

Digital Transformations And The Reality Of Blockchain

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Abstract:

The aim of this study is to clarify the concept and mechanisms by which block chain technology operates, which represents a new revolution in the world of finance. This study focuses on giving a comprehensive view about this technology, and its users who are constantly multiplying. Finally, we found that no one can deny that block chain technology has become a technology that deserves attention and imposing itself on the global arena.

Keywords: Cryptocurrency; Blockchain; Bitcoin; Electronic money.

JEL Classification Codes: G02, G11, L31.

1. INTRODUCTION

Digital transformation has become a reality that the world is experiencing today in the field of finance and business and of course digital transformation has also contributed to its spread . Block chain (Casey, Crane, Gensler, Johnson, & Narula, 2018)technology is an innovative database which has entered the markets in most vital sectors from its wide doors and turned into a major requirement for all dealers, especially that some technologies and applications have become the provision of money and encrypted assets. Here we find that experts and economists give great importance in the era of electronic money to the topic of Blockchain as recent topic(Pal, Tiwari, & Behl, 2021) .This technology has the ability to grow to become the cornerstone of data preservation systems around the world. It seems that digital currencies have become among the most important topics that attract the attention of economists, the most prominent of which is the Bitcoin currency, BITCOIN, or as it is symbolized by BTC. It is known that this currency has a history and a path in its spread since it was launched by unknown people.its porpose was to perform transactions in a secure network.

Blockchain is an open source innovation that's programmable and cannot be controlled. It is essentially a computerized record book for exchanges that are rehashed and distributed over the whole organize of the framework in encrypted blocks of records, each of which may be a square that's linked to each other and secured with a extraordinary code, and each square It contains a hash, which may be a scientific calculation that records a small portion of the information for the transactions included within the record as a entirety, and it is scrambled with a halfway code of the whole code with which the piece chain that creates up the exchange record and the full squares is scrambled.(Varma, 2019) It is known as the decentralized database that's overseen by numerous members - This moreover happens in Blockchain - with Disseminated Exchange Record Innovation (DLT). From the above, the following problem can be raised:

1.1.Problematic :Can blockchain technology replace traditional money?

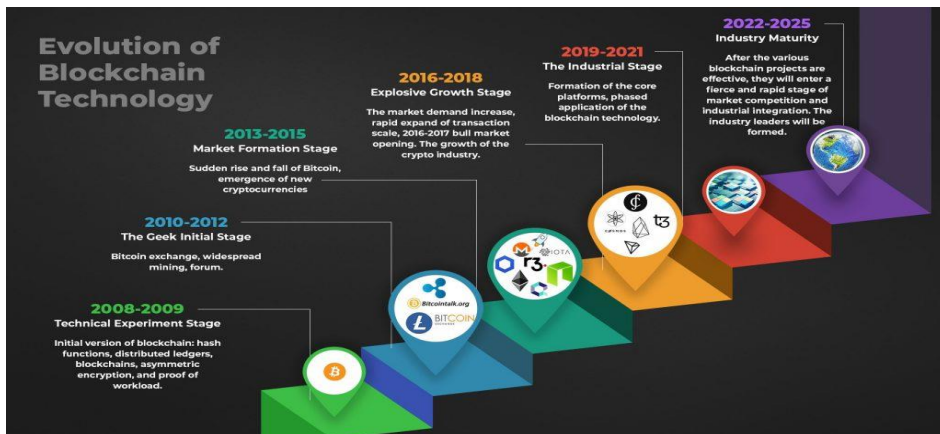
To answer this problem, we divided our plan into the following points: - Theoretical framework about Blockchain; - The most widely traded digital currencies in 2021; - Blockchain technology between the present and the future.

2. The theoretical framework about blockchain: Blockchain, or block chain, is a scientific term given to the production of blocks in the digital currency “Bitcoin”, which are mined in a serial manner. Blockchain is the record through which all financial movements are kept, as well as expenses, financial assets, and everything related to the currency “Bitcoin”. It is a public accounting record in the financial sector, through which the uses of virtual digital currency are revealed, as well as information technology in Internet devices tracking virtual currency([Bai, Liu, & Yeo, 2022](#)).

