

Towards an Algerian Digital Dinar: A Research into the Objectives and the Issuance Options

Received: 02-02-2025

Accepted: 02-06-2025

OULD MAAMAR Oussama¹, Higher School of Management and Digital Economy, Algeria.

oouldmaamar@esgen.edu.dz

Abstract

Algeria has announced its intention to launch a digital dinar, joining thus the ranks of countries and monetary unions that have implemented or are currently considering similar endeavours. This study seeks to uncover the project's objectives and implementation options, by linking the topic to central banking and fintech, which we consider the two most relevant variables. Based on a literature analysis using the descriptive-analytical approach and a projection to the Algerian case, we concluded that the issuance of the digital dinar aims to digitalize the payment system; contain the monetary mass circulating outside the banking system; and expand financial and tax inclusion. We also found that a hybrid retail payment model with the participation of banks and providers of payment services as operators is the most likely to materialize. The 24/7 service availability, peer-to-peer transferability, and transactional caps are likely to be applied, unlike other issuance options.

Keywords: CBDCs, Central Banking, Fintech, Payment System, Digital Dinar, Financial Inclusion.

Jel Classification Codes: E58; G28; O33.

¹ Author correspondents

1. Introduction

Issuing a digital form of local currency has become a global trend today, with 115 central bank digital currency (CBDC) worldwide, between projects under research, pioneering projects, and others that have already been launched (CBDC Tracker, 2025). While countries differ in their objectives for issuing CBDC, they share the fact that their implementation models are subject to a trade-off between objectives and risks. This makes the variables of CBDCs objectives and the issuing options a single subject of research. Despite the relative novelty of CBDC research, the subject's literature has rapidly and solidly developed due to interest from academics, central banks around the world, and supranational bodies such as the Basel Committee on Banking Supervision. This literature constitutes a good basis for research into what individual countries aim to achieve in their CBDC projects? And in what form will it be issued?

1.1. Objectives and Importance of the Study

In 2022, the Algerian government announced its intention to issue a digital Algerian dinar, without clarifying its motivations for the project or its implementation choices. This study aims to uncover the objectives and options for issuing the digital dinar. The importance of the study lies in enriching the CBDCs literature in general and the Algerian digital dinar in particular, as this study brings our point of view on the alignment between the objectives of the issuance and two new research variables, namely central banking and fintech. We also used the results of our theoretical analysis as a new basis for investigating the objectives of issuing the digital dinar from the government's action plan. This study could also serve decision-makers' efforts regarding the issuance of a digital dinar, given that the project is still in the study and scrutiny phase.

1.2. Previous Studies and Added Value

To the best of author's knowledge, (Hirzel, 2023) is the only study that has dealt with the subject systematically. The study addressed the alignment between some Algerian development objectives (knowledge economy, economic diversification, governance enhancement, social development, and environmental sustainability) and the digital dinar attributes (centralization, accessibility etc.). Multi-criteria decision analysis techniques was used in order to identify the most suitable set of the digital dinar attributes.

Our study differs from the Hirzel's one concerning its treatment of the subject in three aspects:

- First, we believe that the objectives of issuing CBDCs should be in accordance with the roles and functions of the issuing body, i.e., the central bank;
- Second, these objectives should take into account the impact of fintech, as new phenomenon affecting the monetary systems and central banking, to which CBDCs worldwide emerged as a response;
- Third, the alignment between the objectives of issuing the digital Algerian dinar and the various issuance options can be treated in an explicit qualitative manner.

Linking the objectives of CBDCs issuance to variables more closely related to central banking, such as the efficiency of payment systems and the effectiveness of monetary policy, allows, in our view, for more accurate results.

1.3. The Problematic

From this perspective, we will treat the problematic of alignment between the Algerian government's objectives, which are

closely related to the roles and functions of the Bank of Algeria and the different issuance options of the digital dinar. Therefore, a preliminary analysis of the literature to define central banking roles and functions and the impact of the emergence of fintech on them is essential. A number of sub-questions thus arise:

- What are the main roles and functions of central banking?
- How does fintech affect central banking?
- How does CBDC serve central banking?
- In which aspects of the government's action plan does the issuance of the digital dinar fit?
- What implementation models and options are most likely to optimize the digital dinar issuance objectives?

1.4. The Methodology

We relied in our analysis of the literature on the descriptive analytical approach, and in order to reach the results of the study, we did a projection on the case of Algeria.

2. Central Banking and CBDCs: a Theoretical Background

In this section we will examine the possible objectives and technical characteristics of a CBDC issuance according to the related literature. In line with the study's premise, we will first begin by studying the roles and functions of central banks from a functional rather than an institutional approach, so we will trace the historical evolution of central banking, following the approach of the majority of studies on the subject. The study will be further extended to the fintech era, when CBDCs are adopted as a response to the later phenomena.

2.1. Some Monetary History

2.1.1. Monetary system in the Era of Free Banking

A monetary system is an alternative to the barter system, where money is used as a mean of exchange in economic transactions. Indeed, money has emerged as a solution to the frictions imposed by the barter system, namely, the double coincidence of wants regarding the exchanged goods, and the timing of the exchange (Halaburda , Sarvary, & Haeringer, 2016, p. 12). In ancient civilisations, money is no more than special kinds of commodities that satisfy the durability and the divisibility conditions. Several kinds of commodities like foodstuffs, and precious metals have been used. In developed societies, the precious metals are standardized (Thammarak, 2014, p. 4). They took the form of easy-to-transport species, stamped with sovereign seals certifying their weight and value, and their edges were milled in order to facilitate the detection of wear or deliberate reduction of its contents.

Modern monetary systems were mostly shaped in the period of free banking, when banks were not subject to any regulating authority. This period begun with the medieval moneychangers and blacksmiths that represents the early banking businesses (Norman, Shaw, & Speight, 2011, p. 8). As a secondary activity, these businesses practiced the safekeeping of their client species and issued notes against them. The notes were used by the clients to settle commercial transaction instead of species, which allowed the use of deposits of species for lending in exchange for interest. These early banks looked for efficiencies in their value chain to maximize their profits, so they initiated the fractional reserve system, which allows the maintenance of only a portion of the total deposits of species a reserve to meet withdrawals, while the remaining deposits could be lent (Selgin & White, 1987, p. 443). Further profits could also be made by, mutually, accepting banknotes from other banks, since it allowed for the expansion of

non-interest-bearing liabilities and, in parallel, the expansion of the volume of lending (Selgin & White, 1987, p. 447).

Later development aimed at reducing credit risk originated from accepting other banks notes; and liquidity risk that is a by-product of the fractional reserve system. Initially, claims arising between banks as a result of the clients' payment transactions were cleared and settled through bilateral arrangements. The latter were subsequently replaced by private cooperative arrangements, namely clearinghouses. Clearinghouses have played several functions aimed at fostering trust and reliability in the payment system, for both member banks and their customers. They were in charge of (Goodfriend, 1990, p. 260): keeping the member banks' reserves of assets allocated for settlement; managing interbank operations of reserves (of liquidity) lending and borrowing; offering of checks insurance mechanism to the benefit of the payee's banks; and imposing regulatory, supervisory and disciplinary measures on members.

