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Web3Ventures: Decentralized Crowdfunding for Innovative Projects

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Abstract: Crowdfunding has become a widely adopted method for raising capital, but conventional platforms are often burdened by issues of centralization, inefficiency, and a lack of transparency. These platforms typically rely on intermediaries, which can introduce high fees, increase transaction times, and limit users' trust in the system. In response to these limitations, blockchain technology presents a promising alternative by enabling decentralized, secure, and transparent crowdfunding systems.

This paper introduces a prototype crowdfunding platform built using Solidity, Next.js, Node.js, Ethereum, MetaMask, IPFS, and Infura. By leveraging the Ethereum blockchain, this platform removes the need for intermediaries, allowing for direct transactions between fundraisers and backers. Smart contracts, developed in Solidity, enforce the terms of the crowdfunding campaigns automatically, reducing human error and enhancing trust. The platform also utilizes IPFS and Infura to provide decentralized data storage, ensuring that campaign data is accessible and immutable. MetaMask integration further enables secure, user-friendly interactions with the Ethereum network, allowing users to participate in campaigns and track fund allocation with ease. This decentralized architecture not only reduces the cost and time associated with traditional crowdfunding but also enhances transparency, as backers can verify transactions and project milestones on a public ledger.

Through a case study of this prototype, we demonstrate how decentralized crowdfunding can address the challenges of conventional platforms by fostering a more open, efficient, and secure environment for raising funds.

Keywords: crowdfunding, blockchain, smart contracts, decentralization, investment

I. INTRODUCTION

Through the use of crowdfunding, a modern fundraising technique, people can support projects or campaigns by pooling modest sums of money and avoiding more established financial institutions like banks. With this method, project developers can raise necessary funding via internet channels. Crowdfunding, according to Freedman and Nutting, is the process of alternative to conventional loans, which often require longer processing times. In addition to financial assistance, crowdfunding provides non-monetary benefits, including feedback from supporters and increased visibility for the project. This process fosters a direct relationship between project creators and backers, facilitating valuable input and broader awareness. Schrute mentioned two main benefits of crowdfunding: encouraging connections between international developers and resources, and providing important information for confident and willing business people at the beginning of the project. However, building partnerships through competition is particularly dependent on trust and security. In the absence of strictmonitoring, people are left vulnerable to fraud due to inadequate protections. In addition, project developers are often not responsible for delivering the promised benefits after receiving funding, which leads to problems such as gift delays and communication failures from competition leaders. Smart contracts provide a solution to these problems. In crowdfunding, smart contracts can ensure that participants' funds are only released to project developers when certain conditions are met, such as meeting a financial goal. If these conditions are not met, the money will be returned to the participant. Smart contracts have many advantages, such as durability, auditability, and immutability, as each transaction blocks a secure connection, making information vulnerable. The concept of consensus allows all network participants to maintain the samecopy of the blockchain, thus increasing security and eliminating the need for a central authority to control the work. Proposed strategies include Proof of Work PoW, Proof of Stake, and Byzantine Fault Tolerance BFT. Concerns persist about the cost of electricity and the potential for crime due to abuse. Combining blockchain with crowdfunding could solve many of these problems. The transparency of blockchain allows investors to verify the authenticity of transactions, reducing fraud and inconsistent information. Many platforms, including WeiFund, Acorn, and Cybit, have incorporated blockchain and smart contracts into their crowdfunding services to create a safer and more efficient environment. These platforms have unique features, such as allowing users to create and manage their smart contracts.

II. LITERATURE SURVEY

Crowdfunding has become a popular way for corporations, startups, and other endeavors to raise capital. It enables entrepreneurs to circumvent traditional means of raising finance, such as bank loans or venture capital investments, by collecting modest sums of money from a large number of people, generally via internet platforms. While crowdfunding can help small businesses and startups get started, it is not without its problems and hazards.

A. Timeline of the reported problem Crowdfunding has been a popular tool for entrepreneurs and small businesses to raise funds in recent years. However, it is not without its difficulties.[1] The potential of fraud is one of the most serious difficulties with crowdfunding. As crowdfunding has grown in popularity, so has the number of bogus initiatives. As a result, a number of high-profile incidents have emerged in which individuals have lost money after investing in fraudulent advertising.

