Survey On Crowd Funding Platform Using Ethereum Smart Contract

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Abstract- *Ever dreamed of turning your idea into reality but lacked the funds? Crowd funding empowers individuals like you to raise money from a large online community, ditching the limitations of traditional fundraising methods. Platforms like Kick starter bridge the gap between aspiring entrepreneurs and potential backers worldwide. However, existing systems often grapple with fees, transparency issues, and concerns about trust. Here's where our innovative application comes in! We built a transparent crowd funding platform that leverages Blockchain technology to revolutionize the game. By utilizing smart contracts, we ensure that every transaction is securely recorded and verifiable, fostering trust and eliminating concerns about hidden fees or opaque processes. So, ditch the limitations and join our community of dreamers! Together, let's turn ideas into reality with the power of transparency and cutting-edge technology.*

Keywords- Crowd funding Platform, Ethereum Smart Contract, Blockchain Technology, Solidity Privacy.

I. INTRODUCTION

Democratizing Fundraising with Blockchain:- Crowd funding revolutionized fundraising, empowering individuals to bring their ideas to life through community support. However, existing platforms face limitations, including opaque fees, trust concerns, and lack of transparency. This paper proposes a novel crowd funding platform built on Ethereum smart contracts, offering:

- Every transaction is immutably recorded and verifiable on the Blockchain, fostering trust and eliminating hidden fees.
- Automated Processes: Smart contracts eliminate manual intervention, ensuring funds are released only upon achieving predefined goals or automatically returned if unmet.
- Decentralized Control: Users interact directly with the smart contract, minimizing platform control and potential manipulation.
- Friction-less Contribution: Integration with crypto currency wallets enables seamless contributions and faster funding cycles.
- This paper delves into the methodology, design, and implementation of this innovative platform, highlighting its potential to disrupt the crowd funding landscape and empower a new generation of creators.

II. METHODOLOGY

1. **Smart Contract Design:** Define key functionalities: Outline actions the contract will perform, like accepting contributions, storing funds, releasing funds based on goals, and handling refunds. Develop contract logic: Write code in Solidity (or preferred language) to implement functionalities, ensuring security and edge case handling. Integrate with user interface: Connect the contract to a user-friendly platform where users can interact with its functions (e.g., contribute, track progress).
2. **System Architecture:** Decentralized approach: Design a system where participants interact directly with the smart contract, minimizing platform intervention.
3. **Data storage**: Leverage Blockchain for storing transaction data and project information immutably and transparently. Security considerations: Implement best practices for smart contract security audits and penetration testing.
4. **Testing and Evaluation:** Unit testing- Test individual contract functions in isolation. Integration testing- Ensure smooth interaction between the contract and user interface.
5. **Potential Challenges:**

Scalability: Consider limitations of the Ethereum network and explore Layer 2 solutions if needed.

User adoption: Address the learning curve associated with crypto currency wallets and Blockchain interaction.

Regulatory compliance: Ensure adherence to relevant financial regulations in your target market.

III. LITERATURE REVIEW

1. **Introduction**: Briefly introduce crowd funding and its limitations. Highlight the potential of Blockchain technology, specifically Ethereum smart contracts, to address these limitations.
2. **Existing Crowdfunding Platforms:** Review existing crowd funding platforms (e.g., Kickstarter, Indiegogo) and their functionalities. Discuss their strengths and weaknesses, focusing on aspects like trust, transparency, fees, and security. Briefly mention alternative solutions based on other block-chains or technologies.
3. **Smart Contracts for Crowd funding:** Explain the concept of smart contracts and their key features in the context of Crowd funding. Discuss existing research and projects utilizing smart contracts for crowd funding.