2.1.2. The Emergence of Central Banking

According to (White, 1999, p. 71) central banking consists of: serving as a bankers' bank; having a monopoly of note issue; acting as a lender of last resort; regulating commercial banks; and conducting monetary policy. It is clear that central banks share some of their functions with clearinghouses, meanwhile, it has the legal status of a public body. It is legitimate, then, to question the usefulness of a public regulating body for an industry that operates with a fairly sufficient efficiency and self-regulation. The period of free banking was characterised by instability and bank runs for two reasons: firstly, conflicts of interest prevented coordination between banks in order to control the aggregate money supply, creating uncertainty about the future purchasing power of money; secondly, the fractional reserve system is inherently vulnerable widespread withdrawal of deposits and the clearing houses had no

other solution than restricting or suspending cash payment (Goodfriend, 1990, p. 263; Giannini, 1995, pp. 219,227).

Table 1. Roles and Functions of a Modern Central Bank

	Monetary Stability	Financial Stability
Roles	Maintain stable value of the currency	Maintain smooth and effective functioning of the financial system and guard against financial imbalances in the economy
Functions	1. Money issuance 2. Regulation of money conditions (i.e., the conduct of monetary policy)	1. Payment systems supervision and oversight 2. Lender of last resort 3. Banking supervision

Source: (Thammarak, 2014, p. 39)

A single issuer of money empowered with mechanisms to control money supply was necessary for the smooth functioning of the system. Central bank money has a superior statute over private money given that it maintains its value in the most difficult economic conditions. In addition to that, it serves as outside money (to the banks) in time of liquidity shortage, as lenders of last resort , central banks generate and inject the necessary liquidity into banks suffering from liquidity pressures, thanks to their ability to expand its own balance sheet by buying assets from the banking sector (Norman, Shaw, & Speight, 2011, pp. 5,22).

It have been proven that market forces alone cannot maintain the smooth functioning of monetary systems, and that the latter depends primarily on public trust in these systems, which is a public good that should be mandated to public institution, i.e. the central bank (Giannini, 1995, p. 225). Today, central banks play a key role in maintaining monetary and financial stability in the

economy, and they monopolize the functions and areas of influence that serve these roles (See Table 1 above). The intervention of contemporary central banks may also extend to areas that impact their traditional functions, such as the efficiency of the payment system and financial inclusion. Considering that both financial inclusion (Mehrotra & Yetman, 2015) and payment system efficiency (Angelini & Passacantando, 1992) are necessary condition for the effectiveness of monetary policy.

2.1.3. The Rise of Fintech

At the turn of the 19th century, most western monetary systems have reached their current configuration, completely replacing commodity money with claims on banks (deposits). Payments are made by transferring these claims from the payer's account to the payee's one, with central banks act as a regulating body and also play roles in settlement of payments. To handle the ever-increasing volume of customer payments and other transactions, banks have started using financial technologies¹ to automate manual, paper-based work in bookkeeping and accounting (Lamberti & Büger, 2009, p. 28). In the mid-1960s, western banks begun to take advantage of electronic money transfer (EFT) capabilities, meaning the application of ICTs in making or processing payments (Sienkiewicz, 2002, p. 2). EFT includes several applications such as conducting clearing and settlement operations electronically via automated clearinghouses; and enabling banks customers to make payments and withdrawals remotely, via automated teller machines and electronic point-of-sale systems (Niblack, 1976, pp. 11-12). In order to enable a customer to make remote payments a portion of his balance must be transferred and stored in an electronic store of value, like debit cards. This new form of payment instruments is called electronic money (emoney).

¹ Meaning information and telecommunication technologies (ICTs) used in the financial industry.

With the emergence of the Internet in the mid-1990s and the subsequent rise of mobile phone networks in the early 2000s, many companies began exploiting these networks as digital channels to attract customers. For technology companies that operate fully online, these digital networks provided the necessary infrastructure for doing business based on new and innovative business models (Reyes-Mercado, 2021, pp. 7-8). At the end of the first decade of the century, the financial industry witnessed the entry of start-ups and big technology companies (Bigtechs) as competitors to banks (Arner, Barberis, & Buckley, 2016, pp. 23-24), relying on the innovative use of technology. This emerging industry, called fintech, adopted implantation strategy based on specialization in a single business line of the banking value chain, and positioning on market segments not adequately served by banks (Tanda & Schena, 2019, pp. 22,24).

In payment services fintechs has significantly transformed emoney with value propositions based on digital proximity; convenience; and customer-centricity. Fintech's digital wallets accessed via internet and mobile devices facilitated an inexpensive; ubiquitous and convenient¹ access to payment services, including cross border multicurrency money transfer, to widespread population including the unbanked such as those in remote areas (Una, Verma, Bazarbash, & Nakaguchi, 2023, pp. 5,7). In some ways, fintech's payment solutions went beyond traditional monetary structures. Digital wallets, the fintech alternative to bank accounts, offered the possibility to be topped up with cash via teller machines and physical retail outlets (Tanda & Schena, 2019, p. 20). This way, emoney did not circulate in traditional monetary circuits, nor did it require settlement through central bank clearing (Reyes-Mercado, 2021, p. 13). The major break, however, came with

¹ These payment services are available everywhere, notably within points of sale, and at all times, even outside the banking working hours. Transactions are executed in real time or very rapidly.

cryptocurrencies, whose initiators intended to create an ecosystem parallel to the current monetary system. Relying on distributed ledger technology DLT enabled them to create self-contained fiat currencies¹ and payment systems without a financial intermediaries or central banks (Velde, 2013, pp. 1,3).

Monetary authorities are seeking to contain the fintech industry by exploiting its benefits, such as enhancing financial inclusion and the efficiencies it brings to users, while mitigating its risks and the disruption it causes to the monetary and banking system. Although cryptocurrencies have gained a considerable momentum, they are not fulfilling the medium of exchange role, due to their huge purchasing power volatility (Claeys & Demertzis, 2021, p. 54; Cline & Mazumder, 2022, p. 168) and their limited technological scalability (IMF, 2021, p. 52). However, recent developments such as stablecoins and smart contract could transform cryptocurrencies from speculative assets into reliable currencies in the near future. Monetary authorities keep their eyes wide open on fintech for two reasons: First, the flow of money in parallel circuits to banks makes the latter irrelevant and reduces the efficiency of monetary policy (Lagarde, 2018, p. 6) especially for emerging countries (IMF, 2021, p. 52). Second, Fintech activities are either not subject to supervision and regulation of the monetary authorities; are only partially subject to them; or the typical supervision and regulation that covers them is not adapted to the nature and specificities of their businesses. This raises issues regarding protecting users from operational risks, cyber risks, governance risks, and, at the macro level, from systemic risks (IMF, 2021, pp. 45-47). Some regulatory responses to fintech so far have been public warnings, bans, or restrictions on certain fintech activities². Clearly, there is a need for

¹ In this respect, the ecosystem relies on the general acceptance of the currency as a medium of exchange, rather than on its legal enforcement by authorities.

