

Decentralized Fact-Checking Toolkit d-FCT

Project Close-out Report

July 25th, 2025

Project Catalyst Fund13

Project ID: 1300076

Contributors

Rafael Brandão (rafael@mobr.ai)

Marcio Moreno (marcio@mobr.ai)

Summary

1. Introduction

2. Challenge KPIs

3. Project KPIs

4. Key Achievements

5. Key Learnings

6. Next Steps

7. Final Remarks

8. References

Summary

Project name:

d-FCT (Decentralized Fact-Checking Toolkit): A Cardano-Based Platform for Transparent, Community-Driven Fact Verification

Project URL:

<https://milestones.projectcatalyst.io/projects/1300076>

Project ID:

1300076

Team:

Rafael Brandão, PhD (rafael@mobr.ai)

Marcio Moreno, PhD (marciofmoreno@gmail.com)

Date project started:

January 20th, 2025

Date project completed:

July 30th, 2025

1. Introduction

The d-FCT (Decentralized Fact-Checking Toolkit) is a community-driven platform designed to redefine how online information is verified. Funded under Project Catalyst F13 (Project #1300076), d-FCT combines AI-powered content analysis with decentralized governance and incentives to create a transparent fact-checking ecosystem. Users can upload content (text, images, videos, and URLs) for analysis and collaborative verification. The platform processes claims through a combination of automated semantic inspection and human evaluation, producing structured knowledge that is periodically anchored on the Cardano blockchain. This hybrid off-chain/on-chain architecture ensures both scalability and trust, while contributors are rewarded through a native token economy that promotes quality participation. Over the course of the project, the team implemented a modular Web2/Web3 architecture that integrates off-chain AI processing with on-chain mechanisms for provenance and rewards. A state machine smart contract was designed to manage topic lifecycles, evidence contributions, and reward distribution. As well as, a second smart contract for governance proposals. A functional MVP¹ is now deployed on the Cardano preview testnet.

2. Challenge KPIs

The d-FCT project successfully addressed Challenge KPIs by delivering tangible outcomes across targeted areas. To increase the number of impactful dApps on Cardano, the team released a functional MVP that integrates AI-driven content analysis, community-based claim verification, and Plutus smart contracts. Usability and accessibility were enhanced through a multilingual ReactJS interface supporting basic onboarding via Lace and Eternl wallets as well as Google SSO, ensuring an intuitive experience for users. To promote community governance and collaboration, the platform introduced a state-machine-driven verification process that incentivizes user participation through tokenized rewards. Finally, to drive blockchain adoption, d-FCT implemented a modular architecture that bridges off-chain processing with on-chain provenance tracking, reward pools, and governance mechanisms built on Cardano's EUTXO model.

Challenge KPI	How It Was Addressed
Increased number of impactful dApps on Cardano	Delivered a working MVP integrating AI-based content analysis, community verification, and an initial design for Plutus smart contracts.
Usability & Accessibility of Cardano solutions	Built a ReactJS multilingual UI (EN/PT-BR) with simple onboarding and basic topic/evidence workflows.

¹ <https://dfc.to>

Promoting Community Collaboration & Governance	Designed a state-machine-driven decentralized verification process with tokenized incentives and governance features.
Driving Blockchain Adoption	Developed a modular architecture enabling provenance tracking, reward pools, and governance using Cardano EUTXO contracts.

3. Project KPIs

The project met its KPIs by delivering a strong technical foundation and a functional MVP. The backend built in Python and the ReactJS frontend enable users to submit content, extract claims, contribute evidence, and explore verified topics. AI-assisted verification was implemented, integrating semantic analysis, content understanding (i.e., media frame inspection, audio transcription, and metadata extraction) to support automated claim detection. The architecture was deployed as a Web2/Web3 hybrid, with a Chain Gateway and orchestrated task pipelines ensuring scalable processing. While the integration of frontend UI and smart contracts is partially complete, the platform already has working transaction flows for DFC token minting, topic submission, evidence handling, reward distribution, and governance. Full integration and deployment are planned for the next stage. Additionally, a reward and reputation system was designed to incentivize timely and high-quality contributions, complemented by an anti-abuse framework using reward pools, decentralized identity, and reputation controls to protect the ecosystem's integrity.

Project KPI	Achieved Outcomes
Functional MVP	Backend (Python) and Frontend (ReactJS) implemented; users can submit content, extract claims, add evidence, and interact with topics.
AI-assisted content verification	Implemented semantic inspection, media frame analysis, audio transcription, and metadata extraction pipelines.
Modular architecture	Defined and deployed a Web2/Web3 hybrid stack; Chain Gateway and task orchestrations ensure scalability.
Smart contract implementation	Plutus Smart contracts were implemented, deployed, and tested on preview testnet, supporting \$DFC minting, provenance and governance features.
Smart contract integration	Achieved basic integration with Plutus validator design and transaction workflows on the frontend; Governance features are also present.

