

Blockchain-Based Decentralized Crowdfunding Application

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Abstract

A brief overview of the project, including the problem statement, objectives, methodology, and expected outcomes.

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Chapter 1

Introduction

1.1 Background

Discuss the importance of crowdfunding and the role of blockchain technology in transforming this industry.

Crowdfunding is a way people to raise money for their projects and ideas by collecting small amounts of money from many individuals, usually through the internet. It helps creators, entrepreneurs, or organizations to get financial support without having to rely on traditional banks and investors.(Investopedia, 2023)

1.1.1 How Crowdfunding Works:

1. **Project Creation:** Someone with an idea or project creates a campaign on a crowdfunding platform and explains the reason they need the fund and how it will benefit others.(Investopedia, 2023)
2. **Setting Goals:** Usually, every campaign has a financial goal which is a amount of money to be raised within a specific time frame.(Investopedia, 2023)
3. **Rewards Or Equity:** Depending upon the type of crowdfunding, backers may receive rewards (like products or experiences) or equity (a share in the business) in return for their support.(Investopedia, 2023)
4. **Promotion:** The creator will promote their campaign through various channels like social media, emails to reach potential backers.(Investopedia, 2023)
5. **Funding:** If enough people fund the campaign and the funding goal is met, the creator will receive the fund to move forward. If the goal is not reached, sometimes

the money is returned to the backers.(Investopedia, 2023)

1.1.2 Types of Crowdfunding:

- **Reward-based:** Backers will receive rewards for their contribution, like a product or service.(Legalvision, 2024)
- **Equity-based:** Backers receive a share of the company in exchange for their investment.(Legalvision, 2024)
- **Donation-based:** People give money without expecting anything in return, often for charitable causes.(Legalvision, 2024)
- **Lending-based:** Backers lend money to individuals or businesses with the expectation of being paid back with interest.(Legalvision, 2024)

1.2 Blockchain Technology in Crowdfunding

Blockchain technology introduces a decentralized approach to crowdfunding, eliminating the need for intermediaries. By leveraging a distributed ledger, blockchain enables secure, transparent, and tamper-proof transactions. This ensures that all parties involved in the crowdfunding process can trust the system without the need for a central authority.

1.2.1 Advantages of Blockchain in Crowdfunding

- **Decentralization:** Blockchain removes the need for a central authority, allowing for more direct interaction between project creators and backers.
- **Transparency:** All transactions are recorded on a public ledger, providing real-time visibility into fund management and reducing the risk of fraud.
- **Security:** The use of cryptographic algorithms ensures that all transactions are secure and immutable, protecting against unauthorized changes or hacks.
- **Lower Transaction Fees:** By cutting out intermediaries, blockchain-based platforms can significantly reduce the transaction fees associated with crowdfunding.

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- **Global Accessibility:** Blockchain allows for cross-border transactions without the need for currency conversions or international banking processes, making crowdfunding more accessible worldwide.

1.3 Problem Statement

Crowdfunding has become a vital tool for startups, social causes, and creative projects, enabling them to raise funds directly from the public through online platforms. Traditional crowdfunding platforms such as Kickstarter, GoFundMe, and Indiegogo have played a significant role in this space, offering a centralized system for campaign management and fund collection.

However, these traditional platforms exhibit several limitations that can hinder the effectiveness and fairness of the crowdfunding process. Centralization allows platform operators to exert significant control over campaigns, including the imposition of fees, policy changes, or even the suspension of campaigns. This centralization limits the autonomy of project creators and introduces single points of failure.

Transparency is another critical issue in current crowdfunding models. Backers often lack real-time visibility into how their contributions are being used, leading to concerns about fund mismanagement or fraud. The centralized nature of these platforms also means that they are vulnerable to security breaches and fraudulent campaigns.

Furthermore, traditional platforms impose significant fees, which reduce the funds available for project creators. These fees, combined with limited access to global participants due to regulatory and payment system barriers, restrict the potential reach of crowdfunding campaigns.

Current blockchain-based crowdfunding platforms attempt to address some of these issues but still face challenges related to usability, accessibility, and adoption. Many existing solutions are either too complex for the average user or fail to provide the level of transparency and security that backers and project creators require.

