FinEquity

For the People By the People

Designing a Participatory Audit System to help underbanked communities challenge algorithmic discrimination in microfinance.

Team

Solo Project

Role

Product Design, user and Market Research, Usability Testing, Prototyping, systems Design, Usability Testing

Background

Why I choose this problem, what did I learn?

Microfinance algorithms promised financial inclusion for India's poorest. But they discriminate against women, rural borrowers, and lower-caste communities, denying fair credit access. As an Indian designer, I've seen this intranation inequality firsthand but rarely discussed. I analyzed and get to know about this problem while working on my startup in financial domain

I learned about algorithmic bias, microfinance systems, RBI regulations and power structures. From design perspective, I mastered participatory co-design, ethnographic research with SHGs, and low-literacy UX prototyping. Sharpened my service design and community-centered prototyping skills.

Goal, Aims and Objectives

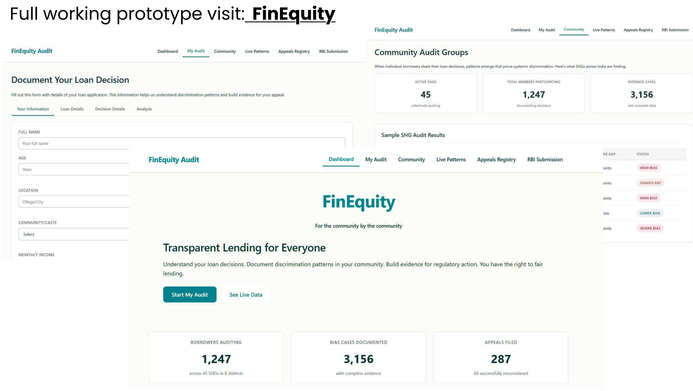
The main objective of FinEquity Audit is to **empower marginalized** microfinance borrowers—women from Self-Help Groups and gig workers—to actively **participate** in auditing algorithmic bias, transforming them from passive victims into confident decision-makers who challenge unfair lending.

This participatory vision ensures communities drive the process themselves: conducting audits, interpreting results, and owning the evidence for appeals and advocacy. Goals include building bias literacy so people understand—not just hear about—**discrimination** in their loan decisions.

Key aims are enabling **collective agency** through SHG-led audits, creating regulatory pressure via community-validated data, and democratizing algorithm auditing so affected people gain power in financial systems that once excluded them.

Overview

Full working prototype visit: **FinEquity**



Project Direction

Shaping the Solution

India remains a lower-middle-income country per World Bank classification, with GNI per capita between $1,136-$4,495. Yet its microfinance sector serves 78 million underbanked borrowers—99% women—across 14.4 million Self-Help Groups, managing a ₹3.81 lakh crore loan portfolio as of March 2025.

FinEquity Audit shapes solutions by tackling algorithmic discrimination that excludes these communities from fair credit, drawing from global auditing practices like those in Kenya and Mexico while addressing India-specific caste and rural biases.

The project advances India's economic health through equitable wealth distribution in microfinance, assessing bottlenecks like 25% higher rejection rates for women and building participatory tools for sustainable inclusion.

Understanding the Terminology

For a better understanding of the Solution, I've listed a few key terms and concepts that are important to us.
These terms and concepts have been utilized in various places and form the foundation of the project's path.

The Problem Nobody Could See

In India's microfinance system, 78 million women borrow money to grow businesses and weather crises. They repay better than men (0.09 default vs 0.50 default rate). Yet they're rejected 25% more often, charged 4-6% higher interest, and get 40% smaller loans when approved.

But here's the thing: Nobody understood why.

The rejections came with cryptic explanations. "Risk profile assessment indicates non-approval." "Business model not viable." "Insufficient income generating capacity." The women thought they failed. The loan officers blamed computers. The regulators couldn't see what was happening.
The algorithms that decided these fates? Total black boxes. Borrowers couldn't understand them. Loan officers couldn't explain them. Regulators couldn't audit them.

