



Implementing the Digital Dinar in Algeria Opportunities and Challenges

تطبيق الدينار الرقمي في الجزائر ما بين الفرص والتحديات

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Article abstract:

Place the abstract here (This paper describes the opportunities and challenges that are, in one hand, related to the implementation of Digital Dinar in Algeria. It illustrates how central bank digital currency (CBDC) would help improve financial inclusion, minimize the level of informal economy, and update the monetary system with some regulatory hurdles, technological problems, and infrastructural gaps that have to be addressed. It also adequately discusses matters relative to Algeria's economic context and its level of digital readiness as well as issues about public trust and cybersecurity. The article provides policy recommendations on guided paths for effective adoption. In conclusion, it can be noted that even though the Digital Dinar has great potential, guided gradualism is highly recommended.

Key words: Digital Dinar, Algeria, CBDC, Informal Economy, Financial Inclusion

ملخص المقال:

تتناول هذه الورقة الفرص والتحديات المرتبطة من جهة بتطبيق الدينار الرقمي في الجزائر. وتُبيّن كيف يمكن للعملة الرقمية الصادرة عن البنك المركزي (CBDC) أن تساهم في تعزيز الشمول المالي، وتقليص حجم الاقتصاد غير الرسمي، وتحديث النظام النقدي، مع الإشارة إلى العقبات التنظيمية، والمشكلات التكنولوجية، والفجوات على مستوى البنية التحتية التي ينبغي معالجتها. كما تناقش الورقة بشكل كافٍ السياق الاقتصادي الجزائري ومستوى الجاهزية الرقمية، إلى جانب قضايا تتعلق بثقة الجمهور والأمن السيبراني. وتقدم المقالة توصيات سياسية بشأن مسارات إرشادية لتبني فعال للدينار الرقمي. وفي الختام، يمكن القول إنّ الدينار الرقمي يتمتع بإمكانات كبيرة، غير أن اعتماد نهج تدريجي موجه يُعدّ أمراً ضرورياً.

كلمات مفتاحية: الدينار الرقمي، الجزائر، العملة الرقمية للبنك المركزي، الاقتصاد غير الرسمي، الشمول المالي.

Introduction

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The central bank digital currency (CBDC) represents a fundamentally revolutionary moneyscape, one in line with the newly prevailing trend for needing safer, quicker, and easier-to-use electronic money. With the phasing out of paper money, which has become increasingly impractical in the field of electronic transactions wherein people are more accustomed to using computers and mobile phones, central banks throughout the world are considering whether to issue a digital currency (CBDC) or not. The reason for this is to modernize their own monetary system and make it more efficient than ever before (BIS, 2024).

With over 30% of Algeria's Gross Domestic Product (GDP) being generated in the informal sector, problems come up not only with collection and enforcement of taxes, but also developing an elegant picture for economic planning (World Bank, 2016). Done properly, a CBDC could go a long way toward legalization of this part of the economy by providing secure digital alternatives for people in this bracket who cannot afford conventional bank accounts, even many times a day cash changes happening instantly. And with a digital dinar, the structure of payments in Algeria could be changed, both while at the same time improving the transmission effect of monetary policy (Kosse and Mattei, 2018).

The country must overcome a series of major challenges on the structural and technological level if it is to issue a digital dinar-from inadequate digital infrastructure to low financial literacy across many dimensions of society; generally weak capacity within various institutions that would have to take responsibility for this project; and difficulties about cyber security (AfDB, 2010). Additionally, because government digitalization has not yet won public confidence, especially where state-owned organizations are concerned, in part this is due to old problems of institutional transparency and technological readiness (AfDB, 1998). Moreover, the legal framework for digital assets and CBDC is still in its embryonic stage and will require comprehensive revision before it can be realized.

The Research Problem

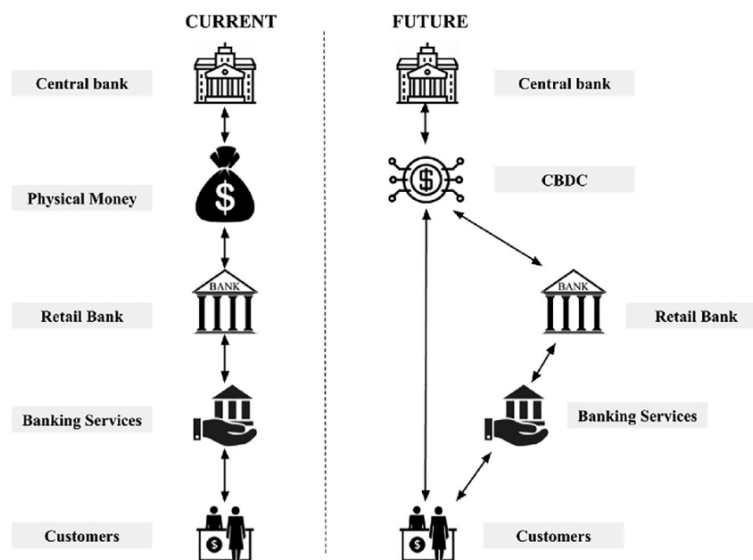
Algeria suffers from a low formal economy, low financial inclusion and underdeveloped digital infrastructure, all of which weaken the country's economic performance and decrease its capacity for monetary control. Offering answers to this problematic; The Digital Dinar might be in effect one strategic response. But its success is contingent upon overcoming regulatory lacunae, technological challenges and public trust deficits. Here is the central research question: Can the Digital Dinar be implemented in Algeria as effectively that informality decreases and financial inclusion expands, despite both existing institutional constraints and huge technological drivers of dependency?