This project aims to address the gap in decentralization, transparency, and trust by developing a blockchain-based crowdfunding platform. The proposed platform will

eliminate the need for a central authority, provide real-time visibility of fund management through a public ledger, and enhance security and trust through the use of smart contracts. By offering global accessibility with lower transaction fees and customizable funding structures, this project seeks to overcome the limitations of both traditional and existing blockchain-based crowdfunding models, paving the way for a more inclusive and trustworthy crowdfunding ecosystem.

1.4 Objectives

The primary objectives of this project are as follows:

- **Develop a Decentralized Crowdfunding Platform:** Design and implement a blockchain-based crowdfunding platform that operates without a central authority, enabling project creators to manage their campaigns autonomously.
- **Enhance Transparency and Trust:** Utilize blockchain technology to provide real-time transparency of fund allocation and usage, ensuring that backers can track their contributions throughout the campaign lifecycle.
- **Reduce Transaction Fees:** Lower the transaction costs associated with crowdfunding by leveraging smart contracts and decentralized payment systems, making the platform more accessible to a global audience.
- **Improve Security and Fraud Prevention:** Integrate smart contracts and decentralized identity management to enhance security measures, reducing the risk of fraud and ensuring that funds are used as intended.
- **Increase Accessibility and Usability:** Design an intuitive user interface and user experience (UI/UX) that caters to both tech-savvy users and those with minimal blockchain experience, broadening the platform's user base.
- **Global Reach and Inclusion:** Ensure the platform is accessible to users worldwide, overcoming geographical barriers imposed by traditional platforms and fostering financial inclusion.

Chapter 2

Literature Review

2.1 Existing Solutions

Review traditional and blockchain-based crowdfunding platforms.

2.1.1 Traditional Crowdfunding Platforms in New Zealand:

1. PledgeMe:

Operational Model: PledgeMe offers both reward-based and equity-based crowdfunding. For reward-based campaigns, project creators offer rewards in exchange for contributions. For equity based campaigns, backers receive shares in the company.(PledgeMe, 2024)

Impact: PledgeMe helps project creators by providing a platform to reach potential backers and raise the necessary funds. It also offers a way for backers to support projects they believe in, either by receiving rewards or gaining equity in a company.(PledgeMe, 2024)

The screenshot shows the Pledge Me website homepage. At the top, there is a navigation bar with links for 'Create', 'Education', and 'Campaigns'. The main title 'Pledge Me' is displayed with the tagline 'Helping Kiwis fund the things they care about.' Below the title, a large banner features the text 'PŪTEA FOR PAKIHI' and 'WHĀRIKI' repeated across the background.

The page is divided into two main sections: 'Investment campaigns' and 'Project campaigns'. The 'Investment campaigns' section displays three projects:

- Ezy Peazy (Yivvan Limited)**: Investment: Technology. Description: Ezy Peazy provides a community-driven platform for posting and fulfilling one-off jobs, fostering opportunities to earn extra income. By Sumit. Minimum target: NZ \$150,000. Days left: 17. Pledged: NZ \$25,600.
- Norish Limited**: Investment: NORISH is a category-changing baby food developed in New Zealand. We're raising to accelerate our growth and impact. By Gina Ulrich. Minimum target: NZ \$350,000. Days left: Closed. Pledged: NZ \$547,650.
- KEA Outdoors**: Investment: KEA Outdoors. We build innovative outdoor gear for this every-day adventurer and are on a mission to take our gear from New Zealand to the World! By Matt Butler. Minimum target: NZ \$250,000. Days left: Closed. Pledged: NZ \$384,906.

The 'Project campaigns' section is partially visible below, showing a weather forecast (21°C Light rain), a search bar, and various system icons at the bottom of the screen.

Figure 2.1: Pledge Me Home Page Investment Campaigns.