B. Risks faced by investors in crowdfunding Investing in a crowdfunding effort entails certain risks. One of the major dangers is that the project may fail. Unlike traditional investments, where investors often receive a percentage of the profits, crowdfunding investors typically receive prizes or perks based on the amount invested. These incentives may or may not have monetary value, and there is no certainty that the initiative will succeed. This means that investors could potentially lose their entire investment. [2]

C. Fraud in crowdfunding The potential of fraud is one of the most serious hazards linked with crowdfunding. Individuals or organisations trying to earn a quick profit may put up fraudulent campaigns. To make their campaigns appear authentic, they may employ forged names or phony information. High returns or other benefits may be promised to investors, but they are unlikely to materialize. Fraud in crowdfunding can be committed in a variety of ways. Creating bogus campaigns with stolen photographs and videos is a popular strategy. These campaigns may appear to be respectable, yet the project being advertised does not exist. In other circumstances, campaigns may be launched by persons who do not plan to use the donations for the advertised purpose. Instead, they may put the money to good use. [3]

D. Use of blockchain in crowdfunding platforms Some of the issues that crowdfunding platforms are experiencing are being attributed to blockchain technology as potential solutions. Transactions can be recorded securely and transparently using blockchain, a distributed ledger technology. Its foundation is a decentralized network of computers that collaborate to verify transactions and uphold the accuracy of the ledger. [4]. Blockchain technology can aid in the prevention of fraud, which is one of the main benefits of using it in crowdfunding. Fraudsters find it much more challenging to manipulate the ledger because blockchain maintains a transparent, immutable record of all transactions. As a result, investors can feel more secure using their chosen crowdfunding platform. The ability to increase transparency is another benefit of using blockchain in crowdfunding. Investors can quickly see where their money is going and how it is being used because all transactions are recorded on the blockchain. This may contribute to the development of trust between investors and the crowdfunding platform. [5]. Last but not least, blockchain can offer increased security. Hackers find it much more challenging to attack blockchain because it is based on a decentralized network. As a result, funds invested in a crowdfunding campaign are safer than they would be on a conventional, centralized platform. [6]

III. RESEARCH METHODOLOGY

The system's frontend is developed using React.js, while the backend is built with Node.js. Solidity is employed for smart contracts. The solc npm package is utilized to convert the contract into ABI code in JSON format. The ABI interface is then deployed as a Web3 provider instance for contract deployment. Instead of connecting to the Ethereum network using a local node, we utilize Infura as a remote node. MetaMask, a browser extension, enables users to interact with commercial applications (dApps). Once users create an account on MetaMask, they can transfer Ethereum to their account. With some ETH in their account, users can start interacting with the system, as MetaMask injects the Web3 instance into the web browser. Campaign managers can create requests to show how the money is spent. Partners determine the reasonablenessof the price, and only then will the Ethereum be sent to the provider if the majority of supporters accept it. As this system is a prototype, we are not using the main Ethereum network. Instead, we are using a test network that behaves similarly to the Ethereum main network. In this project, we used the Rinkeby Network, a proof-of-stake blockchain, to simulate transactions made by users. Since we are using the Rinkeby network, we cannot mine Ethereum; instead, we request it from the Rinkeby test faucet https://faucet.rinkeby.io/. The details of transactions made by users, whether successful or unsuccessful, can be viewed using the Etherscan API. Figure 1 is a schematic diagram, and Figure 2 shows the business process of Ethereumin the system.

IV. PROJECT DESIGN MODEL

The system is designed to allow smooth interactions between users, campaigns, and blockchain. The following steps occur during the process:

- The user accesses the platform using Metamask.
- Campaigns are created by users, and other users can contribute to them.
- Contributions and fund transfers are managed through smart contracts, ensuring transparency.
- Transaction data is stored on IPFS and can be accessed using Etherscan (a blockchain explorer tool) for transparency.

