

Comparative Analysis of Blockchain-Based Crowdfunding Platforms: Trends, Challenges, and Opportunities

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Abstract—Crowdfunding has emerged as a significant alternative to traditional financing methods, with blockchain technology offering innovative solutions for enhancing transparency, security, and efficiency in the fundraising process. This paper presents a comparative analysis of several blockchain-based crowdfunding platforms by reviewing and synthesizing recent academic and industry research. A detailed examination of the operational frameworks, advantages, and limitations of these platforms is conducted, focusing on their performance in areas such as decentralization, smart contract integration, scalability, and investor protection.

Through a critical review of multiple papers, this study identifies common limitations in the existing literature, including incomplete assessments of platform security, inadequate consideration of regulatory challenges, and limited attention to user experience. While certain platforms demonstrate strong potential, others lack robust mechanisms for fraud prevention or struggle with technical scalability. In particular, Solana was found to be the most efficient platform among those analyzed, offering superior scalability and lower transaction costs, making it a favorable choice for blockchain-based crowdfunding. By analyzing and comparing the most accurate and comprehensive studies, this review aims to highlight the key features of successful blockchain crowdfunding platforms and propose directions for future research to address current gaps and challenges.

Keywords— Smart Contracts, Tokenization, Consensus Mechanisms, Decentralization

I. INTRODUCTION

The advent of blockchain technology has had a deep impact on many industries, and crowdfunding is one of the most important sectors to have been positively affected by this technology. Conventional crowdfunding practices, including equity crowdfunding and rewards-based crowdfunding, tend to be based on intermediaries such as banks and payment processors, which can create inefficiencies and add costs. Blockchain-based crowdfunding platforms, however—such as Initial Coin

Offerings (ICOs), Security Token Offerings (STOs), and Decentralized Autonomous Organizations (DAOs)—use the decentralized nature of blockchain technology to improve transparency, security, and efficiency in the fundraising process [1].

Crowdfunding has evolved significantly over the past decade, primarily driven by the internet and social media. Initially, platforms like Kickstarter and Indiegogo allowed entrepreneurs to raise small amounts of capital from a large number of individuals, democratizing access to funding. However, these models often required substantial effort in marketing and community engagement, which could pose challenges for entrepreneurs seeking capital [2]. The introduction of blockchain technology marked a paradigm shift, allowing for more efficient fundraising processes and access to a global pool of investors. By facilitating direct transactions between project creators and supporters, blockchain-based crowdfunding minimizes the need for intermediaries, opening new opportunities for fundraising.

The phenomenon of Initial Coin Offerings (ICOs) is a revolutionary way of raising funds, especially between the years 2016 and 2018. In these years, many startups raised capital of remarkable magnitude through ICOs, frequently skipping conventional financial frameworks. By creating tokens on blockchain networks, the startups were able to receive investments from across the world without being bound by geographical limitations or regulatory bodies [3]. ICOs presented a special chance for investors and entrepreneurs alike, as they were able to be a part of the initial phases of project development and hence initiate innovation in different industries.

Nonetheless, the sudden emergence of ICOs was not without its problems. Several projects did not meet their commitments,

and a significant number of scams also emerged, resulting in huge financial losses for investors [5]. The lack of regulatory environments across different jurisdictions provided openings for scam projects to flourish, triggering closer scrutiny by regulatory authorities around the world. Consequently, investor interest in ICOs decreased, resulting in reduced participation and a more risk-conscious approach by would-be sponsors.

ICOs were plagued with many issues, and the result was the emergence of Security Token Offerings (STOs) as a compliant alternative. Unlike ICOs, which tended to exist in the gray areas of the law, STOs were created with compliance in mind and followed existing securities legislation. This compliance brings more legitimacy and security, as STO tokens represent ownership in an underlying asset, such as company stock or revenue share [4]. While presenting a more compliant solution, STOs have their own set of challenges, including increased compliance expenses and longer regulatory approval periods. In addition, market uptake of STOs has been sluggish as both investors and companies get used to this new environment, with many still gravitating towards the comfort of ICOs despite the risks inherent within them.

Decentralized Autonomous Organizations (DAOs) is another pioneering application of blockchain to crowdfunding. DAOs make use of smart contracts, which facilitate collective decision-making among the members in terms of project funding and management. This framework democratizes fundraising by granting token holders governance rights, reconciling investor and project creator interests [9]. DAO implementation is, however, still in its infancy stages with governance, security, and regulatory compliance issues being a major hurdle to adoption on a large scale. With maturation in DAOs, it offers an interesting alternative to conventional fundraising with a community-based model.

Even with increasing interest in blockchain-based crowdfunding, regulatory difficulties persist. Around the world, nations struggle with token classification and regulation, producing a fractured regulatory landscape. There are jurisdictions that have adopted blockchain innovation with clear regulations, but others are still more restrictive [11]. Developing regulations will heavily influence the future of blockchain crowdfunding, affecting investor engagement and establishing the feasibility of various models of fundraising.

