REGTECH / SOVEREIGN CAPITAL RAIL / GIFT-IFSC

CORPVIDESH AI

AI-Orchestrated Cross-Border Capital RegTech Platform

The quantum leap that could rewire how India sends capital to the world.

TEAM QUANTUM LEAP DEPARTMENT OF LAW · BRAINWARE UNIVERSITY, BARASAT

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USD 14–18 Bn
SURPLUS STRANDED ANNUALLY

18–28 days
CURRENT ODI CLEARANCE

4–9 minutes
CORPVIDESH CLEARANCE

11–17 %
MANUAL FILING ERROR RATE

> *"It is not a dashboard. It is a sovereign rail — and once laid, it becomes invisible, the way UPI became invisible."*
>
> INTERNATIONAL REGTECH REVIEW · VOL. XII

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IN PLAIN WORDS

This is the cover. A team of three law students from Brainware University has designed a computer system called CorpVidesh AI. Its job: let an Indian company send money abroad legally in minutes instead of weeks. The four figures below the names are the headline results the system is built to deliver.

02 HOW TO READ THIS DOSSIER

Contents & Team Mandate

Three source documents — the Hackathon Proposal v3, the International RegTech Review editorial, and the State-of-the-Problem brief — reconstructed into one continuous argument: problem, technology, mechanism, ownership, and money.

TEAM MANDATE

Raja Mukherjee

TEAM LEAD · BWU/BBL/25/002

Owns the regulatory thesis, the FEMA reasoning architecture and the Sahyog / GSTN submission grammar. Translates statutory intent into deterministic machine rules.

Priyanshu Dhar

TEAM CO-LEAD · BWU/BBL/24/158

Owns the ledger, the immutable audit chain, the 400% Net-Worth Monitor and the regulator single-pane-of-glass topology.

Abhispa Nath

TEAM CONCEPT SUPPORT · BWU/BBL/25/121

Owns problem framing, statutory research, dataset curation, governance drafting and the economic model that quantifies the rail.

IN PLAIN WORDS

This page is the table of contents plus who did what. Think of it as the index of a book, followed by three short job descriptions: one member owns the law, one owns the record-keeping technology, and one owns the research and the money maths.

03 EXECUTIVE SUMMARY

One Page, One Rail, One Verdict

A single-page briefing for decision-makers: what the prototype is, what has never been built before, and what it returns to India Inc. and to the Republic.

THE PROTOTYPE

CorpVidesh AI is a regulated, AI-orchestrated rail for Indian outbound capital, operating inside the GIFT-IFSC trusted zone. It places the corporate, the Authorised Dealer bank, the RBI, the Ministry of Finance, the IFSCA and the global execution venue on one real-time substrate — without a new statute, a new regulator or a new form.

KEY INNOVATIONS

Citation-or-refuse FEMA reasoning that cannot answer without quoting the governing Master Direction; deterministic Sahyog / LRS / ODI submission grammar; automated 15CA-15CB with Section 195 computation; a continuously recomputed 400% Net-Worth Monitor; Groth16 zero-knowledge disclosure that proves compliance without revealing the balance sheet; and an immutable Hyperledger Fabric chain on which the regulator is a participant, not a recipient.

IMPACT ON INDIAN CORPORATES

Clearance latency collapses from 18–28 working days to 4–9 minutes and filing error rates fall from 11–17% to under one percent. Compounding exposure is prevented at source rather than cured over 180 days, converting compliance from a cost of delay into a standing proof of integrity.

REALISATION FOR THE GOVERNMENT

Supervisory effort per 1,000 transactions falls from ~240 hours to ~12, per-filing processing cost from ~INR 2,800 to ~INR 180, and INR 6,000–8,000 crore of stranded corporate surplus becomes deployable each year — with a live, tamper-evident view of the outbound account for the RBI and the MoF.

99.7%	95%+	20x	6–8k Cr
LATENCY REDUCTION	FEMA EXPOSURE CUT	SUPERVISORY CAPACITY	INR P.A. UNLOCK

THE ASK IN ONE LINE

Sanction a supervised GIFT-IFSC pilot on live ODI and LRS traffic. The rail is statute-preserving, regulator-observable and reversible on day one — the only thing it removes is the wait.

IN PLAIN WORDS

A one-page summary for busy readers. In short: today a company waits nearly a month for permission to invest abroad; this system does the same checking automatically and safely, so the wait becomes minutes, mistakes almost disappear, and the government can watch everything live instead of chasing paper.

04 WHY IT IS UNIQUE

No Comparable Platform Exists

Bloomberg and Reuters sell data, global suites screen counterparties, fintechs move money and Indian portals accept forms — none of them reasons over Indian capital-account law, proves compliance cryptographically and writes a regulator-readable record of the same event.

	CORPVIDESH AI	BLOOMBERG	REUTERS / LSEG	GLOBAL REGTECH	GLOBAL FINTECHS	INDIAN PORTALS
FEMA / ODI statutory reasoning with binding citation	Full, native	Adjacent only	Adjacent only	Adjacent only	Absent	Adjacent only
Live 400% Net-Worth (Rule 7) headroom monitor	Full, native	Absent	Absent	Absent	Absent	Absent
Automated 15CA-15CB with Section 195 computation	Full, native	Absent	Absent	Absent	Absent	Partial
Deterministic Sahyog / LRS / ODI submission grammar	Full, native	Absent	Absent	Absent	Adjacent only	Partial
Zero-knowledge proof of compliance to a regulator	Full, native	Absent	Absent	Absent	Absent	Absent
Regulator as a ledger participant, not a recipient	Full, native	Absent	Absent	Absent	Absent	Adjacent only
Immutable, hash-chained evidence of every decision	Full, native	Adjacent only	Adjacent only	Partial	Adjacent only	Adjacent only
AML / KYC screening on the same event record	Full, native	Partial	Partial	Full, native	Partial	Partial
Single-pane view of source, path, FX and end-use	Full, native	Partial	Partial	Adjacent only	Partial	Absent
	OUR PROTOTYPE	TERMINAL, ENTITY EXCHANGE, VAULT	REFINITIV WORLD-CHECK, DUE DILIGENCE	FENERGO, COMPLYADVANTAGE	WISE, AIRWALLEX, PAYONEER	AD-BANK ODI DESKS, CLEARTAX, SIGNZY

FULL, NATIVE · PARTIAL · ADJACENT ONLY · ABSENT

WHY BLOOMBERG, REUTERS AND THE REST CANNOT CLOSE THE GAP

Data, not law

Bloomberg and Reuters sell information — prices, entities, sanctions lists. Neither reasons over Rule 7, Section 195 or FEMA contravention logic, or produces a filing an Indian regulator can act on.