Sr. no.	Author/ Organization Name	Title (Year)	Advantages	Disadvantages	Future Scope
1	**1.** Péter Hegedűs.	Towards Analyzing the Complexity Landscape of Solidity Based Ethereum Smart Contracts (2019**).**	**1.Enhanced Security:** By adopting well-known Object-Oriented (OO) metrics for Solidity smart contracts, developers can better identify potential vulnerabilities and faults, leading to improved security. **2. Efficiency:** The findings suggest that smart contracts are relatively short, not overly complex, and well-commented, indicating efficient development practices.	**1. Limited Adoption:** The proposed adoption of OO metrics for Solidity smart contracts may not be widely embraced initially, as it requires developers to learn and integrate new analysis techniques into their workflow. **2. Tool Limitations:** The prototype tool used for analyzing Solidity source files may have limitations in accurately assessing all aspects of smart contract quality,potentially leading to incomplete or biased results.	**1**.The future of Blockchain-based decentralized cryptocurrency platforms lies in leveraging smart contracts for a wider range of applications beyond finance. **2**.Insights from analyzing over 40,000 Solidity files indicate that smart contracts are generally concise, moderately complex, and well-commented.
2	**1.** Milton Chang	Blockchain and the Emerging Trends for Improving "Smart Contract" Security (2020)	**1. Decentralization**: Eliminates the need for a central authority, reducing the risk of single points of failure. **2. Transparency**: Transactions are recorded on a public ledger, providing transparency and accountability.	**1. Scalability Issues**: Limited transaction throughput compared to traditional centralized systems. **2. Energy Consumption:** Proof of Work consensus mechanisms consume significant amounts of energy.	The future of Blockchain security lies in a combination of innovative approaches. Private transactions, Proof of Stake (POS), and Second Factor Authentication are emerging as key strategies to mitigate the risks associated with attacks like the '51% Attack' on Ethereum.

3	**1.** M. V. Ranjith Kumar **2**.Arpit Shukla **3**. Saket Agarwal	Fundraising Portal using Smart Contracts in Blockchain using Group Signatures (April2022)	**1. Transparency:** Blockchain-based fundraising platforms offer transparent transactions, ensuring that contributors can track how their donations are being used. **2 Security:** Smart contracts and multi-signature wallets enhance security, reducing the risk of fraud or misuse of funds.	**1. Complexity:** Implementing and managing smart contracts and Blockchain technology can be complex and require technical expertise, potentially limiting accessibility for some users. **2. Feasibility Analysis:** Address practical challenges like land acquisition and community acceptance for proposed solutions, requiring detailed feasibility analysis for real-world implementation.	**1.** The future scope involves enhancing transparency and trust in fundraising platforms through Blockchain technology, specifically using smart contracts in solidity. **2.** This approach not only overcomes drawbacks in current platforms like Kickstarter but also provides a more efficient and trustworthy platform for raising funds for innovative ideas, campaigns, and startups.
4	**1.** Jiachi Chen **2.** Xin Xia **3.** David Lo **4.** John Grundy **5.** Xiapu Luo	Defining Smart Contract Defects on Ethereum (2020) .	**1. Identification of Contract Defects:** By analyzing smart-contract-related posts and real-world contracts, you're able to identify common defects that may not be immediately obvious. This helps developers understand potential pitfalls and improve their code quality. **2. Categorization of Defects:** Categorizing defects into different types (security, availability, performance, maintainability, and re-usability) provides a structured approach to understanding and addressing them.	**1. Complexity of Remediation:** Identifying defects is one thing, but remedying them can be challenging, especially if they are deeply embedded in the contract logic. **2. Case Study Limitations:** Findings are specific to the southeast Tehran case, limiting generalization to diverse contexts, such as varying geographies and cultures.	**1.** The future scope of this work involves leveraging machine learning techniques to automate the detection and classification of contract defects, thereby improving efficiency and scalability. **2.** Furthermore, exploring advanced analysis methods to identify emerging patterns and trends in contract defects, as well as continuously updating and refining the datasets

