# VENCO - A BLOCKCHAIN BASED STARTUP INVESTMENT PLATFORM

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**Abstract -** *Traditional startup funding platforms often face challenges such as high transaction fees, centralized control, and limited transparency. This project introduces VENCO, a blockchain-based decentralized application (DApp) that enables users to invest directly in early-stage startups they find promising. Built using Next.js for an interactive user experience and Solidity for smart contract development, the platform operates on the Polygon blockchain to ensure scalable, low-cost transactions. MetaMask integration allows for secure wallet connectivity, while Ethereum-based smart contracts automate the investment process—letting startup founders set funding goals and terms. Investors contribute based on their own interest and conviction, and funds are disbursed only when predefined milestones are met, minimizing the risk of fund mismanagement. By removing intermediaries and ensuring transparency, VENCO creates a secure and efficient environment for decentralized startup funding.*

***Key Words*: Blockchain Technology, Smart Contracts, Decentralized Investment, DApp**

## 1. INTRODUCTION

The rapid advancement of blockchain technology has revolutionized various industries, particularly in the financial sector, leading to the emergence of Decentralized Finance (DeFi) applications. DeFi eliminates the need for traditional financial intermediaries such as banks and venture capitalists, enabling a more transparent, secure, and efficient financial ecosystem. [1] One of the most promising applications of DeFi is in the realm of startup funding, where entrepreneurs often struggle to secure investments due to the complexities of traditional funding mechanisms. To address these challenges, we propose VENCO: Crowdfunding (DeFi) DApp for Startups using Blockchain, which provides a secure, transparent, and decentralized platform for fundraising. [2].

VENCO leverages blockchain technology [3] and smart contracts to create a peer-to-peer (P2P) funding ecosystem, allowing startup founders to launch campaigns and investors to fund promising projects without the need for intermediaries. The platform ensures trust and security through cryptographic mechanisms, enabling both parties to interact in a decentralized environment. Unlike traditional financial systems, which rely on centralized authorities such as banks or venture capital firms, VENCO operates on a peer-to-peer network, ensuring that transactions are immutable, transparent, and accessible to all participants.

### *A. Key Challenges in Traditional Startup Funding*

Traditional fundraising mechanisms for startups involve banks, angel investors, venture capitalists, and crowdfunding platforms. These systems have inherent limitations, such as [4]:

- High Intermediary Costs: Banks and venture capital firms often impose high fees, reducing the actual funds received by startups.
- Lack of Transparency: Investors often have limited visibility into how their funds are utilized.
- Security Concerns: Centralized systems are vulnerable to data breaches and fraud.
- Limited Accessibility: Many startups struggle to secure funding due to bureaucratic hurdles and geographical constraints.

### *B. How VENCO Addresses These Challenges*

By utilizing blockchain technology, VENCO ensures confidentiality, integrity, non-repudiation, and authentication in transactions, addressing key security concerns [5]:

- Confidentiality: Investors and startups can securely inter- act without exposing sensitive financial data.

- Integrity: Blockchain ensures that transactions cannot be altered or tampered with.
- Non-Repudiation: Smart contracts guarantee that once a transaction is recorded, it cannot be denied by either party.
- Authentication: Digital signatures verify the identity of both investors and startup founders.

VENCO employs cryptographic techniques to ensure data security through encryption and decryption mechanisms. Transactions are protected using symmetric and asymmetric cryp- tography, allowing for secure communication and fund transfers. Smart contracts further automate and enforce agreements between startups and investors, ensuring funds are released only when predefined conditions are met. VENCO aims to redefine startup funding by offering a decentralized, trustless, and efficient fundraising model powered by blockchain.