THE MACRO CONTEXT

The Indian Microfinance System at a Glance

Scale and Reach

- 78 million borrowers (largest concentration of women in any financial system)
- 99% women (primary focus of microfinance as financial inclusion vehicle)
- ₹3.81 lakh crore gross loan portfolio (38 billion USD)
- 14.4 million Self-Help Groups (SHGs) across India
- Interest rates: 20-26% per annum (vs traditional bank 8-12%)

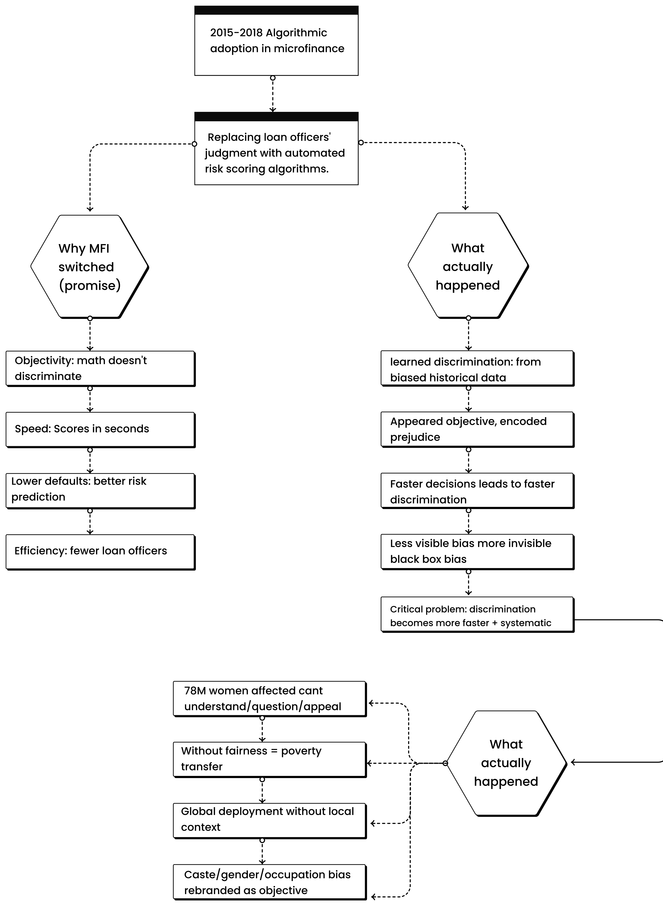
Who Borrows

- Rural women, primarily 25-60 years old
- 8th standard education average (many illiterate)
- Income: ₹3,000-₹10,000 per month
- Occupations: Handloom, agriculture, petty retail, daily labor
- No collateral; community-based social collateral (SHG membership)

Why Microfinance

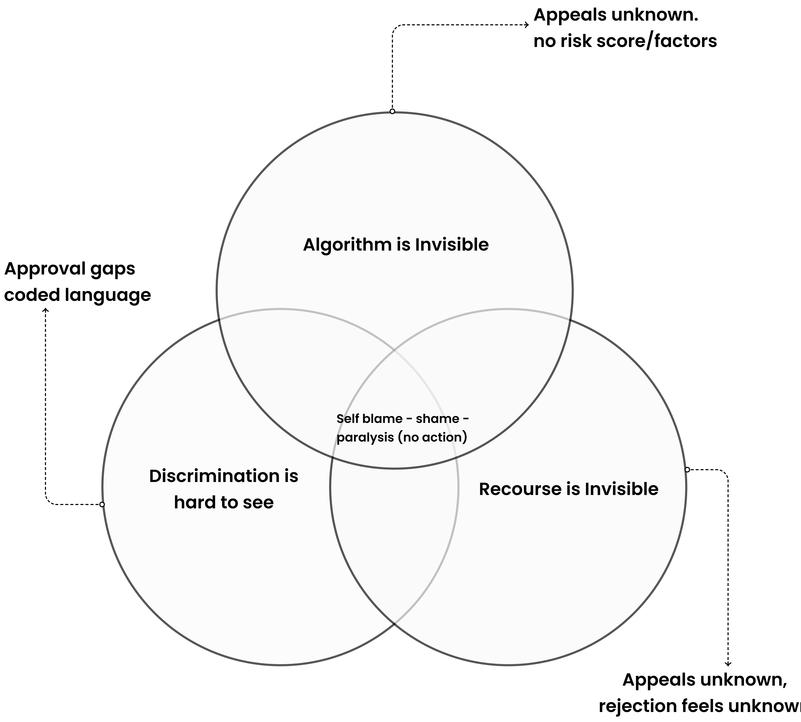
- Excluded from traditional banking (no credit history, no collateral)
- Need emergency credit for medical, seasonal crops, family needs
- Want to grow small businesses
- Alternative to moneylenders (60% interest vs 24% MFI)

