

## Blockchain and Beyond: How Digital Currencies are Redefining Finance

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### Abstract:

This paper examines the evolution of cryptocurrency as a transformative element in global financial technology, tracing its origins from Bitcoin's 2008 inception through the rise of major digital assets like Ethereum, Binance Coin, Solana, and Ripple. It explores the foundational blockchain technology enabling secure, decentralized transactions and contrasts energy-intensive Proof of Work mining with the emerging, sustainable Proof of Stake consensus. The study assesses the economic impact of cryptocurrencies, emphasizing market volatility, financial integration risks, cross-border payment efficiencies, regulatory challenges, and the emergence of Central Bank Digital Currencies (CBDCs). Special focus is given to Egypt's FinTech landscape, where the Central Bank enforces strict prohibitions on cryptocurrency issuance, trading, and promotion due to concerns over volatility, fraud, and illicit use, yet informal crypto adoption and stablecoin use persist amid currency devaluation. The paper highlights the complex interplay between innovation and governance necessary for cryptocurrencies to mature into stable financial instruments. Despite significant risks—including technical, regulatory, and environmental—cryptocurrencies offer potential for increased financial inclusion and efficiency if adequately regulated. The findings suggest that future cryptocurrency integration depends on achieving a balance between technological progress, regulatory oversight, and public trust, with CBDCs representing a promising, institutionally controlled digital currency alternative, particularly within developing economies like Egypt.

**Keywords:** Financial Technology – FinTech - Digital Currency - Cryptocurrencies

## 1 Introduction

In recent decades, digital transformation has significantly reshaped the global financial system. Among the most remarkable innovations is the emergence of cryptocurrency, a decentralized form of digital currency that operates independently of central banks or traditional financial intermediaries. The concept of cryptocurrency has revolutionized how individuals perceive money, ownership, and economic freedom. It has introduced a new era of peer-to-peer transactions, secured through cryptographic technology and maintained by distributed networks known as blockchains.

This study explores the history, development, and evolution of cryptocurrency from its inception in 2008 with the introduction of Bitcoin to the rise of alternative cryptocurrencies such as Ethereum, Binance Coin, Solana, and Ripple. It also examines the technological, economic, and financial implications of these digital assets, emphasizing their influence on the global financial landscape and their growing potential to redefine the future of money.

### 1 History of Cryptocurrency and Global Figure

#### 1.1 The Birth of Bitcoin

In 2008, America experienced a huge financial crisis, the second worst in its history after the Great Depression of the 1930s. That same year, a website called Bitcoin.org appeared unexpectedly on the web, registered by an unknown individual or group under the name 'Satoshi Nakamoto'. No one knew who Nakamoto was or what the site was for, but soon a crypto mailing list on metzdowd.com introduced a new concept: a fully operational electronic peer-to-peer money system.

Satoshi Nakamoto announced the creation of Bitcoin, a digital currency that allows people to exchange money directly and anonymously without intermediaries such as banks or credit card companies. The foundational document, known as the 'White Paper,' outlined how Bitcoin works and became the cornerstone of this revolutionary system. Bitcoin was designed to remove external middlemen and avoid the influence of central banks that can manipulate national wealth and create inflation by printing money. (Nakamoto (2008))

In 2009, Nakamoto launched the first block of the Bitcoin blockchain, known as the 'Genesis Block' or 'Block 0.' From this starting point, the blockchain has expanded to over 881,000 blocks. In 2010, Laszlo Hanyecz famously spent 10,000 BTC on two pizzas — the first real-world Bitcoin transaction.

#### 1.2 Altcoins

As Bitcoin gained popularity, other digital currencies called 'altcoins' began to appear. Many were based on Bitcoin's code but offered different features. Some early altcoins like Litecoin and Ripple's XRP are still active and widely traded today. ((2025).Cryptocurrency (2025))

##### 1.2.1 Ethereum and Smart Contracts

In 2015, Vitalik Buterin created Ethereum, an open source blockchain platform that allows users to develop and run decentralized applications (DApps). Ethereum introduced smart contracts self-executing agreements coded by developers. Once deployed, they are immutable, transparent, and do not require third-party intervention. Ether (ETH), Ethereum's native currency, is used to pay transaction fees and reward network participants. (Buterin (2015))

### 1.2.2 Binance Coin (BNB)

Since its launch in 2017, Binance Coin (BNB) has evolved from a simple utility token power to its own ecosystem. Initially, BNB provided discounts on trading fees for Binance users. Today, it is central to the BNB Chain, known for its low costs and high transaction speeds, making it a major competitor to Ethereum. (Binance (2023))

### 1.2.3 Solana

Solana is a decentralized blockchain network focused on scalability and speed. It can process up to 65,000 transactions per second thanks to its innovative Proof of History (PoH) consensus algorithm. Although Solana has low transaction fees and high speed, it has faced several network outages affecting reliability. (Solana (2024))

### 1.2.4 Ripple (XRP)

Ripple focuses on improving international payment systems for banks and financial institutions. Its network allows for cross-border settlements within seconds, much faster than traditional systems like SWIFT. However, Ripple has faced legal challenges with the U.S. Securities and Exchange Commission over whether XRP should be considered a security.

## 1.3 Global Figures

According to recent data, the top five cryptocurrencies by market capitalization in 2025 are as follows:

Coin	Market Capitalization	Current Price
Bitcoin (BTC)	\$2.21 trillion	\$111,142.80
Ethereum (ETH)	\$476.97 billion	\$3,954.37
BNB (BNB)	\$156.62 billion	\$1,125.30
Solana (SOL)	\$105.35 billion	\$191.82
XRP (XRP)	\$147.18 billion	\$2.45

## 2 How Cryptocurrency Is Made: "Mining"

Cryptocurrency mining is the process through which new digital currencies are produced and verified within a decentralized blockchain system. Unlike traditional financial systems that depend on central banks or governments, cryptocurrencies depend on a distributed network of computers to maintain transparency, accuracy, and trust (Nakamoto, 2008). This process of mining plays a vital role in both the **creation of new coins** and the **validation of transactions**, ensuring that every exchange made through digital currency is legitimate and secure.