Blockchain is a technology that can be defined as an encrypted information system based on a decentralized information base, that is, distributed among all organized devices in the network, to record all transaction data and its modifications, in a way that ensures the approval of all relevant parties on the validity of the data. ([Gong, Zhang, Dong, Chen, & Shi, 2024](#))The strength of Block chain technology lies in two basic standards. These are decentralization and high transparency in managing transactions of all kinds, such as payments and bank transfers, registering real estate ownership and national identities, exchanging assets and documents, or voting processes. Block chain is also known as “a database of transactions distributed by anyone participating in the system. Transaction records are stored and linked together in an encrypted way to form a chain of blocks. It is open to any node in the system and everyone can add new blocks([Gong et al., 2024](#)).” However, new blocks cannot be added without proof of work and agreement by other nodes to participate in the system.”

2.1. Second: How block chain technology works: The way block chain technology works is when an individual requests a transaction and the same transaction is broadcast to the network, the network node verifies the validity of the transaction using pre-defined logic and rules. After verification, the transaction is joined with other transactions to form a "block." The transaction is subsequently finalized and this block is appended to already-existing block chains, rendering it distinct and unchangeable. By integrating with smart contracts, block chain technology enables the automatic issuance of digital securities and the trading of financial derivatives([Gong et al., 2024](#)).

Fig.1 : A practical diagram of blockchain technology



Source: satt-token.com/blog/archives/12029 . Seen on 20/May/ 2024.

To know how block chain technology works through the previous figure, the process of transferring digital money from one person to another can be taken as an example, which goes through the following stages([Sarmah, 2018](#)):

- - The first stage: Person A and Person B must each have their own digital wallet, which is a special account on the applicable Block chain platform, where Person A wants to transfer certain funds to Person B.
- The second stage: Person A represents this transaction in his digital wallet, which is in a certain ledger as a block.
- Phase Three: This person broadcasts this block to all parties
- The fourth stage: The network parties verify the validity of this transaction by performing a mining process, and then a specific consensus mechanism is applied to authenticate this block.
- Stage five: If this operation is correct and unanimously approved, the block representing it is added to the block chain, so that this block cannot be canceled later or its content changed.
- -Stage six: The money is actually transferred from Person A to B.

3. Types of Block chain: When studying block chain networks, we must distinguish between two basic types of block chain networks: the public network

and the private network([Dudczyk, Dunston, & Crosby, 2024](#)) .Blockchain technology, known for its secure path, can be classified into several types based on different characteristics and use cases. Here are the main types of blockchains:

a. Public Blockchains:

- **Description:** These are open and permissionless networks where anyone can join and participate. All transactions are transparent and visible to everyone. Like Bitcoin, Ethereum([Irresberger, John, Mueller, & Saleh, 2021](#)).

- **Use Cases:** Cryptocurrency transactions, decentralized applications (dApps), and smart contracts.

b. Private Blockchains:

- **Description:** These are restricted and permissioned blockchains where only a specific group of participants can join and access the network. Typically used within an organization. Like Hyperledger Fabric, R3 Corda([Idrees & Nowostawski, 2022](#)).

- **Use Cases:** Enterprise solutions, supply chain management, and internal audits.

c. Consortium Blockchains (Federated Blockchains)

- **Description:** These are semi-decentralized and controlled by a group of organizations rather than a single entity. Participation is restricted to the consortium members. Examples: Quorum (by JPMorgan), Hyperledger Fabric.

- **Use Cases:** Inter-bank transactions, consortium-specific solutions, and collaborative projects between multiple organizations.

d. Hybrid Blockchains:

- **Description:** These combine elements of both public and private blockchains, offering the flexibility to control access and maintain some level of openness and transparency. Examples: Dragonchain.

- **Use Cases:** Regulatory compliance, enterprise solutions with selective transparency.

e. Sidechains :

- **Description:** Independent blockchains that are connected to a parent blockchain (mainchain) using a two-way peg. They allow for the transfer of assets between the sidechain and the mainchain. Examples: Liquid Network (for Bitcoin).
- **Use Cases:** Scalability solutions, custom blockchain development, and specific application implementations.

f. Permissioned Blockchains

- **Description:** Access to these blockchains is restricted to specific participants, often used interchangeably with private blockchains but can include consortium blockchains. **Examples:** Ripple, Hyperledger.
- **Use Cases:** Financial services, supply chain logistics, and inter-organizational transactions.

Table 1 :Summary Table of blockchain types.