1. Conceptual Framework of Central Bank Digital Currencies

1.1 Definition of CBDCs :

Central Bank Digital Currency refers to a digital form of fiat money issued and controlled by the country's central bank. With legal status to match the traditional bank note or coin, CBDCs will function like but not look like Bitcoin and other cryptocurrencies. When "Bank money" is electronically created, it takes the form of an account balance instead of something tangible. By contrast, "Cash money" consists in coins and banknotes. However, CBDCs represent a fourth type of currency. Their distinguishing features are twofold: first, transactions between users can be conducted directly rather than via banks or states; second, unlike traditional money, they have no material embodiment Everyone knows that digital currencies are nothing but dematerialized legal tender. To achieve this, they adopt peer-to-peer (P2P) protocols, also used in Bitcoin. You tell us if the text should go in a newspaper or be translated back into French so we can compare perspectives from two different languages (Demé & Ricoult, 2024).

Figure 1 Centralized vs. Distributed Financial Systems



Source : (Ozturkcan et al., 2022)

1.2 types of CBDCs: wholesale CBDC:

wholesale CBDC is the digital of the Central Bank money Wholesale CBDC Financial institutions (which have deposits with the central bank) use it to clear interbank transfers as well as wholesale transactions. The solution is intended to provide efficiency, stability in the financial system and more. Central bank money is two-legged the first leg of central bank money is in cash or Retail CBDC, and the other side in Wholesale CBDC.

Although CBDC, in the form of central bank money has been implemented digitally for years and being transacted between Central Banks to financial institutions (reverse repo), there was a felt need that the infrastructure carrying this digital central bank money needed re-vamping because it would be too inefficient to move Central Bank Money anywhere if carried out on Existing Rail-Roads. Novel methods such as Distributed Ledger technology, Decentralized Finance Applications and the advent of Stablecoins are emerging competitors to the Central Bank money. As a result, from creating money out of nothing via the creation of credit to cater to new demand, over time the technology driving the 'monetisation' phenomenon has been replaced with digital technology that creates parallel monetary infrastructure moving money on these platforms is efficient (quick), cheaper and arguably more transparent there needed to be a re-think of existing digital Central Bank Money infrastructure for competing. This on the other hand led to the origination of Wholesale CBDC concept

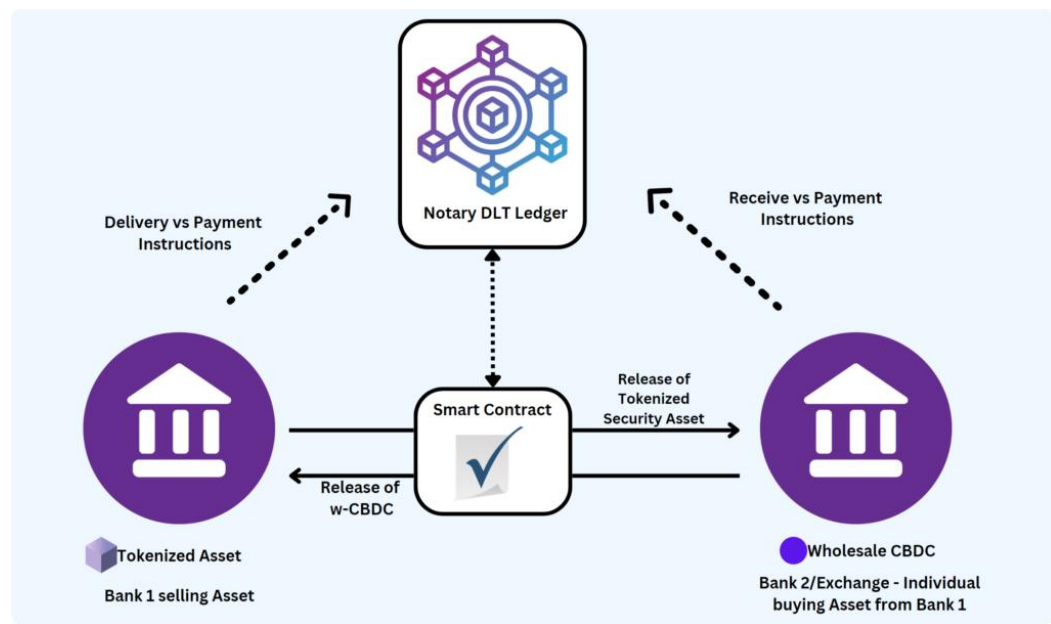
Cutting Down the Settlement Period by Tokenization of Financial Assets

The market has several types of financial assets such as stocks, bonds, mutual funds, securities, equities, debt and many other classes that use a complex settlement system. Almost all these such financial instruments take about 2-3 days for the settlement.

The magic potion mentioned is wholesale CBDC and has been conceptualized in the context of reducing the settlement time through tokenizing the assets on Distributed Ledger Technology (DLT).

In addition to the tokens, there will be smart contracts which is those are just pre-programmed codes. These smart contracts are set up to release the securities tokens through wholesale CBDC, hands-free and credit sale proceeds in the seller's account once sold (Chain, 2023).

