

Cryptocurrencies and Start-up Financing: Innovative Applications of Blockchain Technology

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Abstract: This paper investigates the role of blockchain technology in revolutionizing start-up financing, focusing on the integration of cryptocurrencies through Initial Coin Offerings (ICOs) and Security Token Offerings (STOs). The research aims to explore how decentralized financial systems provide innovative alternatives to traditional funding methods like venture capital. Key topics of analysis include the advantages of blockchain technology, such as enhanced transparency, security, and global accessibility for start-ups. At the same time, the paper addresses significant challenges, including legal uncertainties and operational risks. Case studies of companies like Blockstack and Telegram illustrate the practical applications of ICOs and STOs, shedding light on both their potential and associated risks. The findings suggest that while blockchain can democratize access to capital, its long-term viability will largely depend on the development of comprehensive regulatory frameworks and greater investor protections. Overall, the study provides valuable insights into how blockchain technology could transform the future of start-up financing, fostering a more efficient, secure, and inclusive financial ecosystem.

Keywords: Blockchain, Start-up Companies, Cryptocurrencies, Financing.

1. Introduction

1.1. Background

The theme “Cryptocurrencies and Startup Finance: Innovative Applications of Blockchain Technology” is significant in contemporary finance and entrepreneurship. Cryptocurrencies based on blockchain technology provide a decentralized and secure financing mechanism that has revolutionized traditional startup financing. Unlike conventional methods such as venture capital and bank loans, blockchain supports peer-to-peer transactions, often through initial coin offerings (ICOs) or token sales, allowing startups to reach a wider range of investors on a global scale.

The transparency and immutability of blockchain provide additional security for investors and entrepreneurs, reducing the risk of fraud and increasing trust. This democratization of funding opportunities allows small businesses and start-ups in emerging markets to compete on a more level playing field. Moreover, blockchain applications are not limited to fundraising; They enable efficient tracking of ownership, smart contracts, and secure data management to improve operational efficiency and investor confidence.

The intersection of cryptocurrencies and startup financing highlights blockchain's potential to disrupt the traditional financial system. It introduces a new paradigm of innovation in capital markets that has the potential to reduce the dominance of centralized financial institutions while promoting a more inclusive and decentralized global economy. Therefore, research in this area is critical to understanding future trends in the growth of financial innovation and entrepreneurship.

1.2. What is Blockchain

In contemporary Internet commerce, most electronic transactions rely on third-party platforms for payment processing, which introduces several inherent weaknesses. Blockchain technology offers a decentralized alternative by enabling peer-to-peer online payments, eliminating the need for intermediaries such as financial institutions. The Bitcoin network exemplifies this approach, with blockchain serving as its foundational technology [1]. As a distributed ledger system, blockchain verifies and maintains transaction records across a global network of computers without relying on a central authority. This decentralized structure ensures that information is immutable and transparent, providing greater security compared to traditional centralized databases. Once a transaction is verified by the network, it is irreversibly linked to the existing chain of transactions, ensuring the integrity of the system and the trust mechanism [2].

1.3. The Impact of Cryptocurrencies on Financial Markets

The emergence of blockchain technology will trigger a broad revolution in many industries, and the beneficial fields of blockchain technology may cover finance, big data of the Internet of Things, artificial intelligence, and other fields. Several technology and financial companies are currently experimenting with the technology, which also offers a range of opportunities for entrepreneurship and employment [3]. As the digital economy advances, cryptocurrencies have begun to replace certain functions of traditional currencies. Blockchain-based digital currencies, with their high value, transaction efficiency, low costs, inflation resistance, and privacy features, are significantly impacting the financial market by offering a compelling alternative to conventional financial systems [4].

1.4. The Utilization of Cryptocurrencies in Start-up Financing

The utilization of cryptocurrencies in startup financing, particularly through blockchain-based Initial Coin Offerings (ICOs), represents an innovative method for raising capital. Unlike traditional funding methods such as venture capital or angel investment, ICOs enable startups to sell blockchain tokens directly to global investors, bypassing the need for equity or legal complexity. This decentralized financing method allows companies to obtain capital rapidly, often in the early stages of development, with minimal regulation [5].