Examples	Type	Description	Use Cases
Bitcoin, Ethereum	Public	Open, permissionless, transparent	Cryptocurrencies, dApps, smart contracts
Hyperledger Fabric	Private	Restricted, permissioned	Enterprise solutions, supply chain, audits
Quorum, Corda	Consortium	Controlled by a group, restricted access	Inter-bank transactions, collaborative projects
Dragonchain	Hybrid	Mix of public and private	Regulatory compliance, selective transparency
Liquid Network	Sidechains	, allow asset transfer	Scalability, lockchain development
Ripple, Hyperledger	Permissioned	Restricted access, specific participants	Financial services, inter-organizational transactions

Source : Kirillova, E. A., Bogdan, Zulfugarzade, T. E. (2020). The main features of blockchain technologies classification.

Each type of blockchain has its own strengths and is suited to different types of applications and use cases, offering varying levels of transparency, security, and control.

4. Blockchain properties :Blockchain technology contribute to its functionality and appeal. These properties are fundamental to understanding how blockchains operate and their potential applications.([Qiao et al., 2022](#)) Here are the primary properties of blockchain:

➤ **Decentralization :**Blockchain operates on a distributed network of nodes (computers) where no single entity has control over the entire network.

- **Benefits:** Reduces the risk of a single point of failure, enhances security, and promotes trust among participants.

➤ **Immutability:** Once data is recorded on the blockchain, it cannot be altered or deleted.

- **Benefits:** Ensures the integrity and reliability of data, making it tamper-proof and trustworthy.

➤ **Transparency:** All transactions on a public blockchain are visible to all participants.

- **Benefits:** Enhances trust and accountability, as participants can verify transactions independently.([Deng, Huang, & Wang, 2022](#))

➤ **Security:** Blockchain uses cryptographic techniques to secure data and transactions.

- **Benefits:** Protects against fraud, hacking, and unauthorized access, ensuring the confidentiality and integrity of information.

➤ **Consensus Mechanism:** Blockchain networks use consensus algorithms to agree on the validity of transactions.Examples: Proof of Work (PoW), Proof of Stake (PoS), Delegated Proof of Stake (DPoS), Byzantine Fault Tolerance (BFT).

- **Benefits:** Ensures agreement among distributed nodes, maintaining the consistency and accuracy of the blockchain.
 - **Distributed Ledger:** Blockchain is a type of distributed ledger technology (DLT) where data is replicated and synchronized across multiple nodes.
- **Benefits:** Provides redundancy, enhances data availability, and ensures that all nodes have the same copy of the ledger.
 - **Smart Contracts:** Self-executing contracts with the terms of the agreement directly written into code.
- **Benefits:** Automates and enforces agreements, reducing the need for intermediaries and increasing efficiency.
 - **Programmability** Blockchain platforms, such as Ethereum, allow for the creation of decentralized applications (dApps) through programmable smart contracts.:
- **Benefits:** Enables complex functionalities and customizable solutions for various use cases.
 - **Anonymity and Pseudonymity:** Blockchain can provide varying levels of user anonymity, with transactions typically being pseudonymous.([Buldas et al., 2022](#))
- **Benefits:** Protects user privacy while allowing for transaction traceability if needed.
 - **Tokenization :** Assets or rights can be represented as digital tokens on the blockchain.
- **Benefits:** Facilitates the creation, transfer, and management of digital assets, enhancing liquidity and enabling new economic models.

Table 02 :Summary Table of Blockchain properties

Property	Description	Benefits
Decentralization	Distributed network with no single control	Reduces single point of failure, enhances security
Immutability	Data cannot be altered or deleted once recorded	Ensures data integrity and reliability
Transparency	Transactions visible to all participants	Enhances trust and accountability
Security	Uses cryptographic techniques	Protects against fraud unauthorized access
Consensus Mechanism	Agreement on transaction validity	Maintains consistency and accuracy
Distributed Ledger	Data replicated across multiple nodes	Provides redundancy and data availability
Smart Contracts	Self-executing contracts with coded terms	Automates and enforces agreements
Programmability	Creation of decentralized applications (dApps)	Enables complex functionalities and customizable solutions
Anonymity and Pseudonymity	Provides varying levels of user anonymity	Protects user privacy while allowing transaction traceability
Tokenization	Representation of assets/rights as digital tokens	Facilitates digital asset management and liquidity

Source : Conte de Leon, D., & Sheldon, F. T. (2017). Blockchain: properties and misconceptions. *Asia Pacific Journal of Innovation and Entrepreneurship*, 11(3), 286-300.