² The legal bushbucks of Meta's Libra stablecoin project and the initial public offering of the Chinese Ant Financial are well documented cases in this regard.

other more subtle and sustainable regulatory solutions that may take advantage of technology itself (Lagarde, 2018, p. 7). According to (Malherbe & Montalban, 2022, p. 84; Avgouleas & Blair, 2024, p. 108) CBDCs represent such solutions.

2.2. Basic Aspects about CBDCs

2.2.1. What is New about CBDCs?

CBDC is defined as “a digital payment and settlement medium denominated in the national unit of account that is a direct liability of the central bank” (Saudi Central Bank, 2022, p. 173). But this definition does not precisely limit the scope of CBDC nor does it highlight its novelty, since central banks liabilities in digital form actually exist. It is the part of scriptural money held in central banks accounts in order to settle interbank transactions. Answering what's new about CBD requires some detail. The most distinguishing feature of CBDCs is its (potential) universal access, meaning its possible availability to the public of economic agents (Bjerg, 2017, p. 23). The only central bank liability in digital form is restricted to banks, and, it is linked to gross real time settlement systems RTGS in most countries, while cash, the only instrument available to the public, is issued in physical form. This kind is called retail CBDC (see figure 1). The limited access kind is called wholesale CBDC, and can be conceived of as an upgraded alternative to the existing settlement accounts, as it uses different technology, namely DLT.

The diagram illustrates the classification of CBDCs based on access and technology. It starts with 'Central Bank Issued' at the top, which branches into 'Cash' (dashed border) and 'In Digital' (solid border). 'In Digital' further branches into 'Universal Access' and 'Restricted Access'. These lead to a table of CBDC types:

Universal Access	Restricted Access
<i>CBDC (Retail)</i>	<i>CBDC (Wholesale)</i>
<i>CBDC Deposit Accounts</i>	<i>Settlement Accounts</i> (dashed border)

On the right, a legend indicates that solid blue boxes represent *CBDCs* and dashed blue boxes represent *Other monies*. Below the table, 'Token-Based' and 'Account-Based' are shown as subtypes, both pointing to a 'Technology' box.

The novelty about CBDCs, then, is two folded: first, an extended scope of central banks mandate, by offering payment services directly to the economic agents; second, a possible change in technology if DLT is used. With this come a number of previously unavailable options that must be decided. The issuer must choose between (World Bank Group, 2021, p. 4):

- 457

In addition, there are also potential risks to the banking and payment systems could result from retail CBDC's adoption (Vishal & Ranjan, 2023, p. 158):

- **Potential Disintermediation of Banks:** due to eviction effect by the public payment service.
- **Issues of Liquidity with Commercial Banks:** A digital payment system, such as one based on CBDCs, allows for a massive volume of transactions in a very short timeframe. This requires banks to maintain higher levels of liquidity under normal circumstances and exposes them to the risk of crises in times of liquidity distress.
- **Cyber risk** and possible technology up-gradation problems.

2.2.2. The Implementation Models

Central banks have, then, two main choices: issuing a wholesale or retail CBDC. Under the latter option, the various intermediary tasks are divided between the central bank and payment service providers. According to the level of delegation of tasks to the private party, three operational models of retail CBDC can be distinguished (see table 2).

Table 2. Summary of Retail CBDC Operating Model Features

Operating Model	Type of Design	Onboarding / KYC	Retail Payment
Direct CBDC	Single-tier	Central bank or intermediaries	Central bank handling all payments
Hybrid CBDC	Two-tier	Intermediaries	Intermediaries handling payments, but central bank keeping retail records
Intermediated CBDC	Two-tier	Intermediaries	Intermediaries handling payments, but central bank keeping wholesale records only

Source: adapted from (Van Roosebeke & Defina, 2022, p. 6).

2.2.2. Issuance Objectives

2.2.2.1. Objectives Related to the Payment System

A. Payment System Safety

CBDC projects were firstly motivated by the decline in general cash use. This phenomenon seem being generalised to western countries, (Khiaonarong & Humphrey, 2022, p. 10) reported a decline over 4% in USA, India, China, Argentina, and over 6% in Belgium, Russia and Brazil, between 2012 and 2019. As the trend moves towards cashless societies, payment market will be monopolised by private payment service providers PSPs, with liquidity credit and operational risks inherent in their businesses. This raises concerns about the erosion of public trust in payment systems, as it depends on the coexistence of cash and private payment instruments coupled with convertibility to cash. In this regard, retail CBDCs is considered the digital equivalent of cash in increasingly digitalized payment systems. In addition to being a risk-free mean of payment and store of value, central banks are keen to ensure that this digital complement to cash is technically

reliable, enabling it to provide payment services even in the most extreme circumstances, such as crises and wars (Sveriges Riksbank, 2018, pp. 12-13). This is not expected of private PSPs due to the costs involved.

B. Payment System Efficiency and Innovation

Two aspects of efficiencies can be targeted: technical efficiency and economic efficiency¹, with the former having an impact on the latter (Khiaonarong, 2003, p. 11). Fintech can be instrumentalized within the CDBC projects in order to impact positively these two aspects of efficiency. Firstly, as a source of low cost digital payment solutions based on improved and innovative technologies; and secondly, as a catalyst for competitive forces in the payment market.

• Retail Payments

Fintechs can thus enhance the efficiency and innovation on a stagnant retail payments market. But it is not unusual for these markets to be dominated by a minority of PSPs lacking innovation, a phenomenon that indicates an inherent structural characteristic that can prevent the access of small fintechs (startups). The payment market is a natural monopoly (Nakajima, 2011, p. 8; Ugolini, 2017, p. 27) because of the huge infrastructure costs. This monopoly is further intensified with the digitalisation of the markets due to the high network impact in Internet and mobile networks; the data-driven nature of digital business models, and the customer lock-in effect for big suppliers (big banks and Bigtechs) with the largest share of user data (OECD, 2022, pp. 3-4). Central banks can smooth the market access by offering a public infrastructure that can be built upon by fintechs in order to offer

¹ Technical efficiency influences production and delivery processes and impacts their outcomes, such as response time and costs; economic efficiency, however, influences market forces and impacts prices.

their services to users. As operators of the system, they can impose interoperability and sharing data as use norms (BIS, 2020, pp. 79-82). Intermediated and hybrid retail CBDC models are well suited choices in this regard, as they may save the infrastructure cost for the PSPs and attract the necessary market demand momentum for it to grow and compete. Imposing interoperability and sharing customer data aims to mitigate factors of market dominance that harm competition.

