

# Empowering Startup Transparency and Capital Generation

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**Abstract - Blockchain-based application that aims to address the needs of non-listed startups in managing their equity holders and financial information. The application seeks to provide a secure and efficient platform for equity management and financial reporting for non-listed startups. The objective of the application is to store the details of equity holders of a non-listed startup. The application will use blockchain technology to ensure the security and accuracy of equity holder information. This will simplify the process of managing equity and reduce the risk of errors or inaccuracies. The objective of the application is to provide a platform for uploading financial documents of the startup to the website. This will allow startups to easily share their financial information with their stakeholders and provide them with transparency and confidence in the financial health of the company. The objective is to provide a bidding process for equity. This will enable startups to attract new investors and raise capital in an efficient and secure manner. The application will provide a platform for potential investors to place bids for equity and will handle the bidding process in a transparent and secure manner. Finally, the application will allow startups to request a demo of the prototype. This will enable startups to assess the functionality of the application and determine whether it meets their needs. The demo will provide startups with an understanding of how the application can help them manage their equity and financial information.**

**Keywords - Crowdfunding, Smart Contract, Blockchain, Ethereum, Campaign**

## I. INTRODUCTION

Blockchain technology and web technologies have gained significant attention in recent years for their potential to transform various industries. In this study, we propose a blockchain-based application that aims to address the needs of non-listed startups in managing equity holders and financial information.

The decentralized architecture of blockchain technology is a notable advantage, as it guarantees the security and integrity of stored data. This feature renders it particularly suitable for the storage of sensitive information, such as details pertaining to equity holders. By employing a blockchain-based application, equity holder data can be recorded and stored in a manner that is both secure and resistant to tampering. This instills confidence in startups, as they can rely on the protection of their data. Moreover, the decentralized nature of blockchain ensures that the control of information is not centralized in a single entity, but rather accessible only to authorized parties. Consequently, this eliminates the potential for errors or inaccuracies in equity management and establishes a secure platform for startups to effectively manage their equity holders.

The proposed application can also be used to provide a platform for financial document sharing. Startups can upload their financial documents to the website, allowing stakeholders such as investors and customers to access the information easily. This promotes transparency in the financial health of the company and builds confidence among stakeholders. The use of blockchain technology ensures that the financial information is stored securely and is not susceptible to tampering or manipulation.

Another important feature of the proposed application is the bidding process for equity. This provides startups with the opportunity to attract new investors and raise capital in an efficient and secure manner. The application provides a platform for potential investors to place bids for equity and handles the bidding process in a transparent and secure manner. The use of blockchain technology ensures that the bidding process is tamper-proof and provides a secure platform for investors to place their bids.

Finally, the application allows startups to request a demo of the prototype. This enables startups to assess the functionality of the application and determine whether it meets their needs. The demo provides startups with an understanding of how the application can help them manage their equity and financial information.

The proposed application utilizes blockchain technology to provide a secure and efficient means for non-listed startups to handle their equity holders and financial data. By integrating blockchain with web technologies, the solution ensures the secure storage of information and establishes a transparent platform for managing equity and reporting financial information. This approach has the potential to significantly transform the existing practices of equity and financial management in non-listed startups. Moreover, it offers a secure and efficient platform for startups to attract potential investors and raise capital. By harnessing the advantages of blockchain and web technologies, the proposed application presents a trustworthy and dependable solution that brings benefits to both startups and investors.

## II. LITERATURE SURVEY

Dejan Vujicic [1] et al. provides an in-depth analysis of blockchain technology, its challenges, and limitations. It specifically addresses the security and privacy concerns associated with blockchain-based systems. The increasing popularity of cryptocurrencies has also brought about regulatory challenges that are discussed in the paper. The authors offer a retrospective examination of notable decentralized digital currencies that preceded Bitcoin and Ethereum. The structure and limitations of Bitcoin are explored, along with Ethereum's innovative approach to decentralized operations. The characteristics of Ethereum accounts, the process of Ethereum sales, and the significance of ERC commemoratives are also illustrated. Overall, the paper contributes to the existing body of knowledge by examining the evolution and intricacies of blockchain technology, with a focus on the prominent examples of Bitcoin and Ethereum.

