

The Development of Financial Technology and Its Impact on Financial Inclusion (Case Study: Algeria)

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Abstract:

Financial technology is considered one of the most promising innovations that have created solutions to the problems of inequality, poverty, and lack of access to financial services. At a time when industrialized countries and East Asian countries are witnessing great progress in terms of adopting financial technology, its use in Arab countries is gaining momentum in recent years. As a technical factor to improve financial inclusion and outreach to the poor.

The study found a weak level of performance of the banking sector from the perspective of expanding financial inclusion in Algeria, which represents a fundamental motivation for adopting financial technology techniques, but this depends on the success in overcoming several obstacles.

Keywords: Financial technology, financial inclusion, information technology

Jel Classification Codes: G20,G29, O39, P43

1. INTRODUCTION

Recent years have witnessed great developments in various fields, in which information and communications technology has played the largest role, which has made the world a small village and where regional borders have disappeared, and its use has become a fundamental factor in achieving excellence and distinction. In light of this, the institution strive to increase its flexibility and respond more effectively to customer requirements. Information systems, especially within the organizational environment of institution, have been among the tools that meet the aspirations of the institution, providing and contributing to many practical solutions.

Digital financial technologies are considered an opportunity for banks to develop their financial activities and services, which helps them expand their provision, improve opportunities to benefit from them, enhance the retention of their customers, and include more of those non-customers. This leads to increased competition between banks and improves their performance, by seeking to expand market shares and maximizing profitability. Consequently, this will reflect positively on the rapid and effective growth and development of the banking sector's performance by making it more efficient in achieving sustainable economic and social growth.

Problem Statement:

Based on the above, we will address the following problem:

What is the role of financial technology development in achieving financial inclusion?

This main question leads us to ask the following sub-questions:

- What is financial technology?
- How has financial technology developed in Algeria?
- The Role of Fintech and Its Contribution to Financial Inclusion?

Importance of the Study:

The importance of the study lies in its relevance to one of the most critical contemporary issues. It has become necessary to increase awareness about financial inclusion and its objectives and to highlight the role financial technology plays in enhancing financial inclusion, particularly in Arab countries and Algeria.

In this research, we will address three main elements:

1. The nature of financial technology.
2. The relationship between financial inclusion and financial technology.
3. A case study of electronic transactions in Algeria until 2021.

2.The Nature of Financial Technology and Financial Inclusion.

The term "financial technology" has gained widespread popularity in recent years. It generally aims to attract customers by providing products and services characterized by ease of use, greater

efficiency, transparency, and automation compared to those currently available.

I. Intellectual Approaches to the Concept of Financial Technology

1. Development of Financial Technology:

Financial technology has passed through several stages until it became what it is today, and this is with the great development that has occurred in the financial sector since the past years or even previous centuries. Specifically, since the establishment of the first bank in the year 1472 until many institutions appeared in the financial field, among which are securities institutions, institutions specialized in real estate, and insurance institutions. The matter that contributed to the development of these financial institutions, which began to provide financial services in order to support institutions in the primary markets, and with the development that occurred, they began to provide other services, which led to the establishment of another type of market that was called the term secondary markets. Despite the significant advancements in the financial sector, the concept of financial technology is relatively new compared to traditional financial techniques and tools, which have been known and reputable for a long time. This is what researchers have found, that financial technology truly began to emerge with the advent of the internet in the 1990s. On the other hand, traditional financial techniques appeared earlier, around the mid-20th century, coinciding with the expansion of financial institutions worldwide. (**Rainer Alt , Beck , & Martin , 2018**)

2. Concept of Financial Technology:

According to the Financial Stability Board, financial technology refers to financial innovations using technology that can create new business models, applications, processes, or new products with significant effects on financial markets and institutions and the delivery of financial services. (صندوق النقد الدولي، 2017).

Financial technology is defined as any technology aimed at eliminating many or some of the costs associated with financial intermediation. In the context of credit, financial technology encompasses all credit activities conducted through innovative electronic platforms independent of commercial banks. (**Das, 2019**)

Financial technology is defined as consisting of two words separated from each other: "technology" and "finance," which refer to the methods and means used in various financial operations, according to **Milian et al 2019**. It was also defined by **Vives 2017** as the process of using modern and innovative information and communication technology in all Financial services through the use of digital technologies that will contribute to raising the quality of financial products, either in terms of cost or in terms of time and effort. (**Phat Pham, Abdul , & Ibne Asad, 2021**)

3. Importance of Financial Technology:

- Enhancing financial inclusion and inclusive growth and diversifying economic activities through innovations that provide financial services to those not engaged with the banking system.