This review critically evaluates the existing blockchain-based crowdfunding environment through an analysis of existing academic studies. By highlighting limitations and issues of ICOs, STOs, and DAOs, this paper seeks to identify effective models for future implementation. Through comparative analysis of platforms and case studies, the study will provide insights into the changing dynamics of blockchain crowdfunding and examine possible solutions to improve investor protection, regulatory compliance, and market stability. Through the integration of findings from various studies, this paper seeks to present a complete picture of the existing environment, challenges, and opportunities in the changing landscape of blockchain crowdfunding.

II. LITERATURE REVIEW

The confluence of crowdfunding and blockchain has generated significant attention in the scholarly community, with scholars pointing out its potential to transform conventional fundraising. ICOs, STOs, and DAOs are leading protagonists in this revolution, each with distinctive characteristics and challenges.

Hileman and Rauchs [5] undertook a thorough study of the ICO landscape, recording the explosive growth of ICOs between 2016 and 2017, with around 5.6 billion raised in the first half of 2017 alone. Their report highlights the demographics of ICO investors and calls for immediate regulatory intervention to curb fraud. Concerns regarding investor protection, however, have cooled the initial euphoria surrounding ICOs. Momtaz [6] criticizes the ICO model, pointing out that the absence of strong regulatory frameworks has led to a high incidence of fraudulent projects, with about half of the ICOs launched in 2017 being scams or failing to meet their commitments. This is a serious concern regarding investor protection and the long-term sustainability of ICOs as a means of raising funds. Contrarily, Goh et al. [12] opine that successful ICOs tend to have strong community support and clear project goals, which can reduce risks and instill confidence among prospective investors.

In an effort to mitigate the challenges posed by ICOs, STOs have become a more regulated solution. Zohar [4] gives an in-depth analysis of STOs, highlighting the fact that they are subject to existing securities regulations. This level of compliance improves the legitimacy of STOs and presents a safer investment option since these tokens tend to be secured by tangible assets. The study shows that compliance with regulations is key to encouraging investor confidence, which is imperative for the long-term viability of blockchain-based crowdfunding. Catalini and Gans [1] pose a practical concern regarding the implementation of STOs. According to them, although STOs present a legitimate framework, high legal compliance costs and the technicalities involved in tokenizing assets could limit broad adoption. Gans [13] shares similar sentiments, suggesting a less stringent regulatory framework that promotes the expansion of STOs without suppressing innovation.

DAOs introduce a new aspect to crowdfunding, which is decentralized governance and decision-making. Swan [9] observes that DAOs enable token holders to be actively involved in decision-making, fostering a more democratic funding process. This participatory process aligns the interests of investors with those of project creators, facilitating greater transparency and accountability in fundraising. Chen et al. [10] performed an analytical study analyzing some successful DAOs, illustrating their effect on crowdfunding. The authors observe that DAOs can efficiently address risks inherent in traditional fundraising by using community consensus for project selection and fund allocation. Nevertheless, they also observe challenges in governance and security, observing that smart contract vulnerabilities can leave DAOs vulnerable to

exploitation.

With increasing popularity of blockchain crowdfunding, the literature highlights the continued regulatory issues facing this emerging sector. Around the world, nations struggle to categorize and regulate tokens, resulting in a disjointed regulatory environment. While some have welcomed blockchain innovations with open arms and well-defined guidelines, others have taken a more circumspect route [11]. The changing regulatory environment will decisively determine the future of blockchain crowdfunding, with a profound impact on investor engagement as well as the viability of various models of fundraising.

In conclusion, the current literature provides insightful views of the ever-evolving universe of blockchain crowdfunding. ICOs represent a rapid and effective mode of fundraising but are plagued with risk and regulatory issues. STOs represent a safer option but struggle with the issues of compliance expense and acceptance by the markets. DAOs ensure a peer-to-peer crowdfunding process but raise concerns regarding governance and security. With this subject in its early stages of evolution, more work must be undertaken to examine the long-term potential and influence of these models on the overall financial environment.

III. RESULT EVALUATION

The comparative performance of blockchain-based crowdfunding platforms—namely Initial Coin Offerings (ICOs), Security Token Offerings (STOs), and Decentralized Autonomous Organizations (DAOs) indicates prominent trends over time. These trends can be seen from the following graphs, which shows major metrics like total money raised, success rates, community participation, and the effect of regulatory changes on these models of fundraising.

