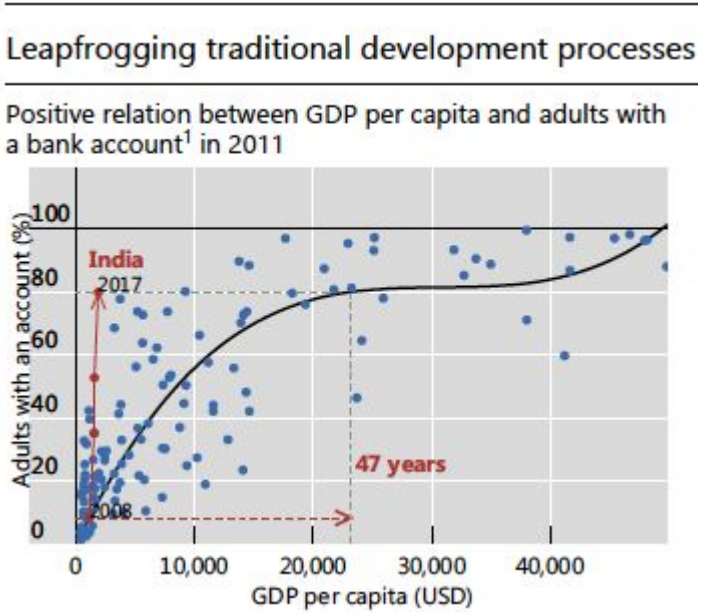
Centre for Digital Public Infrastructure

Digital Public Infrastructure (DPI) Thinking

As of 2008, India was one of the world's most unbanked

Less than **20%** banking penetration

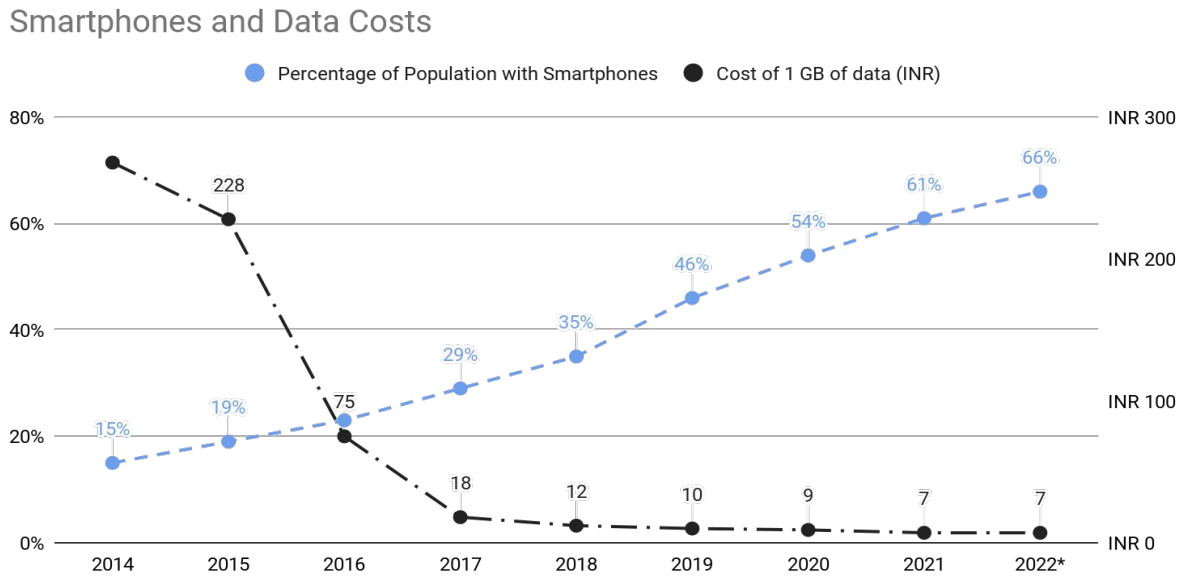
In 9 years, banking penetration shot up to 80% using digital ID, closing the gender gap in accounts!



