Product Requirements Document: Credtics AI Platform (Final)

Product: Credtics AI Credit Management Platform
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1. Product Overview (Updated)

Credtics addresses the systemic inefficiency in the microfinance sector, where manual, paper-based processes cause protracted loan approval cycles (3-5 days) and result in prohibitively high operational costs and suboptimal risk management for Microfinance Institutions (MFIs).

Our primary users are **Loan Officers** and **C-Suite Executives (CFO/CTO)** within MFIs operating in emerging markets. The Loan Officer uses the platform for daily decision-making, while the Executives rely on its efficiency and compliance outputs.

The current prototype is an **AI-powered Decision Support System** that replaces the initial manual underwriting phase. It ingests application data (both traditional and non-traditional), uses a generative model to process and normalize complex/unstructured inputs, and generates an accurate, transparent credit score and risk recommendation **in under 10 minutes**. The core function is the immediate generation of a clear, auditable risk assessment that funnels into a mandatory Human-in-the-Loop (HIL) review.

2. Core Features & Status

The product is built around the sequential processing of a loan application, leveraging AI for automation and analysis, while keeping the human in control.

Feature	Status	AI Dependency	Type
Loan Application Data Input	Implemented	Conventional	Frontend Form/API
Data Normalization & Cleaning	Partially Implemented	AI-Dependent	Generative/Utility
Credit Scoring Algorithm	Partially Implemented	Conventional	Custom Logic (Rules)
Risk Flag	Partially	AI-Dependent	Generative/Analysis

Generation (Anomaly)	Implemented		
Transparent Justification Text	Implemented	AI-Dependent	Generative/Explanation
Human-in-the-Loop (HIL) Review Portal	Implemented	Conventional	Frontend Interface
Integration with MFI Core Banking	Future	Conventional	Backend API

3. AI Specification (Final)

The AI in Credtics is used for **data preparation, synthesis, and explanatory transparency**, enabling downstream conventional algorithms (the credit scoring rules) to function effectively.

Component	What the AI Does (Task, Inputs, Outputs)	Where in User Flow It Appears	Model / Tool Used	Constraints / Guardrails Added
Data Normalization	**Task:** Standardizes unstructured loan application data (e.g., converting "500,000 Shillings" to 500000.00). **Inputs:** Raw form data (JSON string). **Outputs:** Clean, structured JSON.	Triggered immediately upon form submission (backend).	Gemini 2.5 Flash API (Structured Output)	Used a strict JSON Schema to enforce output structure, preventing formatting errors that would break downstream systems.
Risk	**Task:**	Displayed	Gemini 2.5	Enforced a

Flag/Anomaly	Generates a concise, high-level flag (e.g., "High Income Fluctuation Risk") and a brief supporting analysis. **Inputs:** Cleaned data + Custom Risk Rules. **Outputs:** Text summary and risk label.	immediately in the Loan Officer's HIL Portal.	Flash API (Text Generation)	system instruction limiting output length to 2 sentences to ensure conciseness for busy Loan Officers.
Justification Text	**Task:** Explains *why* the score was generated, providing auditable, transparent reasoning based on inputs and rules. **Inputs:** Final Credit Score + Rules Fired. **Outputs:** Multi-paragraph explanatory text.	Available via a 'Details' button in the HIL Portal.	Gemini 2.5 Flash API (Text Generation)	System Prompt requires citing the exact data points that informed the score, preventing fabricated explanations (hallucinations).

4. Technical Architecture (Reality Check)

The prototype is a single-page web application focused on demonstrating the core flow.

- **Front-end Technologies:** HTML, Tailwind CSS, and Vanilla JavaScript.
- **Data Structure:** All application data, conventional scoring rules, and AI output templates

are stored within JavaScript objects/arrays for rapid prototyping.
- **AI Calling:** The AI (represented by the three tasks above) is conceptually called via the **Gemini 2.5 Flash API**. In the prototype, this is simulated through predefined JSON outputs and dynamic text updates triggered by user input, reflecting the expected response time and format of a real API integration.
- **External APIs/Services:** No external APIs are currently integrated in the prototype. A production version would require integration with:
    - **MFI Core Banking System (CBS) API:** For loan disbursement and repayment tracking.
    - **Regional Data Providers (Telcos/Utilities):** For non-traditional data fetching.

