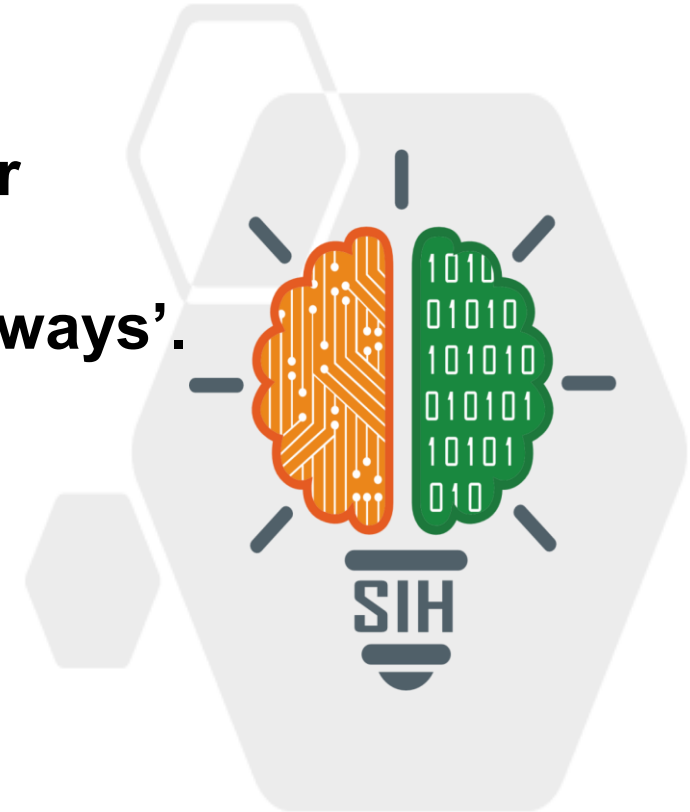


# SMART INDIA HACKATHON 2025

## TITLE PAGE



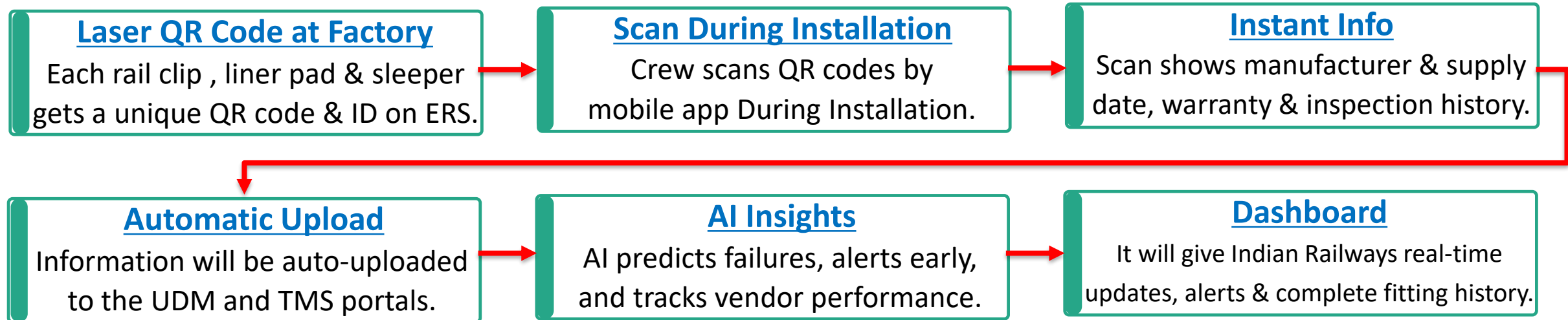
- **Problem Statement ID –SIH25021**
- **Problem Statement Title- AI based development of Laser based QR Code marking on ‘track fittings on Indian Railways’.**
- **Theme- Transportation & Logistics**
- **PS Category- Hardware**
- **Team ID-**
- **Team Name (Registered on portal) : YOLO**



## Problem Statement:

- ❖ 10 crore rail clips, 5 crore liners, 8.5 crore pads bought yearly—**no tracking system**.
- ❖ No ID system for **clips, pads, liners, sleepers**.
- ❖ No **mobile scanning** for vendor, supply date, or warranty.
- ❖ Inspection history missing in **UDM/TMS**.
- ❖ Total approximate annual loss for fittings: **₹1122 crore**.