### 2.1 What Is Cryptocurrency Mining?

In simple terms, mining is the backbone of a cryptocurrency network. It is the mechanism that records all digital transactions in a public ledger known as the **blockchain** (Tapscott & Tapscott, 2018). Every time people make cryptocurrency transactions, such as sending or receiving Bitcoin, those actions are broadcast to the entire network. Since there is no central authority to approve them, **miners** are responsible for confirming and recording them.

Miners use **powerful computers** to solve mathematical puzzles that require intensive computational effort. This process is called **Proof of Work (PoW)**. The goal is to find a special code known as a **hash** that meets specific conditions defined by the system. The first miner who successfully solves the puzzle is rewarded with new coins and the right to add a new block of transactions to the blockchain (Frankenfield, 2023).

This method ensures that the network remains fair and that every participant has an equal opportunity to compete for rewards, while preventing fraudulent activity such as double spending (the act of using the same coin twice). Mining, therefore, maintains the balance between **trust and decentralization** in digital financial systems.

## 2.2 Example: Bitcoin Mining

Bitcoin is the most well-known cryptocurrency and the best example to illustrate mining. Approximately every ten minutes, miners gather all recent Bitcoin transactions into a “block.” They then compete to solve a mathematical challenge that generates a hash value beginning with a specific number of zeros. This process requires trying billions of combinations per second until the right solution is found (Narayanan et al., 2016).

Once a miner discovers the valid hash, they broadcast it to the network for verification. Other miners confirm its correctness, and when the majority agrees, the block becomes part of the blockchain permanently. The successful miner receives a reward, currently 6.25 BTC, along with the transaction fees included in that block (CoinDesk, 2024). This reward is designed to decrease roughly every four years in an event called “halving”, which controls the total supply of Bitcoin and ensures its scarcity much like gold.

## 2.3 Purpose and Importance of Mining

Mining serves two major purposes:

- **Creation of new coins:** It introduces new cryptocurrency into circulation in a controlled and predictable way.
- **Network security:** It ensures that transactions are verified and immutable, making the blockchain resistant to hacking or manipulation (Drescher, 2017).

The system is designed so that any attempt to alter past transactions would require controlling more than 50% of all the computational power in the world, which is practically impossible due to cost and energy limitations. This concept is known as the 51% attack, and it highlights how mining helps maintain the trustworthiness of decentralized systems.

## 2.4 Challenges of Cryptocurrency Mining

Despite its effectiveness, mining comes with several challenges. It consumes enormous amounts of electricity, as computers work continuously to solve puzzles. According to the Cambridge Bitcoin Electricity Consumption Index (2024), Bitcoin mining uses more electricity annually than in some small countries. This has raised serious environmental concerns. Additionally, mining has become highly competitive, requiring expensive hardware and specialized facilities, which makes it less accessible to ordinary users (Krause & Tolaymat, 2018).

## 2.5 The Shift to Proof of Stake (PoS)

Because of these environmental and economic issues, many newer cryptocurrencies are shifting from Proof of Work to a different system known as Proof of Stake (PoS). In this model, individuals do not solve mathematical puzzles. Instead, they “stake” (lock up) some of their

coins as a deposit to participate in the verification of transactions. The more coins someone stakes, the higher their chance to be chosen as a validator and to earn rewards (Buterin, 2022). This approach significantly reduces energy use and is considered more sustainable for the future of blockchain networks. For instance, Ethereum, the second-largest cryptocurrency successfully transitioned to Proof of Stake in 2022, cutting its energy consumption by over 99% (Ethereum Foundation, 2023).

## 2.6 The Significance of Mining in the Cryptocurrency Ecosystem

Cryptocurrency mining is the foundation of blockchain technology. It ensures transparency, fairness, and security in a world without centralized financial institutions. Through mining, cryptocurrencies like Bitcoin achieve stability and trust, allowing millions of users to exchange values directly with each other across the globe. Although mining faces challenges related to cost and energy, innovations like Proof of Stake represent a promising future where digital money remains both secure and environmentally responsible.

## 3 Blockchain Technology

Blockchain is a decentralized digital database or ledger that securely stores records across a network of computers in a way that is transparent, immutable, and resistant to tampering. Each “block” contains data, and the blocks are linked in a chronological “chain”.

A blockchain is a distributed database or ledger shared across a computer network's nodes. While it is best known for its crucial role in cryptocurrency systems, maintaining a secure and decentralized record of transactions, blockchains are not limited to cryptocurrency uses. Blockchains can be used to make data in any industry immutable, meaning it cannot be altered.

Since a block can't be changed, the only trust needed is at the point where a user or program enters data. This reduces the need for trusted third parties, such as auditors or other humans, who add costs and can make mistakes.

Since Bitcoin's introduction in 2009, blockchain use has exploded due to the creation of various cryptocurrencies, decentralized finance (DeFi) applications, non-fungible tokens (NFTs), and smart contracts. Bitcoin and other popular cryptocurrencies, such as Ethereum and Solana, can be purchased through the leading. (Hayes 2025)

### 3.1 Blockchain Technology Mechanism

A blockchain is somewhat like spreadsheets or databases because it is a database where information is entered and stored. The key difference between a traditional database or spreadsheet and a blockchain is how the data is structured and accessed.

A blockchain consists of programs called scripts that conduct the tasks you usually would in a database: entering and accessing information and saving and storing it somewhere. A blockchain is distributed, meaning multiple copies are saved on many machines and must match it to be valid.

The Bitcoin blockchain collects transaction information and enters it into a 4MB file called a block (different blockchains have different-sized blocks). Once the block is full, the block data is run through a cryptographic hash function, which creates a hexadecimal number called the block header hash.