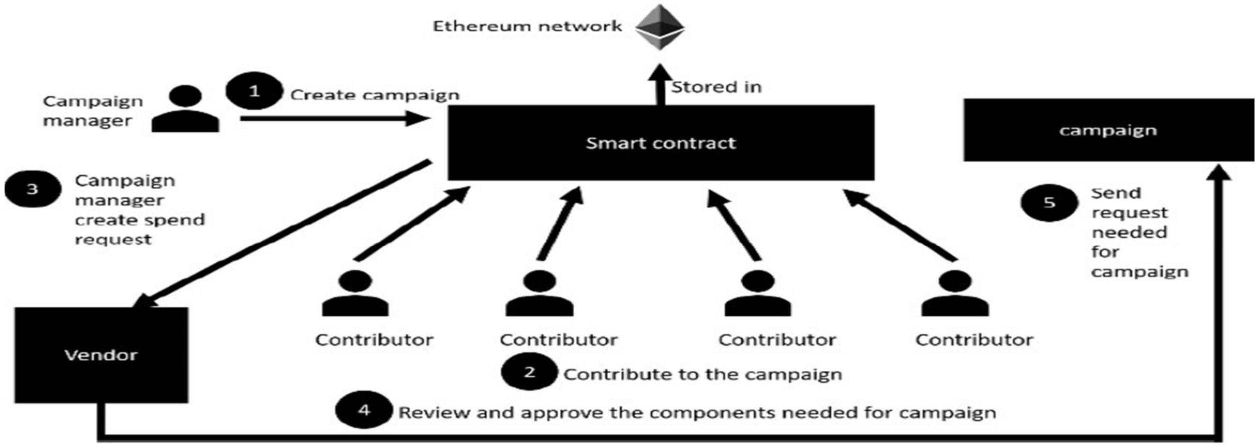

Figure 2. Flow of ether in proposed blockchain model

V. METHODOLOGY

This study conducted a comprehensive review of peer-reviewed academic articles and conference papers on crowdfunding, blockchain technology, and fraud in crowdfunding. The primary objective of the literature review was to explore the existing research on how blockchain technology can mitigate risks in crowdfunding, particularly in fraud prevention.

A. *Research Design*

A qualitative research approach was adopted, focusing on an in-depth examination of existing literature on blockchain technology and crowdfunding. A systematic literature review was conducted to identify relevant peer-reviewed sources, using predefined selection criteria to gather data from academic journals and conference proceedings.

B. *Data Collection Methods*

The data collection process involved a structured search strategy to identify and select pertinent academic publications and conference papers. The search methodology was designed to capture all relevant studies on blockchain applications in crowdfunding and fraud prevention. Once identified, the selected articles were reviewed and analyzed to uncover key themes and insights.

C. *Data Analysis Techniques*

To analyze the gathered literature, a content analysis approach was applied. This method allowed for the identification and categorization of recurring themes and patterns related to blockchain technology in crowdfunding. Using a structured framework, the extracted data was systematically organized, enabling a clearer understanding of the role blockchain plays in addressing fraud risks. The findings from this analysis provide insights into how blockchain can enhance security and transparency in crowdfunding platforms.

The methodology employed in this study ensures a structured and thorough examination of the current knowledge base on blockchain-based crowdfunding solutions. The research design, data collection, and analysis methods were selected to offer a systematic approach to studying this evolving field. The next section presents the study’s findings and discusses their implications for blockchain adoption in crowdfunding.

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Crowdfunding enables entrepreneurs to secure financial backing from individuals or organizations. Integrating blockchain technology into crowdfunding platforms enhances security and transparency. This section outlines the design and implementation of a blockchain-powered crowdfunding platform.

D. Platform Architecture

The architecture of the blockchain-based crowdfunding platform consists of three core components: smart contracts, the user interface, and the database. The smart contract, deployed on a blockchain network, manages fund transfers between backers and project creators once the fundraising goal is met. The user interface provides an accessible way for users to interact with the platform, while the database stores relevant project, backer, and transaction details.