- Facilitating access to alternative funding sources for small and medium enterprises.
- Achieving financial stability by using technology to ensure regulatory compliance and risk management.
- Simplifying foreign trade and remittances by providing efficient and cost-effective cross-border payment mechanisms.
- Increasing government operational efficiency through electronic payment methods, necessitating further reforms to fill the gaps in the frameworks concerned with regulatory standards, consumer protection, and information security. (حسن، 2019 العدد 23)

4. Fintech Companies:

Many articles and research globally have discussed financial technology related to companies developing this concept or operating in this field. The process of creating and developing financial technology is conducted by fintech companies that provide and develop financial services typically between a technology company and another company or directly between the company and the consumer. Research has categorized and coined terms for institutions providing fintech to providers of financial services, with the term financial technology institutions, similar to those offering financial services but not operating in the financial sector, such as insurance companies and mobile money services. This led to the development of these institutions and in turn it led to the emergence of the following types of companies: fintech companies, companies investing in fintech, companies providing fintech solutions, and fintech management companies. (Qianhua , Ka, & Ranga , 2024).

II. Approaches to Financial Inclusion:

1. Definition of Financial Inclusion:

Researchers exploring financial inclusion must also consider the concept of financial exclusion, first used in 1993 by Thrift and Leyshon, expressing concern over limited access to banking services due to crises and challenges faced by banks in the late 1990s. Financial exclusion was defined by Whyley and Kempson as the exclusion from access to all financial products and services available at the time, and it was also mentioned as the result that follows the process of not having access to all banking transactions of all kinds. (Sonu Garg, jun 2014)

Similarly, financial inclusion by (Rangarajan C-2008) is defined, as ensuring optimal access to financial and credit services, which must be characterized by the appropriate timing whenever the need for it arises, through a specific group of people, particularly for individuals with low or moderate incomes, through reasonable costs. (Richa, May 2014).

Financial inclusion is defined as a state where all individuals can access a full range of quality financial services at affordable prices in a dignified manner.(محاجبية و سعدان، 2018)

2. Importance of Financial Inclusion:

With the increasing global focus on expanding financial inclusion and forming alliances between

global financial institutions to coordinate and work within unified mechanisms, the benefits of financial inclusion are growing. The Consultative Group to Assist the Poor (CGAP) of the World Bank believes that building an inclusive financial system is the only way to reach all economically and socially marginalized groups and achieve financial inclusion goals. It must be acknowledged, here, that it is difficult to completely separate the importance of financial inclusion from its goals, as this importance is determined by the goals, and the goals reflect the importance. They are interconnected and intertwined, and the importance of financial inclusion is also determined by its effects. The importance and goals of financial inclusion lie in drawing attention and focusing efforts on combating poverty, unemployment, and marginalization, by integrating the poor, those with limited income, the unemployed, and the marginalized into the economic cycle, and making them individuals who contribute to building society and achieving development on the one hand, and beneficiaries of its fruits on the other hand.

- **Protection of savings:** Most of the savings of the poor are small amounts that fall under the laws of the Central Bank to protect deposits in the event of bank loss or bankruptcy, and the amounts deposited in banks are protected from theft and disasters that occur and destroy the simple homes inhabited by the poor.

- **Social development:** Financial inclusion plays an important social role for low- and middle-income people, as well as for women and small and medium-sized enterprises, by ensuring access to financial services for them in terms of savings or granting microloans, to establish projects that help low-income families improve their income level, and improve their level of income. The economy by increasing production in various fields, employing workers, and raising their income levels. There is no doubt that this will improve the ability of these groups, individuals and projects, to make sound decisions to manage their money by managing their financial risks and absorbing shocks associated with financial changes. This would also achieve economic and social equality among all, regardless of their classes and gender, and create mobility and dynamism in the country's economy that ends with the well-being of all. (حمدوش و بوزانة، 2020)

- **Achieving financial stability:** There is a direct relationship between financial inclusion and achieving financial stability in the country, as it is difficult to talk about financial stability in the absence of financial inclusion, that is, when there is a large social and economic group that is financially excluded. Increasing the population's use of financial services will certainly contribute to achieving financial stability, because it will expand and diversify the deposit portfolio in banks, while reducing levels of concentration in it, thus reducing the risks faced by other financial institutions. (داغي و بهناز، 2018)

- **Immunizing the poor against shocks:** by providing banking services through mobile phones and providing strong and open payment systems at a low cost, especially for the poor, which leads to increasing the ability of the poor to absorb financial shocks, absorb their harmful effects, and seize income-generating opportunities.