- **Wholesale Payments**

Central banks may use financial technology that is most capable of achieving efficiency in payment systems, usually in wholesale segment where they have historically played the role of operator. DLT based system wholesale CBDC is now firmly established as an alternative to RTGS systems across the world. Adopting this alternative may be justified by several reasons (Bech & Garratt, 2017, p. 66): Saving of liquidity needed to run the RTGS system; replace a legacy system that is costly to maintain or with absolute technology, programming language or database design; extending the operating hours.

- **Cross-Border Payments**

Cross-border payments are one of the pain points of traditional payment system, because of the numerous intermediaries and jurisdictions involved the transactions are very slow and costly. It is also one of the segments that can benefit abundantly from the fintech in reducing response time and service costs. CBDCs can be designed to encompass multiple monetary zones, or to ensure interoperability with foreign payment systems (Saudi Central Bank, 2022, p. 176), providing a fast and affordable public solution for cross-border payments.

C. Supporting Fiscal Payments

Central banks could serve as the government's agent to effectuate CBDC enabled ad hoc and regular transfers and payments, to and from different government agencies. A direct public payment interface has the advantages of (WBG, 2021, p. 6): shortening the complex and lengthy procedures required for payment with traditional means (checks, money transfers, etc.); precise targeting of citizens and businesses in need of fiscal stimulus or assistance in national emergencies; and the ability to allocate these payments on a geographical and time basis.

The widespread use of CBDCs over cash can be attributed to a desire to reduce use of the latter, which, due to its difficult traceability, represents a haven for tax evasion, money laundering, and other illegal transactions (Vishal & Ranjan, 2023, p. 154). Digital payments rather than cash based create an electronic trail which can be used by tax authorities to assess liabilities (Das, Gadenne, Nandi, & War, 2022, p. 1). A CBDC based payment system enables the use of payment data, obtained directly or through third party reporting (Banks and other payment providers) be used for tax purposes.

2.2.2.2. Objectives Related to Financial Inclusion

For developed heading toward cashless societies, as part of its responsibilities in financial inclusion, must take care of minorities who cannot use digital payment solutions, like old and people with disabilities or those without access to appropriate infrastructure. Retail CBDCs may be adapted to the needs of these groups, by incorporating special functionalities such as user-friendly interfaces and offline capabilities (Sveriges Riksbank, 2018, p. 13). For developing countries, digital financial inclusion, i.e. the use of fintech to achieve financial inclusion, is an appealing option. Given its advantages in providing customer-centric and affordable digital

and mobile payment services, Fintech contributes significantly to removing the most important obstacles to financial inclusion, namely access, affordability and adaptability of financial services to user needs (Patwardhan, Singleton, & Schmitz, 2018). Many central banks rely on their retail CBDC projects to implement this approach of financial inclusion.

2.2.2.3. Objectives Related to Monetary Policy

The effectiveness of monetary policy depends on two imperative pillars (Landau & Nicole, 2024, p. 6): universality, that is the universal use of official currency as a unit of account by citizens; and uniformity (singleness of currency), meaning all forms of money circulating in the economy are denominated in the official currency. The use of dominant foreign currencies (dollarization) has traditionally been an obstacle for domestic central banks, and with the digitization of payment markets, the latter are facing the consequences of digital dollarization, i.e., the use of other countries CBDCs and cryptocurrencies, especially stablecoins. In a recent survey, on 81 central banks working on CBDCs, 79% of those from developed countries reported accelerating their work as a result of the emergence of stablecoins (Kosse & Mattei, 2022, p. 10). Retail CBDC is expected to maintain the pivotal role of central banks as money issuer.

The need for another use of CBDC is when an expansionary monetary policy faces the so called the zero lower bound, an exceptional circumstances where the economic recession persists under a near to zero expansionary monetary when the nominal interest rate is near to zero (Rogoff, 2016, p. 123). In this context a negative interest rate could be applied on CBDCs to stimulate spending by discourage people from holding money. CBDCs could be used also to transfer base money directly to the economic agents as part of the implementation of the helicopter money mechanism.

3. The Case of Algerian Digital Dinar

Building on the results of the previous section, we will attempt to derive the objectives of issuing the digital dinar, by doing an alignment between the government plan objectives and the functions of the Bank of Algeria BA. At a later stage, we will treat the issuance options.

3.1. General context of the project

In December 2022, the Prime Minister announced the intention of the BA to adopt a national digital currency, as part of the digitalization of payments (APS, 2022). The legal basis for this endeavour has been laid six months later, with the publication of the new monetary and banking law, which stipulate in article 2 that the fiat dinar can take a digital form (JORADP, 2023, p. 4). Despite the diligent we did not find a publicly available document that outlines the government or BA's intentions regarding its CBDC project, this may be because the project is still in its preliminary study phase. Therefore, we relied in our research on other official sources of data.

The government's plan aims, in the economic aspect, to correct the structural imbalances in the Algerian economy, which are mainly represented by its reliance on the national hydrocarbon industry for growth and the general budget. Therefore, the government seeks to achieve two main objectives: first, diversifying the national economy by exploiting available investment and financing opportunities, especially private ones; and second, ensuring the sustainability of public finances by diversifying and integrating private resources (Services du Premier Ministre, 2021, p. 25). The public governance aspects of the government plan aim to support the transformation and diversification of the Algerian economy, through more transparent, efficient, and effective executive authorities.

The BA is mandated with all the typical roles and functions of a central bank, as it is the sole authority¹ charged to create and maintain monetary and financial stability, as well as favourable conditions for economic development by acting in the areas of money, credit and exchange (JORADP, 2023, article 35). The functions of BA include: having a monopoly of note issue (article 40); acting as a lender of last resort (article 47); regulating commercial banks; and conducting monetary policy (articles 42 to 43). In addition to this, BA has powers in related domains, such as ensuring the proper functioning, security and efficiency of means and systems of payment (articles 58 and 59); boosting financial inclusion (article 36); acting as a government advisor within the scope of his mandates (articles 37 to 39).

3.2. The Digital Dinar Objectives

3.2.1. Modernisation and Digitalisation of Retail Payments

The Algerian banking system is criticized for being dominated by public banks that suffer from serious shortcomings in performing their role in financial intermediation. In terms of mobilizing financial resources, banks are unable to provide sufficient bancarization for the economy (Chabha & Benhalima, 2011, p. 74; Lellouchi, 2014, p. 10). Here, the absorption and retention of fiduciary money by the informal economy is a fundamental part of the problem (Chabha & Benhalima, 2011, p. 74; Medjoub, 2018, p. 39). In terms of lending, public banks' performance is characterized by a reluctance to expand their assets despite the existence of guarantees, and a focus on large enterprises at the expense of small and medium-sized enterprises and other profitable market segments (Boudjema, 2011, p. 105; Bank of Algeria, 2019). The banking reforms, pursued by the public

¹ BA includes several structures that are authorities within the scope of their mandate, namely money; banking supervision; and financial stability.

authorities and the BA as a regulatory authority, are based in part on a technological approach (Lellouchi, 2014, p. 11; Bank of Algeria, 2019), which means encouraging bancarization through a diverse and modern banking offering that attracts customers. Significant efforts have been made to modernize and digitize the banking system, especially with regard to payments.