Supervision, not reporting

Terminals and fintech rails report after settlement. CorpVidesh admits the regulator to the record while the transaction is still forming.

Proof, not disclosure

Rivals ask a corporate to reveal the balance sheet to prove a ceiling. Groth16 proves the ceiling and reveals nothing.

IN PLAIN WORDS

A scorecard against everyone else, including the two biggest names in financial information. Bloomberg and Reuters (LSEG) sell data and screening; foreign compliance suites check people and companies; money-transfer apps move cash; Indian portals only receive forms. None of them understands Indian foreign-investment law, proves you followed it without exposing your accounts, or lets the regulator watch live. A filled dot means the function is fully built in, a half dot means partial, a crossed circle means absent.

05 THE ONE-PAGE CASE

A Rail, Not a Portal

CorpVidesh AI does not propose a new law, a new regulator or a new committee. It proposes the opposite: it leaves every existing statute, regulator and form intact — and digitises the seams between them.

THE PREMISE

Between USD 14 and 18 billion of Indian corporate surplus stays home each year, not because boardrooms lack ambition, but because the plumbing that moves a rupee from Mumbai to Manhattan still runs on paper, courier bags and the endurance of mid-office compliance teams.

THE INTERVENTION

A regulated, AI-orchestrated rail inside the GIFT-IFSC trusted zone that places the corporate, the Authorised Dealer bank, the RBI, the Ministry of Finance, the IFSCA and the global execution venue on one real-time substrate.

THE PROOF

Five capabilities on a single rail: citation-grounded FEMA reasoning, deterministic Sahyog submission, automated 15CA/15CB with Section 195 computation, a continuously recomputed 400% Net-Worth Monitor, and an immutable Hyperledger Fabric audit chain.

THE DIVIDEND

Clearance latency collapses from 18–28 working days to 4–9 minutes. Filing error rates fall from 11–17% to a fraction of one percent. Supervisory hours per 1,000 transactions fall from ~240 to ~12.

99.7%	95%+	93%	6–8k Cr
LATENCY REDUCTION	FEMA EXPOSURE CUT	15CA/CB COST CUT	INR P.A. UNLOCK

WHY A LAW DEPARTMENT BUILT THIS

Every failure mode in outbound capital is a legal failure expressed as a technical one: an unread circular, a mis-computed ceiling, an unreconciled form, an unauditable trail. Team Quantum Leap is a law team precisely because the hard part is not the model — it is knowing which paragraph of which Master Direction the model must be forced to cite before it is permitted to answer. Regulatory-first design is the signature of this work.

IN PLAIN WORDS

A 'rail' means shared plumbing that everyone uses, like railway tracks. We are not asking to change any law or create a new office. We are only connecting the offices that already exist, so the paperwork moves electronically between them instead of by courier and email.

06 STATE OF THE PROBLEM

Four Chronic Failure Modes

Cross-border capital from Indian corporates is governed by a thicket of statutes whose seams have never been digitally stitched. FEMA sits with the RBI; 15CA/15CB move through GSTN; Section 195 lives at the Income-tax Department; Rule 7 is recomputed by hand every single time.

LATENCY

18–28

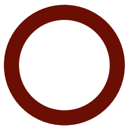
working days for a routine ODI clearance; OPI in unlisted instruments drifts past 60 days.

SEVERITY INDEX

OPACITY

0

live consolidated views held by the RBI or MoF of source, path, FX conversion and end-use.



SEVERITY INDEX

COMPLIANCE RISK

11–17%

documented error rate on manual ODI, APR, FC, 15CA and 15CB filings — CBDT internal review, 2024.

SEVERITY INDEX

LOST OPPORTUNITY

14–18

billion USD of investible surplus that never leaves the country each year.

SEVERITY INDEX

THE PAPER RAIL — AS IT RUNS TODAY

D+0	D+3	D+7	D+14	D+19	D+24	D+28
Corporate treasury	AD Cat-I Bank	CA valuation (Rule 7)	RBI FEMA desk	MoF / GSTN 15CA-CB	Income-tax s.195	UIN + APR + FLA

THE CORPVIDESH RAIL — SAME STATUTES, STITCHED SEAMS

T+0s	T+20s	T+70s	T+2m	T+4m	T+6m	T+9m
Ticket raised	Pre-flight FX + instrument	FEMA reasoner + Rule 7	AML / KYC / UBO	Four-eyes + evidence hash	ZKP regulator attestation	Execute + DLT entry

> *“For two decades this problem was treated as immovable — the cost of doing sovereign business. Quantum Leap refused that premise.”*

IN PLAIN WORDS

The four things that go wrong today: it is slow (weeks), it is invisible (nobody can see the whole picture), it is error-prone (roughly one filing in seven has a mistake), and it is expensive in lost chances (money that never gets invested abroad at all).

07 WHAT THE PROTOTYPE IS ACTUALLY SOLVING

The Ten Statutory Frictions

Ten distinct legal chokepoints stand between an Indian corporate and an overseas allocation — under both the Automatic and the Approval Route of the Foreign Exchange Management Act, 1999.

01 400% Net-Worth Ceiling

Total ODI financial commitment capped at 400% of net worth (or USD 1 bn, lower of the two) per latest audited balance sheet.

RULE 7, FEM (ODI) RULES 2022 — CONTINUOUS MONITOR

02 Stringent Approvals

Even on the Automatic Route: sectoral no-objections, valuation reports, AD-bank routing.

CONSOLIDATED FDI POLICY — DETERMINISTIC PRE-VALIDATION

03 Sectoral Restrictions

Outward investment into financial services barred unless the entity is regulated by SEBI/RBI/IRDAI.

FEMA NOTIF. 20 / OI RULES — SECTOR CLASSIFIER

04 Two-Layer Subsidiary Cap

Structuring legally capped at two layers of foreign subsidiaries.

OI RULES 2022 — GRAPH STRUCTURE VALIDATOR

05 90-Day Repatriation

Disinvestment proceeds must return to India within 90 days.

FEMA S.6 / OI RULES — LEDGER-TIMED OBLIGATION CLOCK

06 TCS Compliance

Outward remittances attract TCS; documentation, reconciliation and refunds add treasury overhead.

INCOME-TAX ACT S.206C(1G) — AUTO-COMPUTATION + RECONCILE

07 Transfer Pricing

Intra-group loans and guarantees require arm's-length support under TP scrutiny.

INCOME-TAX ACT S.92 — BENCHMARK EVIDENCE PACK

08 POEM Risk

Offshore holdcos must hold genuine economic substance or face Indian global taxation.