The Algorithm Revolution in Microfinance



What Exactly is Broken?

Three invisible barriers compound to prevent action



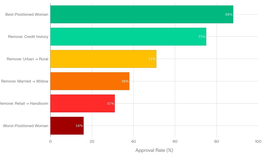
THE COMPOUND EFFECT FRAMEWORK

- **Understanding Discrimination**

- The gap between best and worst is 72 percentage points (5.5× difference)—this isn't random variation, it's systematic exclusion.

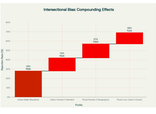
The Compound Effect: Intersectional Discrimination in Loan Approvals

Each factor compounds to reduce approval rates by up to 72%



The Core Contradiction:

- Women perform BETTER (default: 0.09 vs men 0.50)
- Yet women treated WORSE (approval: 42% vs men 68%)
- Conclusion: Discrimination isn't based on risk—**it's based on stereotype**



- Default Rate Gap: Women: 0.09 vs Men: 0.50 (5x better)
- Approval Gap: Women: 42% vs Men: 68% (26-point penalty)
- Intersectional Gap: General women: 88% to SC/ST women: 16% (5.5x disparity)

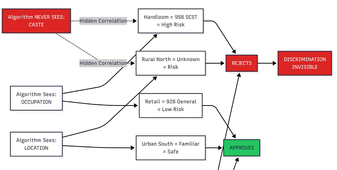
Women borrowers have 5x lower default rates than men. Yet face 26% lower approval rates. This contradiction proves discrimination isn't about risk—it's about bias.

HOW IT HIDES?

95%
correlation
- **Occupation Encodes Caste**

65%
correlation
- **Location Encodes Caste**

₹28k-₹47k
loss
- **Processing Delay Impact**



The Invisible Architecture: How Algorithms Encode Caste Bias
Real Descriptions
Occupation Text
Location Text
Education Text
Caste Proxy Strength
Geography Proxy
Language Proxy
Text Source
Caste Proxy
Geography Proxy
Language Proxy
Handloom Weaver
Rural Farmer
Urban Slum Dweller
Tribal Forest Worker
Coastal Fisherman
Urban Professional
Rural Teacher
Tribal Leader
Urban Student
Rural Student
Tribal Student
Coastal Student
Urban Student
Rural Student
Tribal Student
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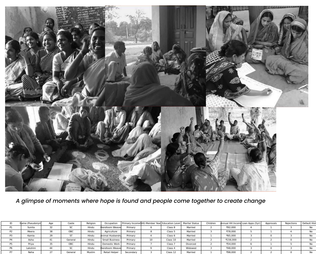
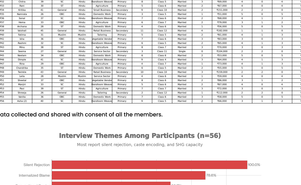
Community Interviews