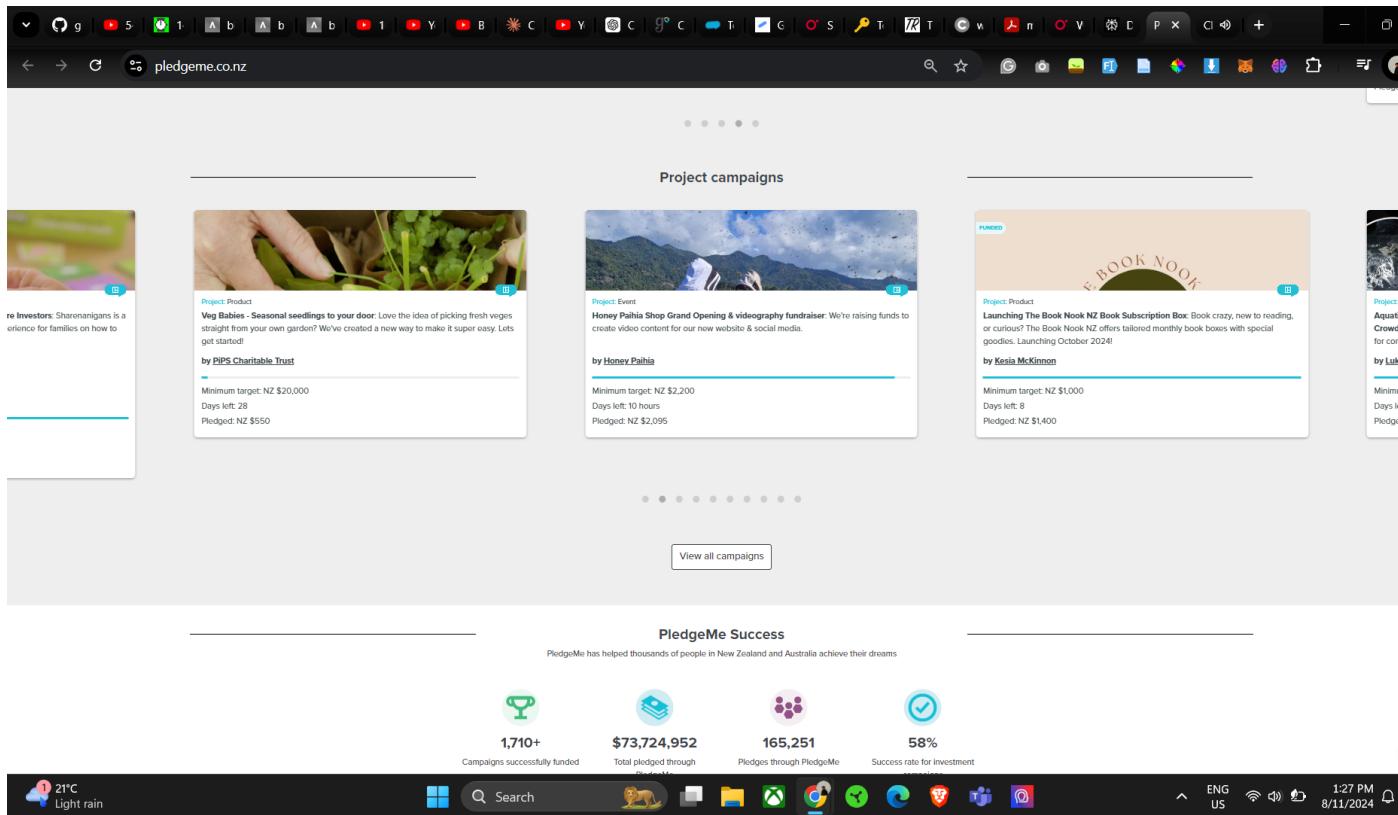


Figure 2.2: Pledge Me Home Project Campaigns.

Snowball Effect:

Operational Model: Snowball Effect is primarily an equity crowdfunding platform. It allows companies to raise capital by offering shares to the public. This platform is used by companies at various growth stages, from startups to more mature businesses looking for expansion capital. (SnowballEffect, 2024)

Impact: For project creators, Snowball Effect provides access to a wide investor audience and simplifies the process of raising funds. For investors, it offers opportunities to invest in private companies and potentially gain significant returns.(SnowballEffect, 2024)