Bhabendu Kumar Mohanta [2] et al. provides an overview of smart contracts and their use cases in blockchain technology. Smart contracts are described as self-executing agreements whose terms are written directly into lines of computer code. And how the integration of blockchain technology and smart contracts gives us the flexibility to develop, design, and implement some real-world problems at less cost and time without using traditional third-party systems. Describe what is provided. What a smart contract is, how a smart contract is structured, how to write a smart contract, how smart contracts work, features that make using smart contracts important, benefits of using smart contracts, and in-depth study of use cases in different areas.

The author also describes how smart contracts are used in blockchain networks to enable trusted transactions and agreements between different parties without the need for a central authority or legal system and minimizes the need for a trusted third party and makes the system secure against malicious attacks and the benefits of blockchain-based smart contracts which include speed and real-time updates, accuracy, lower execution risk, fewer intermediaries, lower cost, and the potential for new business or operational models.

Soumya Shree S. Panda [3] et al. focus on the consensus algorithms employed in blockchain technology, which play a crucial role in maintaining data integrity and consistency within decentralized networks. They provide a comprehensive overview of various consensus algorithms, including their operational principles, strengths, and weaknesses. The significance of consensus in managing a secure and efficient blockchain system is discussed, accompanied by an in-depth analysis of different consensus algorithms' performance and fault tolerance capabilities. The paper also highlights the necessity of consensus in distributed systems and examines various consensus mechanisms suitable for both permissionless and permissioned blockchain systems. Among the consensus algorithms examined, the most commonly utilized ones are Proof of Work (PoW), Proof of Stake (PoS), Delegated Proof of Stake (DPoS), and Practical Byzantine Fault Tolerance (PBFT). PoW, the initial consensus algorithm employed in blockchain, demands substantial computational power and energy consumption to achieve consensus. PoS, on the other hand, presents an energy-efficient alternative to PoW by selecting nodes to validate transactions based on their token holdings rather than computational power. DPoS follows a similar approach to PoS but involves a designated group of nodes, referred to as witnesses, responsible for transaction validation and network stability maintenance. PBFT, specifically designed for private blockchains, relies on a high degree of trust among participating nodes to reach consensus.

Yan Chen [4] et al. endorse a brand-new way of raising funds for the young entrepreneurs throughout the globe by using ICO's (initial coin services) also known as token income, which discusses how token sales works, ability drawbacks of token sales at the side of the benefits and risks of investing in blockchain tokens. Also, the paper discusses the capability impact of the blockchain era and blockchain tokens on entrepreneurship and innovation. The authors argue that the decentralized nature of blockchain technology and the capability to create and distribute tokens can lead to a democratization of entrepreneurship and innovation. The principle benefits of the blockchain era is the ability to create decentralized and autonomous systems that could perform without the want for intermediaries. This can cause decreased expenses and improved transparency in lots of industries.

Tien Tuan Anh Dinh [5] et al. provide an introductory overview of Blockchain, which is a decentralized and distributed digital ledger designed to securely and transparently record transactions. It operates through a chain of interconnected blocks, with each block containing multiple transaction records. The ledger is maintained by a network of computers, and once a block is added to the chain, the information it holds becomes permanently fixed and cannot be retroactively modified. This characteristic renders blockchain highly appealing for various applications that necessitate secure and transparent record-keeping, such as digital currencies, supply chain management, and voting systems. The notable attributes of blockchain encompass decentralization, transparency, immutability, and security, collectively establishing it as a robust and dependable platform for conducting digital transactions.

Joe Abou Jaude [6] et al. have discussed the use of blockchain and its applications in different fields. The applications are designed using the features of blockchain and the consensus protocol used in the network. Smart contracts, which are self-executing agreements with terms coded into lines of code, are well-suited for blockchain implementation due to its secure and decentralized nature.

Paul J. Taylor [7] et al. discusses Blockchain technology possesses the capacity to augment cybersecurity through various mechanisms. By eliminating centralized databases and intermediaries, blockchain mitigates the vulnerabilities associated with data breaches and unauthorized access. The decentralized and tamper-proof nature of the blockchain ledger renders it well-suited for storing and managing sensitive information, including digital identities, financial transactions, and other confidential data. Blockchain ensures end-to-end encryption for all transactions, thereby safeguarding data during its transmission. Utilizing blockchain-based smart contracts enables the enforcement of security protocols and automatic detection and response to security threats. Blockchain has the potential to establish decentralized digital identity systems, reducing the occurrence of identity theft and enhancing privacy. Through its unalterable transaction record, blockchain facilitates tracing the origin of cyber attacks, enabling prompt responses to such threats. Blockchain enhances transparency and accountability in transactions, thereby reducing the susceptibility to cyber attacks and fraudulent activities.