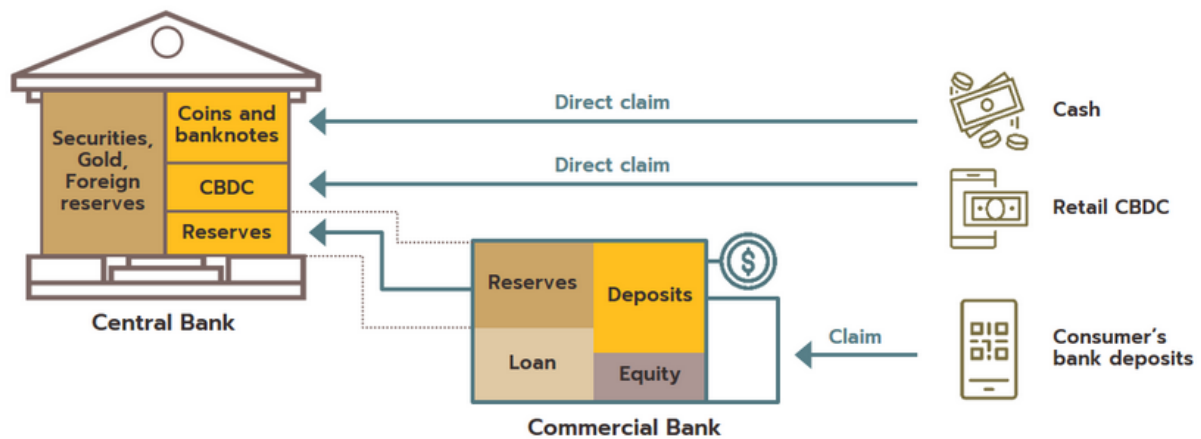
Figure 2 Tokenization of Financial Asset with Wholesale CBDC



Source : (Chain, 2023)

Retail CBDCs: are a digital currency that is issued by central banks but may be used by retail customers; meaning the public. Many central banks in such countries see them as a method of providing consumers with immediate access to safe payment systems and at reducing the high credit risk from different digital currencies. However, while you may miss out on certain efficiencies and benefits that come with utilizing a digital money, cash is not going to give you the same risk as an unregulated private network and when it comes to settling transactions, cash still can be used by law in doing so (Arauz et al., 2021).

Figure 3 CBDCs for Commercial Banks



Source : (Arauz et al., 2021)

Retail Business Models

Three different business models are being explored around the world at present. They are The Direct Model, The Indirect Model and finally The Hybrid Model (Digital Dollar Digest : What Central Bank Digital Currency Architecture Means For Community Banks, 2021).

Direct Model

A direct CBDC allows literally anyone from community banks to an informal gig worker to deposit their money directly at the central bank. Imagine a central bank “checking account” for core payment-related services: receiving, storing, sending and moving money around.

The direct model, however, evokes some more important questions. During times of crisis, people could move their money from banks to the central bank, which would create a bank run that would worsen an already

weak economy. A direct model would also upend the current two-tiered banking system and present challenges that overshadow any advantages in efficiency. When it comes to distributing a digital version of its own allegiance, the Federal Reserve would need to create an intensive financial services infrastructure that puts the largest proportion of technological and operational risk from the private commercial banking sector over to the central bank.

Indirect Model

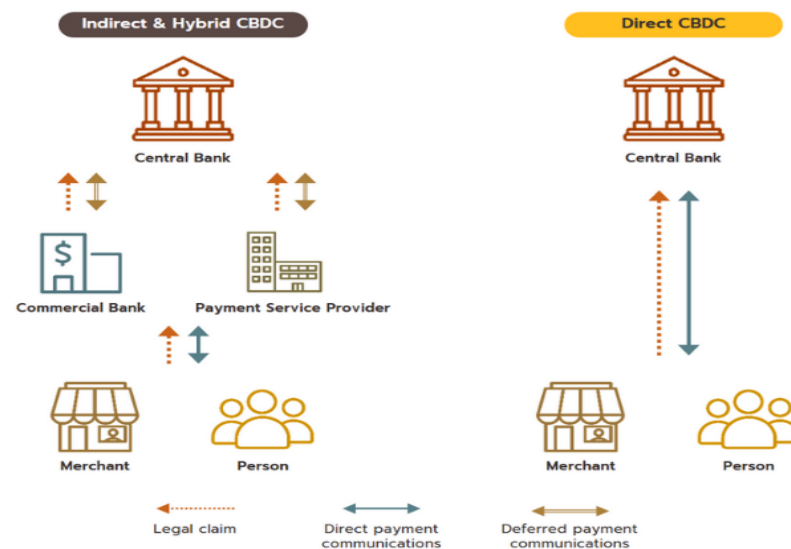
Most central bankers have ruled out arrangements that displace financial intermediation and are therefore exploring indirect CBDC models or two-tier infrastructures.

Under this arrangement, the Federal Reserve would provide a CBDC to financial institutions that are subject to existing regulation and supervision; these financial institutions would in turn offer the CBDC directly to members of the public, who hold it in an electronic wallet. This model would preserve the important role of our community banks.

Hybrid Model (Synthetic)

Hybrid distribution infrastructure (a mix of both the indirect and direct) Digital dollars sometimes called a synthetic model; this option would allow for both banks and licensed private entities to issue fully reserve-backed digital dollars. This is done by PayPal or any other FinTech doing the same service. If a non-FDIC-insured entity failed, consumers would likely have little recourse to recover their funds.

