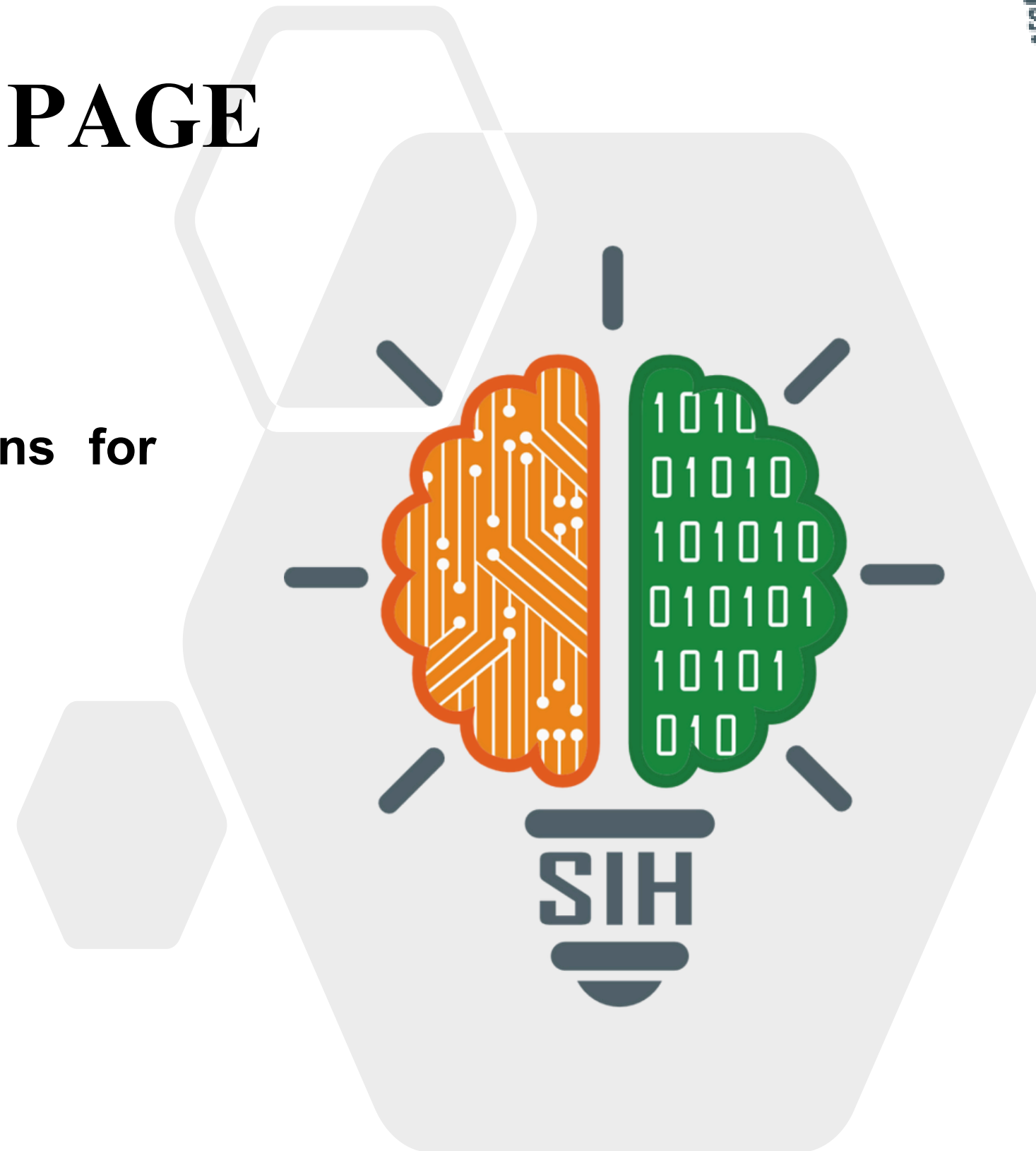# SMART INDIA HACKATHON 2025

TITLE PAGE

- **Problem Statement ID – SIH25060**

- **Problem Statement Title- Real life solutions for Waste Management.**

- **Theme- Clean & Green Technology**

- **PS Category- Software**

- **Team ID-**
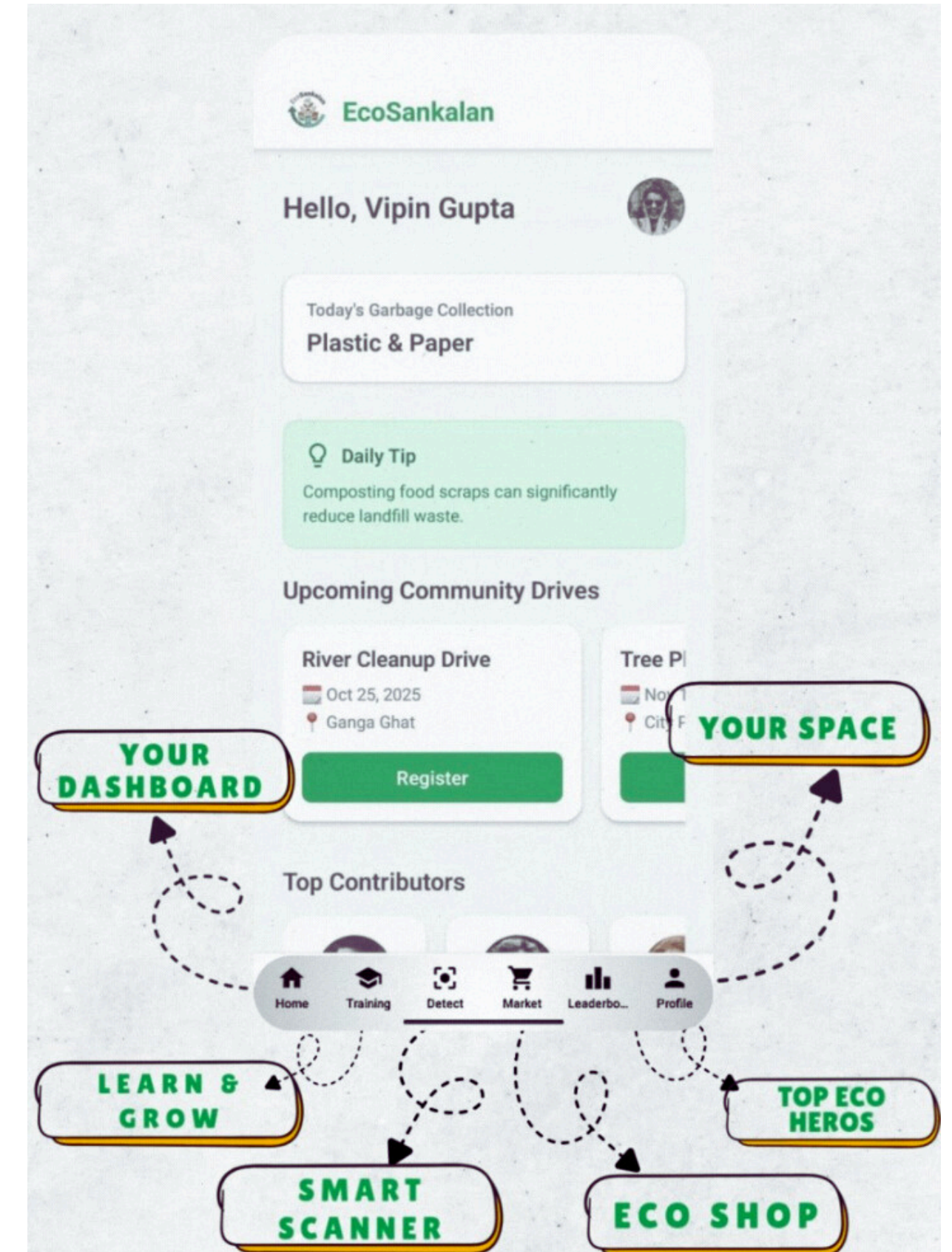
- **Team Name : Turing.Tosh**

EcoSankalan

- ## Proposed Solution

- **Training**: In-app micro-learning + quizzes for awareness → earn points.

- **Incentives**: Points, leaderboards, redeemable rewards to drive participation.

- **Citizen App**: Snap & report waste → AI auto-classifies → escalates if unresolved.

- **Marketplace**: Citizens sell recyclable waste → recyclers/workers buy directly.

