product customization, customer engagement, and flexibility, contributing to stronger financial performance.

For the National Bank of Algeria, profitability is increasingly tied to effective digital integration, balancing investment in technology with financial returns, and reflecting a strategic shift from conventional banking efficiency toward value generated through smart adoption of digital innovations.

5. Conclusion

This study demonstrates that financial technology has become a pivotal instrument in reshaping banking service delivery, offering solutions defined by speed, efficiency, and accessibility. While the Algerian banking sector remains in a transitional phase of digital adoption, measurable progress is evident, most notably at the National Bank of Algeria (BNA), through the expansion of electronic payment systems, mobile applications, ATM networks, and remote account services. These developments have yielded modest yet meaningful improvements in profitability ratios and customer experience, though significant barriers persist, including infrastructure disparities, limited digital literacy, insufficient cybersecurity capacity, and the absence of a comprehensive regulatory framework for Fintech.

The study yields the following principal **findings**: financial technology continues to expand globally, fundamentally disrupting traditional banking models, yet Algerian banks remain at an early stage of adoption relative to advanced economies. BNA has recorded notable growth in digital card issuance, electronic transactions, and ATM penetration, and the introduction of mobile and online banking has reduced branch congestion. Nonetheless, cash transactions continue to dominate daily activity, reflecting persistent gaps in financial and digital awareness. Structural challenges, including urban–rural infrastructure inequalities, shortage of technical expertise, organisational resistance to change, and fragmented regulation, continue to constrain the pace and depth of digital transformation.

- **Hypothesis Testing**

- **Main hypothesis, Confirmed:** The integration of financial technology has improved banking service efficiency at BNA, evidenced by faster transaction processing, enhanced digital service offerings, and positive effects on customer satisfaction and operational performance.
- **H1, Confirmed:** Adoption of electronic payments, mobile banking, and digital applications has improved customer experience through greater convenience, time savings, and increased loyalty.
- **H2, Confirmed:** Reliance on fintech has contributed to growth in deposit account volumes, facilitated by remote account opening and simplified onboarding procedures.
- **H3, Confirmed:** The bank's adoption of financial technology has concurrently improved liquidity indicators and service quality, as evidenced by improvements in BNA's liquidity ratios attributable to the acceleration of electronic transaction cycles, enabling stable financial resource availability and more responsive customer service.
- **H4, Confirmed:** Fintech adoption has concurrently improved profitability indicators and service quality, with measurable gains recorded post-2020 attributable to increased electronic transactions and reduced operational costs.

- **Recommendations**

- Develop a comprehensive national fintech strategy encompassing all banks and regulatory bodies, with concurrent reform of legal and supervisory frameworks;

- Invest in digital infrastructure in underserved areas and improve telecommunications quality to ensure equitable access to digital banking;
- Redesign employee training programs around technology and financial innovation; sustain targeted public awareness campaigns on digital banking benefits;
- Foster fintech innovation through university incubators and public–private partnerships;
- Incentivise electronic payments via tax relief and administrative simplification;
- Strengthen cybersecurity, data protection mechanisms, and integrate AI and blockchain to enhance operational security and efficiency;
- Establish a joint national committee to monitor fintech development in Algeria and implement continuous, data-driven service quality evaluation.

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