Figure 4 differences between Direct Model Indirect Model Hybrid Model (Synthetic)



Source: (Digital Dollar Digest: What Central Bank Digital Currency Architecture Means For Community Banks, 2021).

1.3 differences between CBDC and Cryptocurrency:

Table 1 Comparison between CBDCs and Cryptocurrencies

Aspect	CBDCs (Central Bank Digital Currencies)	Cryptocurrencies
Issuer	Central Banks (gouvernement autorités)	Private entities or decentralized networks
Legal Status	Legal tender	Not legal tender in most countries
Regulation	Fully regulated and backed by the state	Lightly regulated or unregulated (depending on the jurisdiction)
Centralization	Centralized	Decentralized
Value Stability	Stable, usually pegged to national currency	Volatile, determined by market supply and demand
Purpose	Improve payment systems, financial inclusion, monetary control	Investment, decentralized finance, privacy, innovation



Technology	May or may not use blockchain (often uses permissioned DLTs)	Primarily blockchain-based (public and permissionless)
Anonymity	Low or none (transactions can be monitored by authorities)	Varies; some offer high anonymity (e.g., Monero, Zcash)
Transaction Speed	High (designed for efficiency in national systems)	Varies (Bitcoin is slower, newer cryptos can be faster)
Monetary Policy Impact	Can be used as a tool for implementing monetary policy	No direct impact on state monetary policy

Source: Author

2. Opportunities of the Digital Dinar

2.1 Potential Gains from the Digital Dinar:

The economic advantages of the implementation of a digital dinar are multifaceted. First of all, the improvement of financial inclusion remains a primary objective. Reports indicate that many Algerians remain outside the formal banking sector, limiting economic participation and growth. Kharroubi and Bouzaghou (2025) say that financial technology can fill this gap, promoting access to banking services for marginalized populations. The innovations of financial technology have already positively influenced various regions in Algeria, demonstrating the potential for similar progress through a digital dinar (Sissani, 2025).

In addition, digital dinar can facilitate efficient transactions and improve the speed of money within the economy. Matallah (2024) underlines that improved transaction speeds, lower costs associated with payments and the integration of advanced technologies could stimulate economic growth by encouraging the expense and investments of consumers. By simplifying the payment systems, the digital dinar could attract local and foreign investments, essential to relaunch the Algerian economy (Lakhdari, 2024).

Technologically, the introduction of digital dinar requires a basic infrastructure that supports digital transactions. Algeria has seen significant progress in information technology, but the challenges in the adoption of technology and the limitations of infrastructures persist (Timedjehdine & Djarmouni, 2025). The success of digital dinars depends on robust framework it capable of guaranteeing financial transactions while guaranteeing trust (Abada et al., 2024). The establishment of safe digital portfolios and intuitive applications is fundamental for the widespread acceptance and use (Fentazi, 2024).

In parallel, existing payment, systems must evolve to accommodate digital dinars without continuity. Amalou Hallil and Douiderne (2024) show that the financial ecosystem of Algeria is changing quickly, with the emergence of innovative payment systems. However, maintaining a balance between traditional and digital currencies is fundamental for a regular transition. The regulatory bodies must also be prepared to manage the unique challenges presented by digital currencies, guaranteeing adequate consumer protection and compliance with global standards (Khelffi et al., 2025).

In addition, the digital dinar is positioned to strengthen financial inclusion in Algeria, which remains a critical concern in an economy where a substantial part of the population is not banished. (Benamar et al., 2025) point out that in filling the gaps in access to financial services, a digital currency can increase participation in the formal economy, in particular among marginalized demographic data. The digital dinar could offer a platform for low-income and rural areas to engage with financial services, which have always been out of reach due to geographic barriers or costs. Improved financial inclusion can lead to greater economy, investment and household consumption, which ultimately stimulates demand and stimulating broader economic growth in Algeria.(Kharroubi & Bouzaghou, 2025)

The introduction of the digital dinar also holds the potential to improve public trust in financial and governmental institutions through transparency and safety increased in transactions. With blockchain technology at the basis of many forms of digital currency, transactions can be recorded on an unchanging and easily verifiable public master book. This function can significantly reduce the concerns of fraud and corruption associated with cash transactions (Djahmi and Smaali, 2025). As the trust in the integrity of the



financial system grows, citizens can be more likely to participate in formal economic activities, leading to a more robust economy focused on legal and stable monetary practices. (Rachmad, 2025)

3. Phases of Algeria Digital Dinar Launch

Phase 1: Investigation and Feasibility Study (18 months)

Objectives:

We evaluate the technical feasibility up and economic impact the NPR of an IDEA Strategic Objectives and Use Cases Establish foundational research framework.

Key Activities

1.1 Strategic Assessment

Market Research: Understand the current payment landscape in Algeria.

Undertake Technology Assessment: Assess the benefits of blockchain, distributed ledger and digital payment technologies.

Stakeholder Mapping Banks, Fintech companies, Merchants, Consumer Group etc.

International Benchmarking-Examine how implementations were done in other countries (eNaira, DCEP etc.).

1.2 Technical Research

Architecture Design Define high-level system architecture Data Privacy and Protection Privacy. **Principles:** Set-up guidelines around how users data should be controlled Research solutions for offline functionality (use cases in areas with little-to-no internet connectivity).