Huasheng Zhu [8] et al. proposes equity crowdfunding, a new way of raising funds for startups by offering ownership in the form of stocks or shares, is taking the financial world by storm. It's fast, it's cheap and it's accessible, which makes it a great way to encourage innovation and entrepreneurship. But there are still some issues with equity crowdfunding that need to be solved, particularly in China where the market is growing rapidly.

One of the biggest problems with equity crowdfunding is security and transparency when it comes to stock and share registration and transactions. Blockchain technology offers a solution to these issues. Blockchain is a ledger technology that's decentralized and distributed, and it uses cryptography to ensure the security and integrity of data. By using blockchain, the registration and transaction of stocks and shares in equity crowdfunding can be made secure, creating a trustworthy environment for both investors and entrepreneurs.

Israel J. dos S. Felipe [9] et al. discussed the field of crowdfunding has seen a surge in growth in recent years, becoming a popular option for entrepreneurs and start-ups to raise capital. Crowdfunding platforms utilize the power of social networks and the internet to bring together businesses in need of funding and potential investors. While this innovative form of financing has been widely researched, there are still areas that require further exploration. One such area is the influence of mass media and geography on investment behavior in crowdfunding. Mass media has a significant impact on public opinion and perception, which can directly impact investment decisions in crowdfunding. Meanwhile, geography can also play a role in investment behavior as investors from different regions may have different preferences, cultural norms, and economic conditions that impact their investment decisions. Conducting research on the impact of mass media and geography on investment behavior in crowdfunding can provide valuable insights for investors, policymakers, and businesses. A semantic analysis of mass news, for example, can help investors assess their exposure to risk and predict financial returns.

Felix Reichenbach [10] et al. study delves into the concept of signal validity in equity-based crowdfunding. It aims to explore the relationship between signals generated during crowdfunding campaigns and the subsequent success of the venture, which is measured as its probability of survival. The study uses a hand-collected data set of 88 campaigns from a leading German equity-based crowdfunding platform. The effects of several key signals, such as the education level of the CEO, the equity stake offered, investor backing, the number of large investments, and updates during the campaign, were analyzed. The results indicate that ventures with CEOs who hold a university degree are less likely to fail. A higher number of business-related updates and equity stakes offered increase the probability of survival. However, a high number of updates on external certification, promotions, and the team, as well as large investments, are associated with a higher risk of failure. These findings challenge the notion of the wisdom of the crowd and suggest that investors are partially using incorrect signals. The results have important implications for entrepreneurs, investors, and platform design.

Felix Hartmann [11] et al. determines success factors play a crucial role in the success of crowdfunding campaigns. The identified factors can be organized under two main categories: project related and campaign related. Project related factors contain 9 sub-categories, whereas campaign related factors contain 4 sub-categories. When these factors were re-examined from the perspective of different crowdfunding types, it became evident that not all factors have been studied in all categories, and some factors seem to be important only for one or two categories. Five factors were found to have been covered in literature with respect to all three crowdfunding types: industry, location, team size, social network presence, and early investments. Industry has an influence on the success of non-financial and financial crowdfunding. The location factor was found to have an influence on success in all three crowdfunding categories.

Lars Hornuf [12] et al. discusses the traditional law and finance view, stronger investor protection is always seen as a positive thing. However, when it comes to small firms and entrepreneurial initiatives, this view might not always hold true. Equity crowdfunding, a financial innovation that targets small and innovative firms, provides a good example of this situation. In many jurisdictions, securities regulation provides exemptions to prospectus and registration requirements, but the impact of these regulatory reforms on equity crowdfunding remains unclear. In this study, we offer a theoretical framework that shows that optimal regulation depends on the availability of alternative early-stage financing such as venture capital and angel finance. Building on this framework, we provide an in-depth discussion of recent regulatory reforms in different countries and how they may impact equity crowdfunding. Finally, we offer exploratory evidence from Germany on the impact of securities regulation on small business finance.

III. SYSTEM IMPLEMENTATION

The system consists of two main components: a blockchain-based auction platform and a crowdfunding platform. The auction platform is used to auction off contracts. Contracts can be anything from physical assets to intellectual property. The auction platform is designed to be secure and transparent, and it uses blockchain technology to ensure that the bidding process is tamper-proof. The crowd funding platform is used to raise funds for projects. Projects can be anything from new businesses to social ventures. The crowd funding platform is designed to be easy to use and secure, and it uses blockchain technology to ensure that the funds are transferred securely to the project owner.