- **Generating efficiency in the economy:** through digital and electronic linking of large numbers of poor and limited-income people to financial service providers, government services, and companies, which strengthens their conviction to shift from the informal sector to the formal sector. (داغي و بهناز، 2018، صفحة 33)

-Enhancing competition between financial institutions: This is through innovation and work to diversify their products and pay attention to their quality in order to attract the largest number of customers, clients and transactions, and legalizing some informal channels. (حمدوش و بوزانة، 2020)

3. Electronic Trading:

Electronic trading markets, which are active in what is known as global financial markets, have replaced traditional markets that existed in the past. The electronic matching system conducts the electronic display process by matching orders that are within a specific price range and executed within an algorithmic framework to achieve efficiency and liquidity (Phelps, 1994, p. 39). This process gives us an idea of electronic trading, which expresses the commercial linkage in electronic markets and which consists of using electronic systems connected by computers among many participating parties. (Cunningham & Tynan, February 1993, p. 5).

3. The Relationship between Financial Inclusion and Financial Technology.

Most modern studies in the world have concluded that technology related to communications (ICT) and financial technology are considered two important means of electronic trading, which contribute fundamentally and directly to financial inclusion. Whereas, since the spread of the mobile phone and its inclusion of the Internet, it has been found that there is a strong connection between it and financial inclusion, which has affected all countries in transactions internally and externally, and there is significant evidence that demonstrates the process of using electronic money via phones and laptops, which has a strong impact on the financial inclusion of families on the one hand through their accounts in banks, and also small and medium enterprises through the financial transfers that take place through them. (Demir, Pesqué-Cela, Altunbas , & Murinde, 2020)

3.1. Trends of Algerian Banks Toward Electronic Banking:

Algeria began establishing electronic banking, relying on a set of procedures and tools in preparation for the digitization of the Algerian banking sector, since 1995 with the establishment of the monetary company for automatic relations between banks, SATIM, consisting of eight Algerian public banks, which was tasked with developing and digitizing banking transactions by modernizing payment methods and guaranteeing controlling all procedures that ensure the use of the electronic payment system, in addition to participating in developing banking laws to manage banking services, especially electronic ones. It has introduced the electronic payment function practically since the year 2002. Thus, SATIM has been interested in covering services related to the issuance of bank cards for withdrawal from automated dispensers locally, and securing the acceptance of debit cards in all automatic banknote dispensers at the bank level. Then, in a final stage, it had to join all participating banks in international payment networks by issuing two payment cards, Visa Card and MasterCard, that can be used internationally for withdrawal and payment currencies, in order to open the way for the development of E-commerce in Algeria.

Within the framework of developing electronic banking in Algeria, SATIM entered into a partnership contract with the French company DIAGRAMEDI in order to disseminate electronic cash in Algerian banks, so that the first bank payment card would be issued in November 2003, then the first international card would be issued in the first trio of 2004. Center research in scientific and technical media, CERIST, entered into a partnership with the same company, DIAGRAMEDI, the leading company in the field of software, and the two Algerian institutions, MAGAR Multimedia and SOFT Engineering, within the framework of developing electronic banking and the security of financial data exchange, to emerge a mixed company called Algeria E-Banking Service (AES), whose mission is to help Algerian banks in providing electronic banking services, as well as to form frameworks in this field. Algeria also began implementing a project to modernize electronic payment systems since the year 2006 with the launch of both the instant gross settlement system and the electronic clearing system instead of paper processing (Btoji, banking Electronic commerce in the context of Law No. 18-05 relating to electronic commerce (بودبودة و مصداع ، 2021)

3.2.The reality of financial technology in Algeria:

The growth of the modern financial technology industry has accelerated over the past three years due to the opportunities it provides for access to finance, and the provision of a range of digital financial products and services at a lower cost and effort, as well designed in a way that suits the needs of various segments of society. It also gained great international momentum during the year 2020 in general and in the Arab region in particular in the wake of the Corona pandemic, in terms of the development of regulations and legislation, the volume of transactions, services and products that were developed with non-contact requirements and the increasing need to carry out transactions remotely. (بوغزالة امحمد و الاخضر، 2022)