Interoperability Standards: Specify requirements for integration to existing banking systems.

1.3 Regulatory Framework Development

For legal activities, check current financial laws and regulations.

Legal Gaps: Determine Required Regulatory Changes.

A New Framework: Applying AML/CFT compliance requirements.

Bank of Algeria: Central bank authority; Determine role and competence.

1.4 Stakeholder Engagement

Discussion on the banking sector: Engaging commercial banks and financial institutions.

Public Consultation: Citizen Surveys and consultations with Key Stakeholders.

Get the merchants involved Provide retail and other business consultations.

Technology Partners: Find solution providers

Phase 2: Qualification & Development (24 months)

Objectives

Build technical architectures and regulatory frameworks.

Establish governance and operational protocols.

Choose technology partners and suppliers.

Key Activities

2.1 Regulatory Framework Finalization

Legislative Process: Design and approve Digital Dinar Law.

Central Bank Regulations f) ensures the issuance of implementing regulations.

Licensing Framework: Create licensing for digital payment service providers.

Consumer Protection: Enact user rights and redressal mechanisms.

2.2 Technical Infrastructure Development

Develop Core Platform: Develop the central digital dinar ledger system.

Learn about Security Implementation: Implement Cyber security techniques.

Offline Solutions: Develop for Areas with No (or bad) Signal.

Mobile Apps: Make Easy-to-use Digital Wallets for Users.

2.3 Rulebook Development

Operational Standard: Transaction Processing Rules.



API Specification and Protocols: Technical Standards.

Compliance Procedures: Development of AML/CFT operational procedures.

Settlement Mechanism: Explain clearing and settlement processes.

2.4 Partnership Development

Some copy for this slide: Technology Providers: Choose & Contract Solution Provider.

Bank Integration: Educate banks about digital money distribution.

SMS-based and USSD solutions (combined with Wi-Fi for data) - Mobile Network Operators

Payment Gateways: Connect with infrastructure for payments.

2.5 Pilot Program Design

Testing Environment: Sandbox to test.

Selection of Pilot Participants: Partner Banks / Merchants + User Group.

Use Case Testing: Peer to peer (P2P) payments Merchant Payments Government Disbursements

Monitoring Define metrics, set alerts and logging.

Phase 3: Field Evaluation (12 months)

Objectives

With the digital dinar, they can also test the functionality in a controlled environment.

Test and deliver technical performance and user experience.

Iterate on systems by learning from in-the-wild feedback.

Key Activities

3.1 Controlled Launch

Limited Geographical Scope: Launch in 2 to 3 important cities (Algiers, Oran and Constantine)

Chosen Participants: Involving 5-10 banks, around 100-500 traders and about ten thousand para 55,000 customers.

Test Scenario 1: Use case Testing (Attach function) Basic Payments, Govt transfers, Merchant transactions.

3.2 Technical Validation

C-CHOST has more built-in performance metrics, which let you monitor, transaction throughput and latencies.

Penetration Testing and Vulnerability Assessments.

Off-line options: explore those pathways for rural and remote areas.

Connectivity with banking systems: interface testing for third-party solutions.

3.3 User Experience Optimization

User Feedback: Get feedback from surveys and interviews.

Improved Mobile Applications and User Interfaces.

Educational materials and training programs for users.

Customer Support: Set up a help desk with support procedures.

3.4 Regulatory Compliance Testing

Validation of AML/CFT: Testing compliance monitoring systems.

Reporting: Test regulatory reporting functionality.

Keep it private: Meet data protection compliance.

Transaction Monitoring Test fraud detection (European Central Bank, 2024).

Phase 4: Limited Rollout (18 Months)

Objectives

Widening access to the digital dinar for the general public.

Scale technical infrastructure.

Build merchant and user adoption.

Key Activities

4.1 Geographic Expansion

Regional Rollout.

Rural Outreach: Rollout offline solutions for rural integration.



Cross-Border Readiness: Be prepared for possible regionalization.

4.2 Institutional Expansion

Relationship with Banking Network: The licensed banks and financial institution shall be on board

Merchant Network: Add large retailers, utilities and merchant network.

Government Integration: Enable tax payments, social benefits and all other government services.

4.3 Technical Scaling

Infrastructure scaling = Increase system capacity to process more transactions.

Performance optimization: Increase the speed and stability of your system.

Hardening: Apply advanced security configurations.

Backup Systems: Implement disaster recovery and business continuity techniques.

4.4 Financial Inclusion Initiatives

Unbanked: Address identifying the needs of unbanked citizens, in other words citizens who have no access to a regular bank account.

Rural Coverage: Penetration of agent network and mobile money solutions.

Support Micro and Small Enterprises with An Easy on boarding to reduce the time spent in compliance for micro and small enterprises.

Digital Skills: Launch digital payment training nationwide.

Phase 5: Nationwide Rollout (12 months)

Objectives

Be the first digital dinar-offering device with nationwide coverage.

Reach target adoption levels.

Complete payment ecosystem by incorporation of digital dinar.

Key Activities

5.1 Complete National Coverage

Universal Access: Dinar digital should reach all of Algeria.

Multi-Channel Distribution: Provide access via banks, MNO (Mobile Network Operators) and Agents.

Round-the-clock transaction processing → 24/7 Operations.

5.2 Advanced Features Implementation

Smart Contracts–Programmatic Payments for Certain Applications.

Guide to Cross-Border Payments: Payment Corridors by Region.