## 2. LITERATURE REVIEW

Implementation and evaluation of blockchain-based e-voting systems with Ethereum and Metamask - Because traditional voting systems are always vulnerable to manipulation, fraudsters and hackers may alter the election results. For this reason, the researchers have employed blockchain technology to guar- antee security. Since blockchain technology is decentralized, no single entity controls the data. Because Ethereum enables smart contracts and Metamask, an extension for Ethereum wallets that allows users to interact with the blockchain, the researchers decided to use Ethereum to create blockchain. Their system has two main components: Ballot Manager and Voter. Once the voter casts the vote, the system records it on the blockchain, ensuring it's visible and unchangeable. [6]

CoinCrowder: An accountable Blockchain Decentralized Application (DApp) with tamper-proof evidence of purchase and analyses - Crowdfunding allows individuals to contribute to projects online, but current platforms lack accountability. Blockchain solves this problem by guaranteeing data that is secure, transparent, and impenetrable. To ensure open fund usage, the authors developed CoinCrowder, a blockchain- based DApp. Smart contracts are used by CoinCrowder to automatically allocate funds and record transactions. To maintain openness, the approach exposes contributors to tamper-proof evidence. Using its innovative contract features, the authors built the system on Ethereum and tested it on the Rinkeby Ethereum network. [7]

Decentralized Model to Protect Digital Evidence via Smart Contracts Using Layer 2 Polygon Blockchain - In today's world, digital evidence, such as emails and videos, is critical in legal proceedings. However, because the data is controlled by a single party, centralized storage poses security risks. The research suggests securing digital evidence with smart contracts and blockchain technology. The scalability and cheap transaction fees of the Polygon blockchain make it well-liked. To prevent tampering, the system timestamps, encrypts, and uploads digital proof to decentralized storage. Smart contracts allow only authorized individuals to access or modify evidence. If tampering occurs, the system identifies it and notifies the appropriate people. [8]

Blockchain smart contracts: Applications, challenges, and future trends - The study emphasizes innovative contract application in supply chains, healthcare, and banking sectors. When certain conditions are met, smart contracts start running automatically. Scalability problems, intricate implementation, privacy issues, and security flaws are challenges, nevertheless. To address these problems, researchers are looking into Layer 2 solutions including Polygon for flexibility, proofs with zero knowledge for privacy, and improved coding practices. Future concepts covered in the paper involve incorporating AI and IoT to further improve smart contracts and assuring interoperability across various blockchains. [9]

Blockchain Security: A Survey of Techniques and Research Directions - This paper examines three tiers of dangers: process, data, and infrastructure. It covers many smart contract vulnerabilities and attacks, such as double-spending, Sybil attacks, and majority attacks. The study discusses security techniques like smart contract auditing, cryptographic methods, and consensus algorithms. Researchers are exploring solutions like Layer 2 networks, zero-knowledge proofs, and sharding to address scalability, privacy concerns, and interoperability. [10]

## 3. METHODOLOGY

VENCO is designed with blockchain technology at its core to ensure transaction security and transparency. We've implemented a system facilitated by smart contracts deployed on the blockchain that eliminates the need for such intermediaries. The platform facilitates four key functionalities: campaign creation, secure investor funding, blockchain-based data storage, and automated fund disbursement. [11].

To raise funds, a startup owner must set up a campaign in the system and submit the relevant information such as their startup title, description, fund goal and deadline for the campaign. This information is stored in the blockchain's smart contracts. Once the campaign is launched, investors can send cryptocurrency (Polygon) to the contract's wallet

address.The smart contract documents the transactions by keeping track of the investor's wallet address and fund amount. Blockchain ensures the funds remain in the smart contract until certain requirements are fulfilled.

On the blockchain, data is stored in a distributed ledger of blocks. Every block contains a list of transactions, a unique cryptographic hash, a reference to the previous block (hash pointer), and a timestamp [12]. When an investor contributes, the network creates and shares a transaction. This transaction includes the sender's address, the recipient's address (smart contract), the amount, and the time of the transaction. After being validated by the nodes of the network, it is appended to a new block. This makes the transaction permanent and publicly available. As a result, all fundraising operations are secure and transparent.