					based on feedback and new developments in the field, will contribute to ongoing improvement in smart contract security and reliability.
5	**1.** Tianyu Sun **2.** Wensheng Yun	A Formal Verification Framework for Security Issues of Blockchain Smart Contracts (November 2021)**.**	**1. Reliable Guarantee:** By using formal methods, the verification process offers a reliable guarantee of the smart contract's behavior, minimizing the chance of unexpected outcomes or attacks. **2. Comprehensive Framework:** The establishment of a formal verification framework allows for the systematic inspection of various security issues, enhancing the overall security posture of smart contracts.	**1. Limited Scalability:** Formal verification may face scalability challenges when applied to large-scale smart contracts or in scenarios with high transaction volumes. **2. Human Error:** Despite the rigorous nature of formal verification, it is still susceptible to errors introduced by human operators during the modeling, specification, or verification stages.	**1.** The future scope includes extending formal verification to other Blockchain platforms, refining methods for more complex smart contracts, and exploring applications beyond Blockchain **2**. Such as program verification and foundational research in mathematics and computer science.
6	**1.** Giuseppe Antonio Pierro **2.** Roberto Tonelli **3.** Michele Marchesi	An Organized Repository of Ethereum Smart Contracts' Source Codes and Metrics (2020) **.**	**1. Organized Repository:** Smart Corpus provides a structured and up-to-date repository for Ethereum smart contracts, facilitating easy retrieval of Solidity source code and metadata. **2. Accessibility:** It offers free and immediate access to smart contract data, including source code, ABI, and byte-code, making it convenient for researchers and developers.	**1.** C**omplexity of Retrieval:** While Smart Corpus simplifies the retrieval of smart contract data, extracting specific information for empirical software engineering studies may still require multiple sub tasks, adding complexity to the process.	**1.** Ethereum seems promising, especially with the continued development of smart contracts and decentralized applications (D Apps). **2.** Continued research and development in these areas will likely lead to further advancements and broader use cases for Ethereum in the future.
7	**1.** A. Seitenov **2.** G. Smagulova	Distribution of Ethereum Blockchain Addresses (2020)**.**	**1. Reliability:** Ethereum offers a reliable financial saving option among cryptocurrencies due to its established Blockchain	**1. Regulatory Uncertainty:** The regulatory landscape surrounding cryptocurrencies,	**1.** Ethereum seems promising, especially with the continued development of

			network. **2. Versatility:** Ethereum serves as a platform for creating and launching various cryptocurrencies and decentralized applications (D Apps), providing versatility in its use cases.	including Ethereum, remains uncertain in many jurisdictions, posing legal and compliance risks. **2. User Experience:** The complexity of interacting with Ethereum Blockchain and decentralized applications may present usability challenges for non-technical users.	smart contracts and decentralized applications (D Apps). **2**.Additionally, innovations like the implementation of Blockchain records extraction through IPFS paths demonstrate the ongoing efforts to enhancethe efficiency and scalability of the Ethereum network.
8	**1.** Tianyu Sun **2.** Wensheng Yu	Formal Verification Framework for Security Issues of Blockchain Smart Contracts (2020)**.**	**1. Increased Security:** Formal verification provides a rigorous method to ensure the correctness and security of smart contracts, reducing the risk oferrors and vulnerabilities. **2. Reliable Guarantee:** By using formal methods, the verification process offers a reliable guarantee of the smart contract's behavior, minimizing thechance of unexpected outcomes or attacks.	**1. Complexity:** Formal verification processes can be complex and resource-intensive, requiring specialized knowledge and tools, which may limit widespread adoption and accessibility. **2. Time-Consuming:** The formal verification of smart contracts, especially for larger and more complex contracts, can be time-consuming, potentially slowing down the development and deployment process.	The future scope includes extending formal verification to other Blockchain platforms, refining methods for more complex smart contracts, and exploring applications beyond Blockchain, such as program verification and foundational research in mathematics and computer science.
9	**1.** Yue Wu **2.** Junxiang Li **3.** Jiru Zhou **4.** Shichang Luo **5.** Liwei Song	Evolution Process and Supply Chain Adaptation of SmartContracts in Blockchain	**Reduced Costs:** By eliminating intermediaries, streamlining processes, and reducing errors, Blockchain can help lower transaction costs and administrative expenses in the supply chain.	**Interoperability Issues:** Different Blockchain platforms may lack interoperability, hindering seamless data exchange and collaboration between supply chain partners.	**Ecosystem Expansion:** The Blockchain ecosystem will continue to expand with the development of new use cases, applications, and consortia focused on supply chain management
10	**1** .Xianyun Ge	Smart Payment Contract Mechanism Based on Blockchain Smart	**1. Decentralization:** Eliminates the need for intermediaries, reducing costs and enhancing efficiency. **2. Transparency**:	**1. Scalability:** Current Blockchain networks struggle with scalability issues, limiting transaction throughput.Energy	**Future scope:**The future scope of Blockchain includes increased interoperability, scalability solutions,