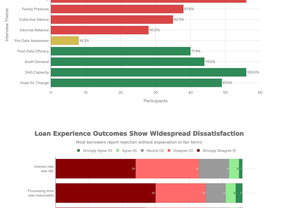
Conducted observational studies with SHG members and conducted in person interviews with 56 SHG members

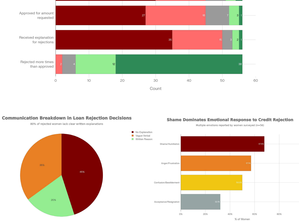


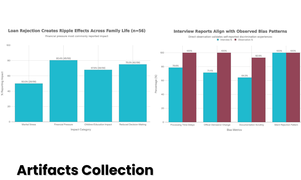
A glimpse of moments where hope is found and people come together to create change

Data collected and shared with consent of all the members.

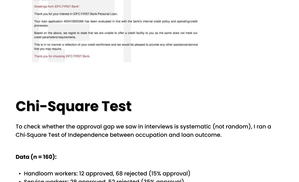








Artifacts Collection



Dear Customer,

Greetings from IDFC FIRST Bank!

Thank you for your interest in IDFC FIRST Bank Two Wheeler Loan.

Your loan application 90057270940 has been evaluated in line with the bank's internal credit policy and operational requirements.

Based on the above, we regret to state that we are unable to offer a Loan facility to you as the same does not meet our credit parameters/requirements.

This is in no manner a reflection of your credit worthiness and we would be pleased to provide any other assistance/service that you may require.

Thank you for choosing IDFC FIRST Bank.

Dear Customer,

Greetings from IDFC FIRST Bank!

Thank you for your interest in IDFC FIRST Bank Personal Loan.

Your loan application 40041900280 has been evaluated in line with the bank's internal credit policy and operational requirements.

Based on the above, we regret to state that we are unable to offer a Loan facility to you as the same does not meet our credit parameters/requirements.

This is in no manner a reflection of your credit worthiness and we would be pleased to provide any other assistance/service that you may require.

Thank you for choosing IDFC FIRST Bank.

Chi-Square Test

To check whether the approval gap we saw in interviews is systematic (not random), I ran a Chi-Square Test of Independence between occupation and loan outcome.

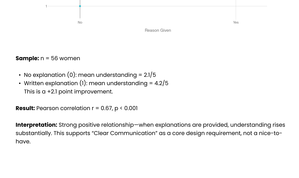
Data (n = 160):

- Handloom workers: 12 approved, 68 rejected (15% approval)
- Service workers: 28 approved, 52 rejected (35% approval)
  This is a 20 percentage-point gap (service workers are 2.3× more likely to be approved).

Test: Chi-Square Test of Independence

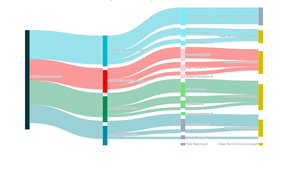
- Null hypothesis: Occupation and approval are independent (occupation doesn't matter).
- Result: $\chi2 = 18.4$, $df = 1$, $p = 0.002$.

Interpretation:
Because $p < 0.05$, the null hypothesis is rejected. This means occupation is statistically associated with loan approval in this sample, making the observed gap very unlikely to be due to chance.



Correlation Analysis: Transparency → Understanding

To test whether transparency actually helps (beyond interviews), I measured the relationship between receiving a written explanation and women's understanding of the decision



Sample: n = 56 women

- No explanation (0): mean understanding = 2.1/5
- Written explanation (1): mean understanding = 4.2/5
  This is a +2.1 point improvement.