The interconnection between the two platforms is facilitated through the utilization of a smart contract. A

smart contract, residing on the blockchain, acts as a programmable code that automates the processes of auction and crowd funding. Its primary function is to enforce the secure transfer of funds exclusively to the project owner once the auction reaches its completion and the project attains successful funding. By leveraging the smart contract, the transactional aspects of the auction and funding process are seamlessly executed with heightened reliability and transparency.

The system exhibits inherent characteristics of scalability and security. Leveraging blockchain technology, the system ensures the integrity and immutability of data, minimizing the risk of tampering. Furthermore, the system is engineered to accommodate a substantial volume of users and transactions, showcasing its scalability prowess. Although still in the developmental phase, the system holds transformative potential in revolutionizing the processes of contract auctions and crowdfunding. With its enhanced security, transparency, and efficiency, the system aims to surpass conventional methodologies in these domains.

The system uses blockchain technology to ensure that the data is secure and tamper-proof. The system is designed to be transparent, so users can see how the auction and crowdfunding process works. The system is designed to be efficient, so users can conduct auctions and crowdfunding quickly and easily.

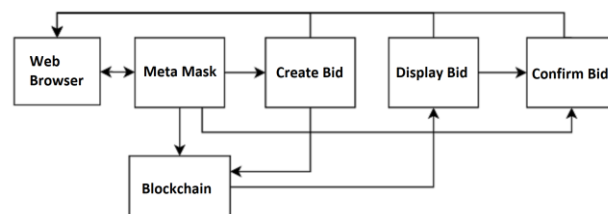


Fig 1. Overview Flow Chart

IV. METHODOLOGY

A. Overview

An auction is a mechanism whereby goods or services are procured through a competitive bidding process, with the highest bidder being awarded the item. Various formats of auctions exist, such as live auctions conducted in physical settings, online auctions facilitated through digital platforms, and blind auctions where bidders remain unaware of their counterparts' identities. Live auctions involve the convergence of bidders at a specific location to participate in the bidding process. In contrast, online auctions enable bidders to engage remotely, accessing the auction platform from diverse geographical locations. Blind auctions preserve bidder anonymity, preventing participants from possessing knowledge regarding the identities of fellow bidders.



Crowdfunding is an approach for acquiring funds by appealing to a vast number of individuals, often through online platforms. It enables the collection of small monetary contributions from the public to support diverse initiatives, such as entrepreneurial ventures, artistic endeavors, and philanthropic endeavors. The underlying system is a decentralized web application that is accessible to anyone with internet connectivity. In this system, the front-end interface facilitates the input of data onto a blockchain and retrieves the stored data using a smart contract. Specifically, the Ethereum network, which is a public blockchain, is utilized, ensuring that the entire transaction history is openly available and identifiable. As a web-based application, all the necessary dependencies are bundled together and hosted on a server.

Meta mask authenticates the user and allows the connection to the Ethereum network. It is necessary to approve the transaction which charges a small gas fee. The records on the blockchain are immutable and take time while reading and fetching from the Ethereum network. The system connects to a meta mask and displays the balance of the current account, which is necessary for other modules to function.

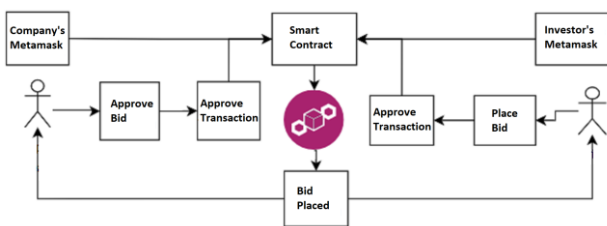


Fig 2. Proposed system architecture

**B. Blockchain network**

The system uses the Ethereum network which is a public blockchain network. Being a public network, the record can be verifiable by anyone making the system more secure and trust-worthy. The Ethereum network being a blockchain all the records are immutable and it is a distributed ledger.

**C. IPFS**

The whole is a decentralized system hence we require a distributed storage to large amounts of data. Storing large amounts of data like images and large texts on blockchain is infeasible, hence the data is uploaded to IPFS and the link is stored on blockchain. Since it is a distributed storage we can access data from Web3 applications. IPFS is accessed through Infura gateway.