2. Funding Models for Cryptocurrencies and Blockchain Technology

2.1. Initial Coin Offerings (ICOs)

Initial Coin Offerings (ICOs) leverage blockchain and distributed ledger technologies to create a new startup financing mechanism, offering an alternative to traditional funding models like venture capital (VC) or initial public offerings (IPO). ICOs enable startups to issue and sell tokens, which can be utility or security tokens, allowing companies to raise funds before products are fully developed [6]. A key advantage is "global access", where startups attract investors globally, bypassing geographic and intermediary restrictions. Additionally, "token economics" guides the issuance and valuation of tokens, and smart contracts automate token distribution. ICOs also enhance "cost-efficiency" by eliminating intermediaries, speeding up the financing process. Importantly, ICOs democratize

investment by allowing small investors to participate without diluting ownership while promoting early customer adoption through network effects [6].

2.2. Security Token Offerings (STOs)

Security Token Offerings (STOs) and Initial Coin Offerings (ICOs) both leverage blockchain for fundraising but differ significantly in their mechanisms. ICOs issue utility tokens that grant access to platforms or services without ownership rights, while STOs offer security tokens representing financial assets like stocks or bonds, giving holders rights similar to traditional shareholders. STOs are more regulated, providing greater investor protection but also higher complexity and costs. In contrast, ICOs are less regulated and offer higher liquidity but face issues like volatility and fraud due to the lack of ownership rights [7].

STOs appeal to startups by attracting institutional investors who are often wary of ICOs due to regulatory concerns. While ICOs provide instant liquidity, STOs face initial trading restrictions, though liquidity is expected to improve as the market matures [7]. The combination of blockchain's benefits with the trust of traditional equity markets makes STOs a promising alternative for startup financing, offering long-term advantages such as increased trust, investor protection, and access to larger capital pools. However, their success will depend on developing a robust regulatory framework and infrastructure to enhance liquidity and streamline transactions [7].

3. Advantages of Blockchain Technology in Start-up Financing

Blockchain technology offers multiple advantages for startup financing by increasing transparency, security, and efficiency. One of the key advantages is its decentralized nature, which not only allows for less reliance on traditional intermediaries such as banks and venture capitalists but also facilitates peer-to-peer transactions while also increasing access to a global pool of investors, as seen in the rise of initial coin offerings (ICOs) [8, 9]. Blockchain also increases the transparency of financial transactions, ensuring that all parties involved can securely access and verify transaction data, thereby fostering trust and reducing fraud [10].

In addition, blockchain can use smart contracts to automatically execute and enforce terms without human intervention, thus simplifying agreements between startups and investors. This reduces legal complexity and improves operational efficiency [8]. The immutability of the technology ensures that records cannot be altered, safeguarding the integrity of financial and operational data, which is critical for startups seeking credibility and the trust of long-term investors [9].

According to the above, blockchain technology is transforming startup financing by democratizing access to capital, increasing transparency, and enhancing security, positioning it as a key tool for startup financing in the future [8,10].

4. Case Study

4.1. Blockstack: Pioneering the Use of STOs in Blockchain Financing

Blockstack, now rebranded as Stacks, stands as a pioneering example of how Security Token Offerings (STOs) can be leveraged to fund blockchain startups in a compliant and regulated manner. Blockstack's journey to becoming the first U.S. company to receive approval from the U.S. Securities and Exchange Commission (SEC) for a token sale marked a pivotal shift in the blockchain financing landscape, transitioning from the speculative and often unregulated nature of Initial Coin Offerings (ICOs) to a more structured and secure model [11].

At the core of Blockstack's vision was the creation of a decentralized internet, where users have full control over their data and applications. This vision resonated with investors, particularly those

wary of the legal ambiguities surrounding ICOs. By choosing to raise funds through an STO, Blockstack demonstrated a commitment to adhering to U.S. securities laws, which provided investors with greater protection and transparency. The Stacks (STX) tokens issued during the STO became an integral part of the Blockstack ecosystem, enabling users to participate in network governance and facilitating transactions on the platform [12].

One of Blockstack's most significant innovations was its integration of the Proof of Transfer (PoX) consensus mechanism. Unlike traditional blockchain networks that rely on energy-intensive proof-of-work models, PoX allowed Blockstack to link its network to the Bitcoin blockchain, leveraging Bitcoin's security features while maintaining its decentralized application platform. This unique feature not only differentiated Blockstack from other blockchain platforms but also appealed to investors who were increasingly concerned about the environmental impact of blockchain technologies [12].