The hash is then entered into the following block header and encrypted with the other information in that block's header, creating a chain of blocks, hence the name “blockchain”. (Hayes 2025)

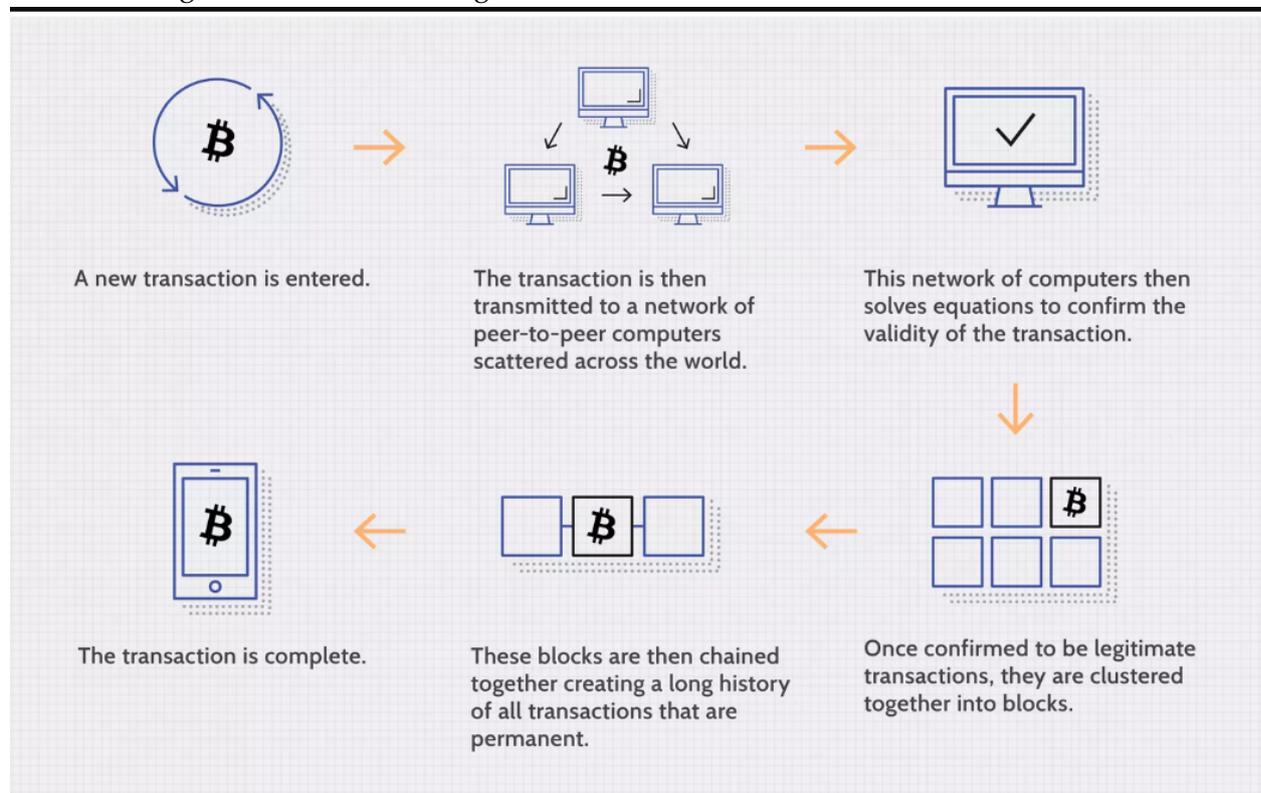
### 3.2 Transaction Process

Transactions follow a specific process, depending on the blockchain. For example, on Bitcoin's blockchain, if you initiate a transaction using your cryptocurrency wallet—the application that provides an interface for the blockchain—it starts a sequence of events.

In Bitcoin, your transaction is sent to a memory pool, where it is stored and queued until a miner picks it up. Once it is entered into a block and the block fills up with transactions, it is closed, and the mining begins.

Every node in the network offers its own blocks in this way because it chooses different transactions. Each works on their own blocks, trying to find a solution to the difficulty target, using the "nonce", short for number used once.

The nonce value is a field in the block header that is changeable, and its value incrementally increases with every mining attempt. If the resulting hash isn't equal to or less than the target hash, a value of one is added to the nonce, a new hash is generated, and so on. The nonce rolls over every 4.5 billion attempts (which takes less than one second) and uses another value called the extra noun as an additional counter. This continues until a miner generates valid hash, winning the race and receiving the reward.



Once a block is closed, a transaction is complete. However, the block is not considered confirmed until five other blocks have been validated. Confirmation takes about one hour to complete because it averages just under 10 minutes per block (the first block with your transaction and five following blocks multiplied by 10 equals 60 minutes).

Not all blockchains follow this process. For instance, the Ethereum network randomly chooses one validator from all users with ether staked to validate blocks, which are then

confirmed by the network. This process is much faster and less energy-intensive than Bitcoin's. (Hayes 2025)

### 3.3 Blockchain Decentralization

A blockchain allows the data in a database to be spread out among several network nodes computers or devices running software for the blockchain at various locations. This creates redundancy and maintains the fidelity of the data. For example, if someone tries to alter a record on one node, the other nodes will prevent it from happening by comparing block hashes. This way, no single node can alter information within the chain. (Hayes 2025)

Because of this distribution and the encrypted proof that work was done the blockchain data, such as transaction history, becomes irreversible. Such a record could be a list of transactions, but private blockchains can also hold a variety of other information like legal contracts, state identifications, or a company's inventory. Most blockchains wouldn't "store" these items directly; they would likely be sent through a hashing algorithm and represented on the blockchain by a token. (Hayes 2025)

### 3.4 Blockchain Transparency and Security

Because of the decentralized nature of the Bitcoin blockchain, all transactions can be transparently viewed by downloading and inspecting them or by using blockchain explorers that allow anyone to see transactions occurring live. Each node has its own copy of the chain that gets updated as fresh blocks are confirmed and added. This means that if you wanted to, you could track a bitcoin wherever it goes. (Hayes 2025)

For example, crypto exchanges have been hacked in the past, resulting in the loss of large amounts of cryptocurrency. While the hackers may have been anonymous except for their wallet address the crypto, they extracted is easily traceable because the wallet addresses are stored on the blockchain. (Hayes 2025)

Of course, the records stored in the Bitcoin blockchain (as well as most others) are encrypted. This means that only the person assigned an address can reveal their identity. As a result, blockchain users can remain anonymous while preserving transparency. (Hayes 2025)

Blockchain technology achieves decentralized security and trust in several ways. To begin with, new blocks are always stored linearly and chronologically. That is, they are always added to the "end" of the blockchain. After a block has been added to the end of the blockchain, previous blocks cannot be altered. (Hayes 2025)