Interoperable: Access to International Payment Systems.

Sophisticated Analytics: Enable economic surveillance and policy tools.

5.3 Ecosystem Development

Innovation Hub: Create a FinTech innovation sandbox.

Usage-of public APIs (The API Economy).

Broaden Partnerships: Add insurance companies, investment firms and other financial services

Integration Services E-Commerce and Digital Services Connect.

Phase 6: Optimize and Iterate (on going)

Objectives

Improve system performance and UX with each new release.

Beux Industry implements user needs with technological advances.

Maintain security and regulatory compliance.

Key Activities

6.1 Continuous Improvement

System Optimization: Regular performance enhancements.

UX: Constantly updated UI/UX improvements and features.

Monitoring: Monitor for continuous compliance.

6.2 Innovation Integration

Technology updates Example new technologies QR crypto, AI/ML.

Improved Feature: Capabilities that users ask for are added.

Growing Partnerships: Harness New Tech Providers to Broaden the Partnership Landscape.

International Coordination: Be part of international CBDC engagements.

6.3 Economic Integration

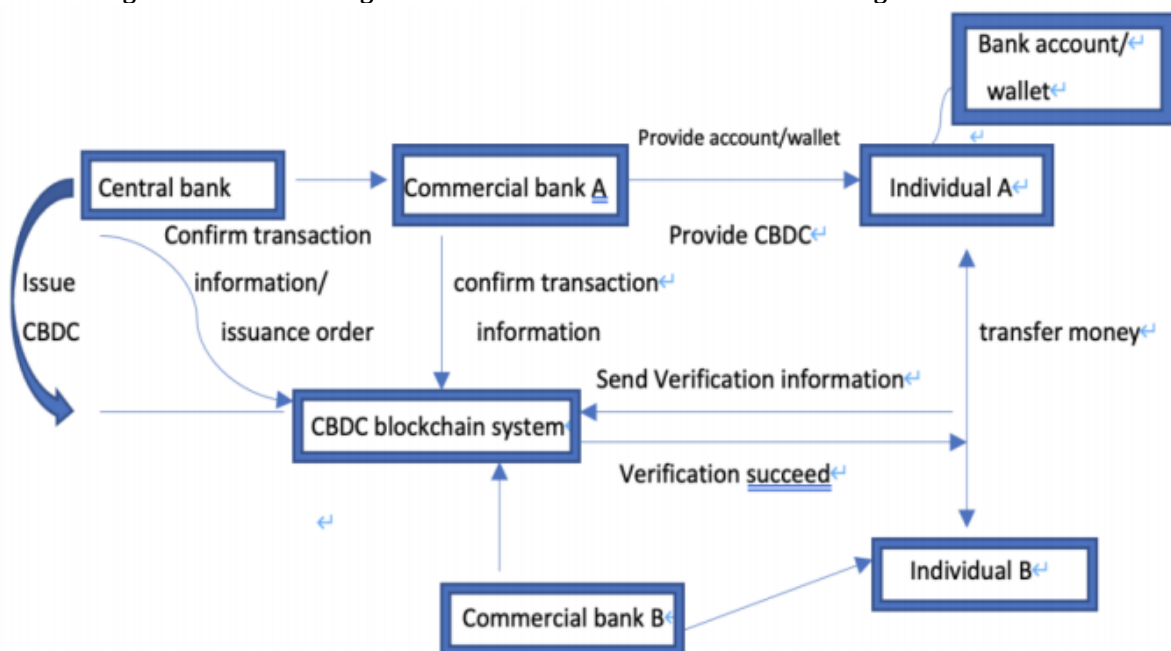
Monetary Policy Tools Allow for additional tools to influence CBDC and other policy execution.

Transactional Data: Use transaction data for economic analysis and forecasting.

Keep the Systematic Stability under monitoring for risk mitigates.

Broaden the Horizon: Learn about regional and international CBDC interoperability for cross-border. Realization (European Central Bank, 2024b).

Figure 6 Schematic diagram of the issuance and circulation of the digital dinar



Source: (Xu & Jin, 2022)