**D. Modules**

*1) Include Financial details of company*

The process involves transferring the financial details and data of a company from local storage to a cloud-based storage system. This enables the information to be securely

stored and accessed remotely, providing convenience and flexibility. Once the financial details are stored in the cloud, they can be retrieved and accessed in a structured format such as tables and graphs. This allows for a more organized and visually appealing representation of the data, making it easier to analyze and interpret.

Furthermore, as new financial data becomes available, it can be seamlessly incorporated into the existing records. This involves updating the stored information with the latest data, ensuring that the financial details remain up to date and accurate. The process of uploading, accessing, and updating financial details in the cloud offers several advantages. It provides a centralized and secure storage solution, facilitates efficient data retrieval in a structured format, and allows for real-time updates to reflect the most recent financial information of a company.

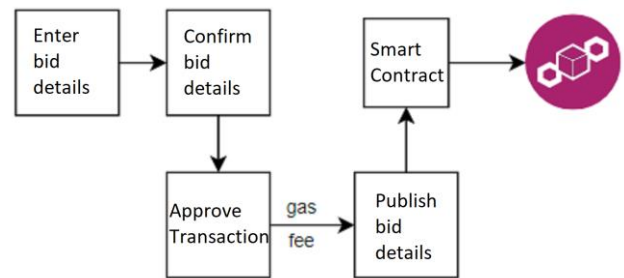


Fig 3. Flowchart of create bid

*2) Bidding*

The startup commences the equity bidding process by establishing the equity bidding window and defining the parameters for the bidding procedure. Prospective investors partake by submitting their bids, indicating the desired quantity of equity they seek to acquire and the price at which they are willing to transact.

A blockchain-based application is employed to authenticate and validate the bids offered by potential investors, ensuring compliance with the startup's predefined terms and conditions. This blockchain-based application operates on a transparent and secure protocol, facilitating the identification of winning bids and the allocation of equity to successful investors.

*3) Crowdfunding*

People can contribute money to the project by sending a type of digital currency called Ether (ETH) to a special contract on the blockchain. The contract keeps track of how much money each person has contributed and maintains a list of all the contributors. There is an administrator who manages the contract and controls certain actions. The contract has a specific funding goal, which is the amount

of money the project wants to raise. The contract keeps track of the total amount of money raised so far. The contract has different stages: started, running, ended, or canceled. The administrator can cancel the fundraising if needed. People can contribute money to the project by calling a function in the contract and sending the desired amount of money.

There is a minimum amount that people must contribute. People can check how much money is currently in the contract. If the fundraising period is over and the goal was not reached, people can request a refund of the money they contributed. The administrator can create spending requests, specifying a description, the person or organization who will receive the money, and the amount. These requests are like proposed expenses. Contributors can vote on spending requests to decide if they should be approved. If a spending request gets approved by more than half of the contributors, the administrator can make the payment to the intended recipient. Contributors can see a list of all the people who contributed and the amount they contributed.