Per BIS, India did for financial Inclusion in less than a decade what would have taken 5 decades by traditional means

Sources: BIS Paper by Derryl D'Silva , Zuzana Filkova , Frank Packer and Siddharth Tiwari
World Bank 2022: 'COVID-19 drives global surge in use of Digital Payments'

Teledensity also scaled from 37% to 93% in 8 years, and cost of data dropped!



700+ Mn

Unique Subscribers

$0.17 cents

Per GB data

Source: Blume Research, NPCI statistics

Digital Public Infrastructure (DPI)
drove this exponential change

Physical Infrastructure → **Railways, Roads, Cell Towers, Internet cables**

Digital Infrastructure to catalyse digital services → **Open tech standards & systems** for Identity, Signatures, Payments, Data, Fulfillment, and beyond

Both drive **Public & Private Innovation**

DPI helped transform a cash-based economy in Brazil

2020

Brazil rolled out interoperable payments via 'PIX'

2022

300+ participating banks + fintechs;

140 Million users (80% of adults)

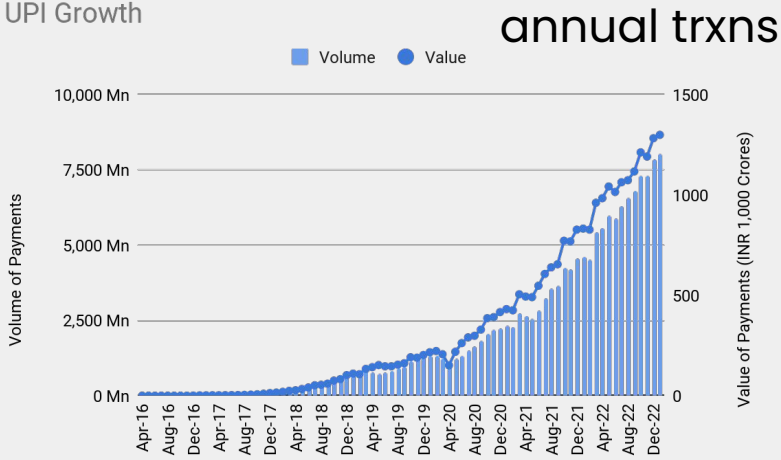
71 Million (~50%) had not used digital payments the year before

In 2016, India used mostly cash

5 Million
PoS machines

<7%
Debit cards

$1 Trillion
annual trxns



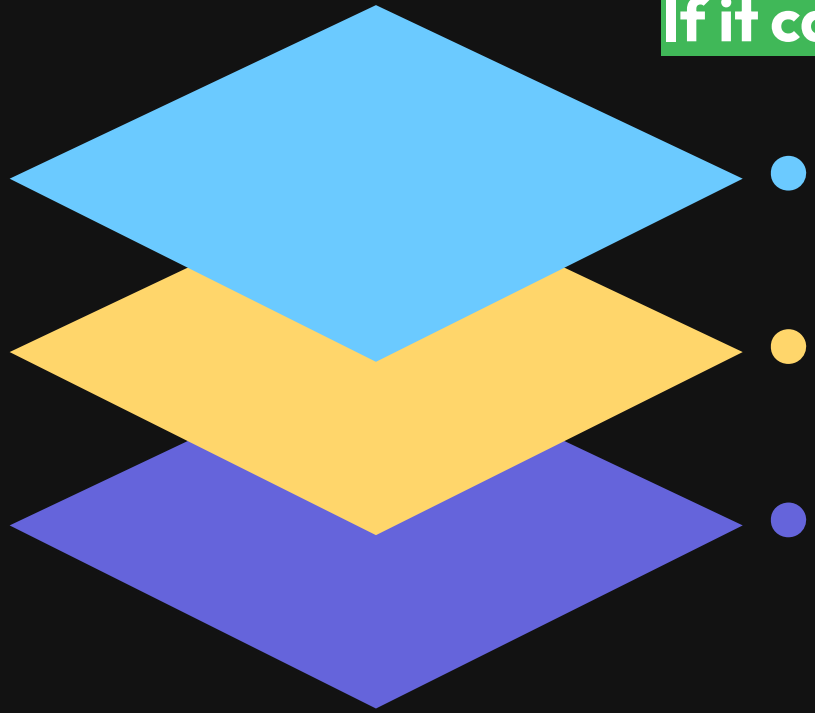
In 6 years, India led digital payments globally

In 2014, paper based certificates and data was prevalent in India

Today, 5.6 Billion verifiable certificates are on eLockers used by 152M+ people &

1.1 Billion bank accounts live on Open Banking

The DPI approach works by using open tech standards & enabling policy to bring the best out of markets



If it can't be reused by others, it's not DPI!