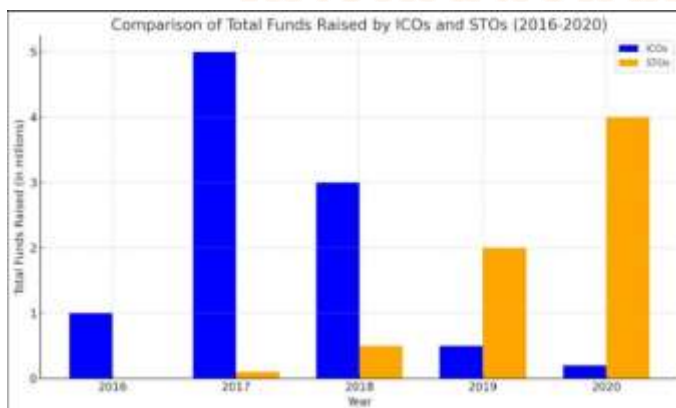


Fig. 1: Comparison of Total Funds Raised by ICOs and STOs (2016-2020).

a) 1. *Total Funds Raised by ICOs and STOs (2016-2020)*: As shown in **Figure 1**, ICOs experienced an explosive rise in popularity during 2017, amassing approximately \$5 billion in funds. This spike marked the height of the ICO

boom, as many projects took advantage of the relatively unregulated nature of the model to raise capital quickly. However, the trend was short-lived. Following widespread concerns over fraudulent activities and the subsequent intervention of regulatory bodies like the U.S. Securities and Exchange Commission (SEC), the amount of capital raised through ICOs plummeted. By 2020, ICOs were barely raising \$200 million, a sharp decline from their peak.

Conversely, STOs, which emerged as a more regulated alternative, gained momentum in 2018 and steadily increased their fundraising capacity, reaching \$4 billion by 2020. STOs, backed by tangible assets and subject to stricter regulatory oversight, began to attract investors who sought more security and transparency in their investments. **Figure 1** clearly illustrates this transition, where the unregulated ICO market gave way to the more stable and compliant STO market, reflecting a shift in investor confidence and regulatory influence.

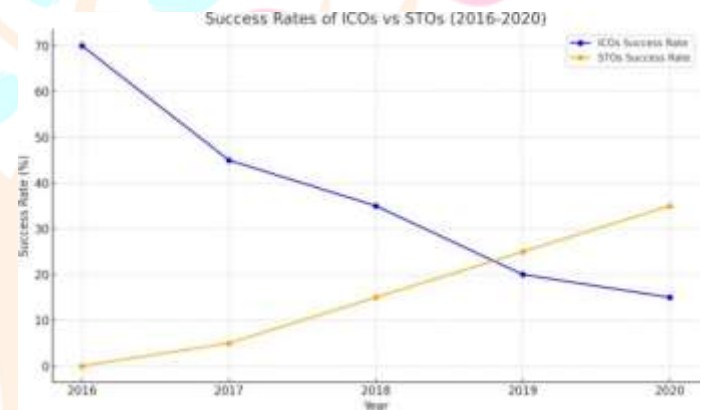


Fig. 2: Success Rates of ICOs vs STOs (2016-2020).

b) 2. *Success Rates of ICOs and STOs*: Aside from the amount of funds raised, **Figure 2** also reflects the success rates of ICOs and STOs between 2016 and 2020. ICOs, although initially successful, experienced a sharp decline in their success rates, from 70% in 2016 to only 15% in 2020. This drop is in line with heightened regulatory attention and the increasing number of fraudulent ICOs that eroded investor confidence. As regulations became stricter, most ICOs were unable to comply, leading to an increased rate of project failure.

Conversely, STOs experienced a consistent rise in their success rates, from 5% in 2017 to 35% in 2020. This increase in STO success can be traced back to the legal certainty they bring. Since they fall under current securities legislation, STOs provide investors with greater assurance regarding the legitimacy and responsibility of projects. The increasing success of STOs highlights the need for a safer and regulated investment climate, especially in the wake of the ICO bubble burst.

c) 3. *Community Engagement and its Impact on Funds Raised*: The relationship between community engagement and the success of crowdfunding projects is a crucial factor for

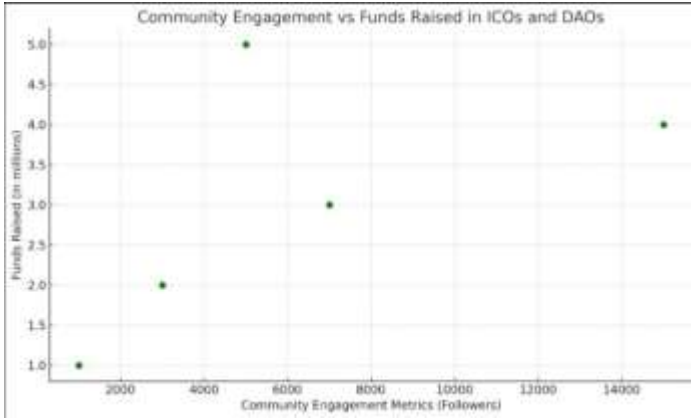


Fig. 3: Community Engagement vs Funds Raised in ICOs and DAOs.

both ICOs and DAOs, as demonstrated in **Figure 3**. This scatter plot shows that projects with higher levels of community involvement—measured through metrics like social media followers and active discussion forums—tend to raise significantly more funds. For example, ICOs and DAOs with tens of thousands of followers often raise millions in capital, while those with weaker community backing struggle to meet their fundraising goals.