Blockstack's STO succeeded in raising \$23 million, but the significance of this financing mechanism extended far beyond the amount raised. The successful completion of the STO signaled a new era for blockchain startups, one where compliance with regulatory frameworks could coexist with innovation. Institutional investors, who had previously been cautious about participating in the largely unregulated ICO market, saw STOs as a more viable entry point into the blockchain space. The increased regulatory oversight associated with STOs reduced the risk of fraud and market manipulation, providing a sense of security that had been lacking in previous blockchain fundraising models [11, 13].

However, Blockstack's journey also highlighted the challenges that come with complying with regulatory frameworks. The process of obtaining SEC approval was lengthy and complex, requiring Blockstack to navigate a web of legal requirements to ensure that its token sale adhered to U.S. securities laws. This raised the question of whether smaller blockchain startups, with fewer resources, would be able to follow in Blockstack's footsteps. The high costs associated with regulatory compliance could potentially create barriers to entry for smaller players in the blockchain space, limiting the democratizing potential of STOs.

Blockstack's use of STOs not only demonstrated how blockchain financing could evolve to meet regulatory standards but also provided a model for other startups seeking to attract both retail and institutional investors. The combination of technical innovation, regulatory compliance, and a compelling vision for decentralized finance made Blockstack a trailblazer in the blockchain ecosystem, and its success is likely to inspire future blockchain projects to pursue regulated financing models.

4.2. The Rise and Fall of a Record-breaking ICO

The story of Telegram and its ambitious Telegram Open Network (TON) project serves as a cautionary tale of the risks and challenges associated with Initial Coin Offerings (ICOs), particularly in the absence of clear regulatory frameworks. Telegram's ICO, which aimed to raise funds for a decentralized internet platform, stands as one of the largest in history, with the company raising over \$1.7 billion from private investors in 2018 [14].

Unlike Blockstack's STO, which was heavily regulated and compliant with U.S. securities laws, Telegram's ICO operated in a more speculative environment. The company issued Gram tokens, a form of digital asset that was intended to function within the TON ecosystem. However, Gram tokens did not represent equity or ownership in Telegram itself, meaning that investors were not entitled to any governance rights or profit-sharing mechanisms. Instead, their potential returns were tied to the future market value of the Gram tokens, which was highly speculative and dependent on the success of the TON network [15].

One of the primary appeals of Telegram's ICO was the company's massive user base, with hundreds of millions of users already using its encrypted messaging platform. Investors were drawn to the idea that Telegram could leverage its existing network to drive the adoption of Gram tokens and the TON platform. This made Telegram's ICO particularly attractive, as it was one of the few blockchain projects backed by an established company with a proven track record of technological innovation [15].

However, the speculative nature of the ICO and the lack of traditional investor protections soon attracted the attention of regulators. The U.S. Securities and Exchange Commission (SEC) intervened, arguing that Gram tokens constituted unregistered securities under U.S. law. According to the SEC, Telegram had violated securities regulations by failing to register the Gram tokens as securities and by not providing investors with sufficient disclosures about the risks associated with the investment.

The legal battle between Telegram and the SEC ultimately led to the cancellation of the Gram token launch and the dismantling of the TON project. Telegram agreed to return funds to investors and pay a settlement to the SEC, marking a significant setback for the company's blockchain ambitions. The collapse of Telegram's ICO highlighted the regulatory uncertainties surrounding blockchain financing, particularly in jurisdictions like the United States, where securities laws are stringent [15].

The failure of Telegram's ICO serves as a stark contrast to Blockstack's regulated STO. While Telegram's ICO attracted significant investment, it lacked the regulatory oversight needed to protect investors and ensure the project's long-term viability. The absence of traditional investor protections, such as equity ownership or governance rights, meant that investors were entirely dependent on the speculative value of the Gram tokens, which never materialized due to regulatory intervention [15].

Telegram's ICO also underscored the importance of regulatory clarity in the blockchain space. Without clear guidelines from regulators, companies like Telegram are left navigating a complex and uncertain legal landscape. This not only increases the risk for companies launching ICOs but also for the investors who participate in them. The case of Telegram demonstrates that while ICOs can raise significant amounts of capital quickly, they are fraught with risks that can lead to catastrophic outcomes if not properly managed.