- **Smart Scheduling**: Citizens & workers notified of today's waste type collection.
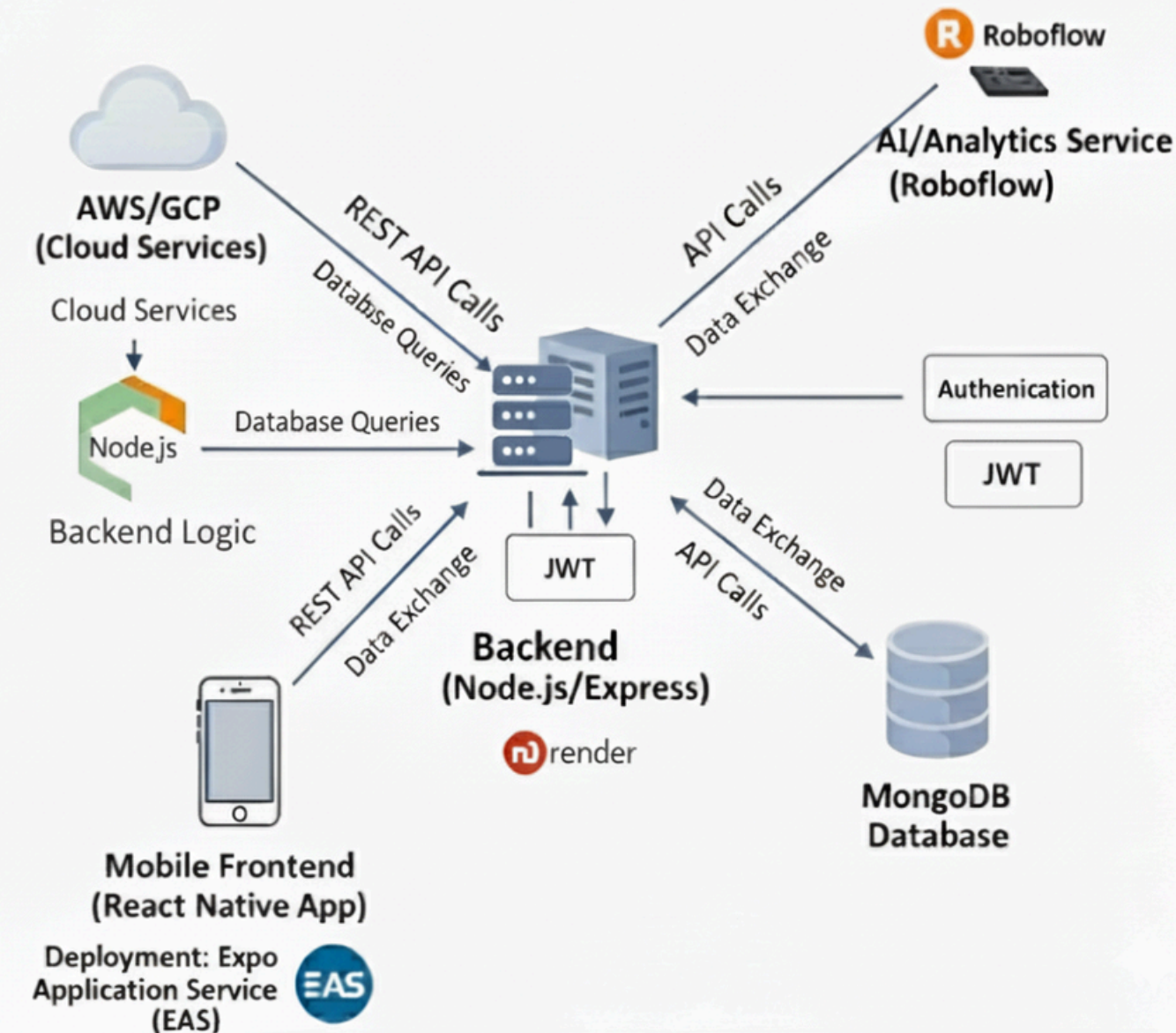
- ## Innovation & Uniqueness:

- Combines **reporting + incentives + education + marketplace** in one ecosystem.

- Ensures **accountability** (before/after proof + auto-escalation).

- **Gamification + Transparency** = sustained citizen participation.

TECHNICAL APPROACH

- ## Technology Stack

- **Frontend :** React Native , JavaScript , TypeScript , Tailwind CSS

- **Backend :** NodeJS , ExpressJS , MongoDB

- **AI and ML :** Roboflow

- **API Services :** Roboflow API

- **Cloud and Deployment :** EAS , Render , GitHub

- **Add-Ons :** JWT

EcoSankalan System Architecture

FEASIBILITY AND VIABILITY

• Feasibility

1. Mobile-first → lightweight React Native app (cross-platform) works on low-cost Android phones.
2. Cloud-based Node.js + MongoDB → low infra, quick scale to multiple ULBs.
3. Easy training → in-app micro-learning content.