		Contract Mechanism (2021)**.**	Transactions are recorded on a public ledger, ensuring transparency and accountability.	**2. Consumption**: Proof-of-work consensus mechanisms, like those used in Bitcoin, require significant energy consumption.	enterprise adoption, regulatory clarity, and integration with emerging technologies like AI and IOT.
11	**1.** Ch. Rupa, **2.** Divya Midhunchakkaravarthy, **3.** Mohammad Kamrul Hasan, **4.** Heshaam Alhumyani **5.** Rashid A. Saeed	Industry 5.0: Ethereum Blockchain technology based DApp smart contract (2021) **.**	**1. Enhanced Security:** Utilizing Blockchain technology can enhance the security of medical certificates by providing immutable records that are resistant to tampering. **2. Privacy:** Blockchain can offer improved privacy by allowing users to control access to their medical data through cryptography techniques.	**1. Cost and Implementation Challenges:** Implementing and maintaining an IoT-based SGS can be costly. It involves the initial investment in smart garbage bins, wireless mesh networks, servers, and routers, as well as ongoing operational costs. **2. Privacy and Data Security Concerns:** Collecting and analyzing data from smart garbage bins may raise privacy concerns. People may worry about their waste disposal habits being monitored and recorded.	1.**Data Analytic's and Predictive Maintenance:** Utilize the collected data to develop advanced analytic and predictive maintenance algorithms. This can help in optimizing waste collection schedules, detecting anomalies, and ensuring the efficient use of resources 2.**Integration with Sustainable Practices:** Integrate the SGS with sustainable waste-to-energy solutions, such as biogas or composting facilities, to further reduce the environmental impact of waste disposal.
12	**1.** Namrata Thakur **2.** Dr. Vinayak D Shindea	Ethereum Blockchain based smart contract for Secured transactions between Founders / Entrepreneurs and Contributors under Start-up Projects (2021)**.**	**1. Global Access:** Blockchain-based crowdfunding platforms can reach a global audience, enabling startups to access a larger pool of potential investors. **2. Reduced Costs:** By eliminating intermediaries and streamlining processes, Blockchain reduces transaction costs associated with traditional funding methods.	**1. Security Risks:** While Blockchain offers enhanced security, it's not immune to hacking or vulnerabilities in smart contracts, posing risks to funds and data integrity. **2. User Adoption:** The adoption of Blockchain technology in crowdfunding may face resistance from traditional investors and stakeholders unfamiliar	**Future scope:** Tokenization of Assets: Blockchain enables the tokenization of assets, allowing startups to tokenize their equity or assets, which could revolutionize traditional fundraising models.

				with the technology.	
13	**1.** Bogner **2.** Andreas **3.** Chanson, **4.** Mathieu **5.** Meeuw **6.** Arne	A Decentralized Sharing App running a Smart Contract on the Ethereum Blockchain (2021)	**1. Ease of Use:** The simplified sign-up process and absence of intermediaries make it easier for users to participate in the sharing economy. **2. Smart Contract Efficiency:** Utilizing smart contracts on the Ethereum Blockchain enables automated execution of rental agreements, reducing administrative overhead and enhancing efficiency.	**1. Cryptocurrency Dependency:** The reliance on cryptocurrencies for transactions may limit adoption among users who are unfamiliar with or skeptical of digital currencies. **2. Regulatory Uncertainty:** The decentralized nature of the platform could pose challenges in terms of regulatory compliance, potentially leading to legal issues in certain jurisdictions.	**Future scope:** Widespread Adoption: As cryptocurrencies become more mainstream and Blockchain technology matures, the adoption of decentralized sharing platforms could increase, leading to broader acceptance and usage.
14	**1.** Ronghua Xu 1 **2.** Yu Chen ID **3.** Erik Blasch ID **4.** Genshe Chen	BlendCAC: A Smart Contract Enabled Decentralized Capability-Based Access Control Mechanism for the IoT (2018)**.**	**1. Efficiency:**BlendCAC provides a lightweight and fine-grained access control solution, optimizing resource utilization and minimizing overhead compared to traditional centralized authorization servers. **2. Flexibility:** The capability-based approach allows for flexible and dynamic access control policies, enabling effective protection of resources and information in diverse IoT environments.	**1. Integration Challenges:** Integrating BlendCAC into existing IoT systems may require significant effort and coordination, especially in environments with heterogeneous devices and protocols. **2. Regulatory Concerns:** Regulatory compliance issues related to data privacy and security may arise, particularly concerning the storage and processing of access control data on a Blockchain network.	**Future scope:** Continued community contributions and collaborations could lead to ongoing improvements and refinements to enhancing its functionality, performance, and usability over time processes and encouraging active participation can lead to more effective and sustainable solutions.
15	**1.** Yonggen Gu **2.** Dingding Hou **3.** Xiaohong Wu **4.** Jie Tao **5.** Yanqiong Zhang	Decentralized Transaction Mechanism Based on Smart Contract in Distributed Data Storage (2018)**.**	**1. Reliability:** Distributed data storage offers increased reliability as data is redundantly stored across multiple nodes, reducing the risk of data loss or unavailability due to hardware failures or network issues. **2. Availability:** With data distributed across multiple nodes, distributed storage	**1. Consistency**: Maintaining data consistency across distributed storage nodes can be challenging, especially in environments with high levels of concurrent access and updates, requiring careful synchronization and coordination	**Future scope Blockchain Integration:** Integration of Blockchain technology with distributed storage systems could enhance data integrity, transparency, and auditability,