Despite its failure, Telegram's ICO had a lasting impact on the blockchain financing landscape. The regulatory scrutiny that followed the Gram token sale led to a broader reassessment of ICOs, with many companies opting for more compliant and secure fundraising models like STOs. Telegram's experience highlighted the need for greater regulatory oversight and transparency in blockchain financing, and it is likely that future ICOs will face stricter scrutiny as a result of this case.

5. Future Expectations

5.1. Increased Adoption of Decentralized Financing Models

One key expectation is the broader adoption of decentralized financing models such as Initial Coin Offerings (ICOs) and Security Token Offerings (STOs). These models allow startups to bypass traditional financial intermediaries and raise capital directly from global investors, promoting inclusivity and accessibility. As regulatory frameworks around blockchain-based financing mature, startups will likely find these methods more attractive due to increased security, reduced costs, and the ability to raise funds on a global scale.

5.2. Evolution of Regulatory Frameworks

As blockchain-based financing gains prominence, regulatory bodies will continue to develop frameworks that ensure investor protection while fostering innovation. Shortly, we can expect more comprehensive regulations around STOs, which will offer greater legal security and transparency

compared to ICOs. This will make STOs particularly appealing to institutional investors, thereby increasing the availability of capital for blockchain-driven startups. Clearer regulations will also mitigate risks such as fraud and volatility, making cryptocurrency-based financing more stable and mainstream.

5.3. Enhanced Operational Efficiency through Smart Contracts

Smart contracts, a key feature of blockchain technology, are expected to significantly improve operational efficiency in the context of startup financing. These self-executing contracts automatically enforce the terms of an agreement once predefined conditions are met, without the need for intermediaries such as lawyers or escrow services. By streamlining transactions, smart contracts reduce the time and costs traditionally associated with contract execution, thus simplifying agreements between startups and investors. This automation minimizes human intervention, lowers legal complexity, and enhances operational transparency. Furthermore, the immutability of blockchain ensures that once a contract is recorded, it cannot be altered, thereby safeguarding the integrity of financial data. This level of security is critical for startups seeking to build credibility with investors. As blockchain-based financing models evolve, the use of smart contracts will likely become integral to fostering trust and efficiency in financial transactions, supporting the long-term growth and sustainability of startups.

5.4. Tokenization of Assets

The tokenization of assets—converting real-world assets into blockchain-based digital tokens—is another trend that is expected to accelerate in the coming years. STOs already represent a step in this direction by tokenizing financial assets such as stocks and bonds. However, the future of asset tokenization extends far beyond traditional financial instruments.

Real estate, fine art, intellectual property, and even natural resources can all be tokenized, allowing for fractional ownership and easier transferability. For startups, this opens up new possibilities for financing. By tokenizing their physical or intellectual assets, companies can raise capital more efficiently and offer investors greater liquidity through secondary markets.

As tokenization becomes more commonplace, it could revolutionize sectors like real estate and commodities, which have historically been plagued by liquidity issues. The ability to trade fractional ownership in assets could attract a broader range of investors, including those who previously could not participate in these markets due to high entry barriers.

6. Conclusion

This paper has explored the innovative use of blockchain technology in start-up financing, with a particular focus on cryptocurrencies, Initial Coin Offerings (ICOs), and Security Token Offerings (STOs). The research highlights that blockchain technology offers several advantages, including enhanced transparency, security, and global accessibility for start-ups and investors. Case studies such as Blockstack and Telegram illustrate the real-world applications of these financing mechanisms, underscoring both their potential and risks, particularly concerning regulatory challenges and market volatility.

The main findings reveal that while blockchain-based financing democratizes access to capital and reduces reliance on traditional intermediaries, its long-term success depends heavily on the development of robust regulatory frameworks. Additionally, the introduction of smart contracts and decentralized systems has the potential to streamline operations and increase efficiency, further attracting institutional investors to the market.

Looking forward, the continued evolution of blockchain technology and the maturation of regulatory oversight are expected to transform the financial landscape. Blockchain financing models could play a pivotal role in creating a more inclusive, efficient, and decentralized global economy, offering new opportunities for start-ups and investors alike.

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