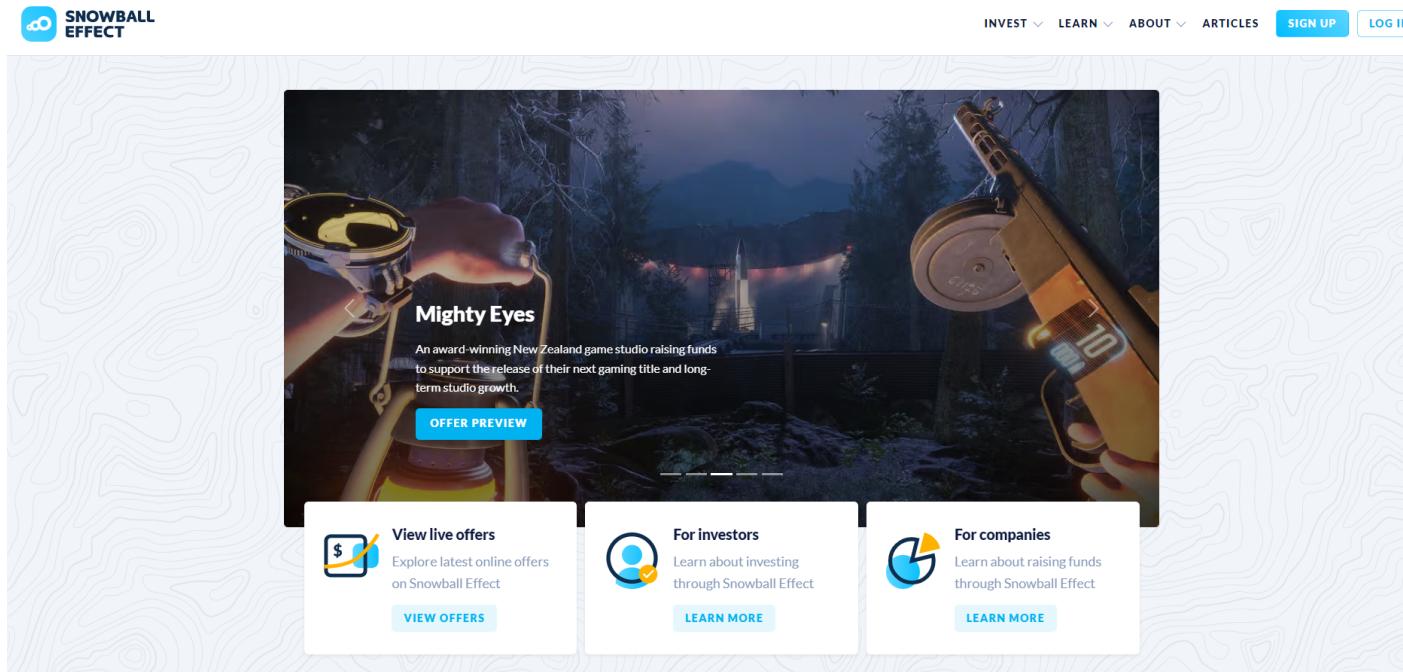


Figure 2.3: Snowball Effect Home Page Investment Campaigns.

Collinson Crowdfunding:

Operational Model : These platforms also focus on equity crowdfunding, allowing companies to raise funds by offering shares to the public. Each platform has its unique features and market focus. (Collinson, 2024)

Impact : These platforms provide similar benefits to Snowball Effect, helping companies raise capital efficiently while giving investors access to investment opportunities in private companies.(Collinson, 2024)