			systems can provide better availability, ensuring that data remains accessible even if some nodes fail or become unreachable.	mechanisms. **2. Performance**: While distributed storage systems can offer scalability, the performance of individual data operations may be affected by factors such as network latency, data replication overhead, and the efficiency of data retrieval algorithms.	opening up new possibilities for secure and verifiable data storage and sharing.
16	**1.** Jascha-Alexander Koch **2.** Jens Lausen **3.** Moritz Kohlhase	Internalizing the externalities of over-funding: an agent-based model approach for analyzing the market dynamics on crowdfunding platforms (May 2021).	**1. Addresses limitations of existing data:** Moves beyond analyzing existing data to explore hypothetical scenarios and agent interactions. **2. Evaluates new mechanisms:** Tests proposed solutions like "taxation" for over-funding in a controlled environment without real-world risks.	**1. Model complexity:** Developing and interpreting ABMs can be technically demanding. **2. Limited generalizability:** Results might not directly translate to all crowdfunding platforms due to platform-specific characteristics.	**1. Refine the ABM:** Enhance the model's accuracy and incorporate additional platform features. **2.Explore other policy solutions:** Test alternative mechanisms to address various challenges on crowdfunding platforms. **3.Analyze different platform types:** Extend the research to diverse crowdfunding models (equity, reward-based, etc.).
17	**1.** Aurélien Petit **2.** Peter Wirtz	Experts in the crowd and their influence on herding in reward-based crowdfunding of cultural projects. (November 2016)**.**	**1. Certification effect:** Expert backers can trigger additional contributions and improve the success probability of a funding campaign, which can be beneficial for both creators and backers. **2. Social influence:** Experts can lead the crowd in their decision to contribute to cultural projects, which can help to promote and support new and innovative projects.	**1. Herding:** If too many backers follow the lead of experts without doing their own research, it could lead to inefficient allocation of funding. **2. Exclusion:** If experts are from a narrow group, it could lead to the exclusion of other voices and perspectives.	More research is needed to **u**nderstand the long-term impact of certification effects and rational herding in RBCF campaigns. Research could also explore ways to mitigate the potential negative effects of herding and bias**.**

18	**1.** Namrata Thakur **2.** Dr. Vinayak D Shinde2	Ethereum Blockchain based smart contract for Secured transactions between Founders / Entrepreneurs and Contributors under Start-up Projects (04 September 2021)**.**	**1. Increased trust and transparency:** Blockchain technology can provide a more secure and transparent way to raise funds, as all transactions are recorded on a public ledger. **2. Faster and more efficient fundraising:** Blockchain-based crowdfunding platforms can automate many of the tasks involved in fundraising, such as collecting payments and distributing funds.	**1. Regulatory uncertainty:** The regulatory landscape for Blockchain technology is still evolving, which can create uncertainty for businesses that want to use it. **2. Technical complexity:** Blockchain technology can be complex to understand and implement, which can be a barrier for some businesses.	**1.** As Blockchain technology matures and becomes more widely adopted, it is likely that we will see more and more crowdfunding platforms using it. **2.** Blockchain technology could also be used to develop new and innovative crowdfunding models, such as token-based crowdfunding.