Result: Pearson correlation $r = 0.67$, $p < 0.001$

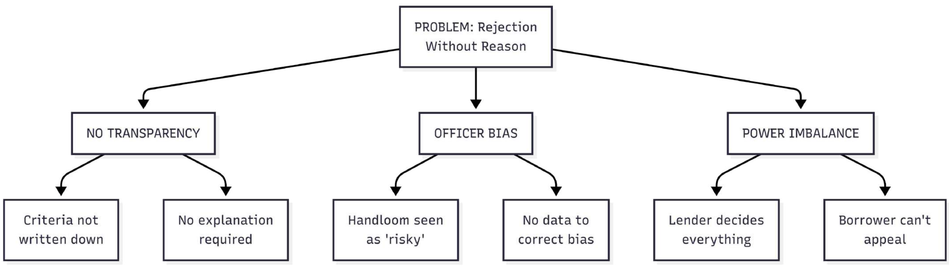
Interpretation: Strong positive relationship—when explanations are provided, understanding rises substantially. This supports "Clear Communication" as a core design requirement, not a nice-to-have.

Participatory Design Flow to Solutions (56 Participants)
Four streams converge to six community-driven recommendations
Silent Rejection
Internalized Shame
Occupational Barrier
Caste Encoding
Family Pressure
Collective Silence
Informal Reliance
Pre-Data Assumption
Post-Data Efficacy
Audit Demand
SHG Capacity
Hope for Change
Clear Communication
Shame Reframing
Peer Mentorship
Community Accountability
Transparent Criteria
Simple Process
Community Accountability
Peer Mentorship
Shame Reframing
Clear Communication
Simple Process
Transparent Criteria
Clear Communication
Simple Process
Transparent Criteria
Community Accountability
Peer Mentorship
Shame Reframing

Affinity Mapping

Geographic Exclusion	FEEDBACK EXPERIENCES	AMPLIFICATION MECHANISMS	SCALE IMPACT	VISIBILITY RECOGNITION	METHODOLOGICAL INSIGHTS	READINESS
Occupational Caste Encoding	Silent Rejection	Feedback Loop Starting	14.79 Crore Women Invisible	Numbers Make It Visible	Qualitative Deep Dive	Communit ies Already Organized
Default Rate Paradox	Shame & Self-Blame	Approval Rate Collapse	5.6 Crore Excluded North	Pattern Recognition Shifts Blame	Affinity Mapping Patterns	Policy Window Opening
Processing Time Gatekeeping	Isolation & Silence	Algorithm Self-Justification	3.2 Crore Handloom Workers	Geographic Mapping	SHG Validation	Audit Frameworks Ready
Interest Rate Premium	Informal Sector Trap	NPA Rate Increase	8 Crore Agricultural Workers	Occupational Truth	Snowball Sampling Growth	Collective Power Activated
Loan Amount Ceiling	Family Pressure	Disbursal Collapse	₹240,000 Lifetime Penalty	Algorithm Audit Readiness	Data-Story Integration	
	Officer Bias Reports	Portfolio Concentrat ion	₹17 Billion Annual Extraction	14.79 Crore Women Invisible	Qualitative Deep Dive	
			₹2.5 Billion Tax Loss			

Root Cause Analysis



3 Major root cause

Root Cause: No Transparency → Design: Show Approval Rates by Occupation

Root Cause: Officer Bias → Design: Publish Decision Criteria

Root Cause: Power Imbalance → Design: Enable Appeals with Templates

Problem Statement

"Automated and semi-automated microfinance lending in India produces large, unexplained approval and terms gaps against women, especially SC/ST handloom workers, yet these unequal outcomes remain invisible to borrowers and regulators because no system turns individual loan decisions into clear, group-level evidence that can be audited, challenged, or corrected."

Personas

Sangeeta Devi (34)
Handloom worker (SHG)

About

- **Location**: Jaipur/Bhilwara belt (rural)
- **Work:** Weaving + small order-based production; income is seasonal and fluctuates
- **Literacy/tech**: Basic literacy; prefers verbal guidance; uses a basic phone, depends on SHG leader for forms
- **Credit contex**t: Relies on SHG + local networks; documentation is inconsistent and hard to assemble on time

Description

A home-based handloom weaver in rural Rajasthan who needs timely micro-loans for raw materials, but faces repeated rejection and long delays that disrupt seasonal income cycles.