Market: Public and private innovation; Competitive market players designing diverse solutions;

Governance: Legal and institutional framework; Public programs to drive adoption; Ecosystem facilitation; Participatory governance

Open Tech Standards & Building Blocks: Open specifications & protocols or shared systems across verifiable ID & registries; signatures, consent, and trust; payments, data sharing, credentialing, and open AI/ML models; and discovery & transactions.

DPI is inspired by the original digital infra!

Protocols & Standards of **internet & mobile** - complemented by hard physical 'connectivity' infra - drove exponential change

Mobile/Telco

Powered by **common protocols** and standards - **GSM, SMS**...

Ensuring **global voice communication** interoperability

Allows **innovation** - handsets, applications ...

Adoption is **driven by ecosystem** by unlocking value to users

Internet

Powered by **common protocols** and standards - **HTTP, HTMP, SMTP**...

Ensuring **global information exchange** interoperability

Allows **innovation** - devices, applications ...

Adoption is **driven by ecosystem** by unlocking value to users

Defining **Digital Public Infrastructure**

A set of **technology building blocks**

powered by **interoperable open standards/specifications**

operated under **a set of enabling rules**

with **open, transparent, and participatory governance**

to **drive innovation, inclusion, and competition** *at scale*

5 Foundational Digital Public Infra Categories
within & across sectors

Verifiable Identity & Registries

Verifying ID & accessing profile data of people, entities, & objects

- Authentication
- eKYC
- Single Sign On
- Civil/Functional Registries
- Entity Registries
- Object Registries (land,etc.)

Data Sharing, Credentials, & AI/ML Models

Sharing Data (credentials, history, attributes) or Models peer to peer or publicly

- Personal data with consent, including credentials
- Non personal data
- Open datasets
- Open reusable AI/ML Models

Signatures, Consent, and Trust

Assuring that data/agreements came with permission from source

- Tamper proof, non-repudiable digital signatures
- Digitally signing a document to indicate agreement
- Granular, revocable consent