The smart contract is built with firm rules regarding fund withdrawals to safeguard against fraud/deception and boost overall security. A campaign owner can only access funds in two ways: when the fund target is fulfilled or when the deadline passes. If the fund target has been met, campaign owners can go ahead with the withdrawal. If not, the investors can request that their funds be returned to them. Both of these solutions are managed by the smart contract [13].

Polygon blockchain is super efficient as it provides higher processing speeds for transactions while maintaining low transaction fees. While using Ethereum's main network can really add up with gas fees, Polygon offers a way to get the same level of security and decentralization, but for a lot less. Solidity is the language we chose for the smart contracts, and Hardhat is our deployment tool, making it simple to implement and test. [14].

## 4. ARCHITECTURAL OVERVIEW

The platform is designed using a three-layered architecture, ensuring seamless interaction between users, smart contracts, and the blockchain. The system consists of the Presentation Layer, Application Layer, and Blockchain Layer, each playing a crucial role in maintaining security, transparency, and efficiency.

A. Presentation Layer: The Presentation Layer serves as the interface between users and the blockchain network. It is built using Next.js, a Reactbased framework that enables a responsive and interactive user experience. This layer allows users (both investors and startups) to:

- Register and create campaigns.
- View active crowdfunding campaigns.
- Contribute funds to campaigns using cryptocurrency.
- Monitor campaign progress and transaction history.

User interactions are facilitated through MetaMask, a browser based Ethereum wallet that enables users to connect with the blockchain. To ensure seamless communication, the platform utilizes Web3.js and Ethers.js, which act as bridges between the frontend and blockchain.

B. Application Layer: The Application Layer serves as middleware, handling all interactions between the Presentation Layer and the Blockchain Layer. It performs the following functions:

- Transaction Handling: Converts user inputs into blockchain transactions.
- Smart Contract Execution: Calls smart contract functions to record investments and manage campaign details.
- Data Retrieval: Fetches stored blockchain data, such as investment records and funding status, ensuring real-time updates for users.
- Fraud Prevention: Implements verification checks, ensuring only valid transactions reach the blockchain. This layer ensures efficient communication between the frontend and smart contracts, enabling smooth operation without direct user interaction with complex blockchain mechanics.

C. Blockchain Layer: The Blockchain Layer is the backbone of the platform, ensuring security, transparency, and immutability of transactions. The platform is deployed on the Polygon blockchain, a Layer 2 scaling solution for Ethereum, chosen for its low transaction costs, high scalability, and compatibility with Ethereum smart contracts.

1) Smart Contracts - Smart contracts are written in Solidity and deployed on the Polygon network to automate the crowdfunding process. These contracts:

- Store campaign details (creator, goal, deadline, contributors).
- Manage investments, ensuring funds are only accessible if funding goals are met.
- Prevent fraudulent actions, such as unauthorized withdrawals or modifications.

2) Fraud Prevention Mechanisms - The blockchain inherently prevents fraud through immutability and decentralization. However, additional security measures are implemented to prevent fraud from both startup owners and investors:

• Startup-side fraud prevention: Funds are locked in a smart contract until the campaign goal is met. If the goal is not reached, funds are automatically refunded to investors.
• Investor-side fraud prevention: Investors cannot withdraw funds after committing, ensuring that contributions remain secure. Additionally, each transaction is recorded on-chain, preventing duplicate or false claims.

D. Decentralized Ledger and Consensus Mechanism: The platform relies on Polygon's Proof of Stake (PoS) consensus mechanism, which ensures that transactions are validated by a distributed network of nodes. This mechanism:

• Prevents tampering and ensures trustless interactions.
• Guarantees decentralization, removing reliance on any single authority.
• Reduces transaction fees and increases scalability compared to Ethereum's mainnet.