5. Prompting & Iteration Summary

Vibe coding tools were critical in defining the specific utility tasks the AI performs, ensuring the output is immediately usable by downstream systems or non-technical users (Loan Officers).

- **Key Prompts:**
    1. **Data Normalization Prompt (Structured Output):** "Generate a Python function that takes raw form data... and normalizes it into a clean JSON format suitable for an AI model, converting currency strings to floats..."
    2. **Scoring Rule Generation Prompt:** "Generate a set of 8 common conventional credit scoring rules for a microfinance institution... Include comments for each rule." (Used to define the conventional scoring logic).
    3. **Justification Text Prompt (Transparency Focus):** "As an Auditing Agent, generate a justification for a credit score of [X], based ONLY on the following risk factors and input values [Y]. The explanation must be concise, cite the data, and avoid financial jargon."
- **Prompt Evolution:** The initial normalization prompts were too generic and resulted in inconsistent JSON formatting. This was iterated by **adding a specific, strict JSON schema requirement and explicitly telling the model to output a Python *function* definition** to define the logic first, which stabilized the mock output structure significantly.
- **Learnings:** For utility tasks (like normalization), **structured output and role-playing (e.g., "Act as an Auditing Agent")** are more effective than simple instruction, as they enforce critical constraints (transparency, format) necessary for integrating AI into a system architecture.

6. UX & Limitations

- **Intended User Journey:**
    1. Loan Officer (LO) enters application data into the Credtics form.
    2. LO submits the form.
    3. AI-powered background processes (Normalization, Scoring) execute.
    4. LO is directed to the **Human-in-the-Loop (HIL) Portal**, where they see the **AI**

Recommendation (Score/Risk), the **Risk Flags**, and the **Justification Text**.
5. LO reviews the data and justification, applies their local context and judgment, and clicks 'Approve' or 'Reject,' finalizing the audit trail.

- **Known Limitations and "Janky" Bits:**
  - **Simulated AI:** The current AI responses are mocked/hardcoded JSON, not real-time API calls, which limits demonstrating latency/rate limits.
  - **No Realtime Data Fetch:** Cannot currently fetch non-traditional data (e.g., mobile money records).
  - **Limited Customization:** The scoring rules are static JavaScript objects and cannot be customized by the MFI client yet.
- **Ethical or Trust-Related Limitations (When NOT to Rely on the Tool):**
  - **Do NOT rely on the tool for the *final* legal decision:** The AI output is a **recommendation**, not a final decision. The Loan Officer must apply the Human-in-the-Loop (HIL) judgment, especially for applications flagged high-risk or those that fall outside the model's training data distribution.
  - **Do NOT rely on the tool for regulatory compliance sign-off alone:** While the system provides transparency, the MFI remains responsible for external compliance reporting and auditing.

7. Future Roadmap

These are the immediate next steps to transition the prototype into a pilot-ready product:

1. **Integrate Live Gemini API:** Replace all mocked AI calls with asynchronous, real-time calls to the Gemini 2.5 Flash API, including exponential backoff handling to manage rate limits and test latency in a production environment.
2. **Add MFI Rule Customization:** Build a simple configuration interface to allow MFI clients to adjust the weights and thresholds of the conventional scoring rules, empowering them to localize the platform without altering the core AI.
3. **Advanced Risk Visualization:** Integrate a scatter plot or radar chart in the HIL portal to visually map the applicant's profile against the MFI's ideal borrower profile, enhancing the LO's understanding of the risk distribution.
4. **Portfolio Monitoring:** Build the first phase of an executive dashboard showing MFI-wide metrics (e.g., average approval time, portfolio at risk) derived from Credtics' data, demonstrating ROI to the C-Suite.
5. **Data Safety & Evaluation:** Implement robust data validation checks upon normalization completion and set up internal A/B testing of different AI prompt versions to objectively evaluate which prompts yield the most accurate and auditable Justification Text.