INCOME-TAX ACT S.6(3) — SUBSTANCE SCORECARD

09 Annual Reporting

APR by 31 December per overseas entity; FLA return by 15 July. Missed deadlines penalised.

FEMA REPORTING REGIME — CALENDAR + AUTO-FILE

10 Currency Volatility

Partial convertibility exposes corporates to FX risk; hedging monitored under FEMA.

FEMA S.3 & S.6 — FX & VENUE OPTIMISER

THE PRICE OF A MISSED FORM

- Late Submission Fee: INR 7,500 + (0.025% × amount × years of delay)
- Serious contravention penalty: up to 300% of the sum involved
- Compounding cycle to cure a lapse: up to 180 days — during which no new investment may be made

IN PLAIN WORDS

Ten specific legal rules that make sending money abroad difficult. Each box says what the rule is, which law it comes from, and how our system handles it automatically. The lines at the bottom are the penalties a company pays when it gets any of these wrong.

08 THE ECONOMIC SURFACE

The Idle-Capital Map of India Inc.

Financial year ending March 2025. The aggregate cash pile of listed India Inc. exceeds INR 10 lakh crore — roughly USD 120 billion — waiting on deployment while the regulatory rail runs on paper.

3,611 listed firms (ex-BFSI, ex-Oil & Gas), FY25 — INR 10.67 lakh Cr

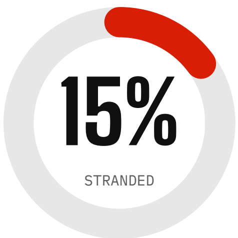
BSE 500 aggregate (ex-BFSI, ex-Oil & Gas), late 2024 — INR 7.68 lakh Cr

343 non-financial BSE 500 firms, 31 March 2025 — INR 5.10 lakh Cr

Annual ODI financial commitment, FY 2024-25 — USD 23.6–25.6 Bn

Annualised outflow trend, FY 2025-26 — USD ~27 Bn

WHERE THE FRICTION BITES



Of the deployable outbound envelope, an estimated USD 14–18 billion never leaves — purely because time-sensitive global allocation becomes commercially unviable once clearance is measured in weeks. This is not capital that lacks a destination. It is capital that misses its window.

ROUTE vs CLOCK

Automatic Route (AD bank)	1–2 weeks
RBI Approval — official	40 working days
Approval — observed	30–60 working days
Compounding cure	up to 180 days
CorpVidesh clearance	4–9 minutes

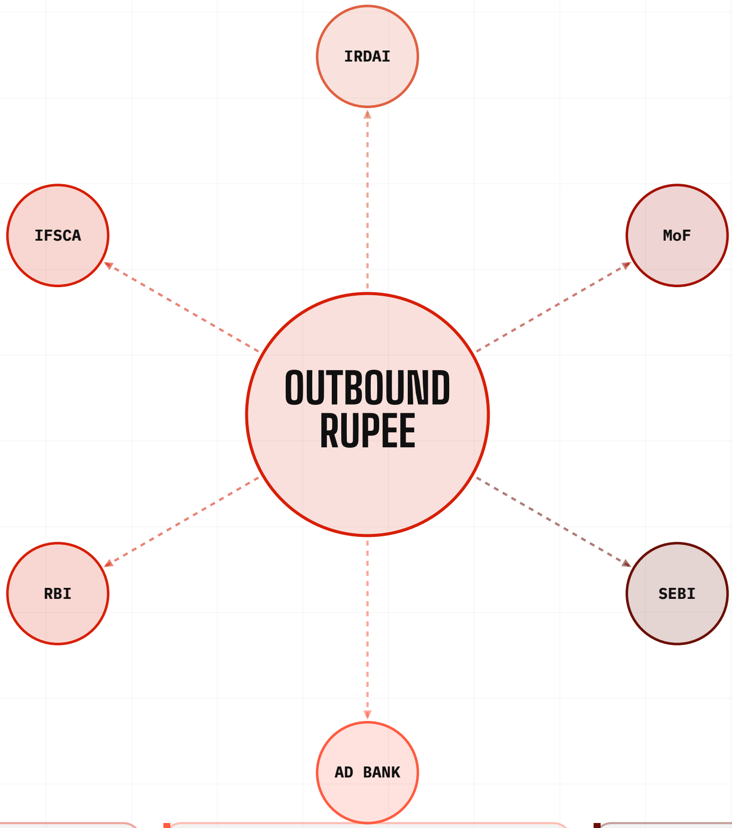
IN PLAIN WORDS

How much money is sitting idle. Indian listed companies hold cash worth more than ten lakh crore rupees. The bars show the size of that pile; the panel on the right shows how long each official route takes today compared with minutes on our system.

09 WHO HAS TO SAY YES

The Regulator Maze

Three to four regulatory layers touch a single outbound rupee, each with its own form, format, clock and evidentiary standard. None of them share a substrate — which is the whole problem.



RBI
Primary regulator. FEMA desk, UIN allotment, Approval Route beyond 400% net worth.

AD CAT-I BANK
First point of contact and gatekeeper. All documents and funds transit here.

SEBI
Engaged for financial-services investors, AIF/MF structures and listed-issuer disclosure.

MINISTRY OF FINANCE
Notifies the OI Rules; GSTN pipes carry 15CA/15CB; CBDT owns Section 195.

IRDAI / PFRDA
Conditional sectoral regulators for insurers and pension funds.

IFSCA
Unified perimeter for the GIFT-IFSC trusted zone where the rail is hosted.

IN PLAIN WORDS
Sending one rupee abroad needs a 'yes' from several different authorities: the central bank, your bank, the tax and finance ministry, and sometimes sector regulators. They do not share one common system, so the company has to run between them. Our platform connects them.

10 STATEMENT OF SOLUTION

Five Capabilities on One Rail

A real-time, AI-orchestrated RegTech platform hosted in the GIFT City IFSC zone — the only jurisdiction in India where the RBI, IFSCA, MoF and global execution venues co-operate under a unified regulatory perimeter.

01

FEMA / ODI / OPI Reasoning

Qwen-class LLMs fine-tuned on the complete RBI circular and Master Direction corpus. A compliance officer asks, in plain English, whether a structure clears Rule 7 and Schedule III — and receives a citation-grade answer in seconds.

CITATION-GRADE OR REFUSE

02

Live RBI Sahyog Submission

Form ODI, APR, FC and LRS transmitted with deterministic field validation before the wire leaves. The rejection-and-refile cycle that today consumes the first two weeks of every transaction simply disappears.