A change in any data changes the hash of the block it was in. Because each block contains the previous block's hash, a change in one would change the following blocks. The network would generally reject an altered block because the hashes would not match. However, a change can be accomplished on smaller blockchain networks. (Hayes 2025)

A new and smaller chain might be susceptible to this kind of attack, but the attacker would need at least half of the computational power of the network. On Bitcoin and other larger blockchains, this is nearly impossible. By the time the hacker takes any action, the network is likely to have moved past the blocks they were trying to alter. This is because the rate at which these networks hash is exceptionally rapid the Bitcoin network hashed at a rate of around 851 exhalates per second as of September 2025. (Hayes 2025)

The Ethereum blockchain is not likely to be hacked either again, the attackers would need to control more than half of the blockchain's stake either. As of September 2025, over 35.7 million ETH have been staked by more than one million validators. An attacker or a group would

need to own almost 18 million ETH and be randomly selected to validate blocks enough time to get their blocks implemented. (Hayes 2025).

### 3.5 Benefits and Drawbacks of Blockchain

For all its complexity, blockchain's potential as a decentralized form of record-keeping is almost without limit. From greater user privacy and heightened security to lower processing fees and fewer errors, blockchain technology may very well see applications beyond those outlined above. But there are also some disadvantages. (Hayes 2025)

Benefits	Drawbacks
<b>Accuracy of the chain:</b> Transactions on the blockchain network are approved by thousands of computers and devices. This removes almost all people from the verification process, resulting in less human error and an accurate record of information.	<b>Technology Cost:</b> Although blockchain can save users money on transaction fees, the technology is far from free
<b>Cost Reduction:</b> Typically, consumers pay a bank to verify a transaction or a notary to sign a document. Blockchain eliminates the need for third-party verification and, with it, their associated costs.	<b>Speed and Data Inefficiency:</b> Bitcoin is a perfect case study of the inefficiencies of blockchain. Bitcoin's PoW system takes about 10 minutes to add a new block to the blockchain. At that rate, it's estimated that the blockchain network can only manage up to 10 transactions per second (TPS).
<b>Decentralization:</b> Blockchain does not store any information in a central location. Instead, it is copied and spread across a network of computers.	<b>Illegal Activity:</b> While confidentiality on the blockchain network protects users from hacks and preserves privacy, it also allows for illegal trading and activity on the blockchain network.
<b>Efficient Transactions:</b> Transactions placed through a central authority can take up to a few days to settle.	<b>Regulation:</b> Many in the crypto space have expressed concerns about government regulation of cryptocurrencies. Several jurisdictions are tightening control over certain types of crypto and other virtual currencies.
<b>Private Transactions:</b> Many blockchain networks operate as public databases, meaning anyone with an internet connection can view a list of the network's transaction history.	<b>Data Storage:</b> Another significant implication of blockchains is that they require storage. This may not appear to be substantial because we already store lots of information and data.
<b>Secure Transactions:</b> Once a transaction is recorded, its authenticity must be verified by the blockchain network. After the transaction is validated, it is added to the blockchain block.	
<b>Transparency:</b> Many blockchains are entirely open source. This means that everyone can view its code. This gives	

auditors the ability to review cryptocurrencies like Bitcoin for security.	
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## 4 Cryptocurrencies Financial Impact

### 4.1 Global Market

Cryptocurrencies have evolved from a niche technological curiosity into a globally significant asset class and payment innovation with complex effects on financial markets, macroeconomic stability, regulation, and economic inclusion. This paper examines the economic channels through which crypto assets affect the global market: price formation and volatility transmission, financial intermediation and systemic risk, cross-border payments and remittances, regulatory responses and policy coordination, and the competing emergence of central bank digital currencies (CBDCs). Using recent empirical studies, policy reports, and country-case evidence including the El Salvador experiment the analysis finds that cryptocurrencies increase market fragmentation and volatility, pose regulatory and financial-stability risks as linkages to traditional finance grow, and simultaneously offer potential efficiency gains in cross-border payments and financial inclusion if properly regulated.

#### 4.1.1 Market Size, Growth, and Volatility

Empirical monitors show crypto market capitalization has experienced large swings and periodic rallies; despite recoveries, the market remains highly volatile relative to traditional asset classes. Recent IMF monitoring reports and market trackers document rallies and contractions in market capitalization and highlight how price volatility can spill into investor portfolios and sentiment.

#### 4.1.2 Cross-Border Payments, Remittances, and Financial Inclusion

One of the benefits of cryptocurrencies is lower cost cross border payments and faster remittances, especially for unbanked populations. Some studies show theoretical efficiency gains: reduced intermediaries, near-instant settlement, and programmability. However, practical frictions limit broad adoption for routine payments.

#### 4.1.3 Stable coins, Monetary Transmission, and Dollarization Risks

Stable coins private tokens pegged to fiat have grown into an important sub segment and pose unique regulatory challenges. Large-scale adoption of global stable coins could affect monetary sovereignty and raise regulatory arbitrage concerns.

#### 4.1.4 Financial Stability and Interconnectedness with Traditional Finance

As crypto firms and products integrate with banking, asset management, and payment infrastructures, conventional financial stability concerns emerge. The literature highlights several channels: direct exposures of regulated institutions to crypto, the use of traditional finance leverage to take crypto positions, and operational risks.

#### 4.1.5 Energy Use, Environmental Impact, and Operational Considerations

Energy-intensive consensus mechanisms (notably Bitcoin's proof-of-work) generate substantial electricity consumption and raise environmental concerns. Policymakers have factored these concerns into local regulatory responses.

#### 4.1.6 Regulation, Policy Responses, and the Role of CBDCs

A consistent theme in the literature is the need for robust regulation proportionate to the systemic footprint of crypto activities. Simultaneously, many central banks are exploring

CBDCs to provide a safe, sovereign digital alternative that could reduce private crypto's appeal for payments.

#### 4.1.7 Analytical Discussion - Channels of Impact

##### A. Price and Volatility Transmission

Cryptocurrency price spikes and crashes influence investor wealth, risk appetite, and portfolio allocation. For institutional investors holding token exposures or funds that provide crypto derivatives, a severe correction can cause margin calls, forced selling, and spillovers.