In this context, Algeria has implemented many policies and reforms in terms of strengthening the institutional framework, creating regulatory laboratories, and establishing modern financial technology centers, in addition to developing regulatory frameworks, whether in terms of creating or amending the legislative structure to develop financial innovations in a balanced framework that maintains the integrity of the financial industry. The law related to e-commerce was issued in May 2018, which allows, in the medium term, the sufficient presence of e-commerce sites for the goods and services sector and the resulting widespread use of online payment. As of the end of December 2018, 271 twenty-seven e-commerce sites operating in the field of services were licensed (**Bank of Algeria, 2019**)

It is also noted in this regard that there are a number of infrastructure components that support electronic payment technologies, including the establishment of an automated (electronic) monetary control authority, the Bank of Algeria's adoption of mechanisms and standards related to electronic payment cards, and the establishment of a clearing authority at the Bank of Algeria, in addition to banks' reliance on digital payment mechanisms. It is also noted that although there are a number of financial technology companies in Algeria, their activity is limited to designing interest solutions and programs for banking institutions and Algeria Post in order to provide digital services for their currencies. While these companies are not allowed, according to the legal

and regulatory framework currently in effect, to work in the field of electronic payment. (Arab Monetary Fund, June 2020 ,Page 10)

Within this framework, the Prime Minister revealed that the Algerian government has drawn up an operational program aimed at accelerating the path of modernization of payment systems, indicating that it seeks to provide more than 16 million payment cards by 2024, and guaranteeing that more than a million merchants are provided with electronic payment devices, and provide more than 10,000 commercial services via the web (بوغزالة امحمد و الاخضر، 2022، صفحة 6)

3.3. The relationship of financial technology to enhancing financial inclusion

- **Eliminating poverty:** Although there are still more than two billion people who deal with banks around the world, but thanks to digital financial services, many have been able to participate in the digital economy for the first time, and access to financial and banking services has proven to be an important step in eliminating poverty. By providing digital financial services to low-income families to give them access to affordable tools and services, which can help increase their economic opportunities to expand or build a business.

- **Total eradication of hunger:** Digital financial services help farmers, both male and female, to a great extent, especially with regard to facilitating access to the funds necessary to increase production, in an efficient, faster and safer manner.

- **Good health and well-being:** Digital payments and finance help expand health care services in low-density rural areas. Digital financing allows families to better deal with health emergencies in order to face unexpected health care expenses (حمدوش و بوزانة، 2020)

- **Gender equality:** Digital financial services enable women to gain resources and assets. Enhancing women's financial capacity is a key factor in achieving gender equality and driving economic growth. Digital financial services provide women with the opportunity to control their financial resources, including access to financial and banking services via Bank accounts, and digital channels help collect useful data about women business owners, leading to an understanding of their needs and a better assessment of their creditworthiness.

- **Clean and affordable energy:** Digital payment systems contribute to reducing operational costs and thus the possibility of expanding access to energy and increasing investment in this sector.

- **Decent work and economic growth:** Digital financial services allow small and medium-sized enterprises to reduce the cost of dealing and increase access to financing. Companies also provide their customers with direct digital channels for withdrawing salaries and commercial payments, which increases economic opportunities and flexibility. (حمدوش و بوزانة، 2020، صفحة 102)

- **Industry and innovation:** According to the World Bank study, the majority of institutions consider that their limited access to financial services represents a fundamental obstacle to achieving growth, and therefore providing credit would help increase the number of small and medium enterprises, which provides job opportunities and increased investment. As digital financing enables SMEs to grow, innovate and access new markets, which drives the growth of the digital economy. Digital financial services help small and medium-sized companies build an

archive or history of their payments and the credit scores they have obtained, which constitutes a guarantee for them and contributes to increasing their chances of obtaining financing in the future.