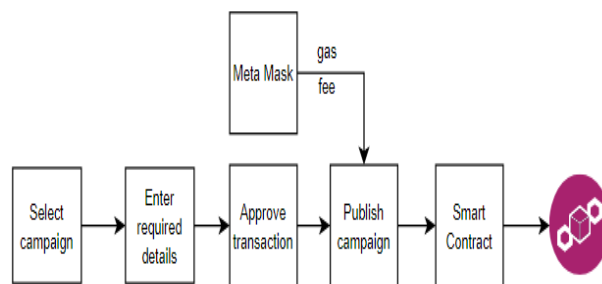


Fig 6. Flowchart of donate money

V. RESULTS

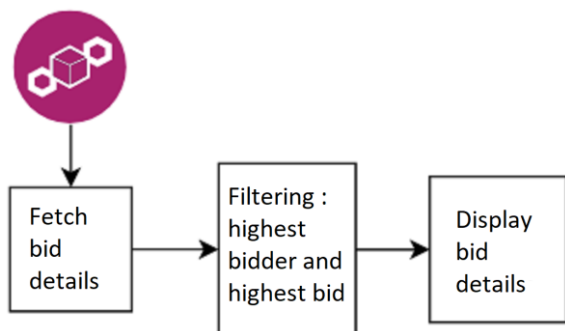


Fig 4. Flowchart of display bid details

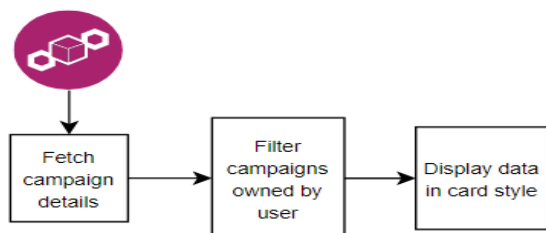
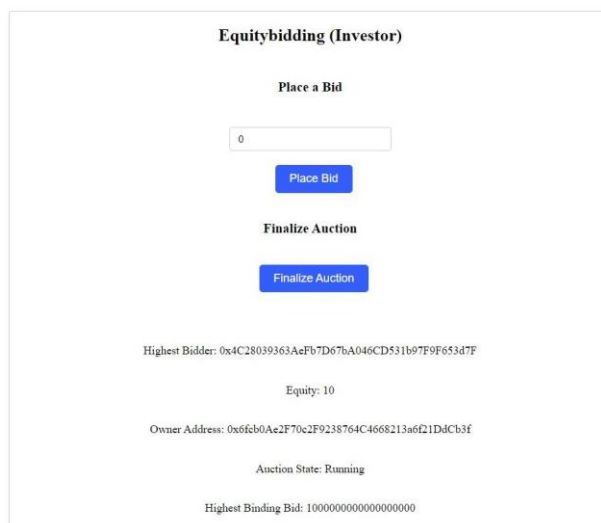
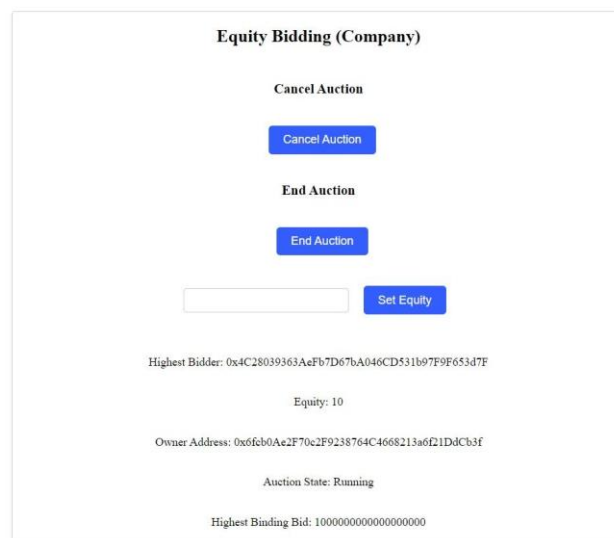
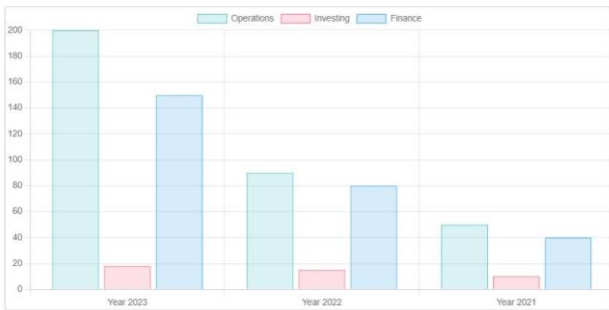


Fig 5. Flowchart of display campaign for campaign creators



**Cashflow**

	2021	2022	2023
Operations	50	90	200
Finance	40	80	150
Investing	10	15	18



**VI. CONCLUSION**

The proposed blockchain-based application aims to address the challenges faced by non-listed startups in managing equity holders and financial information. By leveraging the power of blockchain technology, the application provides a secure and efficient platform for equity management, financial reporting, and attracting new investors. The application ensures that equity holder information is stored in a tamper-proof manner, reducing the risk of errors or inaccuracies. It also provides a platform for financial document sharing, promoting transparency and building confidence among stakeholders. The equity bidding process is secure and transparent, reducing the risk of manipulation or corruption.

The blockchain-based application can be integrated with other financial systems to enhance its functionality and improve the user experience. This can include integration with accounting software, payment gateways, and other financial management tools. The financial reporting features of the application can be enhanced to include advanced analytics and reporting capabilities. This can help startups to better understand their financial performance and make informed decisions. The application can be designed to automatically check for compliance with relevant financial regulations and reporting standards. This can help to reduce the risk of non-compliance and improve the overall reliability of the financial information provided by the startup. The security features of the application can be enhanced to include additional layers of encryption and authentication. This will help to protect sensitive financial information and reduce the risk of data breaches.

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