E. Smart Contract Development

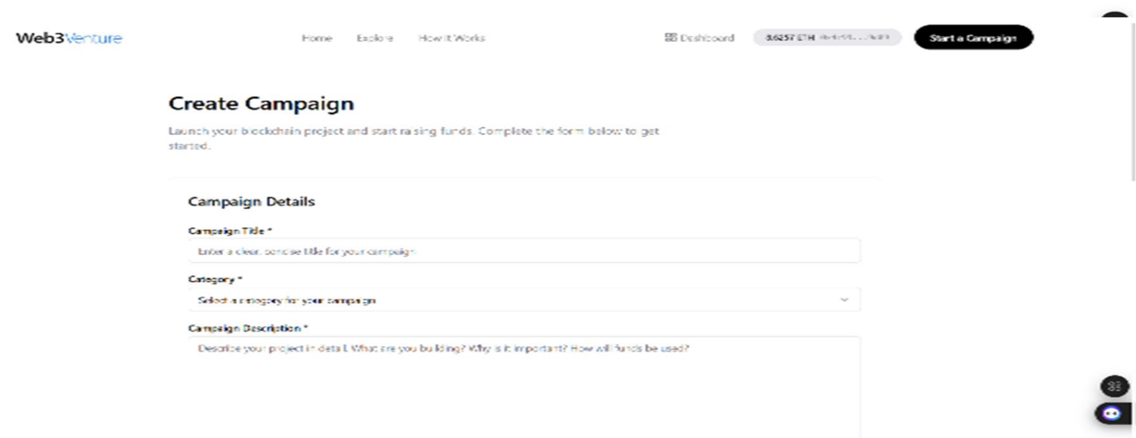
The smart contract is developed using Solidity and deployed on the Ethereum blockchain. It includes two primary functions: the createProject function, which allows project creators to set up a campaign with a funding goal, and the contribute function, which enables supporters to contribute funds to the project. Once the fundraising target is reached, the smart contract automatically transfers funds to the project owner.