##### B. Payments, Inclusion, and Remittances

Where remittance corridors are costly and traditional banking penetration low, crypto and stablecoin solutions can lower costs. However, on/off ramps, exchangers, and regulatory compliance complicate adoption.

##### C. Regulatory Fragmentation and Arbitrage

Divergent national regulations have created jurisdictional arbitrage opportunities. The literature shows regulatory divergence increases cross-border regulatory risk and complicates global supervision.

##### D. Macroeconomic and Fiscal Implications (Case: El Salvador)

El Salvador's adoption of Bitcoin as legal tender provides an empirical case of macro-fiscal exposure, where government balance sheet and public finances were affected by price volatility.

##### E. Market Structure, Custody, and Operational Risk

Large custodial exchanges and third-party service providers create concentration risks. Operational failures have generated large losses historically, underscoring the need for clear custody rules and resolution frameworks.

#### 4.1.8 Policy Implications and Recommendations

- **Harmonized International Regulatory Frameworks:** Cross-border nature of crypto requires international coordination.
- **Proportionate Prudential Oversight:** Regulators should apply prudential requirements to entities that bridge crypto and traditional finance.
- **Consumer Protections and Market Integrity:** Transparency and trading rules reduce fraud and protect retail investors.
- **Stable coin-specific Rules:** Stable coins should meet standards for reserve backing and redemption.
- **CBDC Development with Safeguards:** Central banks should consider CBDCs to preserve monetary sovereignty.
- **Energy and Environmental Policies:** Encourage transition to less carbon-intensive consensus mechanisms.

## 4.2 Egyptian Market

### 4.2.1 Legal and Regulatory Environment

Egypt's Central Bank bans the issuance, trading, and promotion of cryptocurrencies without CBE approval. Violations can result in imprisonment and fines between EGP 1–10 million. The CBE reiterated warnings Sept-2022 and Mar-2023 (Central 2023) statements renewing warnings against dealing in cryptocurrencies. No licenses have been granted to local crypto exchanges to date, as follows:

“The CBE reiterates its previous warnings against dealing with all types of cryptocurrencies, whether through individuals, companies, applications, or digital platforms. Thereby, the Central Bank of Egypt emphasizes that no license has ever been issued or granted to engage in such trading activities in the Egyptian market due to the high risks they comprise, including but not limited to, fluctuations and significant price volatility, as well as their use in financial crimes, and electronic piracy.

Additionally, cryptocurrencies are not issued by any central bank or official centralized issuing authority, that can be held accountable and is consequently lacking any issuing cover that would guarantee the stability of such currency and protect the rights of its users. “

From the abovementioned article, since Bitcoin and similar cryptocurrencies fall under the umbrella of “cryptographic units,” they are included in the restrictions outlined by Egyptian law. This means:

- **Bitcoin Trading:** Individuals are prohibited from buying, selling, or exchanging Bitcoin without explicit approval from the CBE.
- **Mining Operations:** Mining Bitcoin or other cryptocurrencies is also considered illegal, as it involves creating new cryptographic units without Central Bank authorization.
- **Promoting or Facilitating Cryptocurrency Use:** Any attempt to promote or enable the use of cryptocurrencies, whether through advertising or facilitating transactions, is also prohibited.

The CBE’s restrictions aim to protect the national economy from risks such as:

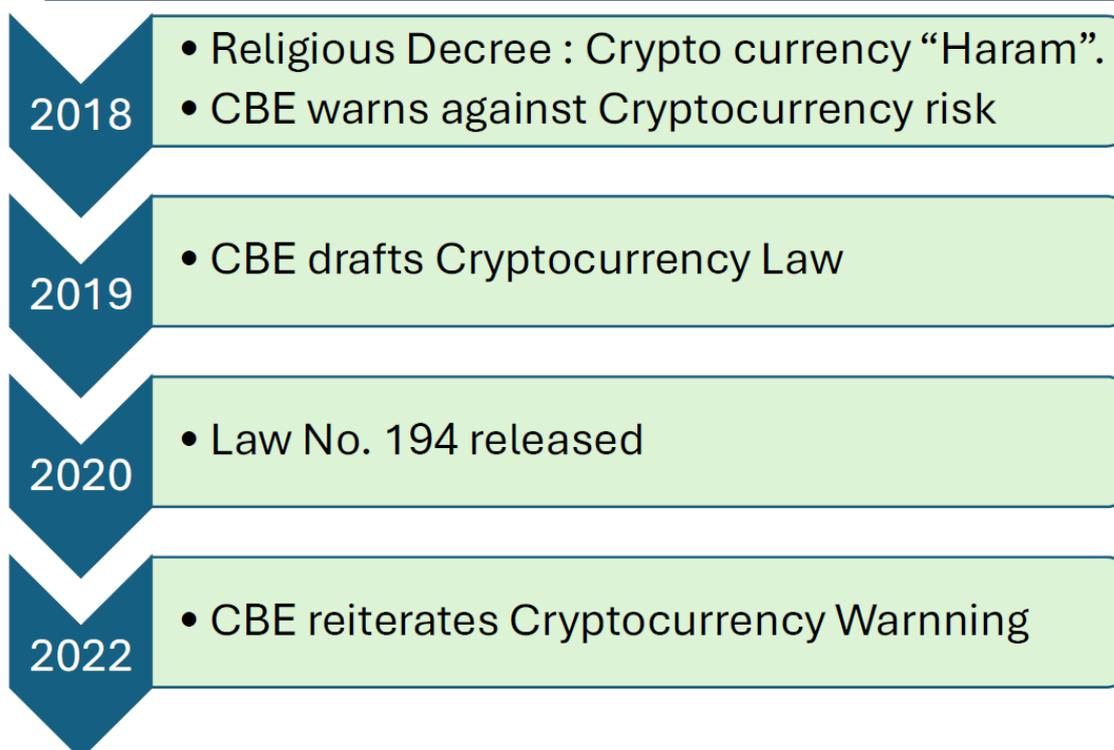
- **Volatility** in cryptocurrency prices.
- **Fraud and scams** due to lack of regulation.
- **Illicit uses** like money laundering and terrorism financing.
- Egypt's strict prohibition on cryptocurrencies creates significant hurdles for businesses that use digital assets for international transactions. By eliminating crypto as a payment rail, companies are forced to rely on traditional banking channels, which are often slower and more expensive for cross-border payments. This restriction increases operational friction and can isolate the Egyptian market from global partners who prefer the efficiency of digital currency settlements, ultimately hindering trade and financial innovation (Lightspark 2025).