Goals

- Get a loan decision fast enough to buy thread/raw material before the season/order window closes.
- Understand why a loan was rejected so she can fix it and try again.
- Avoid moneylenders and protect SHG reputation.

Frustrations

- Rejected" comes with no clear reason, so improvement feels impossible.
- Delays (weeks) make the loan useless for seasonal needs.
- Paperwork and branch visits cost time, travel money, and dignity.

Kamla Bai (29)
Daily wage worker

About

- **Location:** Rural Rajasthan (SC/ST hamlet, limited transport)
- **Work:** Daily wage + seasonal farm/livelihood work; unpredictable income
- **Literacy/tech:** Low literacy; can't read formal letters; depends on SHG facilitator/leader for any application steps
- **Credit context**: If rejected, often shifts to informal borrowing due to urgency.

Description

A low-literacy SC/ST woman balancing daily-wage work and caregiving, who needs small loans for emergencies and livelihood stability but is blocked by documentation barriers, opaque decisions, and social intimidation at institutions

Goals

- Access a small loan quickly for health/school/ emergency without repeated trips.
- Have a trusted person (SHG leader) help her apply correctly the first time.
- Feel respected and safe in the process (no humiliation).

Frustrations

- Can't understand paperwork; "go bring documents" is vague and overwhelming.
- Rejection feels permanent; no clear path to appeal or correct errors.
- Fear of being judged/ignored reduces willingness to reapply

Empathy mapping

SAYS

- “Please tell me clearly why my loan was rejected.”
- “If the decision comes late, I lose the season and the work.”
- “I keep getting asked for documents, but no one explains what exactly is missing.”

Thinks

- “Maybe they automatically see handloom work as risky.”
- “If I knew the rules, I could prepare and apply correctly.”
- “Is this happening only to me, or to many women like me?”

Does

- Asks the SHG leader/facilitator to help fill forms and talk to the bank.
- Makes repeated follow-ups but often gets vague responses.
- After rejection, delays reapplying for a while to avoid embarrassment and cost.

Feels

- Anxious about deadlines and seasonal income.
- Embarrassed and discouraged after rejection.
- Frustrated because the process feels opaque and unfair.

SAYS

- “I can’t read these letters/forms—someone must explain it to me.”
- “If they reject me once, I feel ashamed to go back.”
- “Just tell me what to do next, step by step.”

Thinks

- “People like me are not treated seriously.”
- “They will reject me because I don’t have the right papers.”
- “If something is wrong, I don’t know who to ask or how to challenge it.”

Does

- Relies on an SHG leader/facilitator to submit applications and interpret messages.
- Avoids going to the branch alone due to fear of disrespect or confusion.
- In urgent situations, borrows informally because it’s faster than the formal process.

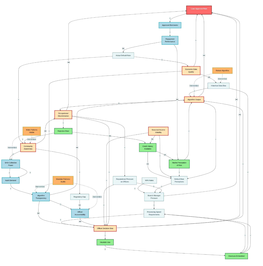
Feels

- Powerless in front of institutions.
- Fearful of being judged or dismissed.
- Relieved when information is given in simple language by someone trusted.