- **Reducing inequalities:** Digital finance has a role in reducing inequalities, as it provides low-income families with new tools to increase their income, improve financial flexibility and access to new economic and social opportunities, which leads to increased productivity rates and incomes of rural families by linking them economic opportunities outside narrow rural communities. Sustainable cities and communities that facilitate micro-mortgages while providing digital payments services. People living in informal settlements must invest in them in order to obtain adequate housing. (حمدوش و بوزانة، 2020، صفحة 102)

4: Study the status of electronic transactions in Algeria until 2021

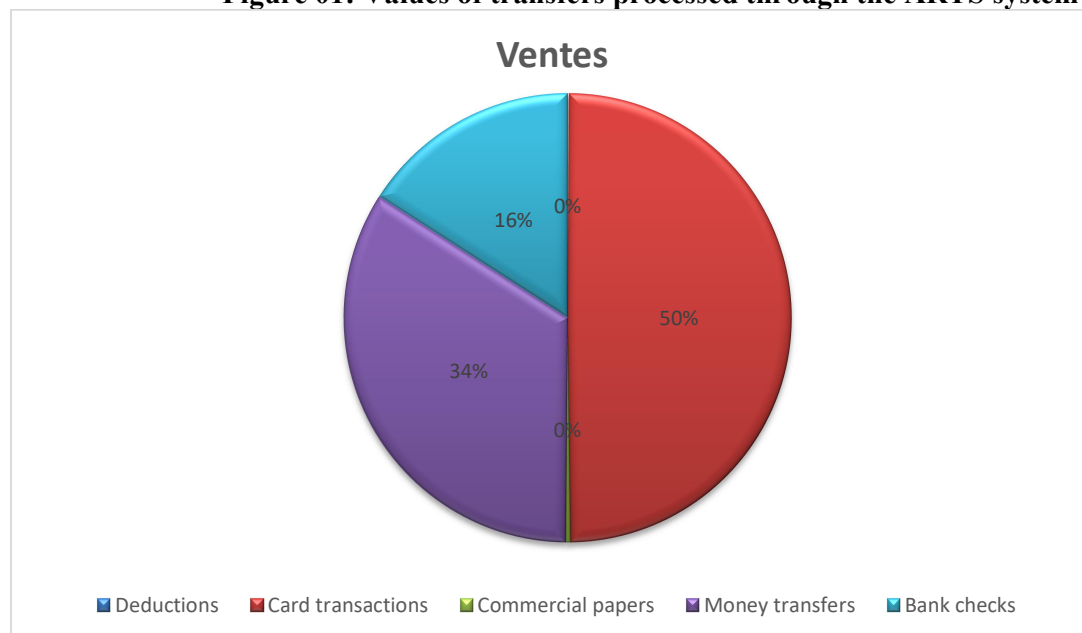
Table 01: Payments processed through the electronic clearing system during the year 2021 (according to the nature of operations)

Volume in millions of transactions and value in billions of dinars				
Nature of The Operation	Volume	Value	Percentage by Volume (%)	Percentage by Value (%)
Checks	7.642	15203.428	% 15.92	% 84.56
Commercial papers	0.170	312.111	%0.35	% 1.73
transfers	16.297	1375.465	%33.94	% 7.965
Deductions	0.042	661.355	%0.09	% 3.68
Card transactions	23.867	427.758	%49.70	% 2.38
Total operations during 2021	48.018	17980.117	% 100	%100
Total operations during 2022	34.629	16140.316		
growth rate	% 38.66	% 11.40		
Daily average (251/working days) in 2021	0.191	71.634		

Source: Bank of Algeria report for the year 2022.