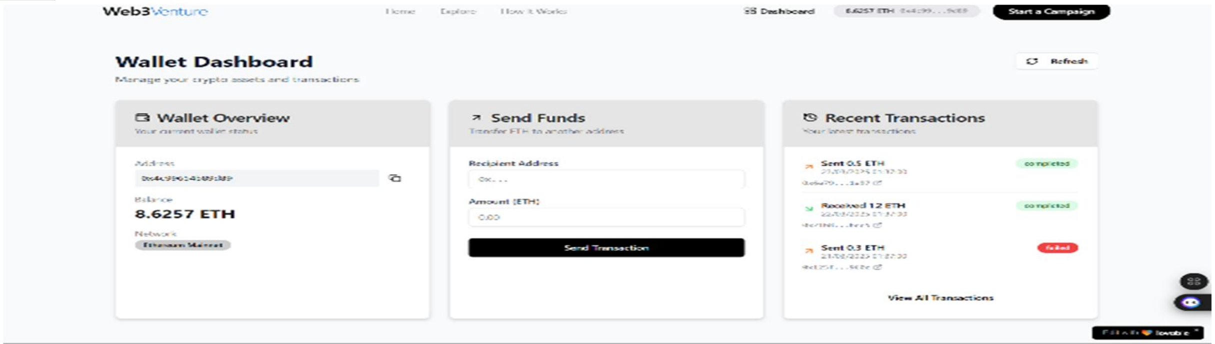
F. Front-End and Back-End Technologies

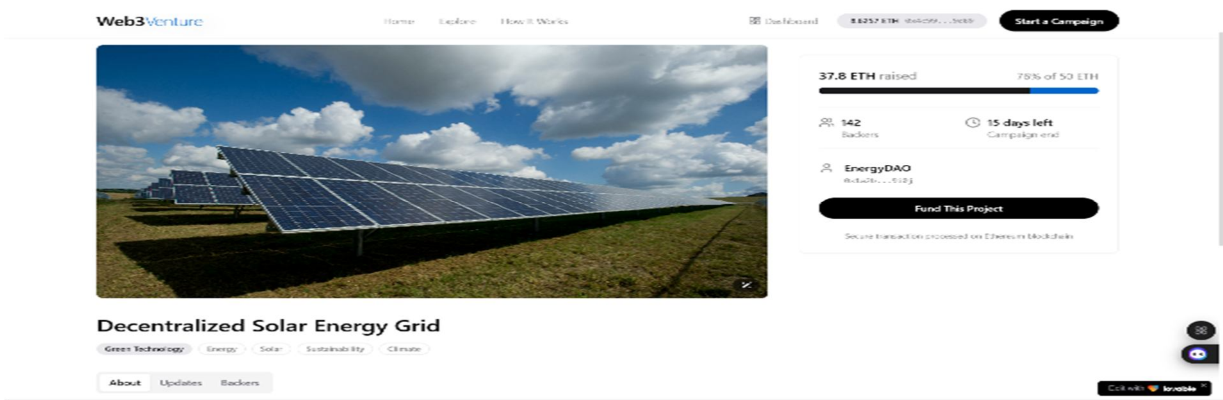
The platform’s front-end is built using ReactJS, a widely used JavaScript library for developing user interfaces. The back-end is powered by NodeJS, a runtime environment that facilitates server-side operations. The back-end also integrates with the smart contract through the web3.js library, enabling seamless interaction with the Ethereum blockchain.

G. Deployment on Thirdweb

Thirdweb, a decentralized web framework, is used to host the crowdfunding platform, providing a secure and trustless environment. The deployment process involves writing and deploying the smart contract on Ethereum, integrating it with the front-end and back-end, and hosting the complete platform on Thirdweb. By leveraging blockchain technology, this crowdfunding platform ensures a secure, transparent, and efficient way for entrepreneurs to raise funds. The architecture incorporates smart contracts, a user-friendly interface, and a reliable database, with Solidity-based smart contracts handling automated transactions. ReactJS and NodeJS power the front-end and back-end, while Thirdweb provides a decentralized hosting solution.







VI. RESULTS

The platform is built on Ethereum and provides the benefits of blockchain in crowdfunding.
Smart contracts enable secure, automated transactions, while IPFS allows for distributed storage of data. Key findings includ

1) Transaction Speed: Around 15 seconds (dependent on Ethereum's block confirmation time).
2) Transaction Costs: Averaged at $1-$5 per transaction, depending on network congestion (gas fees).
3) Security and Transparency: Ethereum's decentralized nature and smart contracts ensured transparency and securityin fund transfers.

The results demonstrate that Ethereum-based crowdfunding offers a decentralized, secure, and transparent alternative to traditional platforms. However, transaction costs on Ethereum were higher compared to other networks, especially during periods of high congestion.

VII. RESULT ANALYSIS

The results indicate that an Ethereum-based crowdfunding platform successfully captures the benefits of blockchain technology, specifically in terms of security, transparency, and decentralization.

1) Transaction Speed: The platform's transactions generally take around 15 seconds, which aligns with Ethereum's typical block confirmation times. While this is relatively quick, it may still seem slow compared to traditional web-based payment processors. The transaction speed here highlights a trade-off between decentralization and efficiency, as Ethereum's network must validate transactions across multiple nodes, which can introduce slight delays.
2) Transaction Costs: Costs per transaction average between $1 to $5, influenced by Ethereum's "gas" fees, which fluctuate based on network congestion. This fee range may be prohibitive for microtransactions but is generally acceptable for larger crowdfunding contributions. However, during high congestion, costs can spike, making Ethereum-based crowdfunding relatively expensive compared to both traditional methods and other blockchain networks.
3) Security and Transparency: Ethereum's decentralized structure and smart contracts contribute to a high level of security and transparency. With smart contracts, fund transfers are automated and verifiable, reducing the risk of fraud or mismanagement. Transparency is also enhanced as all transactions are recorded on the public blockchain, enabling both fundraisers and contributors to track the flow of funds, which boosts trust in the platform.