The BA relied on a combination of providing and modernizing the infrastructure under its management, and enforcing norms aiming at modernizing the banks' information systems. In 2005, BA generalized interbank withdrawal cards across the entire system, as well as Algeria Post. The following year, it launched the Algerian RTGS system (ARTS) and the clearing system for checks and other mass payment instruments (ATCI). These steps were preceded by efforts to modernize information systems at the bank level since 2002 (KPMG, 2024, p. 275). The digitization of retail payments occurred relatively later, in a collective and coordinated manner between banks through interbank institutions, SATIM and GIE monétique, that work in close coordination with the BA. Mobile payments have been launched five banks in October 2024. The service allows payments to be made at points of sale by scanning the QR code using a mobile phone. It is also planned to equip the service with SoftPos technology during the current year, with the aim of enabling merchant users to receive payments at points of sale without the need for electronic payment terminals (APS, 2024-B). This step was preceded by the establishment of interoperability between banks operating mobile payment systems, with the aim of enabling various transactions between their users (APS, 2024-A). Similar achievements have been made regarding online payments using bank cards (SATIM, 2021). As for traditional electronic payment at points of sale using bank cards, it was decided to generalize the use of electronic payment terminals under Article 111 of the 2008 Budget Law (JORADP, 2017, p. 48).

The section of the government's action plan concerned with modernizing the banking system includes the objective of accelerating the digitization of the payment system (Services du Premier Ministre, 2021, p. 25), explicitly stating that this acceleration will be achieved through the legal framework and infrastructure. Therefore, the issuance of the digital dinar is expected to be a cornerstone of this endeavour, given that any digital money includes a payment system, i.e., the necessary infrastructure for its transfer. The infrastructure provided by the BA at the interbank level to date might be extended in the future to include the retail payments market, in order to ensure the coexistence of digital currency with physical currency at the retail level. This is what was confirmed by the Prime Minister in the context of his statement regarding the intention to issue the digital dinar, which is to use the latter as a support for the physical dinar (APS, 2022). The digital dinar, if issued at the retail level, can thus be envisioned as a support to the efforts spent until now to modernize and digitize payments, ensuring at the same time the presence of central bank money alongside banks' money at this level of the payments market.

3.2.2. The Ability to Apply a Demonetization Policy

While providing digital means and systems for payments as a first step towards their generalisation, the draining of credit currency and its retention outside banking channels is another serious issue that requires appropriate treatment. According to the latest report of the BA, fiduciary money outside banks represents 34% of the M2 money supply. Teller machine withdrawals represented 85.3% of the total volume of interbank electronic money transactions and 93.1% of their total value, reflecting the clear trend among cardholders to favour the use of cash over card payments (Bank of Algeria, 2023, pp. 41,76). This trend poses a serious threat to monetary sovereignty and a major obstacle to the

BA's ability to manage its monetary policy. It also leads to the waste of financial resources, as it prevents them from being put to their best economic use through the banking system or the financial market.

The government's past attempts to contain the problem have failed, as it has been unable to implement Law 05-01 on combating money laundering and terrorist financing¹, which stipulates in Article 6 that all payment transactions exceeding a certain threshold must be conducted using payment instruments through approved banking and financial channels (JORADP, 2005, p. 4). If the digital dinar is adopted for retail payments and gains sufficient usage, the government could regain control of the fiduciary aggregate by converting it to digital dinar through a demonetization policy. As an example of a similar policy, the case of India is well documented. In 2016, the Indian government demonetized 86% of the currency in circulation, by declaring some categories of banknotes as no longer a legal tender. This measure caused a sharp decrease in the circulating cash in favour of electronic payments (Das, Gadenne, Nandi, & War, 2022, p. 1). Because of the lack of widespread use of private payments in Algeria, this enforcement is unimaginable without a digital alternative to fiduciary currency.

3.2.3. Boosting Financial Inclusion via Payment Service Providers

Small and medium enterprises SMEs are often subject to financial exclusion, particularly in terms of their access to Bank lending, for a number of reasons (WEF, 2015, p. 9):

- High transaction costs due to the usually small amounts loaned;

¹ This law was amended and supplemented by several subsequent texts, notably in 2015 and 2023.

- Information asymmetry as a result of these enterprises not having audited financial statements and the absence of infrastructure for their credit data;
- A relatively high risk profile that does not match the banks' risk appetite;
- Regulation that imposes higher capital requirements on banks for lending to them.

Fintech is better able to lend to SMEs and overcoming the mentioned obstacles, through tailor made business models. These include the following financing products (WEF, 2015, p. 11): marketplace (peer-to-peer) lending; merchant and e-commerce finance; invoice finance; supply chain finance; trade finance.

The Algerian government has taken this into account in its objectives for financial inclusion, by adopting a specialization in the scope of activity between banks and payment service providers PSPs. That particular type of fintech is considered as a vector of financial inclusion for startups through epayment and e-commerce channels (Services du Premier Ministre, 2021, p. 31), while banks and the postal service contribute to financial inclusion in the traditional way, based on the geographical expansion of their network of agencies. The creation of a legal framework for PSPs, alongside crowdfunding, is mentioned in the context of new financing and support mechanisms that are planned to be created to suit the specificities of start-ups. In addition to that, the section on modernizing the banking and financial system states that the government intends to develop the necessary infrastructure in order to modernize the payment system and implementing epayment (Services du Premier Ministre, 2021, p. 25), which indicates that PSPs will be included in the digital dinar infrastructure as operators.

A national fabric of fintech companies does not exist currently¹, which suggests that the government aims at encouraging the establishment of such an industry by offering the digital dinar infrastructure. At a first phase, the establishment of PSPs that leverage the digital dinar infrastructure as an ecosystem for their businesses of providing payment services to startups and those practicing e-commerce. In a second phase, these fintechs can provide more advanced services such as lending and financing services, leveraging synergies with their core payment businesses. This pattern of business development and diversification from payment and money transfer services to other financial services is widely observed (Reyes-Mercado, 2021, p. 13). The digital dinar infrastructure, as a national fintech ecosystem, can provide another support element, i.e. information, as credit information in particular is a productive resource for lending services. Sharing this type of data between all operators, including banks with very rich databases in this regard, could be imposed as a norm.