NEAR-ZERO REJECTION

03

MoF GSTN Automation

Form 15CA and 15CB generated and machine-verified, Section 195 TDS computed with DTAA auto-application, routed through the chartered accountant's digital-signature workflow inside the same session.

CA BOTTLENECK REMOVED

04

Continuous 400% Net-Worth Monitor

Rule 7 recomputed on every balance-sheet event and corporate action. The ceiling becomes a live invariant rather than a quarterly reconstruction performed by hand.

BREACH PREDICTED PRE-SUBMISSION

05

Immutable Hyperledger Audit Chain

A tamper-evident chain giving the RBI and the Ministry of Finance, for the first time, a single-pane-of-glass view of every outbound rupee from source to end-use.

AUDIT BECOMES INSTANTANEOUS

IN PLAIN WORDS

The five jobs our software does. In everyday terms: it reads the rulebook and answers questions with proof, files the central-bank forms correctly the first time, prepares the tax forms, keeps a live check that you are not crossing the legal investment limit, and keeps an unchangeable record of everything.

11 TECHNOLOGY INFOGRAPHIC — PART ONE

The Reasoning Layer

Choice of technology, and why each choice is not interchangeable. In a domain where a hallucinated regulation triggers a contravention, the model is the least interesting part of the stack — the grounding discipline around it is everything.

Qwen-class LLM

AI REASONING CORE

WHY THIS TECHNOLOGY

An open-weight, self-hostable large language model fine-tuned on 50,000+ annotated segments of RBI Master Directions, FEM Rules and Notifications spanning 2000–2026.

WHY UNIQUELY HERE

Closed frontier APIs cannot be hosted inside the GIFT-IFSC trusted zone under RBI data-localisation. Open weights are the only lawful way to keep a regulator's corpus, and a corporate's balance sheet, inside sovereign perimeter while still reasoning over them.

CORPUS 50K+ SEG · HOST IN-ZONE

LangChain RAG

RETRIEVAL GROUNDING

WHY THIS TECHNOLOGY

Retrieval-augmented generation with citation binding: every assertion is anchored to the precise paragraph of the precise circular that produced it.

WHY UNIQUELY HERE

Legal defensibility, not accuracy, is the acceptance test. A FEMA answer without a paragraph citation is inadmissible in a compounding proceeding — so the architecture refuses to answer rather than answer ungrounded.

MODE CITE-OR-REFUSE

Milvus Vector DB

SEMANTIC INDEX

WHY THIS TECHNOLOGY

High-dimensional index over the regulatory corpus plus 2,000 labelled FEMA compounding orders used as adversarial retrieval context.

WHY UNIQUELY HERE

Circulars amend circulars. Keyword search retrieves the superseded text; vector retrieval with recency weighting retrieves the operative one. Regulatory drift is a retrieval problem before it is a model problem.

CASES 2,000 · REFRESH WEEKLY

scikit-learn

DETERMINISTIC SCORING

WHY THIS TECHNOLOGY

Classical, fully explainable models for AML/KYC risk scoring, sanctions proximity and net-worth breach prediction.

WHY UNIQUELY HERE

A supervisor must be able to reconstruct why an alert fired. A gradient-boosted score with published feature weights is auditable; a transformer embedding is not. Explainability is chosen over marginal accuracy — deliberately.

OUTPUT EXPLAINABLE

THE GUARDRAIL CHAIN — AI PROPOSES, THE SYSTEM VALIDATES

Prompt → Retrieve + cite → Schema validate → Rule engine cross-check → Confidence threshold → Human four-eyes → Ledger write

No model output reaches a regulator surface without passing all seven gates. Any gate can veto; none can be bypassed by configuration.

IN PLAIN WORDS

The 'brain' of the system. A language model is software that reads and understands text; here it has read every central-bank circular. It is never allowed to answer from memory alone: it must quote the exact rule, or refuse. The seven boxes at the bottom are safety gates every answer must pass.

12 TECHNOLOGY INFOGRAPHIC — PART TWO

Ledger, Data & Lineage

Audit in this domain is usually retrospective. The ledger choices here make it instantaneous — and make the regulator a first-class participant rather than a downstream recipient of reconciled PDFs.

Hyperledger Fabric

PERMISSIONED DLT

WHY THIS TECHNOLOGY

A permissioned channel topology in which the corporate, the AD bank, the RBI, the MoF and the auditor each see exactly the slice they are entitled to — no more, no less.

WHY UNIQUELY HERE

A public chain is unlawful for this data and a central database is untrustworthy to a supervisor who did not write it. Fabric's channels are the only structure that delivers tamper-evidence and confidentiality simultaneously.

ENTRIES PERMANENT · MODEL APPEND-ONLY

Groth16 ZKP

SELECTIVE DISCLOSURE

WHY THIS TECHNOLOGY

Zero-knowledge proofs allowing a corporate to prove to the RBI that it is within the 400% ceiling without disclosing the underlying balance sheet.

WHY UNIQUELY HERE

Supervision and commercial confidentiality are normally traded off against each other. ZKP is the only construct that gives the regulator mathematical certainty while giving the corporate competitive privacy — first application of its kind on an Indian capital-account rail.

PROVES COMPLIANCE · REVEALS NOTHING

PostgreSQL + Kafka + NiFi

WHY THIS TECHNOLOGY

A hot transactional ledger, a replayable Kafka event bus and NiFi batch ingestion feeding a Bronze → Silver → Gold medallion architecture.

WHY UNIQUELY HERE

Regulatory disputes are reconstructions of a moment in time. A replayable event log lets the platform re-derive the exact state on which a decision was taken — which a mutable database can never do.

TIERS BRONZE/SILVER/GOLD

DVC Data Version Control

WHY THIS TECHNOLOGY

Every dataset versioned, PII-scanned, SMOTE-balanced where needed, with an immutable Hyperledger shadow ledger recording each transformation.

WHY UNIQUELY HERE

If a model decision is challenged years later, the exact corpus version that produced it must be producible on demand. Lineage is not hygiene here — it is evidence.