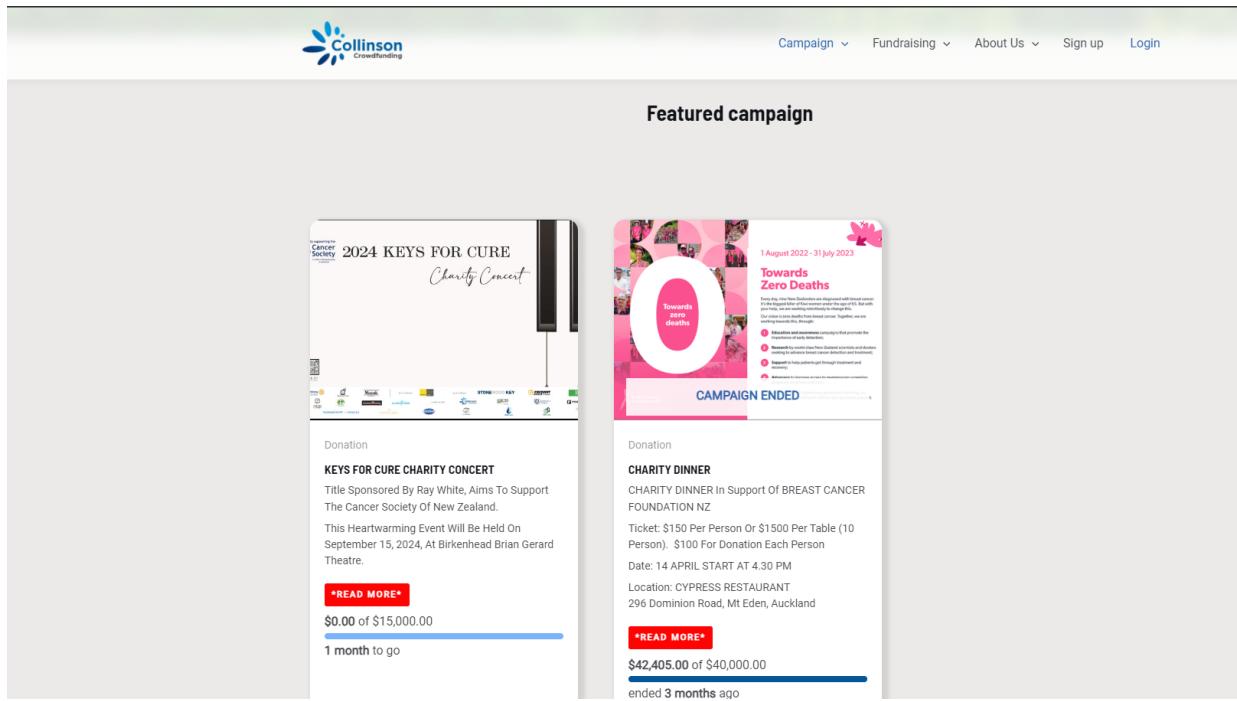


Figure 2.4: Collinson Crowdfunding Home Page Investment Campaigns.

Givealittle:

Operation Model: Givealittle is a donation-based crowdfunding platform. It allows individuals, charities, and organizations to raise funds for various causes without expecting anything in return. (Givealittle, 2024)

Impact: This platform is particularly impactful for charitable causes, personal emergencies, and community projects. It provides a simple and accessible way for people to support causes they care about. (Givealittle, 2024)

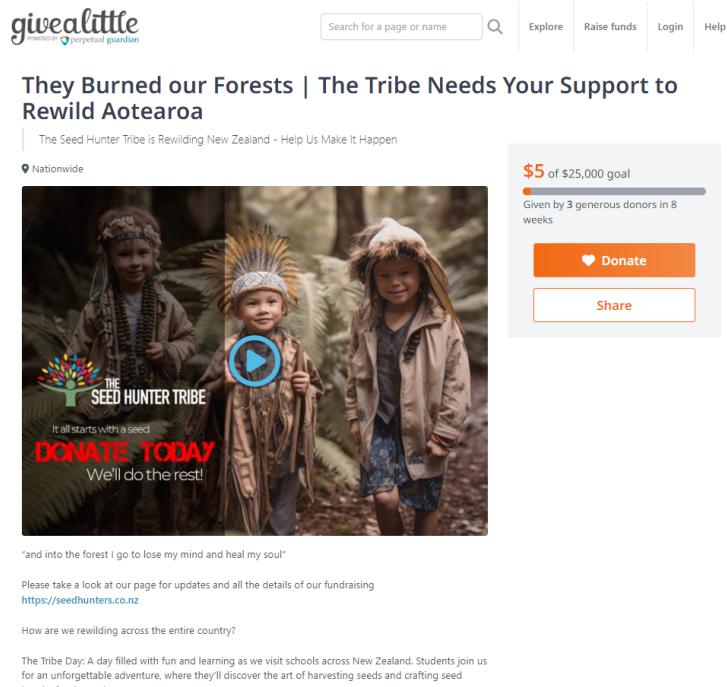


Figure 2.5: Givealittle Home Page.