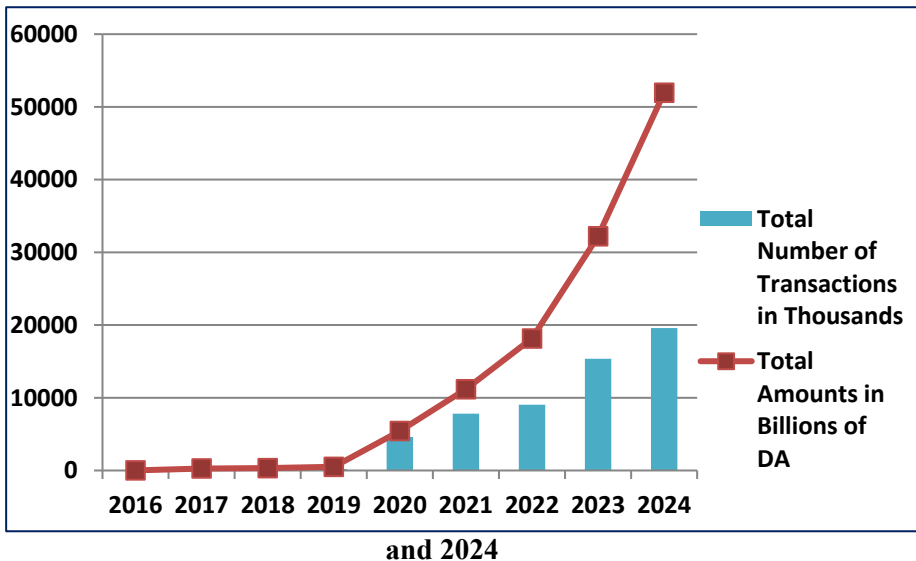
3.2.4. Fiscal Inclusion via Payment Data

Algeria has recently begun digitizing its various government sectors. This endeavour aims to achieve greater efficiency in the work of these sectors; and to simplify, facilitate, and accelerate citizens' access to their services within the digital proximity approach. However, this is not the only reason, as the pooling of information systems across various administrative sectors allows the exploitation of some synergies that improve their performances. Obtaining tax-relevant data is one of the most important objectives of digital pooling efforts. The government's action plan includes the alignment of sectorial digitalization development plans, as well as the establishment of interoperability mechanisms between the

¹ However, the government's plan (page 32) encourages foreign start-ups, especially African ones, to enter the national ecosystem.

various administrations (Services du Premier Ministre, 2021, pp. 20-21). In the section on tax, budgetary accounting and customs reforms, improving resource mobilization capacities and the search for tax information was set as a major objective (page 17). In this regard, the digital dinar infrastructure could play a crucial role in collecting tax data for sharing with the tax administration.

Figure 2. Evolution of Online Payments in Algeria between 2016



Source: Author's own elaboration using data from GIE Monétique.

In the section on the integration of the informal sector into the legal circuit, the government aims to put in place the necessary mechanisms and tools to contain all the resources of this sector into legal channels of the economy (Services du Premier Ministre, 2021, p. 29). This involves trying to take advantage of the funds available on the informal market as a source of financing for the national economy; as well as recovering tax losses resulting from clandestinity. Start-ups are expected to play a pivotal role in the

financial inclusion of this part of the national corporate fabric through e-payment and e-commerce, using the mechanisms we have previously discussed. In this context, the government intends to implement integration, incentive and control measures that can help transfer informal activity to the formal sector (Services du Premier Ministre, 2021, p. 29). Therefore, it is likely to rely on the growing trend of business activity in Algeria shifting towards e-commerce (see Figure 3), which allows for greater transparency and more data to be exploited to contain the informal economy.

On another hand, the government is trying to shift from a system of universal subsidies to a system of targeted subsidies, in favour of needy households, thereby guaranteeing social equity (Services du Premier Ministre, 2021, p. 18). The digital dinar will play a role in this context, and may be combined with the use of the national identification number to facilitate the transfer of aid to those entitled to it. Algeria's experience with the government's emergency aid for those affected by the COVID-19 pandemic has shown that transferring funds using public treasury orders took an exaggerated amount of time, despite the urgent nature of the process.

3.3. The Issuing Model and Options

All objectives of issuing the digital dinar require the availability of infrastructure at the retail transaction level, which excludes the adoption of a system at the wholesale payments level. The trade-off between different retail models depends, of course, on which one best serves the intended objectives, taking into account the risks as well. While all retail models serve the goals of digitizing payments, demonetization, and tax inclusion, the goal of financial inclusion requires that PSPs play an active role in the payment system as an operator, which precludes the direct provision of a retail model by BA (see table 3 below). The same applies to banks. Failure to incorporate the dinar payment system could result in their being disintermediated, as the new system would then constitute a more

attractive alternative to current banking services for users of payment and money transfer services¹. Both the intermediated and hybrid retail models serve the objectives of issuing the digital dinar, including financial inclusion through the PSP. However, in our view, the hybrid one is more likely to be implemented, given that the transaction record will then be held at the BA and not at the operator's level. This not only gives the BA greater control over retail payment data, but also gives it a monopoly on this data to share and use for financial and tax inclusion purposes. Although it is also possible for the BA to adopt the intermediated model coupled with requirements for disclosure and reporting, in order to save this data at its level. The ultimate goal, in our view, is to establish central registries similar to those currently in existence (central registry for unpaid checks, etc.) which banks access and use regularly in their various activities.

In principal, the digital dinar system is likely to offer the widest functionalities and options² to its users, including 24/7 service availability and peer-to-peer transferability, in order to gain widespread adoption for the system, except for some features that conflict with the issuing objectives or pose a major risk. Accordingly, anonymous payments will be excluded because they fundamentally conflict with the objectives of financial and fiscal inclusion and demonetisation policy, which require identifying the beneficiary of the service, whether a natural or legal person. An intermediated or hybrid Algerian dinar payment system.

¹ Especially if the digital dinar system is coupled with the option of remunerating payment balances.

² With the exception of the remuneration of payment balances, which is expected to exert a restrictive effect on the use of the digital dinar system, given that a wide range of potential users adhere to the provisions of Islamic Sharia in their financial transactions.

Table 3. Alignment Matrix

	Implementation Models				Further Options				
	Wholesale	Direct (Retail)	Hybrid (Retail)	Intermediated (Retail)	Anonymity	Availability 24 /7	p-to-p Transferability	Transaction Caps	Remuneration (Interest)
✓ <i>The model/option serves the objective</i>									
✗ <i>The model/option does not serve</i>									
⚠ <i>Existence of risk</i>									
Objectives / Risks									
Digitalisation of Retail Payments	✗	✓	✓	✓	✓	✓	✓	✗	✓
Ability to Apply a Demonetization Policy	✗	✓	✓	✓	✗	✓	✓	✗	✓
Boosting Financial Inclusion via PSPs	✗	✗	✓	✗	✗	✓	✓	✗	✗
Fiscal Inclusion via Payment Data	✗	✓	✓	✗	✗	✓	✓	✗	✓
Banks' Disintermediation		⚠							⚠
Banks' Liquidity Risk						⚠		⚠	
Cyber risk									

Source: Author's own work.

in which banks participate as operators is vulnerable to the liquidity risk we mentioned in the previous section, which makes likely the use of transaction caps as safety measure. Another concern that could pose a risk to banks' liquidity is the availability of 24/7 payment services, which could lead to liquidity crises outside of bank business hours. Here, a technological solution to create a kind of automated liquidity management should be considered.