DATASETS 9 PRODUCTION

NINE PRODUCTION DATASETS — SOURCE TO FILING

DATASET	INGESTION PATH	GOVERNED ZONE	CONSUMED BY	OUTPUT / FILING
FEMA Regulatory Corpus (50K+)	NiFi batch → DVC	Silver → Gold (vector)	Qwen-FEMA Engine	Sahyog ODI / APR / LRS
ODI/OPI Historical (15K)	Kafka CDC	Silver → Gold (features)	Engine + Net-Worth Monitor	Sahyog real-time filing
Global Equity Feeds	Streaming API	Bronze → Silver	FX & Venue Optimiser	Broker / SWIFT execution
FX Rates (ECB / RBI)	Scheduled pull	Bronze → Silver	Routing Optimiser	Broker / SWIFT execution
Corporate Financials (50K synth.)	Batch + DP	Silver → Gold	400% Net-Worth Monitor	Treasury dashboard
OpenSanctions / OFAC / UN	Daily delta	Bronze → Silver	AML/KYC Risk Scorer	GSTN flag + FIU-IND alert
KYC Docs (PAN/CIN/Aadhaar)	Encrypted upload	Bronze enc. → Silver tok.	AML/KYC Risk Scorer	Auditor & regulator view
FEMA Contravention Corpus (2K)	Curated import	Silver → Gold (vector)	Engine (RAG context)	Advisory + risk flags
SWIFT / Bank Confirmations	Real-time MT	Bronze → Silver → Chain	Auto-Reporting + Audit	15CA/15CB + ledger

IN PLAIN WORDS

The 'memory' of the system. A ledger is a shared record book that nobody can secretly edit. Once a step is recorded, it stays. Zero-knowledge proof is a way to prove a fact ('we are within the limit') without showing the private numbers behind it.

13 TECHNOLOGY INFOGRAPHIC — PART THREE

Cloud, Security & Sovereign Rails

Where the platform physically sits, what protects it, and which government endpoints it is wired into. Each choice is a consequence of Indian law, not of engineering preference.

GIFT-IFSC Zone

JURISDICTION

Hosted inside India's only unified regulatory perimeter, where the RBI, IFSCA, MoF and global execution venues co-operate under one supervisor.

UNIQUENESS

Anywhere else in India, the same transaction crosses four disjoint perimeters. The zone is not a hosting preference — it is the legal precondition that makes a single rail possible at all.

Sovereign Cloud (Mumbai)

Alibaba Cloud Mumbai region with RBI data-localisation compliance, ISO 27001 and SOC-2 Type II attestation, KMS envelope keys rotated every 90 days.

UNIQUENESS

RBI's Data Localisation Master Direction forecloses offshore processing of payment-adjacent data. In-country region plus HSM-backed keys is the only compliant topology.

Open Policy Agent

Every read and write is mediated by OPA policy; every access decision is itself written to the Hyperledger ledger.

UNIQUENESS

Making access auditable — not merely data auditable — closes the insider-risk gap that FEMA and PMLA supervision have never been able to see into.

Crypto & Key Custody

AES-256-GCM at rest, TLS 1.3 everywhere, mutual-TLS on Sahyog and SWIFT channels, HMAC-SHA-256 field tokenisation for PAN, Aadhaar and beneficiary accounts.

UNIQUENESS

Per-tenant pepper means a breach of one corporate's tokens cannot be replayed against another's — essential when the Top-1000 share one rail.

Sovereign Integrations

RBI Sahyog (ODI, APR, FC, LRS), MoF GSTN (15CA/15CB), Income-tax Section 195 surface, Account Aggregator, SWIFT MT103/MT202, FIU-IND.

UNIQUENESS

These are fragile, under-documented endpoints. Deterministic field validation before transmission is what collapses submission rejection from industry norms to near-zero.

Edge Delivery Layer

React 19 on TanStack Start, Cloudflare Workers edge runtime, role-segregated portals for treasury, CFO, compliance, bank, auditor and regulator.

UNIQUENESS

Least-privilege is enforced at the route boundary, not in the UI. A regulator session physically cannot render a competitor's balance sheet.

THE GOVERNING PRINCIPLE OF EVERY TECHNOLOGY CHOICE

No component was selected for capability alone. Each was selected because a specific Indian statutory constraint — data localisation, evidentiary reconstruction, selective disclosure, least-privilege supervision, or citation-grade defensibility — admitted only that class of technology as lawful. This is what regulatory-first architecture means in practice, and it is why the stack cannot be casually substituted.

IN PLAIN WORDS

Where the system lives and how it is protected. It runs inside GIFT City, India's international finance zone, on Indian soil. Keys that lock the data are stored in tamper-proof hardware, and the security standards listed are the ones banks are audited against.

14 SYSTEM & DATA ARCHITECTURE

The Five-Layer Regulated Stack

Deployed inside the GIFT-IFSC trusted zone. Each layer has a single reason to exist, a defined blast radius, and an explicit owner within Team Quantum Leap.

LAYER 1
PRESENTATION

Corporate Treasury Portal · RBI/MoF Regulator Dashboard · Mobile CFO Approvals · Auditor View

ROLE-SEGREGATED UIS ENFORCING LEAST-PRIVILEGE ACCESS

LAYER 2
API & ORCHESTRATION

REST/GraphQL Gateway · OAuth2 + Aadhaar eKYC · Apache Kafka Event Bus · WAF & Rate Limiter

SECURE, OBSERVABLE AND REPLAYABLE INTEGRATION PLANE

LAYER 3
AI / COMPLIANCE CORE

Qwen LLM FEMA Engine · 400% Net-Worth Monitor · AML/KYC Risk Scorer · FX & Venue Routing Optimiser

DECISIONING BRAIN WITH DETERMINISTIC GUARDRAILS ON EVERY AI OUTPUT

LAYER 4
DATA & INTEGRATION

PostgreSQL Transaction Ledger · Hyperledger Fabric Audit Chain · Vector DB · Object Store

HOT, COLD AND IMMUTABLE DATA TIERS, EVERY RECORD LINEAGE-TAGGED

LAYER 5
REGULATORY & EXTERNAL

RBI Sahyog API · MoF GSTN (15CA/15CB) · SWIFT & FX Banks · Global Exchanges

OUTBOUND INTEGRATION TO SOVEREIGN AND MARKET RAILS

FEDERATED TOPOLOGY · ACTIVE-ACTIVE

- Sovereign IFSC edge
- Alibaba Cloud Mumbai
- Hyperledger federated DLT
- KMS + HSM key custody
- ISO 27001 / SOC-2 Type II

IN PLAIN WORDS

The system drawn as five stacked floors, bottom to top: where the data comes in, where it is checked, where decisions are reasoned, where records are sealed, and what the user finally sees. Each floor only talks to the one above and below it, which keeps failures contained.

15 THE REFERENCE MODEL

Seven Strata of a Sovereign Rail

The five-layer deployment view is how the platform is built. The seven-strata model is how it is governed — each stratum answering to a different constituency.

