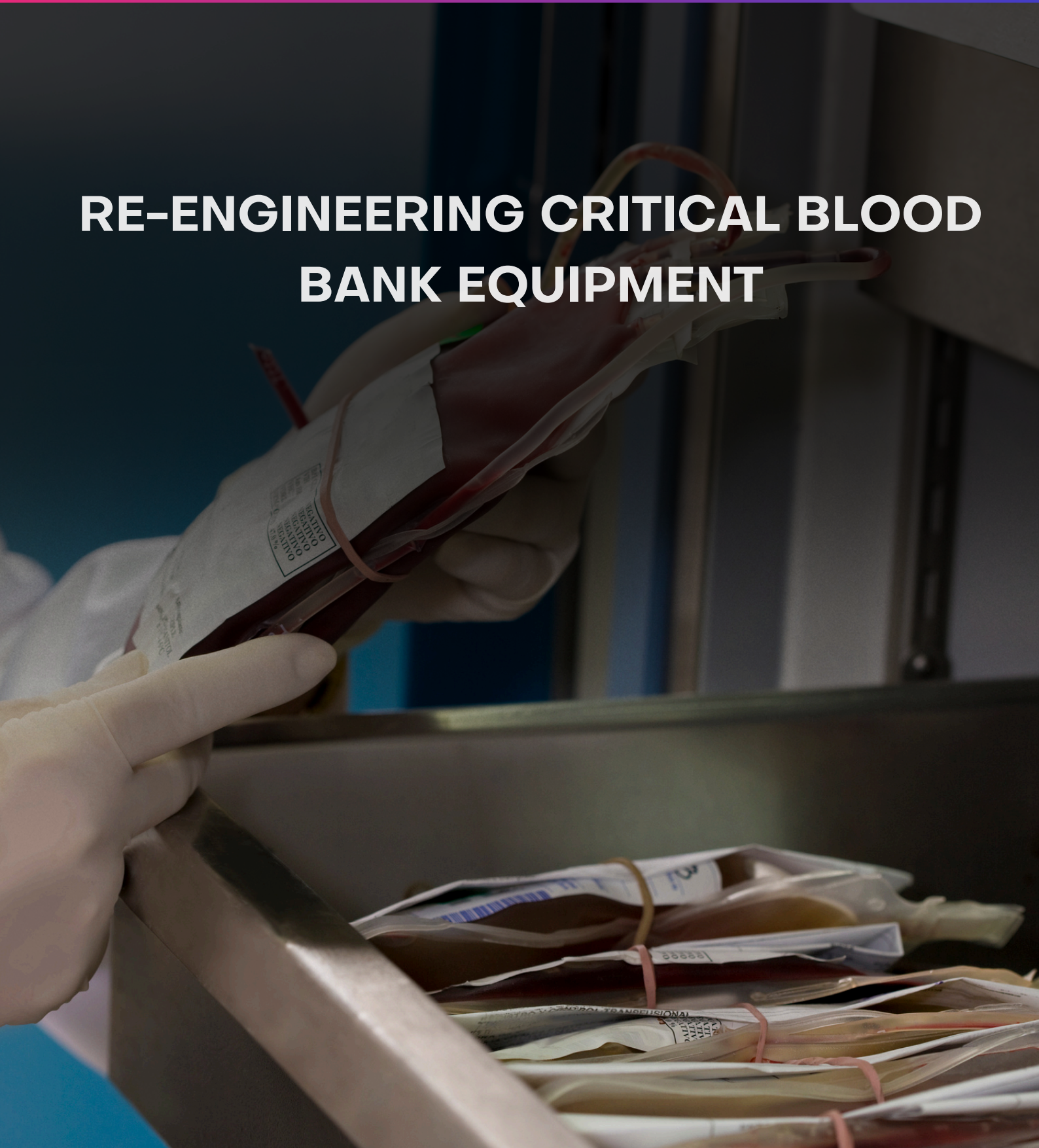


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RE-ENGINEERING CRITICAL BLOOD BANK EQUIPMENT

STAKEHOLDER

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Core Issue

The Department of Immunohematology & Transfusion Medicine operates with highly specialized equipment, some of which is prohibitively expensive and difficult to access. Two urgent equipment needs have been identified: **Centralised Temperature Monitoring for Standalone Refrigerators** and **Blood Bag Tube Sealer**

Constraints

- High procurement costs make advanced machines inaccessible for smaller or resource-limited hospitals.
- Existing imported solutions have high maintenance costs and require specialized servicing.
- Critical nature of blood and medicine storage demands precise temperature control and failsafe sealing technology.
- Lack of modular, scalable designs suitable for incremental upgrades or in-house repairs.

Context

Hospitals across India face significant budgetary constraints while managing life-saving equipment. The inability to access affordable, reliable devices for core transfusion and storage processes directly impacts efficiency, patient safety, and operational readiness. Innovating low-cost, accurate, and durable devices for temperature monitoring and blood bag sealing can improve not only this hospital's workflow but also serve as a replicable model for other healthcare institutions.

Groundwork to be considered

- What affordable IoT-based solutions could be developed for centralised temperature monitoring of multiple standalone fridges?
- Can existing sealing technology be miniaturized, locally fabricated, or re-engineered for reduced cost without compromising safety standards?
- Which components are essential to meet medical-grade compliance, and which can be simplified to lower costs?



Existing Systems

- Off-the-shelf imported central monitoring systems with high per-unit and integration costs.
- Blood bag sealers available commercially but at a price point that restricts widespread use.
- Maintenance contracts tied to original vendors, increasing operational expenditure.

Resources

Topic / Need	Resource Description	Link
IoT-based temperature monitoring for medical refrigeration	Case study of a remote refrigeration monitoring system for the pharma	Rishabhsoft
Healthcare IoT temperature monitoring benefits	Guide explaining compliance, alert systems, and safety improvements in hospital settings	SensoScientific
Wireless temperature & humidity monitoring	Plug-and-play solution with centralized data logging for multiple fridges	MWI India
Cloud-based refrigerator monitoring	GxP-compliant system with centralized dashboards and remote alerts	ELPRO
Automatic blood bag tube sealers	Market insights on current sealing technology, ultrasonic sealing, and vendor trends	Data Insights Market
Portable blood bag tube sealer trends	Analysis of portable designs and adoption in emerging healthcare markets	DataIntelto , OpenPR