## Proposed Solution:



## Unique Value:

- ✓ ₹1 Innovation → Savings ₹561 crore per year.
- ✓ AI powered → Intelligent Railways.
- ✓ Expandable → From clips to complete tracks & Monitoring.
- ✓ Zero manual error & Easy to Implement.
- ✓ Full traceability of every fitting.
- ✓ Next-gen ready → Industry 4.0 standard.



**Laser QR Marking Machine**



**Mobile Scanner/Android App**



**Indian Railways UDM & TMS**

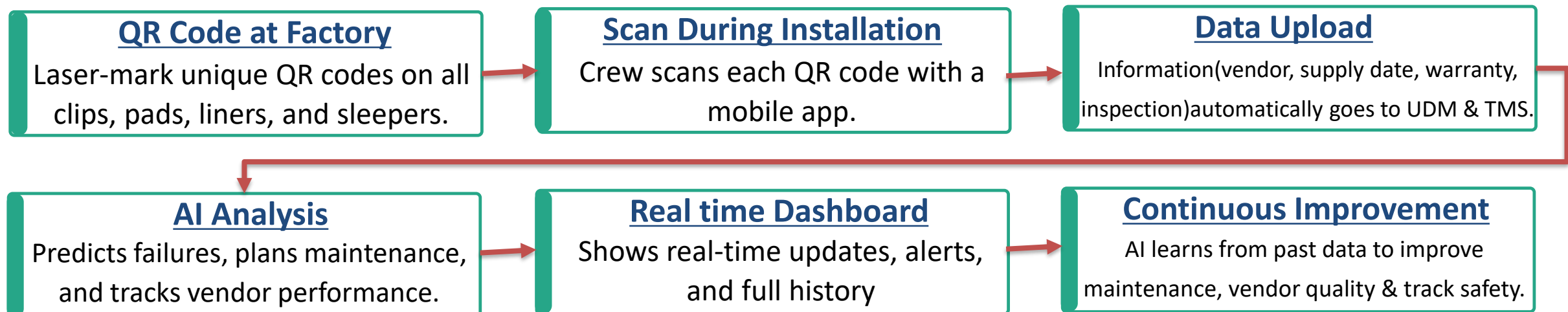
## Hardware:

- **Laser QR code printer** for clips, pads, liners, sleepers.
- **Mobile devices** for scanning and data entry.

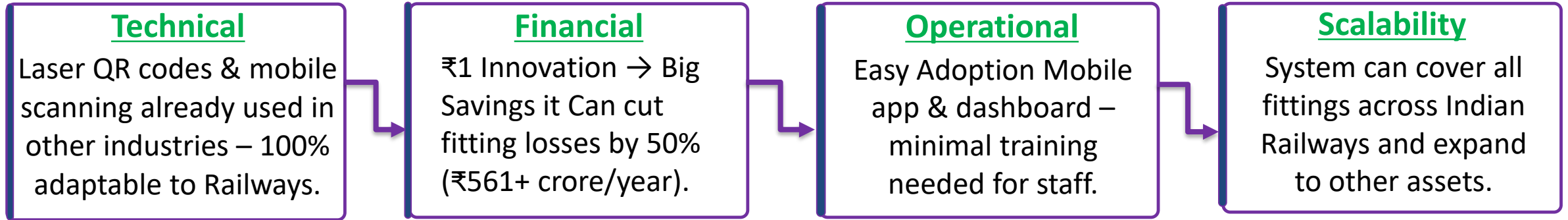
## Software:

- **Mobile app:** Java, Swift(iOS), Flutter
- **Backend & AI :** Python , java
- **Database:** MongoDB
- **Core Integration:** UDM & TMS Portals

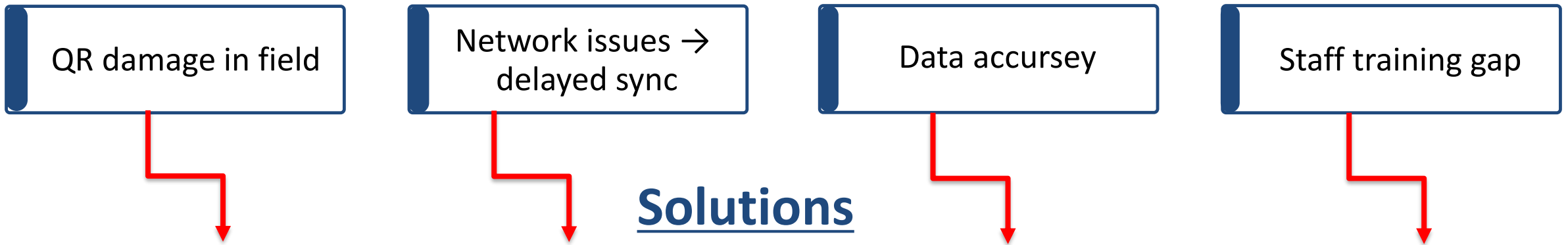
## Methodology (Step-by-Step Flow)