VII **SOVEREIGN TRUST**
Statutory perimeter, IFSCA supervision, ZKP attestation, parliamentary and CAG export

VI **CLOUD & EDGE**
In-country region, HSM custody, active-active federation, disaster recovery

V **DATA & LEDGER**
Medallion zones, DVC lineage, Fabric channels, permanent audit entries

IV **INTEGRATION & NETWORK**
Sahyog, GSTN, SWIFT gpi, ISO 20022, FIX, FpML, Account Aggregator

III **DOMAIN & COMPLIANCE**
FEMA reasoner, Rule 7 monitor, AML/PEP/UBO, sub-cap and sector logic

II **EXPERIENCE & API**
Gateway, eKYC, event bus, four-eyes workflow, mobile approvals

I **PRESENTATION**
Six role-segregated consoles: treasury, CFO, compliance, bank, auditor, regulator

THE AI REASONING PRINCIPLE

"AI proposes, classifies, summarises and routes.
The system validates, logs and escalates."

IN PLAIN WORDS
The same architecture in more detail, as seven layers. This is the engineering blueprint: the deeper you go down the list, the closer you get to raw data; the higher you go, the closer you get to the screen a compliance officer actually uses.

16 MECHANISM MATRIX — PART ONE

How the Prototype Actually Works, Layer by Layer

For each layer: the trigger that wakes it, the mechanism it executes, the artefact it writes, and who can see that artefact. This is the unique feature of the prototype — nothing happens without a written, visible consequence.

LAYER	TRIGGER	MECHANISM EXECUTED	ARTEFACT WRITTEN	VISIBLE TO
L1 Presentation	Treasury raises an INR ticket	Mandate check against role, cap and sector; instrument lookup	Signed intent record	Corporate, Compliance
L2 API / Orchestration	Ticket accepted	OAuth2 + Aadhaar eKYC binding; event emitted to Kafka with idempotency key	Replayable event offset	Platform, Auditor
L3 AI Core — FEMA reasoner	Event consumed	Retrieval over the circular corpus; ODI/OPI classification; Schedule III test; citation binding	Reasoning trace with cited paragraphs	Compliance, Regulator
L3 AI Core — Rule 7 monitor	Balance-sheet or corporate action	Net worth recomputed; 400% headroom and USD 1 bn sub-cap evaluated live	Headroom snapshot + breach forecast	Corporate, RBI
L3 AI Core — AML/KYC	Counterparty resolved	Sanctions, PEP, UBO and FATF-jurisdiction proximity scored with published weights	Risk score + feature attribution	Compliance, FIU-IND
L4 Data & Ledger	Decision reached	Evidence bundle hashed (SHA-256); prev-hash chained; Fabric channel entry committed	Immutable block entry	All parties, scoped
L4 Selective disclosure	Regulator query	Groth16 proof generated: compliance proven, financials withheld	Verifiable proof artefact	RBI, MoF, IFSCA
L5 Regulatory rails	Attestation complete	Deterministic field validation, then Sahyog / GSTN transmission and SWIFT instruction	Filing receipt + MT confirmation	Corporate, AD bank, Regulator
L5 Post-settlement	Funds settled	UIN tracking, APR and FLA calendars armed; 90-day repatriation clock started where applicable	Obligation timers on ledger	Corporate, RBI

THE UNIQUE FEATURE — EVIDENCE BEFORE EXECUTION

Nothing executes unwritten

Every mechanism must emit an artefact before the next layer is permitted to run. There is no silent path through the platform.

Every artefact is chained

Artefacts carry the hash of their predecessor, so removing one breaks verification for all that follow.

Visibility is scoped, not filtered

Entitlement is enforced at the channel, so an unauthorised party never receives the record to begin with.

IN PLAIN WORDS

The mechanism matrix, part one: what actually happens inside, layer by layer. For each layer you can see what goes in, what the software does to it, and what comes out as proof that can be shown to a regulator later.

17 MECHANISM MATRIX — PART TWO

The Nine-Stage Outbound Journey

One transaction, traced end to end. Each stage names its actor, the AI assist permitted, the evidence written, and the regulator's live visibility at that instant.

Stage	Actor	AI assist	Evidence	Regulator
01 **Treasury initiates INR ticket**	CORPORATE TREASURY USER	Instrument and destination suggestion	Signed intent	Visible on raise
02 **Pre-flight snapshot**	PLATFORM	FX rate and venue liquidity retrieval	Rate-locked snapshot	Visible
03 **FEMA reasoner**	AI CORE + COMPLIANCE	ODI/OPI classification, Rule 7 and sub-cap test with citations	Reasoning trace	Full trace shared
04 **AML / PEP / KYC / UBO**	RISK SCORER	Sanctions and beneficial-ownership proximity scoring	Risk score + attribution	FIU-IND feed
05 **Four-eyes review**	CFO / APPROVER	Summarisation only — no decisioning authority	Evidence hash	Approval logged
06 **Regulator ZKP attestation**	RBI / MOF / SEBI / IFSCA	None — deterministic proof verification	Proof artefact	Attestation on chain
07 **GIFT-IFSC routing**	IBU RAILS	Venue and currency optimisation (USD/EUR/SGD/HKD)	Routing decision record	Visible
08 **Anchor bank execution**	AD CAT-I / IBU	None — straight-through processing	MT103 / MT202 confirmation	Visible
09 **Settlement + disclosure**	PLATFORM	Auto-drafting of 15CA/15CB, APR and FLA schedules	DLT entry + filing receipt	Single pane updated

IN PLAIN WORDS

The nine steps of one real transaction, from a company deciding to invest abroad to the money landing and the annual report being filed. For each step: who acts, what the software does for them, and what evidence is automatically stored.

18 FIRST-OF-ITS-KIND APPLICATIONS

Six Things No Indian Rail Has Done Before

Each claim below is a structural first, not a feature comparison: an application of technology to a statutory problem that has not previously been attempted on India's capital-account infrastructure.

FIRST 01

Zero-knowledge supervision

A corporate proves to the RBI that it sits within the Rule 7 ceiling without disclosing its balance sheet. Supervision and commercial confidentiality stop being a trade-off.

WHY IT IS A FIRST

No Indian capital-account filing has ever been satisfied by a cryptographic proof.

FIRST 02

Rule 7 as a live invariant

The 400% ceiling is recomputed on every balance-sheet event and corporate action, turning a quarterly manual reconstruction into a continuously true statement.

WHY IT IS A FIRST

Breach is forecast before submission rather than discovered after contravention.

FIRST 03

Citation-or-refuse regulatory AI

The reasoner is architecturally forbidden from answering without binding its answer to the operative paragraph of the operative circular.

WHY IT IS A FIRST

Converts a language model from a clever assistant into an admissible instrument.

FIRST 04

Access itself made auditable

Every OPA access decision is written to the same immutable ledger as the transactions, so who looked is as evidentiary as what happened.