Equitise:

Operation Model: Equitise focuses on equity-based crowdfunding. It allows startups and growing companies to raise capital by offering shares to the public. This platform is designed to connect investors with innovative companies looking for growth capital. (Equitise, 2024)

Impact: Equitise helps startups and growing companies access a broad base of investors, facilitating the capital-raising process and enabling business expansion. For investors, it provides opportunities to invest in promising companies with potential for high returns. (Equitise, 2024)

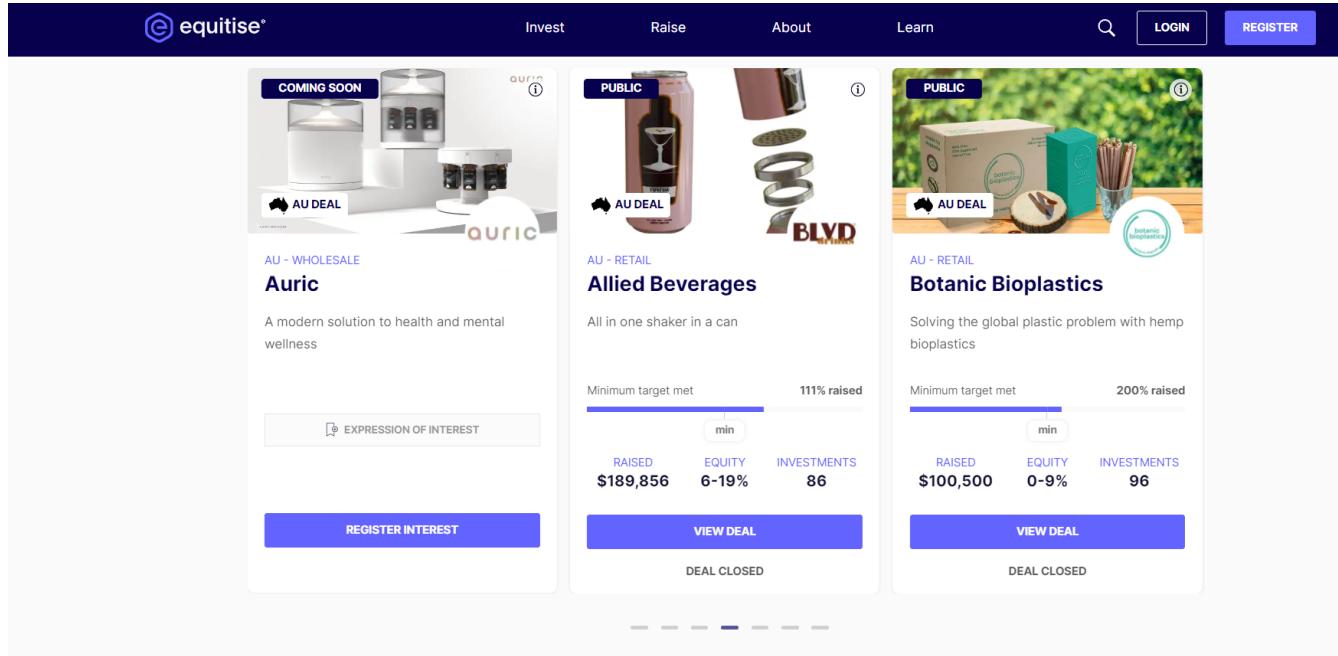


Figure 2.6: Equitise Home Page.

2.1.2 Limitations:

- Centralization:** Because these platforms are centralized, they have considerable control over which projects are offered and how well campaigns perform. This may restrict the options available to certain project creators.
- High Fees:** Crowdfunding platforms typically charge for their services and this charge can account for a sizeable amount of the funds received. As a result, project creators receive a less net sum.
- Transparency:** Even though these platforms claim to be transparent, there are still issues with the amount of information disclosed by project creators. It is

possible that investors and donors might not always have a full understanding of a project's risks and financial standing.

4. **Security:** Even with Financial Markets Authority (FMA) regulation, there is always a chance of fraud or financial mismanagement. Maintaining security and confidence is still difficult.
5. **Global Accessibility:** Due to legal and logistical issues, traditional crowdfunding platforms might not be able to reach a worldwide audience. This may limit the possible group of backers and investors.