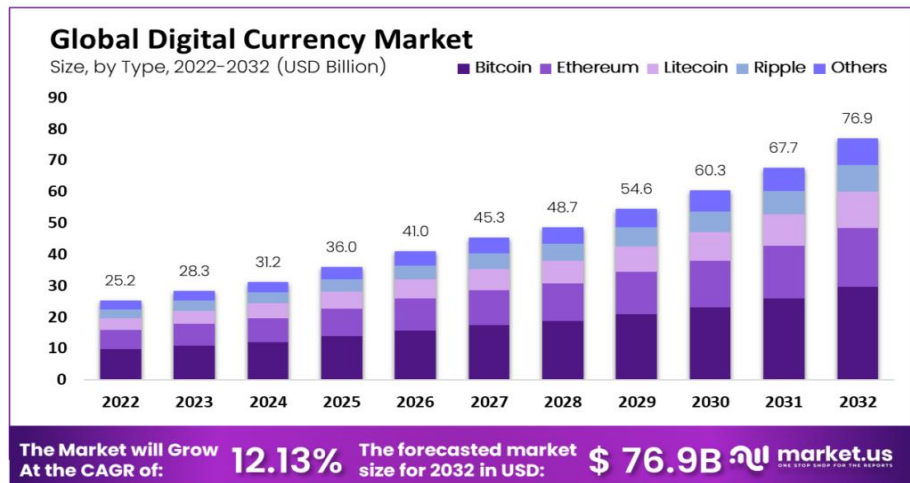
These properties collectively contribute to the robust, secure, and versatile nature of blockchain technology, making it suitable for a wide range of applications across various industries.

5. The most traded digital currencies in the year 2022-2032:

From 2022 to 2024, the most traded digital currencies were primarily dominated by well-established cryptocurrencies and a few newer entrants. The top cryptocurrencies based on trading volume included ([Wang, Lucey, Vigne, & Yarovaya, 2022](#)):

- **Bitcoin (BTC):** Continues to be the leading cryptocurrency by trading volume, often considered the gold standard in the crypto market.
- **Ethereum (ETH):** Known for its smart contract functionality, Ethereum remains a significant player in the crypto space.
- **Tether (USDT):** A stablecoin that has consistently high trading volumes due to its pegging to the US dollar, providing a stable trading medium.
- **Binance Coin (BNB):** The native coin of the Binance exchange, BNB, has high trading volumes due to its utility on the platform.
- **USD Coin (USDC):** Another stablecoin, USDC is widely used for transactions and trading, contributing to its high volume.

Fig 02 :Developement of global digital currency market



Source : <https://market.us/report/digital-currency-market/> consulted on 24/04/2024

According to the above chart , We can notice that the size of the global digital currency market will probably increase from 28.3 billion dollar in 2023 to

around 76.9 billion dollar by the year 2032, that means more than 12.13% between 2023 and 2032. Of course, we can anticipate global digital currency market will be of the best investment options for any investment portfolio with the aim of trading via CFDs. Knowing that digital currencies are assets with high volatility and risk, therefore, before making a decision, this choice depends on the path that digital currencies have followed in recent years, the current market value, the trend of the sector and the investment arguments presented by each of the digital currencies (Wang et al., 2022).

- **Bitcoin:** Symbolized by the symbol (BTC), it is considered one of the most famous digital currencies and has the highest trading volume, with the exception of stable currencies. Despite the strong increase in competition, it remains the absolute dominant force in the digital currency market according to its market value. It has been in use since 2009.

- **Ethereum currency:** It is symbolized by (ETH). It occupies second place and its market value reaches 282.2 billion dollars, and its price is 4362.35 dollars. Its innovation is attributed to Vitalik Buterin, who worked as a programmer for digital currencies in "Bitcoin" in 2013, and began financing the basic part of the platform in 2014.