## Feasibility

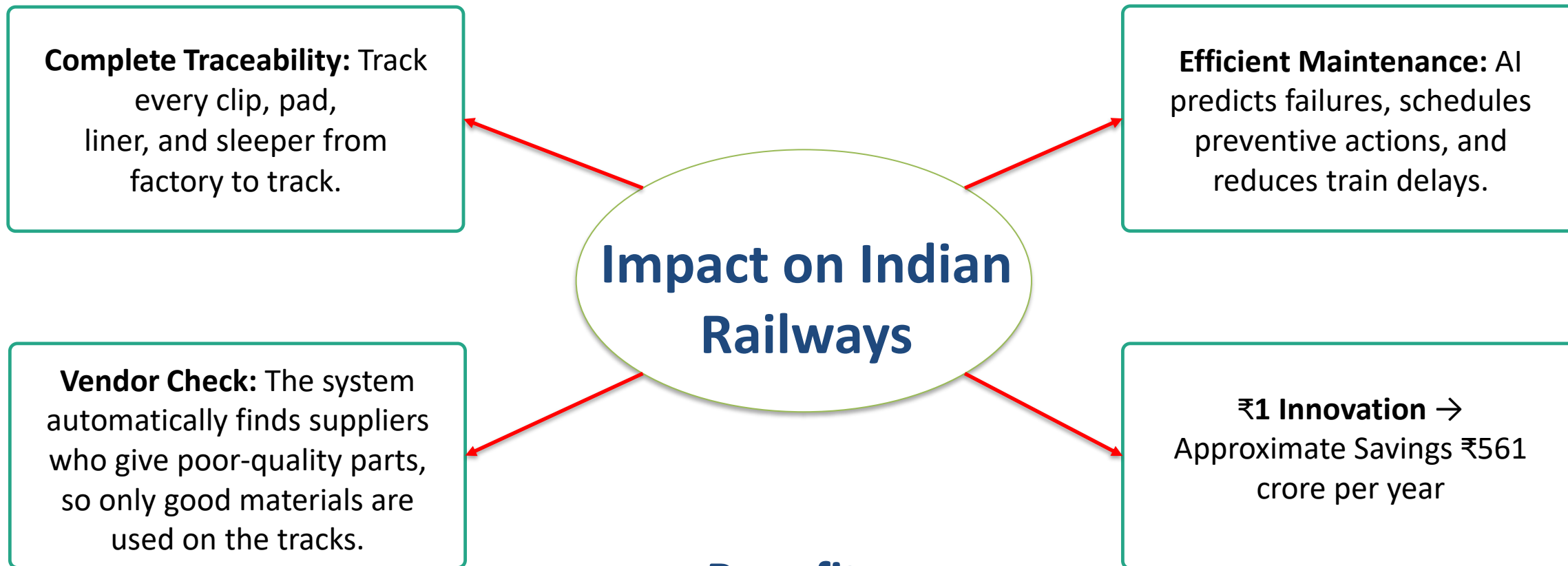


## Challenges / Risks



## Solutions





## Benefits

- ✓ Complete traceability of all clips, pads, liners, and sleepers.
- ✓ Predictive maintenance using AI reduces failures and downtime.
- ✓ Safer rail operations for passengers and staff.
- ✓ Reduces losses by up to ₹561 crore/year.
- ✓ Reduces waste from damaged or poor-quality fittings.
- ✓ Longer-lasting components reduce waste and energy use, supporting sustainable and greener railway operations.



# RESEARCH AND REFERENCES



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3. "AI on Track: How technology is transforming Indian Railways" from The Financial Express: This news article highlights recent initiatives, such as the implementation of the Machine Vision-Based Inspection System (MVIS) for rolling stock, which uses AI/ML to detect defects.

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