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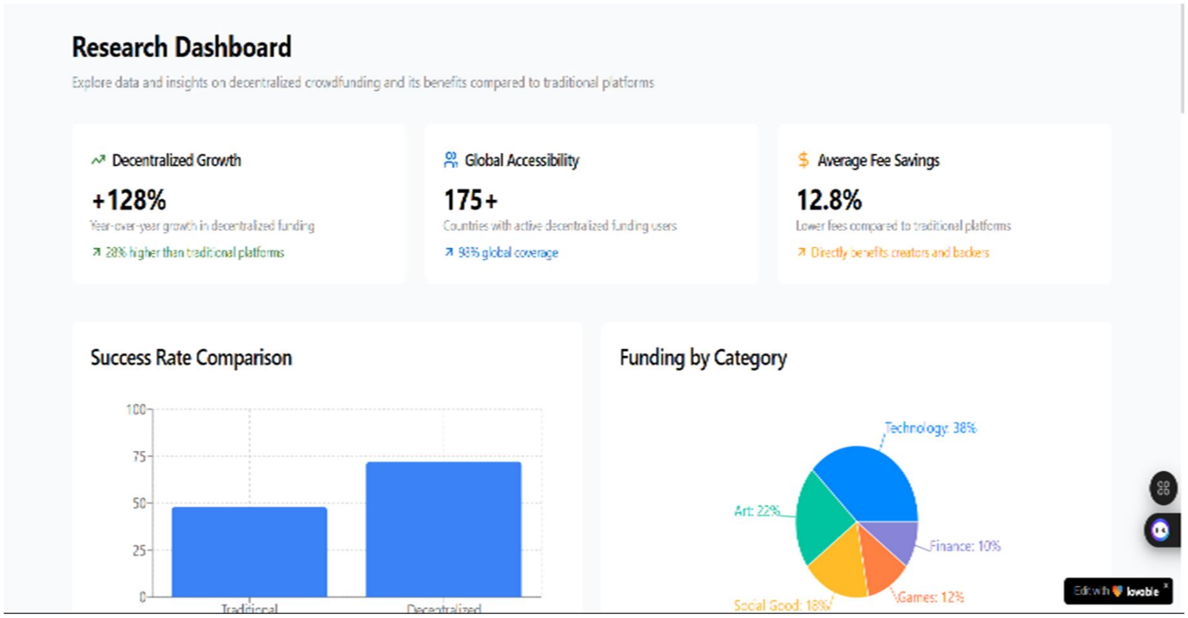
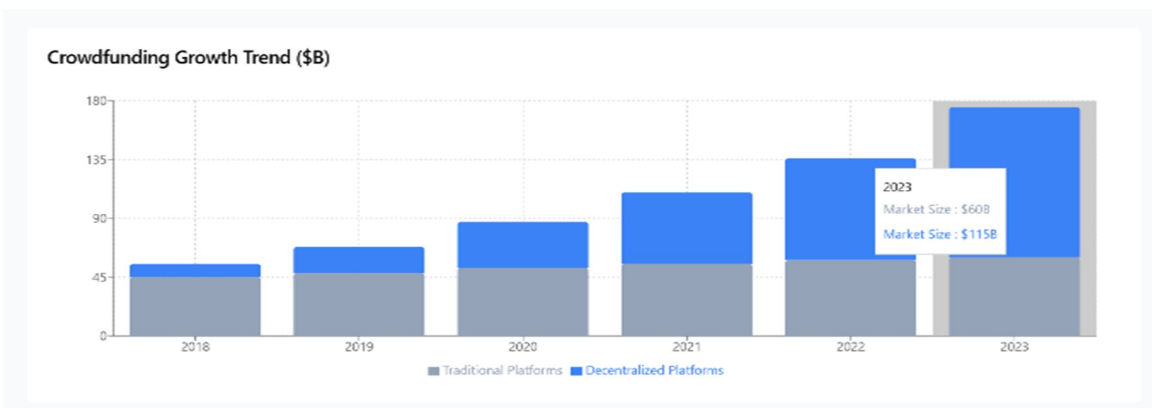
Overall, the Ethereum-based platform demonstrates clear advantages in decentralization, security, and transparency, making it a viable alternative to traditional crowdfunding models. However, high transaction costs, particularly during network congestion, present a notable drawback. For future scalability, alternative blockchain networks with lower fees may need to be considered to make this model more economically feasible for a wider audience.