4. Conclusion

Our examination of the literature on central banking at the beginning of the study allowed us to establish the potential paths within which a role for the Algerian digital dinar could be envisioned, as its issuance cannot be linked to objectives loosely linked to central banking roles and functions. The evolution of banking and monetary systems around the world has led to central banks being at the forefront of monetary systems. Endowed with broad powers that aim for maintaining user confidence in the system, a prerequisite for its smooth functioning due to its reliance on a fractional reserve system. These bodies arm themselves with mechanisms that allow them to avoid systemic risk and maintain stable value of the currency, as they are the unique fiat money issuer; the lender of last resort; the banks' supervisor, and the implementer of monetary policy. This has made the areas related to the functions and roles of central banks, such as monetary policy transmission channels, the payment system, and financial inclusion, areas of strategic importance to them, within which central banks operate and which should not be undermined in any way.

From this perspective, the fintech industry is not only a disruptive force in the banking and payments market in particular, but also extends to disrupting central banking itself. However, fintech also has a positive role to play, as it holds within it opportunities to support and enhance the role of central banking in financial inclusion, the efficiency and innovation in payment systems, and other as-yet-unexplored possibilities. In this context, CBDCs are considered by many researchers as central banks' response to fintech, through which they attempt to exploit the opportunities and mitigate the threats.

In the case of Algeria, the government is attempting to correct structural imbalances in its economy and public finances, through efforts to diversify the economy and impose greater control over

the mobilization of financial and tax resources, particularly with regard to the informal economy. Here it is expected that the digital dinar will be instrumentalized as a digital alternative to the fiduciary dinar, providing greater effectiveness for its users and overall efficiency for the payment system as a whole, as part of efforts to modernize the latter. Such a system is also necessary to contain the money supply circulating outside the banking system, and to achieve financial and tax inclusion. Our study also concluded that a hybrid retail payment model with the participation of banks and PSPs as operators is the most likely to materialize. The system is likely to offer 24/7 service availability, peer-to-peer transferability, and transactional caps. It is also likely that remuneration on payment balances will not apply nor anonymous payments and money transfer transactions will be permitted.

5. Bibliography List

- Angelini, P., & Passacantando, F. (1992, Ottobre-Dicembre). Central Bank's Role in the Payment System and its Relationship with Banking Supervision. *Giornale degli Economisti e Annali di Economia*(9/12), pp. 453-491.
- APS. (2022, 12 26). *Digitalization of payments: Towards adoption of digital dinar*. Retrieved 03 21, 2024, from Algeria Press Service: <https://www.aps.dz/en/economy/46237-digitalization-of-payments-towards-adoption-of-digital-dinar>
- APS. (2024-A, 04 10). *GIE Monétique: lancement de l'interopérabilité des paiements mobiles au cours de l'année 2024*. Consulté le 02 11, 2025, sur Algérie Presse Service: <https://www.aps.dz/sante-science-technologie/169414-gie-monetique-lancement-de-l-interoperabilite-des-paiements-mobiles-au-cours-de-l-annee-2024>
- APS. (2024-B, September 16). *GIE monétique: cinq banques lanceront le paiement mobile en octobre*. Consulté le 02 11, 2025, sur Algérie Presse Service: <https://www.aps.dz/economie/176155-cinq-banques-lanceront-le-paiement-mobile-en-octobre-prochain>
- Arner, D., Barberis, J., & Buckley, R. (2016). 150 YEARS OF FINTECH: An evolutionary analysis. *JASSA The Finsia Journal of Applied Finance*(3/2016), 22-29.
- Avgouleas, E., & Blair, W. (2024, February 28). A Critical Evaluation of Central Bank Digital Currencies (CBDCs): Payments' Final Frontier? *Capital Markets Law Journal*, 19(02), pp. 103-112.
- Bank of Algeria. (2019, 02 19). *Mot du Gouverneur à l'ouverture de la Journée sur :« La modernisation des banques : Réalisations et Perspectives » Organisée par l'ABEF*. Consulté le 03 02, 2025, sur bank-of-algeria.dz: <https://www.bank-of-algeria.dz/mot-gouverneur-ouverture->

- journee-la-modernisation-banques-realizations-et-perspectives-labef/
- Bank of Algeria. (2023). *Rapport Annuel 2023: Evolutions Economiques et Monétaires*. Algiers.
- Bech, M., & Garratt, R. (2017, September). Central bank cryptocurrencies. (B. f. Settlements, Ed.) *BIS Quarterly Review*, 55-70.
- BIS. (2020). *BIS Annual Report 2020: Promoting Global Monetary and Financial Stability*. Basle: Bank for International Settlements.
- Bjerg, O. (2017). *Designing New Money: The Policy Trilemma of Central Bank Digital Currency*. Copenhagen Business School.
- Borio, C. (2019, January). On Money, Debt, Trust and Central Banking. *BIS Working Papers*(763), pp. 1-27.
- Boudjema, R. (2011). *Economie du Développement de l'Algérie 1962-2010* (Vol. 3). Alger: Dar El-Khaldounia.
- CBDC Tracker. (2025, 01). *Today's Central Bank Digital Currencies Status*. Consulté le 01 26, 2025, sur <https://cbdctracker.org/>: <https://cbdctracker.org/>
- Chabha, B., & Benhalima, A. (2011). La Bancarisation dans le Contexte de Libéralisation Financière en Algérie. *Les Cahiers du CREAD*(95), pp. 53-78.
- Claeys, G., & Demertzis, M. (2021). Digital Currencies: What role in our financial system? In T. Liaw, *The Routledge Handbook of Fintech* (pp. 51-66). New York: Routledge.
- Cline, D., & Mazumder, S. (2022). *Money, Banking, and Financial Markets: A Modern Introduction to Macroeconomics*. New York: Routledge.
- Das, S., Gadenne, L., Nandi, T., & War, R. (2022). Does going cashless make you tax-rich? Evidence from India's demonetization experiment. *Institute for Fiscal Studies (IFS) Working Papers*(22/03), pp. 1-13.