#### 4.2.2 Religious Considerations in the Debate

In 2018, Egypt’s Grand Mufti announced that cryptocurrencies haram forbidden under Islamic law, citing their speculative nature and potential for fraud reinforcing public resistance even though the fatwa is not legally binding.

“It should be noted that the declaration of cryptocurrencies being haram is fatwā, meaning that while the religious decree is a legal opinion, it is non-binding.”

## Egypt's Legal & official Timeline



### 4.2.3 Challenges for Cryptocurrency Businesses in Egypt

In Egypt, the prevailing misunderstanding. that these digital assets as a quick path to wealth or associate them with illegal activities, while others misunderstand the concept of decentralization. Decentralization means that cryptocurrencies are not governed by any central authority, like a bank or government, but rather operate on distributed networks that rely on cryptographic security. While this innovation is celebrated globally for enabling financial autonomy, it raises significant concerns in Egypt, where the government views unregulated financial systems as threats to national stability and security (Attorney-at-law 2025).

### 4.2.4 Egypt's Market Reality

Despite restrictions, crypto use exists informally through peer-to-peer (P2P) trading and international platforms. Many Egyptians explore stablecoins such as USDT to preserve savings amid currency devaluation and inflation.

The Legal restrictions banned the issuance, trading, and promotion of cryptocurrencies without CBE approval, **but there is no specific law banning Bitcoin or cryptocurrency ownership**. Bitcoin is usually available on the major cryptocurrency exchanges that operate in Egypt (Kaur 2025).

Since Egypt doesn't officially record how many people own cryptocurrencies, estimates vary:

- The company **Triple-A (2022)** (Triple-a.io 2022) estimates about **3 million Egyptians** roughly **3% of the population** own crypto.

- **Chain lysis** ranks Egypt among the **top countries in the Middle East and North Africa (MENA)** for grassroots crypto use but doesn't give exact numbers.
- Some **market forecasts** suggest that by **2026**, the number of users could grow to **around 13.9 million users** (Cryptocurrencies - Egypt 2025), though that includes a broad definition of "users."
- The average revenue per user in the Cryptocurrencies market in Egypt is estimated to be US\$71.4 in 2025, When compared globally, United States is projected to have the highest revenue in the Cryptocurrencies market, reaching US\$16.1bn in 2025.

To stay realistic, analysts often report a **current range between 2.5 and 3.5 million crypto owners** in Egypt, while noting that there are **no official statistics** and different studies use **different methods**.

#### 4.2.5 The Future of Cryptocurrency in Egypt

Although the future of crypto laws in Egypt remains uncertain, existing trends indicate that the regulatory environment will become more institutionalized. The Egyptian Central Bank's ongoing admonitions over cryptocurrencies indicate a preference for stringent regulations. The 2020 draft legislation shows a trend away from outright prohibition and toward regulatory control, giving the Financial Regulatory Authority the authority to monitor crypto operations.

In any case, the increasing acceptance of cryptos and blockchain technology around the world might incite the Egyptian policymakers to reconvene and reevaluate the current regulations in the future (Partners 2025).

Egypt is studying a digital Egyptian pound (e-pound) as a regulated alternative. A CBDC would allow citizens to use digital money under full CBE oversight—offering speed and cost efficiency without the legal risks of decentralized crypto (Lightspark 2025)

## 5 Risk and Return

### 5.1 Risk

Cryptocurrencies have attracted a reputation as unstable investments due to high investor losses from scams, hacks, bugs, and volatility. Although the underlying cryptography and blockchain are generally secure, the technical complexity of using and storing crypto assets can be a significant hazard to new users. (Hayes 2025)

In addition to the market risks associated with speculative assets, cryptocurrency investors should be aware of the following risks:

- **User risk:** Unlike traditional finance, there is no way to reverse or cancel a cryptocurrency transaction after it has already been sent. According to Ledger, a well-known crypto wallet, analysts estimate that about 11 % to 18% of bitcoins are lost for various reasons.
- **Regulatory risks:** The regulatory status of some cryptocurrencies is still unclear in many areas, with some governments seeking to regulate them as securities, currencies, or both. A sudden regulatory crackdown could make it challenging to sell cryptocurrencies or cause a market-wide price drop.
- **Counterparty risks:** Many investors and merchants rely on exchanges or other custodians to store their cryptocurrency. Theft or loss by one of these third parties could result in losing one's entire investment.