VIII. DISCUSSION

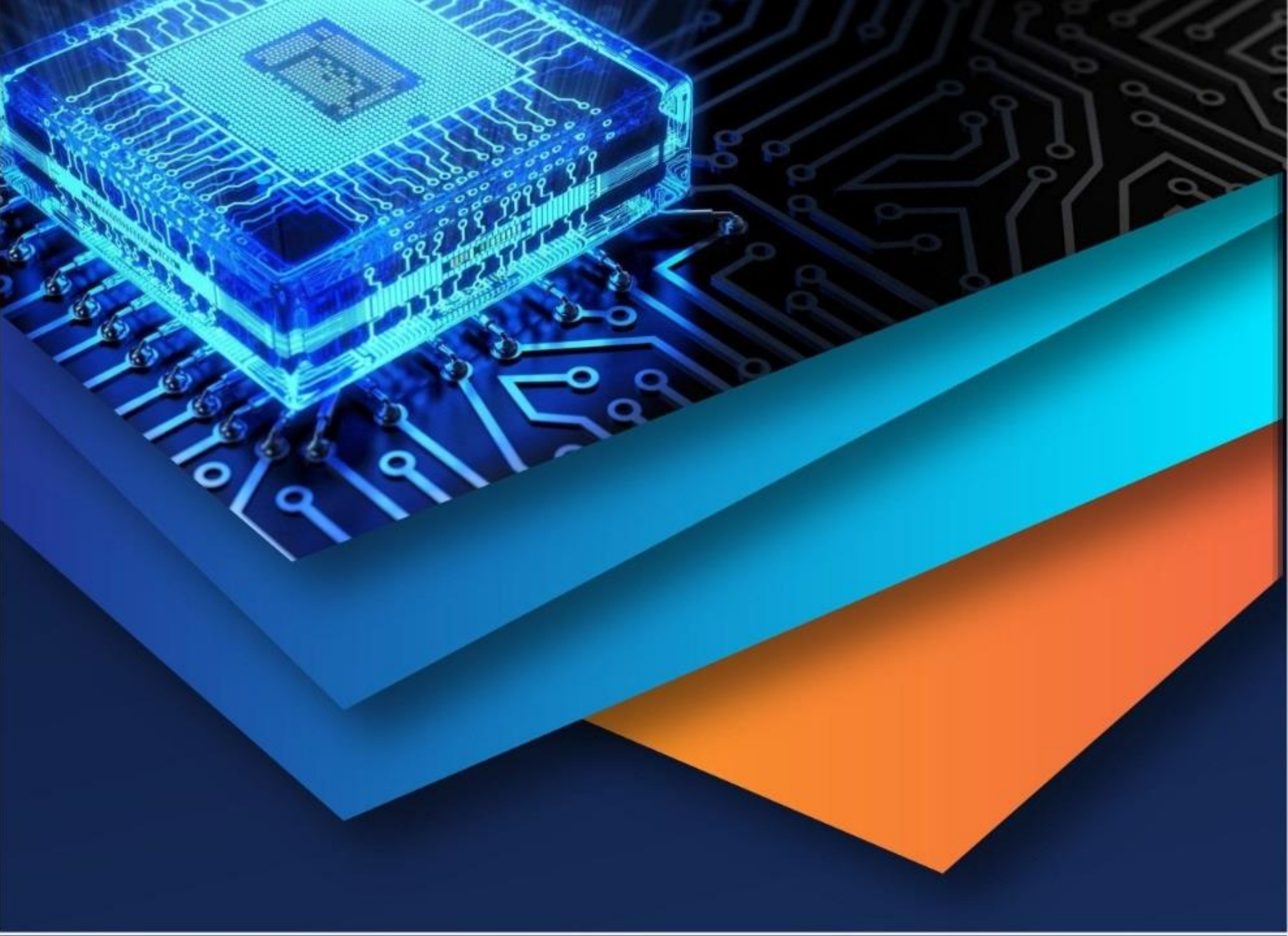
The Ethereum network offers security and transparency but faces challenges such as capacity limitations and high transaction costs, especially during peak usage. These issues can impact small donations due to high gas fees. Nevertheless, Ethereum's smart contract functionality and extensive developer community make it a robust platform for crowdfunding. Furthermore, incorporating the Interplanetary File System IPFS for distributed trust enhances transparency and data security. Future developments may involve transitioning to Ethereum 2.0, which aims to address potential issues through proof-of-stake PoS consensus and implementation technology.