WHY IT IS A FIRST

Closes the insider-risk blind spot that FEMA and PMLA supervision cannot currently see.

FIRST 05

Single-pane sovereign view

The RBI and the MoF observe source, path, FX conversion and end-use of every outbound rupee on one live surface rather than reconciling ex-post from AD-bank submissions.

WHY IT IS A FIRST

Gives monetary and fiscal policy a full-information analytics surface for the first time.

FIRST 06

Statute-preserving digitisation

No new law, regulator, form or committee. Every existing statute survives intact; only the seams between them are digitised.

WHY IT IS A FIRST

The lowest-friction path to national adoption — nothing has to be repealed.

> *"Once laid, this rail becomes invisible — and reshapes the behaviour of every actor on top of it."*
>
> ON THE QUANTUM LEAP THESIS

IN PLAIN WORDS

Things that, to our knowledge, have never been built in India before: software that must cite the law before answering, a live limit-monitor, and privacy-preserving proof of compliance. The note under each box explains why it is a first.

19 OWNERSHIP MATRIX

Who Designed What

Team Quantum Leap is small, but every member carries a discipline that maps directly onto a layer of the stack. Ownership below is design ownership — the person answerable for the correctness of that component.

Raja Mukherjee

TEAM LEAD · BWU/BBL/25/002

- Qwen FEMA compliance engine and the prompt / retrieval grounding pipeline
- RBI Sahyog connectors for LRS, ODI Form FC, OPI and APR submissions
- Citation-or-refuse guardrail policy and model evaluation harness
- Regulatory-first architecture doctrine across all seven strata
- Regulator-facing single-pane dashboard specification

Priyanshu Dhar

TEAM CO-LEAD · BWU/BBL/24/158

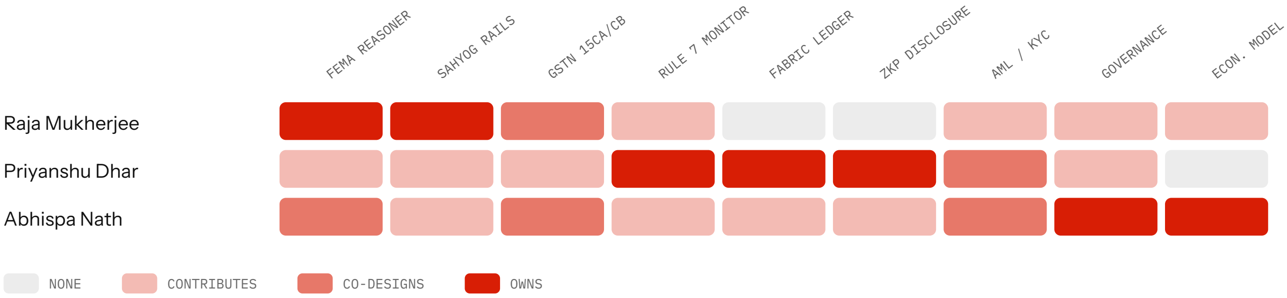
- Hyperledger Fabric channel topology and the immutable audit chain
- Continuous 400% Net-Worth Monitor under Rule 7, FEM (ODI) Rules 2022
- Groth16 selective-disclosure proofs for RBI / MoF queries
- Evidence hashing, prev-hash chaining and the chain-verification routine
- OPA access mediation and the access-as-audit ledger

Abhispa Nath

TEAM CONCEPT SUPPORT · BWU/BBL/25/121

- Problem framing: the ten statutory frictions and the idle-capital economics
- Statutory research across FEMA, OI Rules, Section 195, POEM and Transfer Pricing
- Dataset curation, DVC lineage discipline and the FEMA contravention corpus
- Four-pillar data governance: consent, retention, encryption, access control
- Financial impact model and the sovereign-realisation thesis

COMPONENT → OWNER RESPONSIBILITY GRID



IN PLAIN WORDS

The ownership matrix: exactly which team member designed which part, so credit and accountability are clear. The coloured grid below shows, component by component, who owns it, who co-designed it, and who contributed.

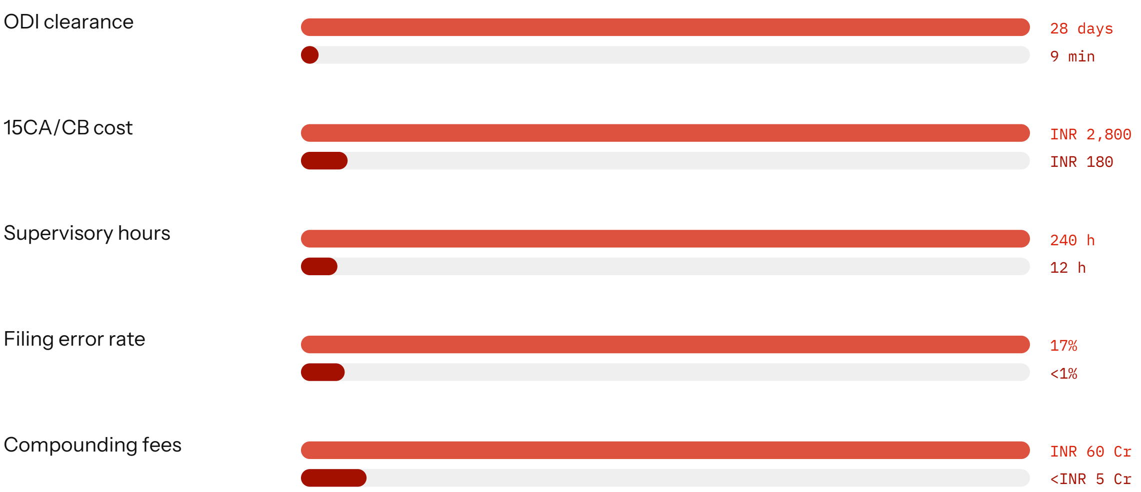
20 FINANCIAL INFOGRAPHIC — PART ONE

The Collapse of Time into Money

Time is the only raw material the current rail consumes in bulk. Every metric below converts a unit of eliminated latency or complexity into a rupee figure for the Indian corporate sector.