Fig 03: Ethereum digital price market value

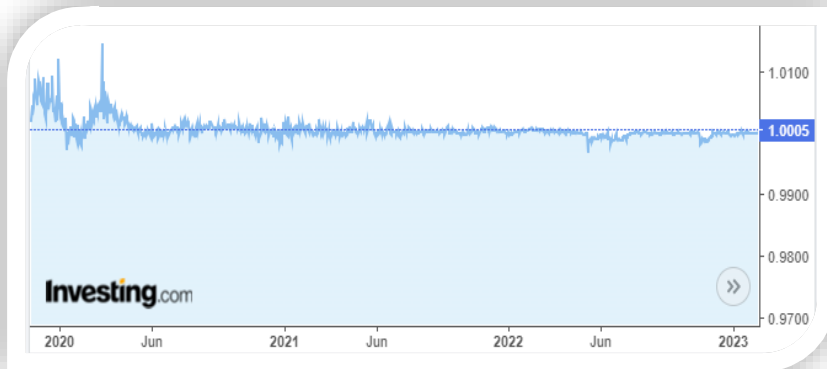


Source : <https://www.coingecko.com/en/coins/ethereum> consulted on 24/05/2024

- **Tether coin:** Symbolized by (USDT), it occupies third place and its price is \$1.21, and its market value was estimated at: \$45.9 billion. It is an encrypted digital currency whose value is linked to the value of the US dollar and the euro,

that is, it converts recognized currencies into digital currencies, and is based in Hong Kong([Grobys & Huynh, 2022](#)).

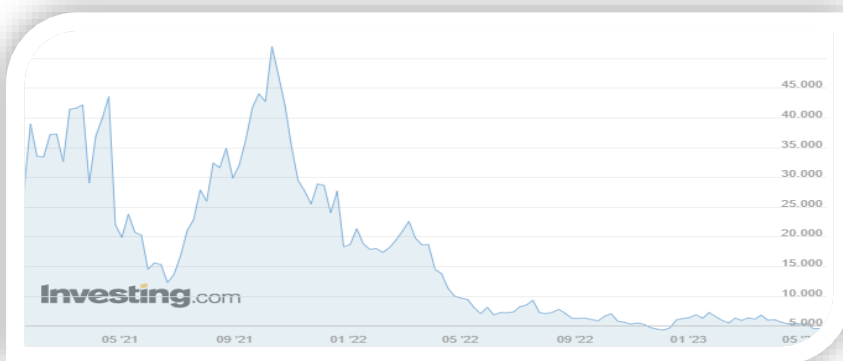
Fig 04 : Tether Price Summaries



Source : <https://sa.investing.com/> consulted on 24/05/2024

- **Polkadot coin (PAOLKADOT):** It is symbolized by: (DOT), and its price is \$31.71, while its market value was estimated at about \$49.6 billion.

Fig 05 : Polkadot coin market value



Source : <https://sa.investing.com/> consulted on 28/05/2024

- **Cardano coin:** It is symbolized by “ADA”, as this currency occupies the fifth symbol, and its price is 2.46 dollars, and its market value was estimated at: 46.35 dollars. It was created in 2015([Jia et al., 2022](#)).

Fig 06 : Cardano coin market value



Source :<https://sa.investing.com/> consulted on 27/05/2024

6. Blockchain between the present and the future: In terms of global market size, the value of the blockchain technology market in 2021 was estimated at 5.92 billion US dollars, and it is expected to rise at a cumulative growth rate of 84% until 2030, reaching its value to 1,431 billion US dollars. Blockchain technology plays a major role in the regulatory process for various business sectors around the world. By 2022, global blockchain technology solutions is expected to move to more than 11.7 billion \$.

On the other hand, Blockchain technology can reduce banks' infrastructure costs by 30%, due to database management being more flexible than the current systems available. At the health sector level, it is expected that total spending on integrating Blockchain technology into the health care system will rise to \$5.61 billion by 2025, and 55% of healthcare applications will adopt blockchain technology by 2025.

Recent analysis indicate that the financial and business sectors will lead the way in spending on Blockchain technology in the coming years, due to the solid foundations this technology provides for the decentralized preservation of ownership data and financial transactions between individuals and institutions that are difficult to manipulate or hack. It also provides a reliable alternative to payment methods via Boundaries in all business transactions. Therefore, we can

conclude that Blockchain technology, which is currently used to pass anonymous cryptocurrency transactions, will be able to be used in the future - together with cryptocurrencies - in legal and acceptable ways by central banks after imposing regulatory rules and restrictions issued by official authorities.