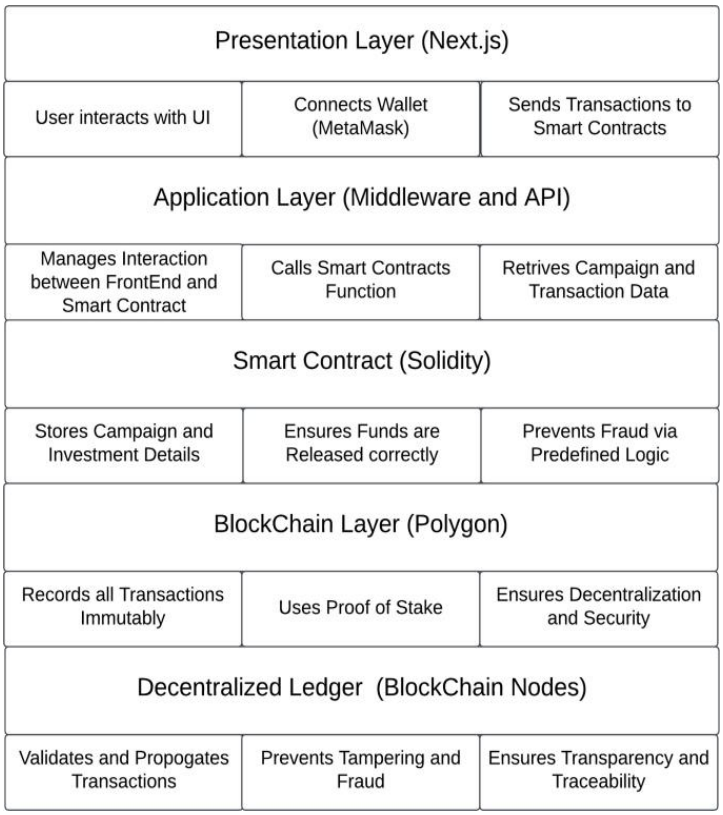


**Figure -1:** Architecture of VENCO

## 5. PROPOSED SYSTEM

A. Welcome Page of VENCO: The system begins with a landing page through which users can connect their MetaMask wallet so that they may interact with the system. No logins, the system uses user's blockchain wallet address to secure a decentralized identity system. Users are presented with options to view live campaigns or launch new ones. The landing page provides essential details about the platform's purpose and guides new users in advancing with the crowdfunding process.

B. Registering a Campaign: Campaign creators can start their campaign with the following information :

• Campaign Name and Description
• Total Funding Amount
• Deadline of Campaign

After submitting the required data, the campaign calls a preexisting smart contract on the polygon blockchain.

C. Supporting the Campaign Proposals Listed: Investors willing to invest should link their MetaMask wallet and enter the amount of money they would like to invest. The transaction is then finalized and it is processed using Web3.js and sends funds directly into the campaign's smart contract. Securely, money is locked within the contract until the campaign reaches its target. When the campaign fails to achieve the target prior to the end of time, refunds automatically trigger through code for smart contracts. Blockchain is immutably locked into transactions, providing accountability and transparency.

D. Disburse and Refund Mechanism: The smart contract uses a condition-based payment system as a measure in an attempt to supply fiscal integrity :

- Goal attainment : The funds are transferred in real-time to the creator of the campaign by the smart contract.
- Failure of goal : A refund mechanism is initiated by a smart contract to return an investment to its owner.

By eliminating the middlemen, the process eliminates misrepresentations and misappropriation of funds, as well as enhancing contributor confidence and trust.

E. Withdrawal and Transaction History: Once the funds are released, the fundraisers are able to simply withdraw the funds from the smart contract and deposit it in their own wallets. The system keeps on-chain records of transactions, so individuals can see a record of contributions, verify fund transfers and withdrawals and access campaign results. An open system such as this lends legitimacy to decentralized crowdfunding because all the transactions are locked and transparent.