User Journey

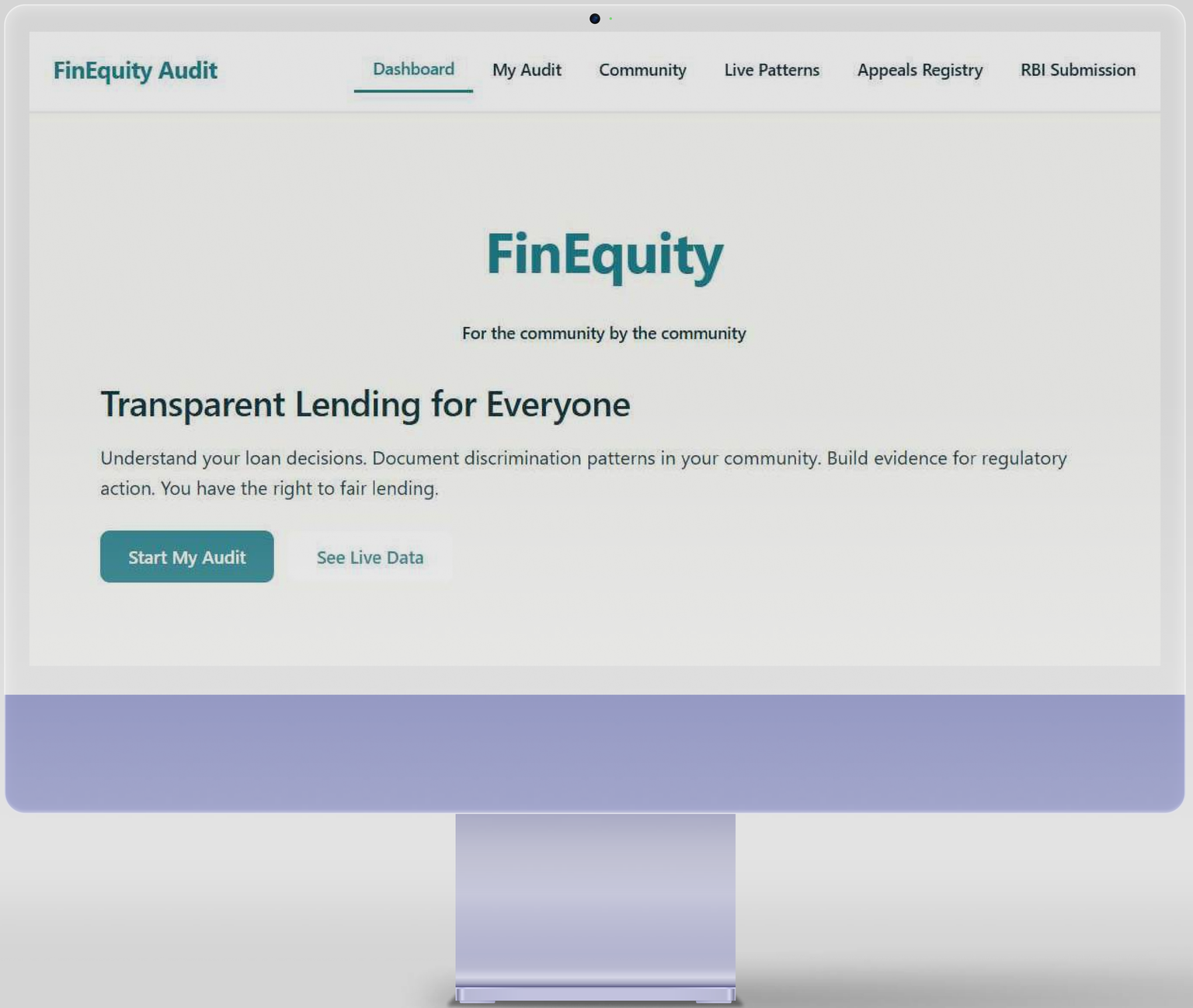
Step	Actor	Start	What happens	Main pain	Design response
1. Early	Priya	Sees SHG leader's phone	Checks in, sees 3 loans	Cannot track repayment	Loan Journey Tracker
2. Meet	Priya	Pools progress	Meet + follow up	Relational costs updates	Relational Cost Tracker
3. Business	Priya	Underwrote deal	Decision	Confusion	Confusion + shame
4. SHG	SHG + Priya	Set pattern	Members share outcomes	Relation systems issue	Relation systems issue
5. Audit	SHG	Build evidence	Log decisions consistently	Manual + paper fly	Manual + paper fly
6. Appeal	Priya + SHG	Reverse decision	Support appeal with evidence	Appeal + documentation	Appeal + documentation