MACRO METRIC	PRE-CORPVIDESH	WITH CORPVIDESH AI	NET BENEFIT
Average ODI clearance time	18–28 working days	4–9 minutes	~99.7% latency reduction
FEMA compounding fee outflow (industry)	INR 40–60 Cr p.a.	under INR 5 Cr p.a.	INR 35–55 Cr saved annually
RBI supervisory officer hours / 1,000 txns	~240 hours	~12 hours	95% supervisory capacity freed
MoF / GSTN 15CA-CB processing cost	~INR 2,800 per filing	~INR 180 per filing	93% cost reduction
Cross-border capital unlock (corporate surplus)	Stranded INR 1.1–1.5 lakh Cr	Deployable same day	INR 6,000–8,000 Cr annual ROI
Manual filing error rate	11–17%	under 1%	95%+ reduction in FEMA exposure
Compounding cure cycle after a lapse	up to 180 days	Prevented at source	Investment pipeline never frozen

WHERE THE TIME GOES — AND WHERE IT STOPS GOING



99.7%
REDUCTION IN END-TO-END PROCESSING LATENCY
28 days → 9 minutes

93%
REDUCTION IN PER-FILING GOVERNMENT PROCESSING COST
INR 2,800 → INR 180

20x
SUPERVISORY CAPACITY MULTIPLIER AT THE RBI
240 h → 12 h / 1,000 txns

IN PLAIN WORDS

The money picture, part one: time. Work that takes weeks of human effort becomes minutes of machine effort. Fewer hours, fewer mistakes, and less money stuck waiting means a lower cost per filing and faster deals for companies.

21 FINANCIAL INFOGRAPHIC — PART TWO

Integrity for Corporates, Realisation for the Republic

Reduced time and reduced complexity are not merely efficiency gains. They convert directly into corporate integrity — fewer contraventions, cleaner books, defensible boards — and into sovereign realisation for the Government of India.

GREATER INTEGRITY — INDIAN CORPORATES

- **Contravention exposure falls by 95%+**
  Deterministic validation removes the 11–17% manual error band that generates FEMA notices, compounding fees and PMLA exposure.
- **Boards get a defensible posture**
  A continuous compliance score plus an immutable audit chain replaces board-level uncertainty with a producible evidentiary record.
- **Books reconcile in real time**
  On-chain hashes reconcile against AD-bank R-returns continuously, eliminating quarterly reconciliation lag and restatement risk.
- **Reporting obligations never lapse**
  APR by 31 December and FLA by 15 July are armed as ledger timers, so the 180-day compounding freeze never begins.
- **Governance becomes an asset**
  An auditable outbound-capital record is a disclosable ESG and governance credential for global investors and lenders.

GREATER REALISATION — GOVERNMENT OF INDIA

- **Tax realised, not chased**
  Real-time Section 195 computation with DTAA auto-application, pre-matched against income-tax returns and GSTR filings, closes the base-erosion gap at source.
- **Supervisory capacity multiplied 20x**
  Officer time per 1,000 transactions falls from ~240 hours to ~12 — the same establishment supervises twenty times the flow.
- **Policy set on full information**
  Geo-sector drill-down on where Indian capital lands supports macro-prudential and industrial policy with live data.
- **STR latency: weeks to minutes**
  A direct FIU-IND feed on suspicious cross-border patterns converts a retrospective alert into a pre-settlement intervention.
- **Parliamentary and CAG audit on tap**
  API-grade export replaces months of compilation with a query, strengthening the accountability chain end to end.

THE VALUE CHAIN — FROM A SAVED MINUTE TO A SOVEREIGN GAIN

TIME SAVED	COMPLEXITY ABSORBED	ERRORS ELIMINATED	INTEGRITY EARNED	CAPITAL DEPLOYED	REVENUE REALISED
28 days → 9 minutes	7 desks → 1 rail	17% → <1%	Defensible boards	INR 6–8k Cr p.a.	Tax at source

THE SOVEREIGN ARITHMETIC

India's ambition to deploy capital globally at market speed rests on a rail that does not yet exist. Against a build cost of INR 21 lakh for the reference implementation, the modelled annual return to the corporate sector alone is INR 6,000–8,000 crore in unlocked deployment, plus INR 35–55 crore in avoided compounding fees, before a single rupee of improved tax realisation is counted. The asymmetry is not marginal. It is structural.

IN PLAIN WORDS

The money picture, part two: integrity and what the country gains. When every step is recorded and provable, companies can demonstrate honesty instead of merely claiming it, and the government can see and collect what is due, sooner and more accurately.

22 DELIVERY, RISK AND THE ASK

Roadmap, Budget & Verdict

A twelve-week horizon, a modest budget, and a register of the risks the team considers material — stated plainly rather than minimised.

12-WEEK IMPLEMENTATION

W 1-2
Discovery & regulatory mapping
FEMA corpus ingest, dataset readiness, GIFT-IFSC sandbox onboarding

W 3-5
Core AI engine
Qwen FEMA engine MVP, 400% net-worth monitor, vector RAG

W 6-8
Integration layer
RBI Sahyog mock, GSTN 15CA/CB, SWIFT mock, exchange feeds

W 9-10
Governance & security
Hyperledger ledger live, OPA policies, encryption hardening

W 11
UAT & pilot
Two anchor-corporate pilot transactions in the IFSC sandbox

W 12
Demo & submission
Hackathon demo, full documentation, regulator briefing pack

BUDGET ESTIMATION (INR)

Cloud infrastructure (12 months)	5,00,000
AI model credits + fine-tuning	4,50,000
Hyperledger network + nodes	3,00,000
Regulatory sandbox & IFSC fees	2,50,000
Security audit, ISO 27001 / SOC-2	2,00,000
Data acquisition + curation	1,80,000
Integrations (Sahyog, GSTN, SWIFT)	1,50,000
Contingency	70,000
TOTAL	**INR 21,00,000**

RISK REGISTER & MITIGATION

LLM hallucination on regulatory text — MED / HIGH
RAG grounding + schema validators + human-in-loop

RBI Sahyog API availability — LOW / HIGH
Idempotent retry + IFSC sandbox fallback

DPDP cross-border data restrictions — MED / MED
Mumbai localisation; ZKP for regulator queries

Model drift on FEMA amendments — HIGH / MED
Weekly retraining + circular-change alerting

Adversarial prompt injection — MED / HIGH
Input sanitisation, output schema enforcement, WAF

THE VERDICT

CorpVidesh AI gives Indian corporates the speed of Singapore, the transparency of Switzerland and the regulatory rigour of Mumbai — on one rail, anchored in GIFT City IFSC. It does for outbound corporate capital what UPI did for retail payments: it makes the previously impossible feel instant, trusted and routine. The rail will be built sooner or later; the only open question is whether it is built in partnership with the team that has already built it once.

TEAM QUANTUM LEAP · DEPARTMENT OF LAW, BRAINWARE UNIVERSITY · RAJA MUKHERJEE · ABHISPA NATH · PRIYANSHU DHAR

IN PLAIN WORDS
The closing page: what we will build over the next twelve weeks, what it costs, the risks we accept, and our final argument for running a supervised pilot on real transactions in GIFT City.