2.2 Review of Related Research Papers:

2.2.1 Crowdfunding Platforms: A Systematic Literature Review and Bibliometric Analysis:

Author: Alexandra Mora-Cruz and Pedro R. Palos-Sanchez

The authors Mora-Cruz Alexandra and Palos-Sanchez Pedro R., conducted a comprehensive analysis of the existing literature on crowdfunding platforms for their paper "Crowdfunding Platforms: A systematic Literature Review and a Bibliometric Analysis". This study offers insightful information about the evolution, effectiveness, and challenges of traditional crowdfunding models, which are crucial for understanding the context in which blockchain-based solutions can be developed.

Key Insights from the Literature Review:

1. **Growth and Popularity:** This paper highlights the significant growth in academic interest and research on crowdfunding platforms, especially in response to the financial difficulties brought on by the COVID-19 epidemic. The growth underscores the growing dependence of entrepreneurs and small firms on crowdfunding as an alternate financing method.
2. **Diverse Crowdfunding Models:**

2.3 Gaps in Research

Identify gaps, such as security vulnerabilities, trust issues, or limitations in user control, that your project will address.

2.4 Theoretical Framework

Provide a framework or models that will guide your research and development process.

Chapter 3

Project Description

3.1 System Overview

Describe the overall architecture of the decentralized crowdfunding platform.

3.2 Key Features

3.2.1 Smart Contracts

How they will automate and secure transactions.

3.2.2 User Interface

How users will interact with the platform.

3.2.3 Security Measures

Blockchain's role in enhancing security and trust.

3.3 Technology Stack

Specify the technologies, programming languages, and blockchain platform you will use.

Chapter 4

Research Methodology

4.1 Research Design

Describe the methodology for analyzing the problem and designing the solution.

4.2 Data Collection

4.2.1 Quantitative Methods

Metrics from existing platforms.

4.2.2 Qualitative Methods

Surveys, interviews with users, and experts.

4.3 Case Study

Outline a hypothetical crowdfunding campaign to demonstrate your platform's functionality.

Chapter 5

Implementation Plan

5.1 Development Phases

5.1.1 Phase 1: System Design and Architecture

5.1.2 Phase 2: Smart Contract Development

5.1.3 Phase 3: User Interface and Backend Development

5.1.4 Phase 4: Integration and Testing

5.2 Timeline

Provide a Gantt chart or timeline for the project's milestones.

Chapter 6

Evaluation and Testing

6.1 Evaluation Metrics

Identify the KPIs (e.g., transaction speed, security incidents, user satisfaction).

6.2 Testing Strategy

Explain how you will test the platform, including beta testing with real users.

6.3 Compliance

Ensure the solution meets industry standards and regulatory requirements.

Chapter 7

Expected Outcomes

7.1 Impact

Describe the potential impact of the project on the crowdfunding industry.

7.2 Scalability

Discuss how the platform can be scaled to accommodate more users and campaigns.

Chapter 8

Conclusion

Recap the problem, solution, and expected outcomes. Suggest potential future enhancements or research directions.

Chapter 9

References

Bibliography

- Collinson. (2024). Collinsoncrowdfunding [Accessed: 2024-08-11]. <https://ccfl.co.nz/>
- Equitise. (2024). Equitise [Accessed: 2024-08-11]. <https://www.equitise.com/>
- Givealittle. (2024). Givealittle [Accessed: 2024-08-11]. https://givealittle.co.nz/cause/rewilding-nz-or-it-all-starts-with-a-seed?gad_source=1&gclid=Cj0KCQjwwuG1BhCnARIsAFWBQg20H61nzkr6I3jWQb97vsHH3y51JYaAuXJEALw_wcB
- Investopedia. (2023). Crowdfunding [Accessed: 2024-08-11]. <https://www.investopedia.com/terms/c/crowdfunding.asp>
- Legalvision. (2024). Types of crowdfunding [Accessed: 2024-08-11]. <https://legalvision.com.au/types-of-crowdfunding/>
- PledgeMe. (2024). Pledgeme [Accessed: 2024-08-11]. <https://www.pledgeme.co.nz/>
- SnowballEffect. (2024). Snowballeffect [Accessed: 2024-08-11]. <https://www.snowballeffect.co.nz/>

Appendix A

Appendix A: System Architecture Diagrams

Include detailed diagrams (e.g., system architecture, data flow).

Appendix B

Appendix B: Survey or Interview Questions

Survey or interview questions if applicable.

Appendix C

Appendix C: Additional Technical Details or Code Snippets

Additional technical details or code snippets.