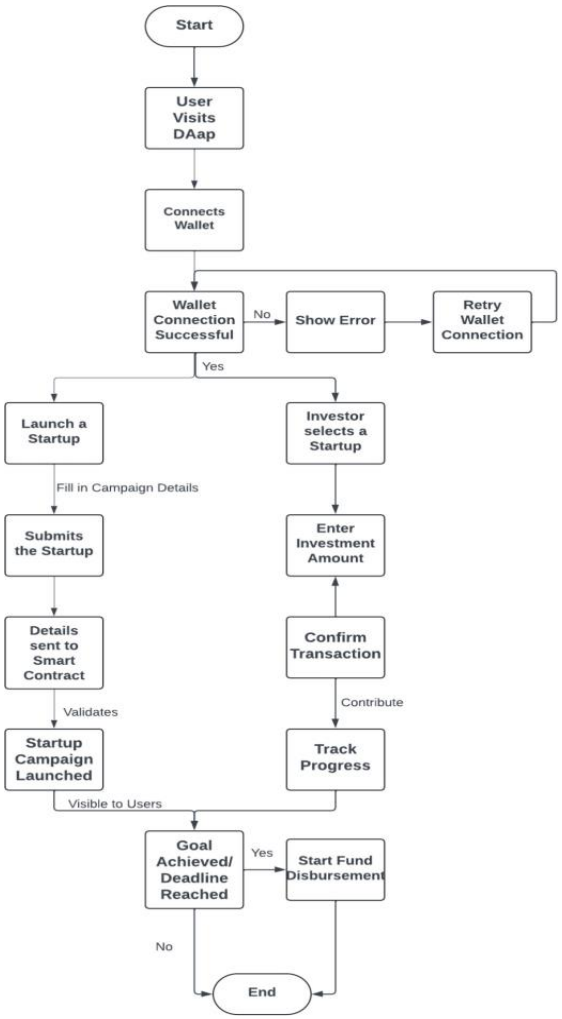


**Figure -2:** Proposed System of VENCO

## 6. RESULT AND ANALYSIS

Landing Page of the crowd-funding website allows fundraisers to create their campaign and investors can look for potential ventures. The page has a login feature where fundraisers can put in their startup information and pre-defined condition and link an e-wallet for safe transactions.

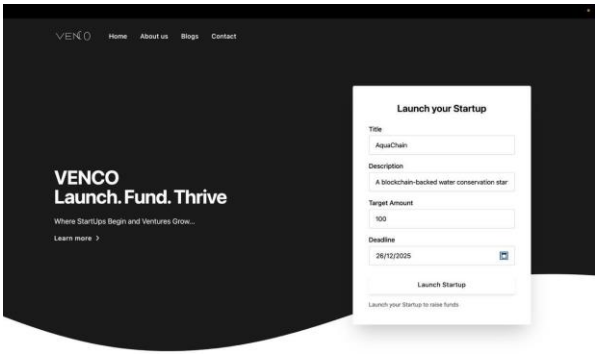


**Figure -3:** Launch Hub of VENCO

Initially, users are requested to connect their MetaMask to VENCO, allowing fundraisers to launch their startups and investors to invest in innovative ventures. This helps to deliver a secure, transparent and authentic transaction between fundraisers and investors.

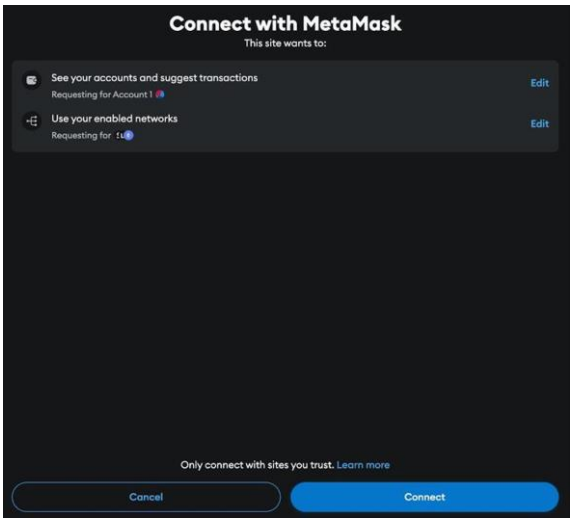


**Figure -4:** Connect MetaMask for Transactions

The Listed Campaigns presents all the current and past campaigns along with 'Your Funding Initiatives', where fundraisers can see their own startups. It presents key information such as startup name, funding status, deadline, and a short description to enable investors to make informed choices.