Reward & reputation system	Designed a contribution scoring (quantitative + qualitative) and timeliness-based incentives; on-chain implementation planned.
Anti-abuse & Sybil mitigation mechanisms	Framework outlined with reward pools, DID, and reputation-based controls.

4. Key Achievements

The d-FCT project achieved key milestones that solidify its potential as a decentralized fact-checking solution. The team implemented an AI-assisted claim verification pipeline capable of semantic extraction, media inspection, and large-scale content processing, laying the groundwork for automated and efficient fact-checking. A Plutus-based state machine (dSM) was designed to govern the lifecycle of topics, evidence submissions, voting, and reward distribution, ensuring a clear and secure process for community-driven verification. On the user side, the project delivered a multilingual, user-centric frontend integrated with backend pipelines and storage gateways, offering an accessible and intuitive experience. Collaboration with the Cardano ecosystem was strengthened through active engagement with the Catalyst community and open-source contributions. Finally, the project produced a technical report, providing detailed documentation on the platform architecture, smart contract design, scoring mechanisms, and anti-abuse strategies, which will guide the next phases of development.

- **Defined and implemented an AI-assisted claim verification pipeline**, enabling semantic extraction and media inspection at scale.
- **Designed a Plutus-based state machine (dSM)** governing topics, evidence, votes, and reward distribution.
- **Delivered a multilingual, user-focused frontend** integrated with backend pipelines and storage gateways.
- **Collaboration** with the Cardano ecosystem, leveraging Catalyst feedback and open-source contributions.
- **Produced a technical report** detailing architecture, smart contracts' design, scoring, and anti-abuse strategies.

5. Key Learnings

The development of d-FCT generated key learnings that will shape its next iterations. First, adopting a state machine approach leveraging Cardano's datums and redeemers proved to be an effective way to maintain process integrity and enforce secure state transitions in the verification workflow. The project also established a contribution scoring system, which factors in timeliness, engagement, and expert weightings. This is essential to drive high-quality participation and fair reward distribution. Additionally, the use of a hybrid Web2/Web3 architecture enabled faster MVP delivery without compromising future scalability, as it allows for

a progressive migration to fully decentralized components. Lastly, it became clear that decentralized governance demands careful design of reputation and staking mechanisms to ensure resilience against abuse and maintain a trustworthy, community-driven environment.

- The **state machine approach** (using datums/redeemers) is ideal for maintaining process integrity on Cardano.
- **Hybrid Web2/Web3 design** accelerates MVP delivery, while enabling gradual migration of components to decentralized infrastructure.
- **Decentralized governance** requires careful planning of user reputation and staking mechanisms to prevent abuse.
- **Contribution scoring** combining timeliness, engagement, and expert weightings is critical to incentivize quality.

6. Next Steps

The next phase of d-FCT will focus on expanding its decentralization and on-chain capabilities, while preparing the platform for mainnet. The immediate priority is to integrate all smart contract use cases with the frontend, enabling fully on-chain provenance tracking, reward pool management, and token distribution. Following this, the project will integrate staking mechanisms, empowering \$DFC token holders to actively participate in decision-making and platform evolution. A beta testing phase with fact-checking communities is planned to refine the user experience and validate the incentive models in real-world scenarios. On the infrastructure side, the team plans to transition media and claim storage to decentralized solutions such as Arweave, Filecoin, or Iagon, reducing reliance on centralized S3 storage. In addition, leveraging its governance and verification primitives, d-FCT could be extended to the DeSci domain, enabling decentralized scientific research validation as a natural evolution of its fact-checking ecosystem. A complete DAO implementation is also on the team's radar.

- **Integrate smart contract use cases on the frontend**, supporting users with on-chain provenance, governance, and token distribution.
- **Cover staking and governance use cases**, allowing \$DFC token holders to influence platform evolution.
- **Launch beta testing with fact-checking and Cardano communities**, refining UI/UX and validating incentive models.
- **Expand decentralized storage** (Arweave/Filecoin/Iagon) for media and claims, replacing centralized S3.
- **Expand the platform into a DAO framework and advance into the DeSci domain**, enabling decentralized research verification and leveraging governance primitives.

7. Final Remarks

The d-FCT project successfully built the foundation for a transparent, scalable, and community-driven fact-checking ecosystem. The combination of AI, blockchain, and incentive

mechanisms positions d-FCT as a unique solution to combat misinformation with verifiable, decentralized workflows. The next phase focuses on a full-fledged UI integrated with smart contracts, while testing with users to refine UX, flows, and incentives.

8. References

Close-out Video: <https://youtu.be/jdnXWleVVYQ>

Deployed MVP: <https://dfc.to>

GitHub Repository: <https://github.com/mobr-ai/dfct-cardano>

Project URL: <https://milestones.projectcatalyst.io/projects/1300076>

Technical Report:
<https://github.com/mobr-ai/dfct-cardano/blob/main/docs/TechnicalReport-M1.pdf>

Company Website: <https://mobr.ai>