Systems mapping


Priya's Journey
Relational Cost Tracker
Loan Journey Tracker
Relational Cost Tracker
Relational Cost Tracker
Relational Cost

Prototype

Full working prototype visit: **FinEquity**



Usability Report

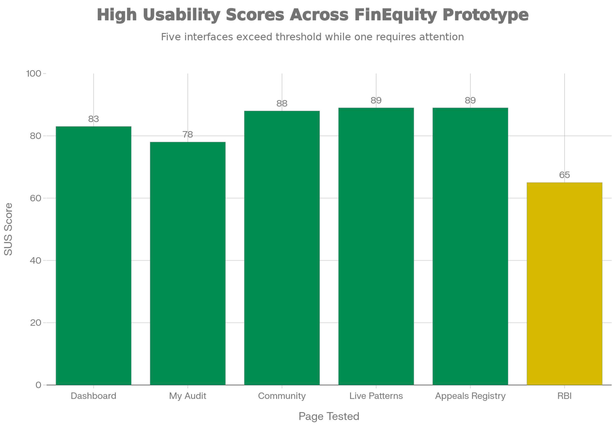
- 18 participants tested (6 borrowers, 6 SHG leaders, 6 advocates)
- 6 pages tested (Dashboard → My Audit → Community → Live Patterns → Appeals Registry → RBI)
- Methods: Task completion, SUS score (0–100), emotional check (1–5), interviews

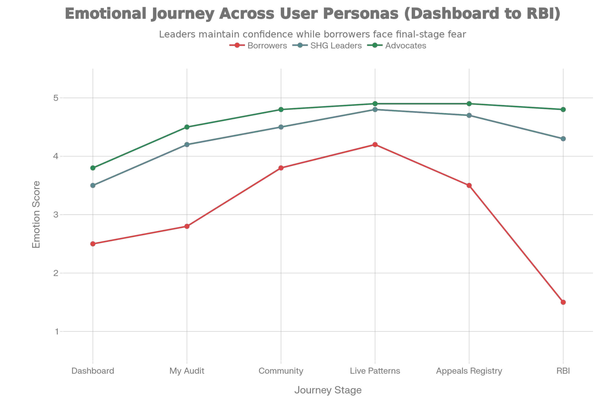
Strengths

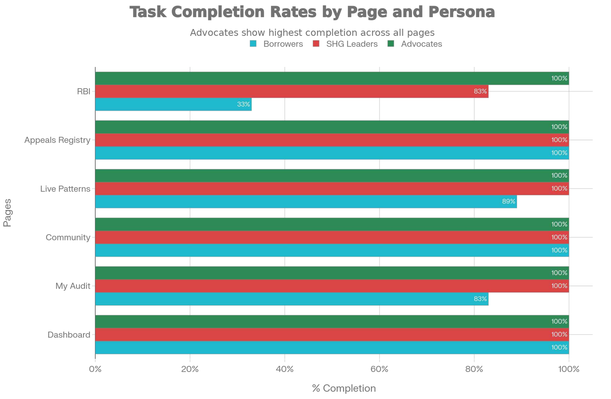
- Dashboard/Community pages work well (SUS 83–88)
- Borrowers move from shame (2/5) → empowered (4/5) by mid-journey
- Appeals Registry builds confidence: anxiety drops 4.7 → 2.3
- Overall SUS: 80.6/100 (good)

Critical Issues

1. RBI page too complex — SUS 65 (borrowers), 90+ (advocates). Borrowers feel intimidated. Fix: Make simple version.
2. Form drop-off — 1 borrower abandoned due to caste field sensitivity. Fix: Add privacy explainer first.
3. Retaliation fear — "What if lender finds out?" mentioned 3x







Thank You

Please contact to akshanshpareek25@gmail.com for full research reports and data for research purpose