19	**1.** Ali Haji Gholam Saryazdi **2.** Ali Rajabzadeh Ghatari **3.** Alinaghi Mashayekhi **4.** Alireza Hassanzadeh	Developing a Comprehensive Framework for Crowd Funding Factors by Using the Hexagon Technique (01 June 2021).	**1. Accessibility:** Provides funding opportunities for projects that might not qualify for traditional loans or investments. **2.Democratic**: Allows anyone to invest in projects they believe in, regardless of their wealth or status. Transparency: Platforms often provide detailed information about projects, allowing investors to make informed decisions.	**1.High failure rate:** Many projects fail to reach their funding goals. Fraudulent activity: Some platforms have been plagued by scams and fraudulent projects. **2.Limited regulatory oversight:** The industry is still relatively new and regulations are evolving. Potential for bias: Platforms and algorithms may favor certain types of projects or creators.	**1.Technology advancements:** Blockchain technology and other innovations could improve security, transparency, and efficiency. Regulation: Development of clear regulations could increase investor confidence and attract more traditional investors. **2.New models:** Exploring new crowdfunding models like equity crowdfunding and hybrid models. Global expansion: Increased adoption in new markets and regions.
20	**1.** Parmeet Kaur **2.** Sanya Deshmukh **3.** Pranjal Apoorva **4.** Simar Batra	Analysis and Outcome Prediction of Crowdfunding Campaigns (February 2003) **.**	**1. Accessibility**: Provides funding for projects that might not qualify for traditional loans or investments. **2. Community building:** Creates a sense of community around projects and fosters collaboration.	**1. High failure rate:** Many projects fail to reach their funding goals.Some platforms have been plagued by scams and fraudulent projects. **2.Limited regulatory oversight:** The industry is still relatively new and regulations are evolving.	**1. Technology advancements:** Blockchain technology and other innovations could improve security, transparency, and efficiency. **2. Regulation:** Development of clear regulations could increase investor confidence and attract more

					traditional investors.
21	**1.** Christian Garaus **2.** Nadine Izdebski **3.** Christopher Lettl	What Do Crowd Equity Investors Do? Exploring Post investment Activities in Equity Crowd Funding (November 24, 2020.)**.**	**1.** Democratizes accessto capital for startups, giving them more freedom.Crowd equity investors may engage in post-investment activities such as product co-creation, providing market knowledge, and increasing public awareness. **2.** This can potentially benefit startups by providing them with additional resources and support.	**1.** The prevalence of post-investment activities among crowd equity investors is not well-understood.These activities may require significant time and effort from the founders, and may not always be beneficial. **2.** There is a risk of conflicts arising if the founders do not follow the advice of crowd equity investors.	**1.** More research is needed to understand the prevalence and impact of post-investment activities in equity crowdfunding. **2.** Equity crowdfunding platforms could play a role in facilitating communication and collaboration between startups and investors.

The provided paper discusses the benefits and challenges of implementing Blockchain in crowd funding, including transparency, fraud mitigation, and reduced transaction costs. It also explores the potential impact on investors, entrepreneurs, and regulatory frameworks. Blockchain technology has the potential to revolutionize various industries, including crowd funding, smart contracts, and data security. While there are challenges such as scalability, complexity, and regulation, ongoing research and development are addressing these issues and paving the way for wider adoption.

IV. CONCLUSION

Blockchain technology has emerged as a potential solution to address the limitations of traditional crowd funding methods. It offers transparency, immutability, and decentralization, which can enhance trust and reduce fraud risks in crowd funding platforms. Blockchain-based crowd funding platforms enable investors to have control over their contributions and provide a secure and decentralized platform for crowd funding. Smart contracts on the Blockchain can be used to create agreements between project creators and investors, allowing for efficient management and allocation of funding. The implementation of a Blockchain-based crowd funding system can provide trust and transparency, particularly in the medical crowd funding sector. Overall, Blockchain technology has the potential to revolutionize the crowd funding landscape by increasing transparency, mitigating fraud risks, reducing transaction costs, and attracting large amounts of funds from donors and investors.

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