Compensation model

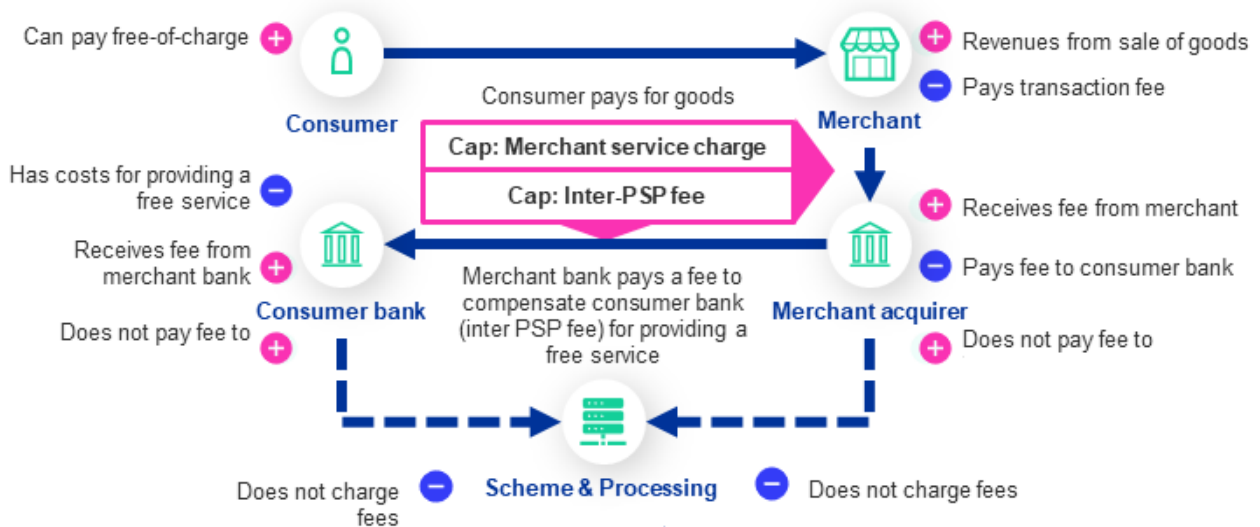
Such a compensation model would help create a win-win-win solution for both consumers and merchants, as well as PSPs related to the adoption of its digital dinar. At present this would have to be agreed by Algerian co-legislators, but an Algerian system would lean towards a compensation model so that economic incentives for the PSPs where they can cover their operational costs when performing digital Dinar distribution. The current draft legislation contemplates a compensation model that seeks to ensure a proper economic incentive for everyone (consumers, merchants, banks) guided by the following principles:

Unlike the use of cash, a digital dinar would be an open public good and hence would cost nothing to use for basic services. Available in every ancient town of Algeria.

As today, PSPs would charge merchant fees for providing digital dinar-related services to compensate for the operational costs of distributing a digital dinar. PSPs could even further create new digital dinar offerings for their customer base, in addition to the ones needed for basic usage.

Such transaction fees would come under a ceiling applicable on the fees that merchants pay to PSPs for digital dinar services, according to the detail of the Algerian authorities laid down in its draft legislation for issuing a digital Dinar; The costs are borne by the Algerian system as in paying the cost of printing money (European Central Bank, 2024).

Figure 6 Step by step of the digital dinar compensation model



Source: (European Central Bank, 2024)

4. Obstacles and Challenges in Implementing the Digital Dinar

Obstacles

1. Architecture Trade-offs: Deciding to adopt centralized, decentralized (DLT) or hybrid systems is a dilemma due to the complex and often opposing trade-off among scalability, efficiency, resilience and control.

System Scalability: Because systems have to potentially handle in millions of transactions on daily basis with no latency and downtime, you need a really stronger infrastructure which most of the entities do not possess at first go.

Offline Payment Complexity: To guarantee secure offline transactions is pretty challenging technically especially in remote or low connectivity areas.

Interoperability Gaps: The assurance of interoperability with current domestic payments networks in addition to and future cross-border networks may trigger technical issues and standardization.

Cybersecurity vulnerabilities: The system would create a juicy target for hackers interested in accessing, manipulating or just shutting down these huge data troves.

2. Legal and Regulatory Obstacles

Legal Tender Status Unclear: There may be ambiguity surrounding the Digital Dinar's legal status as cash in various jurisdictions leading to confusion among businesses and consumers.

Fragmented Regulatory Frameworks: Without unified national and international standards, accepting and using digital IDs domestically may be problematic, as well as for cross-border purposes.

AML/CFT Compliance Challenges: Striking the balance between anti-money laundering (AML) and counter-terrorism financing (CFT) obligations and operational efficiency is no easy task.

There will be a tension over privacy vs. oversight the balance between ensuring users act independently and allowing states to surveil their activities, which could result in legal challenges and pushback from end-users; For instance, Liability Allocation Issues establishing who is at fault between the central bank and intermediaries when it comes to fraud, technical breakdowns or omissions perceived as contentious.

3. Economic and Monetary Obstacles

Credit Risk created due to Bank Disintermediation Risks: Commercial bank deposits then reduce directly with digital Dinar wallets credit supply and financial stability etc.



Impact on Monetary Policy Transmission: Effects on interest rates, liquidity management and policy response time are complex; affecting potential incumbents defines economic governance.

Shame about Capital Flight Risks: In a cross-border sense, the Digital Dinar could open itself to be used in order the launder black money out of countries if high-level criteria will not later on put into place.

Barriers to Adoption in the Informal Economy Reluctance of cash-heavy sectors may constrain uptake and decreases effectiveness Barrier Adoption.

Increased international trade status in question without widespread usage, the Digital Dinar may not significantly enhance Algeria's presence as a regional currency

4. Security and Ethical Obstacles

Fear of Big Brother: Centralized tracking of transactions could place governments in an Orwellian position, heightening concern over mass surveillance and decreasing public confidence.

Data Protection Risks Sensitive financial information may be accessed or misused by unauthorized means.

Risks from Quantum Computing Advances in computing could break current encryption

Programmability Ethical Risks restrictions on intended spending nature or limited financial controls can be seen as overbearing.

The interoperability with cross systems makes a firm more susceptible to threats from across the borders due to pervasiveness of cyber and regulator risks (Paulovici, 2025).

Challenges

1. Flexible Hybrid Technical Architecture

Principles: A centralized core ledger with distributed modules that address the scalability, resilience, and transparency issues.

Key Elements:

A stablecoin protocol with a central bank-managed settlement layer for issuance and transaction finality. Permitted distributed Interbank Reconciliation modules MiTiB (Multi-Party Transaction Integrity Blockchain) Standards for API between modules. Avoid duplicating functions and injecting different security layers by maintaining proper governance.