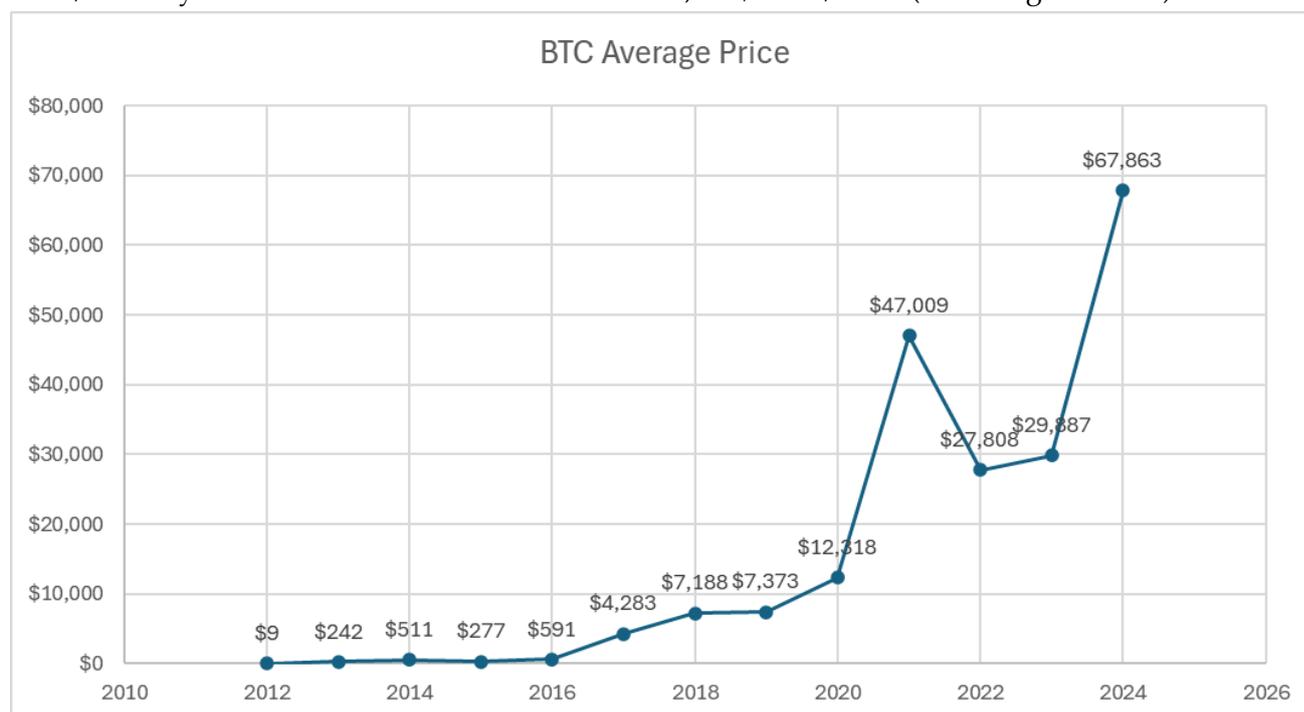
- **Management risks:** Due to the lack of coherent regulations, there are few protections against deceptive or unethical management practices. Many investors have lost large sums to management teams that failed to deliver a product.
- **Programming risks:** Many investment and lending platforms use automated smart contracts to control the movement of user deposits. An investor using one of these platforms assumes the risk that a bug or exploit in these programs could cause them to lose their investment.
- **Market Manipulation:** Market manipulation remains a substantial problem for cryptocurrency investors, with influential people, organizations, and exchanges promoting their favored tokens.

Despite these risks, cryptocurrencies have experienced a significant price surge, with the total market capitalization rising to approximately \$3.91 trillion (As of Aug. 28, 2025). Despite the asset's speculative nature, some have created substantial fortunes by taking on the risk of investing in early-stage cryptocurrencies. (Hayes 2025)

## 5.2 Return

Investing in cryptocurrency can offer high potential returns, as historically seen with major cryptocurrencies like Bitcoin, but it is also a highly volatile and speculative asset class with the potential for substantial losses. The actual return is not guaranteed and depends on numerous factors, including which specific cryptocurrency is purchased, the timing of the investment, market conditions, and overall investor sentiment. (Dasman 2021)

Analyzing Bitcoin (BTC) as one of the most famous cryptocurrencies in world. BTC initially started at 9\$ USD/BTC in 2012, in 2013 BTC price rise dramatically by 2557% to become 242\$ USD/BTC. In 2020 during COVID 19 it had another spike of 67% to become 12,318\$ USD/BTC. By the end of 2024 BTC was settled at 67,863\$ USD/BTC. (Investing.com n.d.)



Analyzing the above graph, if an investment of 1,000\$ in BTC was made in 2022. In 2024 the investment would grow by 451% to reach 5,509\$.

## 6 Conclusion

The evolution of cryptocurrency represents a transformative shift in the global financial and technological landscape. Emerging from the aftermath of the 2008 financial crisis, cryptocurrencies such as Bitcoin and Ethereum have introduced a decentralized paradigm that challenges the dominance of conventional financial institutions. Through the integration of blockchain technology, these digital assets have demonstrated the capacity to enhance transparency, transaction efficiency, and data security while simultaneously redefining the concepts of value exchange and monetary sovereignty. Their rise reflects a broader global movement toward digitization, autonomy, and financial innovation.

Despite these advancements, the cryptocurrency market remains characterized by substantial volatility, speculative behavior, and operational risks. The absence of a unified global regulatory framework has contributed to significant disparities in oversight, enabling opportunities for misuse, fraud, and market manipulation. Moreover, the environmental impact of energy-intensive mining processes and the technical barriers associated with blockchain scalability present additional challenges to the sustainable growth of the sector. The transition toward energy-efficient consensus mechanisms, such as Proof of Stake, however, illustrates a promising evolution toward greater sustainability and operational stability.

From an economic perspective, cryptocurrencies present a complex duality. On one hand, they enhance cross-border payments, financial inclusion, and innovation within digital finance. On the other, they pose potential threats to monetary policy, fiscal stability, and regulatory control particularly within developing economies. In Egypt, the Central Bank's prohibition of cryptocurrency trading underscores the government's cautious stance toward digital assets, emphasizing risks of volatility, illicit activities, and consumer vulnerability. Nonetheless, the increasing informal use of digital currencies and the exploration of Central Bank Digital Currency (CBDC) suggest that regulatory frameworks are gradually adapting to the realities of a digital economy.

In conclusion, the future trajectory of cryptocurrency will depend on achieving equilibrium between innovation and governance. Effective regulation, public awareness, and technological refinement are essential to ensure that cryptocurrencies evolve from speculative instruments into legitimate and stable components of the financial ecosystem. As global and national authorities continue to explore digital monetary alternatives, the integration of transparency, sustainability, and institutional oversight will determine whether cryptocurrencies can fulfill their transformative potential in reshaping the global economy.

## 7 References

(2025). Cryptocurrency, CoinMarketCap. (2025). *CoinMarketCap*.

Attorney-at-law, Joseph Iskander -. 2025. *Andersen in Egypt*.

<https://eg.andersen.com/legality-cryptocurrency-in-egypt/>.

Binance Academy. (2023). What is BNB? (2023). *Binance Academy*.

Buterin, V. (2015). Ethereum white paper. <https://ethereum.org/en/whitepaper/>. (2015).