• Challenges

4. **Citizen-side**: Low awareness, digital illiteracy, app fatigue.
5. **Technology-side**: Spam reports, server downtime, photo misclassification.
6. **Operational-side**: Marketplace trust issues, logistic gaps, unverified buyers/sellers.

• Use Cases

7. **Citizen Participation** – Snap waste → AI verifies → task auto-assigned to worker.
8. **Training Adoption** – Students, SHGs & citizens earn points after completing training.
9. **Marketplace** – Households sell recyclables, recyclers/NGOs buy → direct income.

• Solutions

1. Awareness campaigns, gamification & rewards → drive citizen adoption.
2. AI-based spam filtering + citizen reputation scores → improve trust.
3. Verified recycler/worker onboarding + escrow system for marketplace.
4. Cloud backup & monitoring → minimize downtime, ensure reliability.

• Supporting Facts

- Yadgir "See Waste, Send Photo" success shows citizens *will* participate if easy & accountable.
- Smart city pilots with AI/RFID showed 20–30% reduction in missed pickups.
- Recycling market projected to cross ₹6,000 crore by 2030 → marketplace viability.

IMPACT AND BENEFITS

Turing.Tosh

Benefits of the solution

Social

Operational

Environmental

Governance

Economic

• Potential impact on target audience:

- **Citizens :** Easy reporting, rewards (points, leaderboards), awareness training in local language.

- **Workers & Staff :** Daily waste-type instructions, optimized routes, reduced confusion.

- **Recyclers/NGOs :** Direct access to sell/buy waste items, better material sourcing.

- **Youth/Students :** Incentivized participation through gamified learning modules.

• Benefits of the solution

Social :
- Community-driven participation through incentives & gamification.
- Awareness campaigns & in-app training → long-term change in waste habits.
- Builds trust between citizens & municipal authorities via public dashboards.

Environmental:
- Increase in waste segregation → more recycling, less landfill.
- Reduced open dumping → improved sanitation & air quality.
- Marketplace ensures recyclables are reused efficiently.

Economic :
- Fuel & operational cost savings for ULBs (15–20%).
- New business opportunities for recyclers/startups in circular economy.

Operational :
- Complaint resolution time reduced ~40%.
- Real-time dashboards improve accountability & performance tracking.

Policy & Governance :
- Strengthens Swachh Bharat Mission & Smart City programs.
- Improves Swachh Survekshan rankings with measurable results.