- Giannini, C. (1995). Money, Trust, and Central Banking. *Journal of Economics and Business*(47), pp. 217-237.
- Goodfriend, M. (1990). Money, Credit, Banking, and Payment System Policy. In D. Humphrey, *The U.S. Payment System: Efficiency, Risk and the Role of the Federal Reserve* (pp. 247-284). Boston: Kluwer Academic Publishers.
- Halaburda , H., Sarvary, M., & Haeringer, G. (2016). *Beyond Bitcoin: Economics of Digital Currencies and Blockchain Technologies* (2nd ed.). Cham: Palgrave Macmillan.
- Hirzel, T. (2023, 12 31). Assessing the Impact of Central Bank Digital Currency (CBDC) Adoption on the Transition Towards a Knowledge-Based Economy: A Meta-Analysis. *International journal of economic performance*, 06(03), pp. 1-15.
- IMF. (2021). *Global Financial Stability Report: COVID-19, Crypto, and Climate: Navigating Challenging Transitions*. International Monetary Fund, Washington DC.
- Jing, Y. (2020, 11 02). *Chinese Regulators Summon Ant Leaders Ahead of Gigantic IPO*. (Wall Street Journal) Retrieved 02 23, 2025, from <https://www.wsj.com/articles/chinese-regulators-summon-ant-leaders-amid-record-ipo-11604327306>
- JORADP. (2005, 02 09). Loi n° 05-01 relative à la prévention et à la lutte contre le blanchiment d'argent et le financement du terrorisme. *Journal Officiel de la République Algérienne*(11). Secretariat Général du Gouvernement Algérien.
- JORADP. (2017, 12 31). Loi N° 17-11 Portant Loi de Finances pour 2008. *Journal Officiel de la République Algérienne*(76). Secretariat Général du Gouvernement Algérien.
- JORADP. (2023, Juin 21). Loi n° 23-09 portant loi monétaire et bancaire. *Journal Officiel de la République Algérienne*(43). Secretariat Général du Gouvernement Algérien.

- Khiaonarong, T. (2003, January 15). Payment systems efficiency, policy approaches, and the role of the central bank. *Bank of Finland Discussion Papers*(1/2003), pp. 1-63.
- Khiaonarong, T., & Humphrey, D. (2022, February). Falling Use of Cash and Demand for Retail Central Bank Digital Currency. *IMF Working Papers*(WP/22/27), pp. 1-22.
- Kosse, A., & Mattei, I. (2022, May). Gaining momentum – Results of the 2021 BIS survey on central bank digital currencies. *BIS Papers*(125), pp. 1-23.
- KPMG. (2024). *Guide Investir en Algérie*. Alger: KPMG.dz.
- Lagarde, C. (2018). Central Banking and Fintech: A Brave new World. *Innovations*, 12(1/2), pp. 4-8.
- Lamberti, H.-J., & Büger, M. (2009). Lessons Learned: 50 Years of Information Technology in the Banking Industry – The Example of Deutsche Bank AG. *Business & Information Systems Engineering Research Papers*(1), pp. 26-36.
- Landau, J.-P., & Nicole, S. (2024, June). *Monetary Sovereignty in a Digital World*. SciencesPo.
- Lellouchi, M. (2014, 06). Le redéploiement bancaire préconisée pour l'expansion de la bancarisation en Algérie. *Abhath Iktissadia*(10), pp. 9-21.
- Malherbe, L., & Montalban, M. (2022). Cryptocurrencies, Big Techs, central bank digital currencies and the changing role of banks in the payment industry: old wine in new bottles? In G. Vallet, S. Kappes, & L.-P. Rochon, *Central Banking, Monetary Policy and the Future of Money*. Cheltenham: Edward Elgar Publishing.
- Medjoub, R. (2018, 06). Quelques réflexions sur le développement de l'économie informelle en Algérie. *Revue du Lareiid*, 04(01), pp. 32-53.
- Mehrotra, A., & Yetman, J. (2015, March). Financial Inclusion – Issues for Central Banks. *BIS Quarterly Review*, pp. 83-96.

- Nakajima, M. (2011). *Payment System Technologies and Functions: Innovations and Developments*. Hershey: Business Science Reference.
- Niblack, W. (1976). *Development of Electronic Funds Transfer Systems*. FEDERAL RESERVE BANK OF ST. LOUIS.
- Norman, B., Shaw, R., & Speight, G. (2011, June). The history of interbank settlement arrangements: exploring central banks' role in the payment system. *Bank of England Working Papers*(412), pp. 1-32.
- OECD. (2022). *The Evolving Concept of Market Power in the Digital Economy* . Organisation for Economic Co-operation and Development.
- Patwardhan, A., Singleton, K., & Schmitz, K. (2018). *Financial Inclusion in the Digital Age*. International Finance Corporation.
- Reyes-Mercado, P. (2021). *FinTech Strategy: Linking Entrepreneurship, Finance, and Technology*. Cham: Palgrave Macmillan.
- Rogoff, K. (2016). *The Curse of Cash*. New Jersey: Princeton University Press.
- Sandner, P., Gross, J., Grale, L., & Schulden, P. (2020, 07 29). *The Digital Programmable Euro, Libra and CBDC: Implications for European Banks*. Retrieved 02 23, 2025, from SSRN (Social Science Research Network): https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3663142
- SATIM. (2021, 12 03). *Accord d'interopérabilité des systèmes de paiement électronique*. Consulté le 02 04, 2025, sur <https://satim.dz/>:
<https://satim.dz/index.php/fr/actualites/interopabilite>
- Saudi Central Bank. (2022, April). CBDC and its associated motivations and challenges. (B. f. Settlements, Ed.) *BIS Papers*(123), pp. 173-177.

- Selgin, G., & White, L. (1987, July). Evolution of Free Banking. *Economic Inquiry*, XXV, pp. 439-457.
- Services du Premier Ministre. (2021). *Plan d'action du Gouvernement pour la Mise en Oeuvre du Programme du Président de la République*.
- Sienkiewicz, S. (2002, April). The Evolution of EFT Networks from ATMs to New On-Line Debit Payment Products. *Federal Reserve Bank Discussion Papers*, pp. 1-12.
- Sveriges Riksbank. (2018). *The Riksbank's e-krona project: Report 2*. Stockholm.
- Tanda, A., & Schena, C.-M. (2019). *FinTech, BigTech and Banks: Digitalisation and Its Impact on Banking Business Models*. Cham: Palgrave Macmillan.
- Thammarak, M. (2014). *Central Banking: Theory and Practice in Sustaining Monetary and Financial Stability*. Singapore: John Wiley & Sons.
- Ugolini, S. (2017). *The evolution of central Banking: Theory and History*. London: Palgrave Macmillan.
- Una, G., Verma, A., Bazarbash, M., & Nakaguchi, N. G. (2023, February). Fintech Payments in Public Financial Management: Benefits and Risks. *IMF Working Papers*(WP/23/20).
- Van Roosebeke, B., & Defina, R. (2022, December 15). Central Bank Digital Currencies: A Review of Operating Models and Design Issues. (M. P. Archive, Ed.) *MPRA Papers*(116240), pp. 1-15.
- Velde, F. (2013, December). Bitcoin: A primer. (F. R. Chicago, Ed.) *Essays on Issues*(317), pp. 1-4.
- Vishal, S., & Ranjan, A. (2023). Advent of central bank digital currency and the future of monetary sovereignty. In A. Ranjan, & R. Dygas, *Digital Currencies and the New Global Financial System* (pp. 152-161). New York: Routledge.

- WBG. (2021). *Central Bank Digital Currency: Background Technical Note*. New York: World Bank Group.
- WEF. (2015). *The Future of FinTech: A Paradigm Shift in Small Business Finance*. Geneva: World Economic Forum.
- World Bank Group. (2021). *Central Bank Digital Currency: Background Technical Note*. Washington DC.