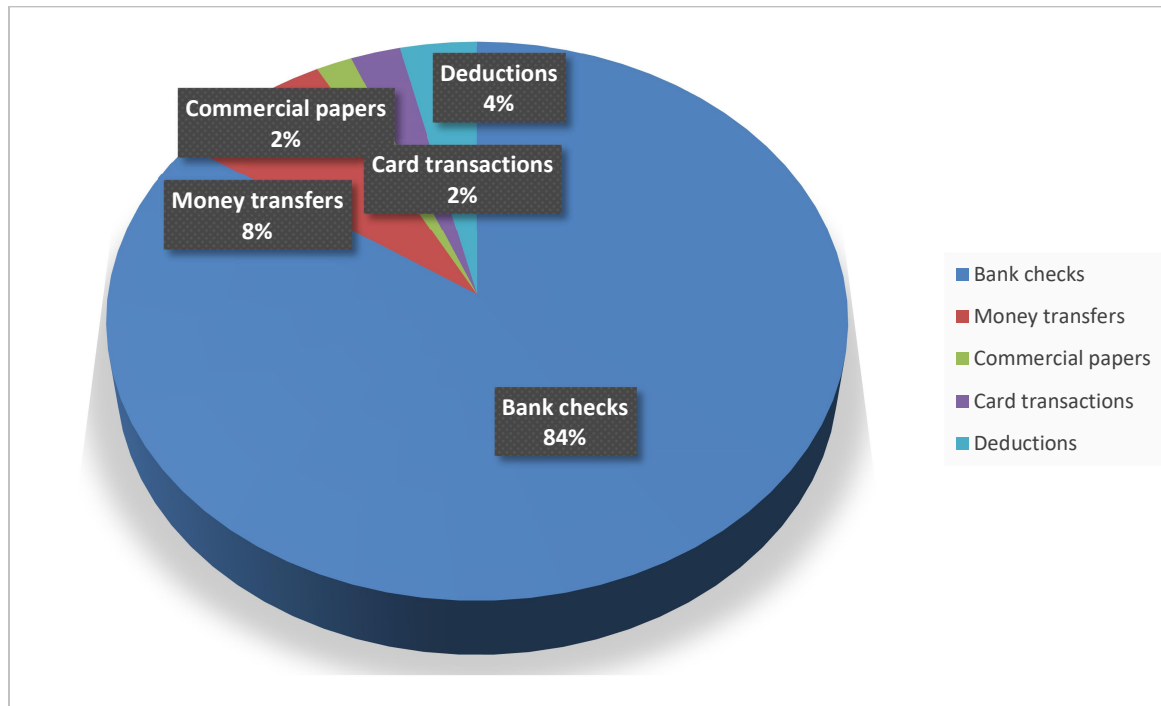
The electronic clearing system for payments for the wide public during the year 2021 processed the equivalent of a volume of 0.48 million payment transactions, with a value of 17,980.1 billion dinars, compared to 34.6 million transactions, with a value of 16,140.3 billion dinars during the year 2020, that is, a significant increase of 38.66% in terms of volume. With a significant growth of 11.40% in value. During the same year, the system recorded a daily average of 191 million transactions with an estimated value of 71.6 billion dinars, compared to 133 million transactions with a value of 63.5 billion dinars during the past year.

Figure 01: Values of transfers processed through the ARTS system



Source: By researchers relying on the Bank of Algeria report for the year 2022

Transactions using cards and transfers processed by the electronic clearing system were the most widely used in 2021, with percentages equal to 49.70% and 33.94%, respectively, of the total volume of payment methods exchanged. In this regard, it is important to emphasize that these payment methods, which have a basic electronic nature, increasingly support their position in the settlement market, unlike cheques, which in terms of their use appear to be declining from year to year.

Figure 02: Values of the Electronic Clearing System operations for payments 2021-ARTS

Source: By researchers relying on the Bank of Algeria report for the year 2022

Conversely, the value of the cheques that were cleared electronically in 2021 increased by 15,203.4 billion dinars, out of a total clearing value of 17,980.1 billion dinars, i.e., representing a share of 84.56%, while the share of transfers represents the amounts that can be cleared, as a reminder, those whose value is less than one million dinars, lost a triangle rate of 7.65%.

During the year under study, the electronic payment clearing system recorded a total of rejections amounting to 226,680 transactions with a value of 539.6 billion dinars, that is, a logical rejection rate estimated at 0.47% in terms of volume and 3.09% in terms of value.

Table 02: Transactions using cards during 2021

Volume in millions of transactions and value in billions of dinars

Nature of The Operation	Volume	Value	Percentage by Volume %	Percentage by Value %
ATM Withdrawals	21.503	413.558	% 90.10	% 96.68
Card Payments	2.355	14.122	% 9.86	% 3.3

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Including payment via electronic stations	2.349	14.104	% 9.84	% 3.3
Including Internet payments	0.006	0.018	% 0.02	%0
Including Refunds via electronic and Internet terminals	0.009	0.078	% 0.04	% 0.02
Total Card transactions	23.867	427.758	% 100	% 100

Source: Bank of Algeria report for the year 2022

Commercial papers (bills and promissory notes) were most affected by rejection, at 64.52% in terms of volume and 14.21% in terms of value, and this may be due to the absence of a physical nature.

In this regard, it is important to note that, in December 2021, the Standardization Committee reviewed the interbank standards in a way that allows the Algerian Postal Banks and the Public Treasury to exchange their commercial papers in a way that is completely immaterial in nature.