RESEARCH AND REFERENCES

Problem Validation

- The Problem: The core issue of waste management in India is a behavioral one: a lack of consistent segregation at the household level.
- Reference: Official reports from the Government of India's Swachh Bharat Mission and the CPCB.(Link:https://sbmurban.org/swachh-survekshan)
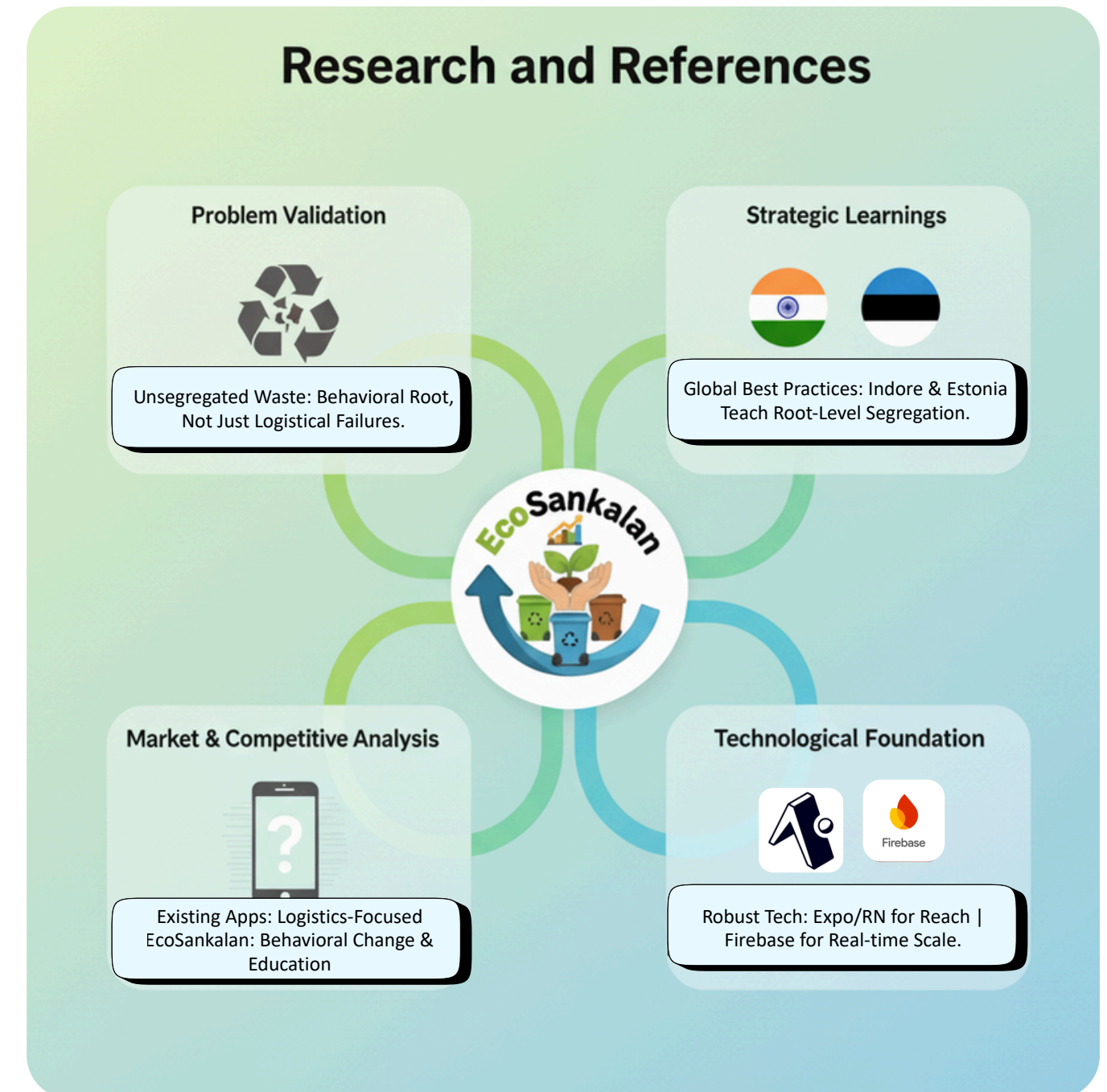
Strategic Learnings

- The Indore Model: Learned that scheduled, segregated collection and continuous citizen education are critical for urban waste management success.
- Reference: Data and reports from the Indore Municipal Corporation's solid waste management program.(Link:https://sbmurban.org/indore-clean-green) (Link:https://documents.worldbank.org/en/publication/documents-reports/documentdetail/145111637051108755/waste-management-in-estonia-survey-on-behaviors-perceptions-and-motivations)

Market & Competitive Analysis

- The Gap: Existing apps focus on logistics and collection. We identified the need for a solution that addresses the fundamental issue of behavior change and education at the source.
- Reference: Analysis of top waste management apps and market research reports.

Technological Foundation

- Our Stack: We chose Expo/React Native for rapid, cross-platform development and Firebase for a scalable, real-time backend.
- Reference: Expo and Firebase official documentation, highlighting the benefits of their ecosystems.
  (Link:https://docs.expo.dev/workflow/overview/)
  (Link:https://firebase.google.com/docs)

Research and References

Problem Validation
Unsegregated Waste: Behavioral Root, Not Just Logistical Failures.

Strategic Learnings
Global Best Practices: Indore & Estonia Teach Root-Level Segregation.

EcoSankalan

Market & Competitive Analysis
Existing Apps: Logistics-Focused EcoSankalan: Behavioral Change & Education

Technological Foundation
Robust Tech: Expo/RN for Reach | Firebase for Real-time Scale.

IMPORTANT INSTRUCTIONS

SMART INDIA HACKATHON 2025

Please ensure below pointers are met while submitting the Idea PPT:

1. **Kindly keep the maximum slides limit up to six (6). (Including the title slide)**
2. **Try to avoid paragraphs and post your idea in points /diagrams / Infographics /pictures**
3. **Keep your explanation precise and easy to understand**
4. **Idea should be unique and novel.**
5. **You can only use provided template for making the PPT without changing the idea details pointers (mentioned in previous slides).**
6. **You need to save the file in PDF and upload the same on portal. No PPT, Word Doc or any other format will be supported.**

Note - You can delete this slide (Important Pointers) when you upload the details of your idea on SIH portal.