- **Lithuanian digital currency:** The Lithuanian digital currency, which was announced in 2018 and entered into testing in 2020, is the first government-paid currency in the Eurozone in Europe. This currency, called “Lipcoin,” is part of a project to test state-backed digital currencies based on private blockchain technology. Lipcoin can be exchanged directly with the central bank. It is scheduled to offer 24,000 digital tokens, which will be sold in packages of 06 for 99 euros, and their holders will be able to trade these tokens in specific contexts, so that a token from each of the six categories will be equivalent to an actual silver coin with a value of 19.18 euros.

- **Euro digital currency:** The European Central Bank announced that it is conducting tests for a digital currency for the Euro Organization, and it is expected that the digital euro will be an official electronic version of euro banknotes, guaranteed by the European Central Bank, but the fundamental difference is that funds can be deposited directly with the European Central Bank, and the euro currency can be kept. Digital currency in digital wallets outside the banking system, and its use in electronic payments, ([Tronnier & Kakkar, 2021](#)) all of this, and the European Central Bank still has concerns about the extent of the digital currency’s impact on monetary policies and commercial banks in the euro area.

- **Chinese digital currency:** China began researching and developing cryptocurrency and a central bank digital currency in 2014 with an announcement from the People's Bank of China. After the Chinese State Council released the "Pilot Implementation Plan for Comprehensive Reform in Shenzhen to build a visionary pilot zone," the project was put on hold until the social networking site Facebook introduced the Lira in 2019. This gave the Chinese digital currency plan new impetus. 2020–2025 is the term for socialism with Chinese characteristics. This plan emphasizes the importance of proceeding with the experimental stages of research and development of the digital yuan. According to specialists, the digital currency can support the Chinese digital economy with a value estimated at tens of trillions (in yuan), by reducing costs, facilitating payment and cross-border

trade, monitoring payments, preventing illicit financial transactions, and helping China establish... More effective monetary policy

Issuing digital currencies in Arab countries: Some Arab countries have been interested in studying the feasibility of launching digital currencies issued by their central banks. In this context, the “Aber” project for cooperation between the Saudi Arabian Monetary Agency and the Central Bank of the United Arab Emirates to study the issuance of a joint digital currency is considered one of the most prominent regional projects in this regard.([Glavina & Asmiatullin, 2023](#)) . The "Aber" project is based on studying the possibility of using block chain technology to launch a unified digital currency between the two countries and use it among the banks participating in the project inside and outside the borders. The project also aims to the following:

- ✓ Studying digital currencies and how to issue and trade them
- ✓ Study and understand the matching and settlement processes between banks using block chain technology
- ✓ Understand the technologies used and the technical and operational impacts on existing infrastructure
- ✓ Determine the impact of issuing a digital central currency on monetary policies.

This project was implemented in three stages. The first stage is to use the digital currency through the blockchain to settle payments between the two central banks in Saudi Arabia and the Emirates, followed by using it to settle transactions between each central bank and the national banks in its respective platforms in the second stage, and then this is followed in the second stage. The third is to use digital currency to settle inter-bank payments in both countries.

7. CONCLUSION: Blockchain technology has been able to impose itself in the modern world as a technology that is based on solid foundations and serves all transactions, which has earned it high confidence. This is thanks to its continuous development and strong advantages, starting with providing a high level of security, transparency, and the ability to track recorded data across the business network, to its ability to save a lot of costs while maintaining a high degree of efficiency. Finally, a set of results were reached that can be presented as follow:

- Blockchain technology is an encrypted information system that relies on a decentralized information base, that is, distributed among all organized devices in the network, to record all transaction data and its modifications, in a way that ensures the approval of all relevant parties on the validity of the data;
- Blockchain technology is characterized by security, transparency, and is impenetrable.
- Blockchain systems contribute to reducing costs because there is no need for an intermediary party to complete transactions.
- Blockchain systems enhance the level of transparency in the transaction history compared to current ledger systems;
- Some Arab countries have sought to study the feasibility of launching digital currencies issued by their central banks, and the “Aber” project for cooperation between the Saudi Arabian Monetary Agency and the Central Bank of the United Arab Emirates to study the issuance of a joint digital currency is considered one of the most prominent regional projects .

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