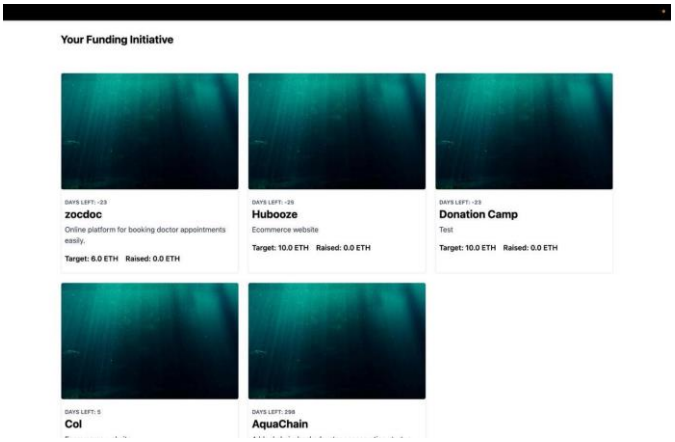


**Figure -5:** Startups Overview

Our platform allows the investors to find and invest in promising startups. Investors can browse through various startups and invest in their preferred startup. Each startup listing displays the startup's name and description to provide a secure and transparent transaction. Investors can enter the amount they wish to invest in their preferred startup. The platform ensures secure and transparent transactions, fostering trust between investors and entrepreneurs.

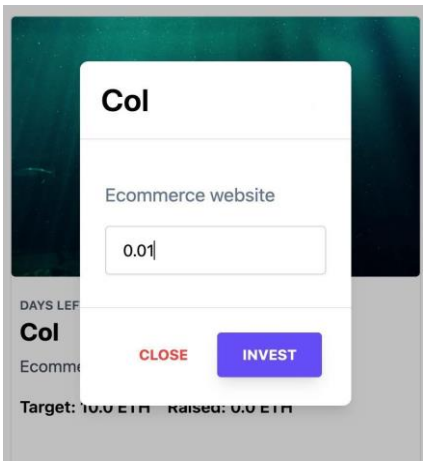


**Figure -6:** Investing in a Startup

The Campaign Closed Popup Notification feature notifies users when a campaign ends due to its predefined deadline. If an investor tries to invest in a closed campaign, a popup notification notifies investors, prevents further investments and ensures a transparent accuracy.

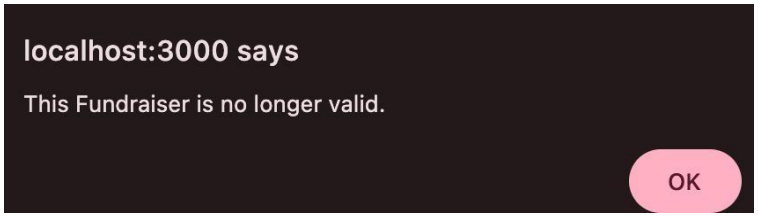


**Figure -7:** Campaign Closed Popup Notification

## 7. CONCLUSION

Our VENCO is blockchain and smart contract driven to provide a transparent and secure fundraising system. By excluding middlemen, it is made affordable while providing trust and security assurances in the form of non-tamperable transactions. Our DApp provides financial independence and inclusion by connecting fundraisers with investors directly, making fundraising globally more efficient and simpler.

Addition of support for other blockchain networks such as Binance Smart Chain (BSC) or Avalanche will reduce transaction charges and increase outreach to broader segments. Addition of artificial intelligence and machine learning can offer data-driven suggestions for campaign success forecast- ing, funding technique improvement, and individual detail suggestions to fundraisers and investors. Besides that, crowd- vesting capability where investors are offered equity or profit- sharing rewards for shares, will solidify venture capital and crowdfunding and provide new opportunities. All these will spur increased usage and improved user experience.

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