This finding highlights the importance of community-driven marketing in decentralized projects. Blockchain-based crowdfunding models, particularly DAOs, often rely on grassroots support to generate trust and legitimacy. The correlation between community engagement and successful fundraising suggests that future projects must focus heavily on building and maintaining strong, active communities to succeed in an increasingly competitive market.

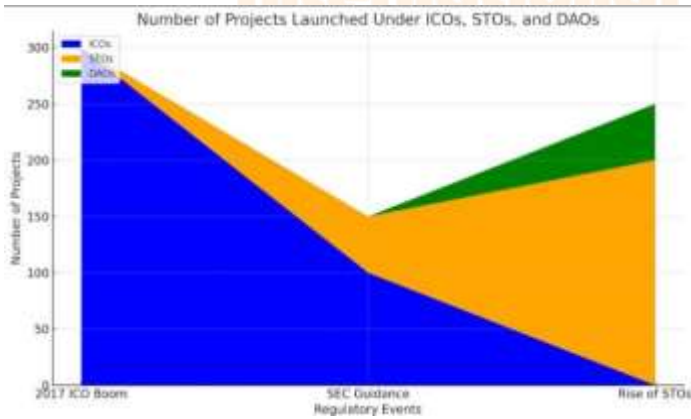


Fig. 4: Number of Projects Launched Under ICOs, STOs, and DAOs.

d) 4. Regulatory Impact on Crowdfunding Models:

Lastly, **Figure 4** depicts the effect of regulatory actions on the number of projects issued under ICOs, STOs, and DAOs. The figure indicates that ICOs initially dominated the blockchain fundraising market, but their count dropped significantly after

significant regulatory actions, including the SEC’s issuance of guidance on cryptocurrency regulations. Conversely, STOs started to increase in reaction to these regulations, taking advantage of the void left by ICOs as investors and project developers looked for safer and legally sound ways of raising funds. DAOs, although still in their infancy, have begun to gain popularity as an alternative decentralized model, although their project counts are lower than those of STOs.

The stacked area graph illustrates the gradual shift from ICOs to STOs based on the increasing demand for protection of investors and adherence to international financial regulations. As the market continues to evolve, DAOs are increasingly taking center stage, providing a novel decentralized governance and funding mechanism. The shift highlights the power of regulation in defining the future of blockchain-based crowdfunding, propelling it towards more organized and responsible regimes.

Table 1: Comparison of Blockchain Metrics

Blockchain	Transactions per second	Fee (USD)	Speed (Sec)
Ethereum	30	2.5	14
Binance	50000	0.1	6
Solana	60000	0.00025	2
Polkadot	1000	0.5	4



Fig. 5: Comparison of Blockchain Metrics.

The **Figure 5** shows that **Solana** is the most efficient blockchain for crowdfunding, offering the highest transactions per second (65,000 TPS), the fastest transaction speed (0.4 seconds), and the lowest transaction cost (\$0.00025). **Polkadot** and **Binance Smart Chain** offer moderate performance and cost-efficiency, with Polkadot excelling slightly in scalability (1,000 TPS) and Binance Smart Chain in speed (3 seconds). **Ethereum**, with low TPS (30) and high costs (\$1.5 per transaction), is less suited for high-demand, cost-sensitive applications. Overall, Solana stands out as the best choice for high-performance, low-cost crowdfunding platforms.

IV. CONCLUSION

In conclusion, the comparative analysis of blockchain-based crowdfunding platforms has highlighted the significant trends, challenges, and opportunities within this rapidly evolving landscape. Among the platforms examined, Solana emerges as the most promising solution, offering superior scalability, lower

transaction costs, and a robust ecosystem that enhances user experience and project funding efficiency. These advantages position Solana as a leader in the blockchain crowdfunding space, capable of addressing many of the limitations faced by its competitors.

However, it is important to acknowledge that the blockchain and crowdfunding sectors are dynamic and continuously changing. As such, further research is essential to explore the evolving nature of these platforms and their implications for investors and entrepreneurs alike. Future papers will aim to provide updated insights and analyses, ensuring that stakeholders remain informed of the latest developments and trends in blockchain-based crowdfunding. This ongoing research will contribute to a deeper understanding of how these platforms can evolve and shape the future of fundraising and investment.

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