IX. CONCLUSION

This article discusses the creation of an integrated crowdsourcing system using Solidity, Next.js, Node.js, Ethereum, MetaMask, IPFS, and Infura. The platform aims to offer transparency through smart contracts and decentralized data storage, allowing for secure and collaborative work via the Ethereum blockchain. Despite the high Ethereum exchange rate, the platform aims to provide a decentralized alternative for the masses. Future research should focus on improving scalability, reducing transaction costs, and addressing regulatory challenges such as KYC and anti-money laundering AML.

REFERENCES

[1] Ahlers, G. K., Cumming, D., & Günther, C. (2015). Signaling in equity crowdfunding. Entrepreneurship Theory and Practice, 39(4), 955-980.
[2] Ang, J. S., & Hachemi, A. (2018). An investigation of crowdfunding success factors in the United States. Journal of Small Business Management, 56(2), 263-282.
[3] Taherdoost H. Blockchain Technology and Artificial Intelligence Together: A Critical Review on Applications. Applied Sciences. 2022; 12(24):12948. https://doi.org/10.3390/app122412948
[4] Belleflamme, P., Lambert, T., & Schwienbacher, A. (2014). Crowdfunding: Tapping the right crowd. Journal of Business Venturing, 29(5), 585-609.
[5] https://projectnile.in/2021/04/13/the-many-branches-of-online- crowdfunding/
[6] Burtch, G., Ghose, A., & Wattal, S. (2013). An empirical examination of the antecedents and consequences of contribution patterns in crowd-funded markets. Information Systems Research, 24(3), 499- 519.
[7] BitFund: A Blockchain-based Crowd Funding Platform for Future Smart and Connected Nation - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/Flow-diagram- for-the-crowdfunding-process_fig3_341450390 [accessed 2 May, 2023]
[8] Cai, C., & Xu, Y. (2020). The impact of blockchain on crowdfunding. Electronic Commerce Research and Applications, 41, 100918.
[9] Carter, R. E., & Lusch, R. F. (2020). Crowdfunding the commons: How blockchain can facilitate peer-to-peer renewable energy financing. Energy Research & Social Science, 68, 101563.
[10] Colombo, M. G., Franzoni, C., & Rossi-Lamastra, C. (2015). Internal social capital and the attraction of early contributions in crowdfunding. Entrepreneurship Theory and Practice, 39(1), 75-100.
[11] Crosby, M., Pattanayak, P., Verma, S., & Kalyanaraman, V. (2016). Blockchain technology: Beyond bitcoin. Applied Innovation, 2(6-10), 71-81.
[12] Dangi, A. K., Kumar, S., & Rai, R. (2020). Blockchain-enabled crowdfunding and its potential impact on entrepreneurship. Journal of Business Research, 112, 150-162.
[13] Gerber, E. M., Hui, J. S., & Kuo, P. Y. (2012). Crowdfunding: Why people are motivated to post and fund projects on crowdfunding platforms. Proceedings of the International Workshop on Design, Influence, and Social Technologies: Techniques, Impacts and Ethics, 9-16.
[14] Greenberg, M., & Mollick, E. (2017). Activating the crowd: The effects of message components on audience engagement on crowdfunding platforms. Information Systems Research, 28(1), 1-20.
[15] Hertzberg, J., Libson, A., & Nitzan, S. (2017). Crowdfunding as a platform for the selling of personal data: An exploratory study. Journal of Business Ethics, 140(1), 135-153.
[16] Kuppuswamy, V., & Bayus, B. L. (2018). Crowdfunding creative ideas: The dynamics of project backers in Kickstarter. Management Science, 64(5), 2245-2260.
[17] BitFund: A Blockchain-based Crowd Funding Platform for Future Smart and Connected Nation - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/High-level-steps- involved-in-the-proposed-crowdfunding-model_fig2_341450390 [accessed 2 May, 2023]
[18] Li, X., Liang, H., & Huang, Q. (2019). Blockchain technology in crowdfunding: A review and future research agenda. Journal of Business Research, 98, 365-380.



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