In terms of development, the total volume of clearing payment tools increased in 2021 by 38.66% compared to the previous year in terms of volume. This is due to the significant growth recorded by card operations as much as the deductions.

Hence, card transactions continued their rapid rise, recording a growth rate estimated at 84.73%. The same applies to deductions, with an increase rate estimated at 32.03%.

The value of card transactions has literally doubled, recording an impressive increase of 92.33%, and a lower level or degree for transfers and cheques, with significant rates estimated at 13.82 and 11.09, respectively.

According to the statistics of the Pre-Clearing Center between Banks (a stock company), an operator in the electronic clearing system for payments for the wide public, during the year 2021, cash withdrawals from ATMs accounted for 90.10% of the total volume of electronic payment transactions between banks. And 96.68% of its total value, which reflects the clear trend of cardholders to prefer using interbank cards to pay through electronic payment terminals at (approved) merchants and those located on the Internet platforms of web merchants.

Table 03: Development of transactions using cards during 2021

Volume in millions of transactions and value in billions of dinars

Nature of The Operation	2020	2021		growth rate %	
	Value	Volume	Value	Volume	Value
ATM Withdrawals	11.997	217.979	21.503	413.558	%79.24
Card Payments	0.920	4.408	2.355	14.122	%155.93
Including payment via electronic stations	0.439	3.441	2.349	14.104	434.94%
Including Internet payments	0.481	0.967	0.006	0.018	%-98.83
Including Refunds via	0.003	0.024	0.009	0.078	185.04%

electronic and Internet terminals					
Total Card transactions	12.920	222.411	23.867	427.758	%84.73

Source: Bank of Algeria report for the year 2022.

12 million operations amounting to 218 billion Algerian dinars during the year 2020, recording 21.5 million operations amounting to 413.6 billion dinars operations in 2021, that is, a growth rate of 79.24 in terms of volume and 89.72 in terms of value.

As for payment operations using registered cards in 2021, it should be noted that 2.4 million transactions worth 14.1 billion dinars were recorded by each of the banks as well as the Algerian Post, compared to 0.920 million transactions worth 4.4 billion dinars in 2020, with a rate of development of 155.93% in volume and 220.34% in value.

On the other hand, it is important to point out that according to the statistics of the automated cash group on December 30, 2021, it was found that:

- Out of a total of 11,609,624 cards put into circulation, 2,768,285 interbank cards were offered or issued by banks, i.e. a rate of 23.84, compared to 8,841,339 issued by Algeria Post (i.e., a rate of 76.16). The total number of cards issued by banks and Algeria Post, at the end of 2021, has known an increase rate estimated at 17.04, moving from 136,9919 to 624,11,609 cards issued;
- A banking services facility consisting of 3,053 dispensers or ATMs and 37,561 electronic payment terminals that were placed at the disposal of bank card holders and approved merchants, meaning an average of 3,803 cards issued to one automated dispenser and 309 cards issued via electronic payment terminals, which is considered marginal in terms of acceptance points; 153 online merchants were approved compared to 71 at the end of 2020, with an increase rate of 115.49%.

5.CONCLUSION

With the continuous change in various aspects of demographic, social and economic life, it was natural for new products and services to emerge to keep pace with this continuous tremendous development in the needs and desires of customers. Competitiveness increased under the pressures of globalization and the challenges of technological development and the world of knowledge. As a result of this tremendous change in the world of business, commercial transactions became active and also benefited from this technology, which has facilitated many procedures that used to take a lot of time and cost.

Financial technology can support potential growth and reduce poverty by enhancing financial development, inclusion, and efficiency in providing financial services, but it may bring risks to consumers and investors, and to financial stability and integrity more broadly. This was demonstrated by the national authorities' keenness to enhance the potential benefits of financial technology and mitigate its possible risks.

Results :

- The digital economy constitutes a necessary element in overcoming the obstacles that have long prevented achieving financial inclusion across a wide range of financial services.
- Algeria has witnessed a remarkable development in the uses of financial technology, and this is due to the great interest that the authorities have given to this aspect, and to its importance in modernizing the financial sector.
- Financial inclusion aims to disseminate financial services and ensure their access to all segments of society with high quality and low costs.
- Financial technology is every invention and innovation that depends on technological development to develop the banking sector, by providing services characterized by low cost, ease and speed.

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