*Buterin, V.*

- Central, Egypt of Bank. 2023. *The Fourth (4th) Warning Statement on Cryptocurrencies*. March. <https://www.cbe.org.eg/en/news-publications/news/2023/03/08/warning-statement>.
2025. *Cryptocurrencies - Egypt*. [https://www.statista.com/outlook/fmo/digital-assets/cryptocurrencies/egypt?srsltid=AfmBOopVx\\_fimN5y2CxFfpuEDq73QAme7AU5RBuB9Hbx73b9NOIYPVu](https://www.statista.com/outlook/fmo/digital-assets/cryptocurrencies/egypt?srsltid=AfmBOopVx_fimN5y2CxFfpuEDq73QAme7AU5RBuB9Hbx73b9NOIYPVu).
- Dasman, Sunita. 2021. *Analysis of Return and Risk of Cryptocurrency Bitcoin Asset as Investment Instrument*. 09 24. <https://www.intechopen.com/chapters/78745>.
- Hayes, Adam. 2025. *Blockchain Facts: what is it, how it works, and how it can be used*. 09 04. <https://www.investopedia.com/terms/b/blockchain.asp>.
- Investing.com. n.d. *Investing.com*. <https://www.investing.com/crypto/bitcoin/btc-usd>.
- Kaur, Guneet. 2025. "An overview of crypto regulations in Egypt." *Cointelegraph*, *Cointelegraph*, August: [cointelegraph.com/learn/articles/crypto-regulations-in-egypt](https://cointelegraph.com/learn/articles/crypto-regulations-in-egypt).
- Lightspark, Team. 2025. *Lightspark Team*. August 22. <https://www.lightspark.com/knowledge/is-crypto-legal-in-egypt>.
- Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. <https://bitcoin.org/bitcoin.pdf>. (2008). ", S." *Nakamoto*.
- Partners, Youssry Saleh &. 2025. "Cryptocurrency legality in Egypt." March 28: [www.lexology.com/library/detail.aspx?g=a21a3371-3157-4c46-8ab2-1e15e9a59450](https://www.lexology.com/library/detail.aspx?g=a21a3371-3157-4c46-8ab2-1e15e9a59450).
- Solana Foundation. (2024). Solana blockchain documentation. (2024). *Solana Foundation*.
- Triple-a.io. 2022. *Triple-a.io*. <https://www.triple-a.io/cryptocurrency-ownership-data/cryptocurrency-ownership-egypt-2022>.
- (2025).Cryptocurrency, CoinMarketCap. (2025). *CoinMarketCap*.
- Attorney-at-law, Joseph Iskander -. 2025. *Andersen in Egypt*. <https://eg.andersen.com/legality-cryptocurrency-in-egypt/>.
- Binance Academy. (2023). What is BNB? (2023). *Binance Academy*.
- Buterin, V. (2015). Ethereum white paper. <https://ethereum.org/en/whitepaper/>. (2015). *Buterin, V*.
- Central, Egypt of Bank. 2023. *The Fourth (4th) Warning Statement on Cryptocurrencies*. March. <https://www.cbe.org.eg/en/news-publications/news/2023/03/08/warning-statement>.
2025. *Cryptocurrencies - Egypt*. [https://www.statista.com/outlook/fmo/digital-assets/cryptocurrencies/egypt?srsltid=AfmBOopVx\\_fimN5y2CxFfpuEDq73QAme7AU5RBuB9Hbx73b9NOIYPVu](https://www.statista.com/outlook/fmo/digital-assets/cryptocurrencies/egypt?srsltid=AfmBOopVx_fimN5y2CxFfpuEDq73QAme7AU5RBuB9Hbx73b9NOIYPVu).
- Dasman, Sunita. 2021. *Analysis of Return and Risk of Cryptocurrency Bitcoin Asset as Investment Instrument*. 09 24. <https://www.intechopen.com/chapters/78745>.
- Hayes, Adam. 2025. *Blockchain Facts: what is it, how it works, and how it can be used*. 09 04. <https://www.investopedia.com/terms/b/blockchain.asp>.
- Investing.com. n.d. *Investing.com*. <https://www.investing.com/crypto/bitcoin/btc-usd>.

- Kaur, Guneet. 2025. " An overview of crypto regulations in Egypt." *Cointelegraph*, *Cointelegraph*, August: [cointelegraph.com/learn/articles/crypto-regulations-in-egypt](https://cointelegraph.com/learn/articles/crypto-regulations-in-egypt).
- Lightspark, Team. 2025. *Lightspark Team*. August 22.  
<https://www.lightspark.com/knowledge/is-crypto-legal-in-egypt>.
- Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system.  
<https://bitcoin.org/bitcoin.pdf>. (2008). ", S." *Nakamoto*.
- Partners, Youssry Saleh &. 2025. "Cryptocurrency legality in Egypt." March 28:  
[www.lexology.com/library/detail.aspx?g=a21a3371-3157-4c46-8ab2-1e15e9a59450](https://www.lexology.com/library/detail.aspx?g=a21a3371-3157-4c46-8ab2-1e15e9a59450).
- Solana Foundation. (2024). Solana blockchain documentation. (2024). *Solana Foundation*.
- Triple-a.io. 2022. *Triple-a.io*. <https://www.triple-a.io/cryptocurrency-ownership-data/cryptocurrency-ownership-egypt-2022>.

IMF- Changing landscape of crypto assets: considerations for regulatory and supervisory authorities.

IMF- Crypto-Assets Monitor (Q2 2025).

Bank for International Settlements (BIS) Crypto, tokens and DeFi: navigating the regulatory landscape.

Financial Stability Board (FSB) Global crypto rules report (Reuters coverage, Oct 2025).

Nature Financial and market risks of bitcoin adoption as legal tender (2024).

Goldbach (2024) Evidence on El Salvador's Bitcoin adoption impacts.

Philadelphia Fed (Allen et al., 2022) Fintech, Cryptocurrencies, and CBDC: Financial Structural Implications.

IMF & FSB Policies for Crypto assets (Sept 2023).

BIS Bulletin Addressing the risks in crypto: laying out the options (Aquilina et al., 2023).

Atlantic Council — CBDC Tracker (survey of CBDC projects worldwide).