2. Two-Tier Distribution through Regulated Intermediaries

Motive: Using licensed commercial banks and regulated payment providers to distribute the digital currency will maintain the intermediation roles of financial institutions, it says, while leveraging their existing delivery channels to customers.

Key Elements:

Institutional licensing and compliance

Transaction processing, liquidity management and reporting service-level agreements

Liability frameworks (e.g. liability for fraud, disputes and operational failures).

Policy design: to ensure intermediaries compete with CBDC also proximity of intermediary accounts closer to the CBDC should not drive too much deposit migration.

3. Tiered Privacy and Identity Framework

Opinion: A tiered set of identities can maintain the compromises between the need to know and what users want to disclose.

Key Elements:

Graduated know your customer levels that increase the more valuable and risky a transaction is.

Privacy-preserving cryptographic protocols (e.g. selective disclosure, zero-knowledge proofs).

Clear legal standards for data retention and government access.

Consideration: As technical countermeasures can never fully protect a human's anonymity, there is also the need to enforce legal privacy protections.

4. Comprehensive Legal Recognition before Launch

Reasoning: A definitive legal status is necessary for enforcement, acceptance by merchants, and trust in the system.

Key Elements:

Legal tender status of the digital currency.

Combat with Bank, AML (Anti-Money Laundering), Data Protection laws.

Prescribed Dispute Resolution Process and Oversight Authority

Brand new Lego says: legal and technical design MUST grow in parallel, they cannot come together later because there will be inner inconsistencies.

5. Safeguards to Preserve Financial Stability

Reason: CBDCs, if not managed with caution can disrupt liquidity flows & credit availability.

Key Elements:

Holding limits for individual wallets.

Use tiered or non-interest-bearing structures and thereby, reduce incentives for mass migration out of bank deposits.

Automated gross-up processes routing any surplus balances to international commercial bank accounts

Considerations: All parameters need to be stress tested across various economic scenarios.

6. Offline Transaction Capability

It is essential for financial inclusion and resilience, especially in areas with unreliable connectivity.

Key Elements:

Multi-mode virtual wallets (secure element in mobile devices, smartcards, and QR based vouchers)

Transaction counters and reconciliation (anti-double-spend) Mechanisms

Offline transaction amount limits to control risk exposure.

Conclusion: Offline platforms introduce AML/CFT and fraud scenarios that must be dealt with by limiting exposure through thresholds and periodic checks.

7. Strong Cyber security and Post-Quantum Readiness

A digital currency infrastructure is arguably prone to cyber-attacks.

Key Elements:

Multi-factor authentication, hardware security modules (HSM) and secure key management.

Support for cryptographic agility to transition to a future NIST post-quantum encryption standard.

Agile red teaming, pen testing and rehearsing of the disaster recovery plan.

Operational considerations: Security is a consideration in both the tech stack and in operations, so even getting Kafka to play securely also incurs work on the Ops end of thing.

(Xu & Jin, 2022).

Conclusion:

The analysis offered through this study illustrates the complex landscape of challenges and opportunities that face the prospective Digital Dinar in these analyses collected from Algeria. The evidence suggests that the introduction of a central bank digital currency (CBDC) may enhance financial inclusion, ensure more efficient payment system and lower transaction costs, as well as facilitate monetary policy transmission. An important application of Digital Dinar could be a reduction in the informal economy through transparent and traceable transactions resulting in higher rate of tax compliance. And the integration of cutting-edge payment technologies could also make Algeria a regional hub for digital financial innovation.

Yet the findings also highlight important obstacles that need to be solved in order for the Digital Dinar project to work as hoped. Challenges such as strengthening cyber security, preserving user privacy, improving technological infrastructure and gaining popular confidence in a different kind of money Regulatory changes, integration with current payment systems, and a massive awareness campaign are also crucial to trigger mass adoption.

Results



-The Digital Dinar is set to enhance financial inclusion, where a large portion of the people living in villages and other areas do not have banking access.

-Faster payment speeds, lowered costs and better transaction visibility could improve economic efficiency and lower the extent of informality.

-The stronger your technological infrastructure and more comprehensive your legal framework, the more successful this will be.

-The cyber security risks and data privacy concerns are significant barriers that demand a deliberate approach of risk management.

-This also underscores the importance of public trust, and the educational process that is required to avoid the same resistance change when attempting to fit a token economy into the existing financial landscape.

Recommendations

-Infrastructure Development: Develop secure, scalable and interoperable digital payment infrastructure to support both wholesale and retail CBDC transactions at a large scale

-Regulation: Define a precise regulatory framework for issuance, usage, data protection and dispute regulation.

-Cyber security and Privacy: Roll out the high-end cyber security policies and privacy-preserving technologies to win user trust.

-Awareness Campaigns: Rollout countrywide awareness programs to up-skill on tech & build confidence in the Digital Dinar.

-Some implementers of smart cities have been indicated to make use pilot programs where they phase test the technical, operational and social acceptance aspects before full-scale deployment.

-Stakeholders' collaboration: involving financial institutions, technology providers and civil society to co-design the ecosystem for inclusivity and acceptance

-To sum up, the Digital Dinar yields a strategic leverage for Algeria to have an updated monetary system aiming at economic growth, but it needs to be both innovative from technology and realistic with security, regulatory and sociological issues.

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