Discovery & Fulfilment Networks

Accessing goods and services

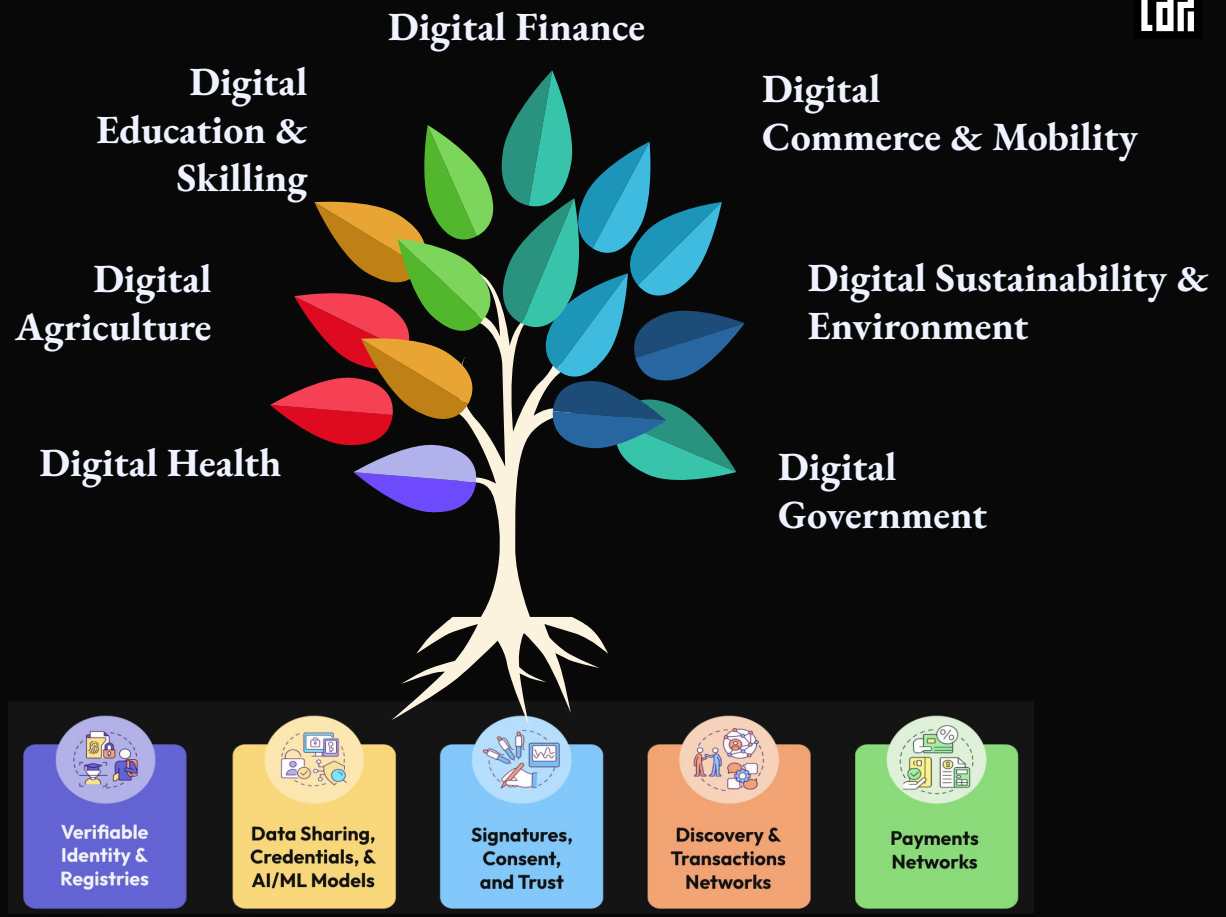
- Open APIs for services (public/private)
- Open eCommerce networks

Payments Networks

Making payments with ease

- P2P/M
- B2B
- G2P
- P2G

DPI: Foundational Ingredients of a Digital Economy



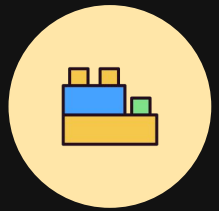
DPI has the potential to create exponential societal change

If well architected.

5 DPI Technical Architecture Principles
make digitisation inclusive & scalable

1.

Interoperability driven by open specifications



2.

Minimalist, Reusable building blocks rather than end-to-end solutions

3.

Diverse, inclusive innovation by the public + private ecosystem via open & multi-modal access

4.

Federated & Decentralized with a preference for letting data stay where it's been collected

5.

Security & Privacy by design

Why these principles matter

1. Interoperability	2. Minimalist, Reusable building blocks	3. Diverse, inclusive innovation	4. Federated & Decentralized	5. Security & Privacy
Choice of solutions and services for individuals **Scale** of access and adoption for individuals **Competition** in markets while remaining interoperable	**Feasibility & Success** of digital intervention **Privacy** protection based on minimalism **Combinatorial innovation** by market **User-centric solutions** **Financial sustainability** (lower cost of the DPI) **Evolvability & Extensibility**	**Inclusion** **Scale** **User Choice** **Resilience** because of diverse providers **User-centric solutions**	**Autonomy** of Institutions & players **Fewer Intermediaries;** more peer to peer transactions **Cybersecurity Privacy Resilience** - avoid overdependence on any one system	**Public Trust** in the Infrastructure **Protection** of individuals from harmful actors

DPIs combine the best of Public & Private provision

Public Only

Single Provider
Cautious Innovation

- Government Apps
- Departments/ Ministries
- Government

DPI Approach

Addresses diversity & choice
Encourages Innovation & competition,
Ensures openness and sovereignty

- Diverse applications and market Innovation
- **Interoperable DPI**
  (open APIs/protocols, shared platforms and enabling policies)
- Government / Regulators

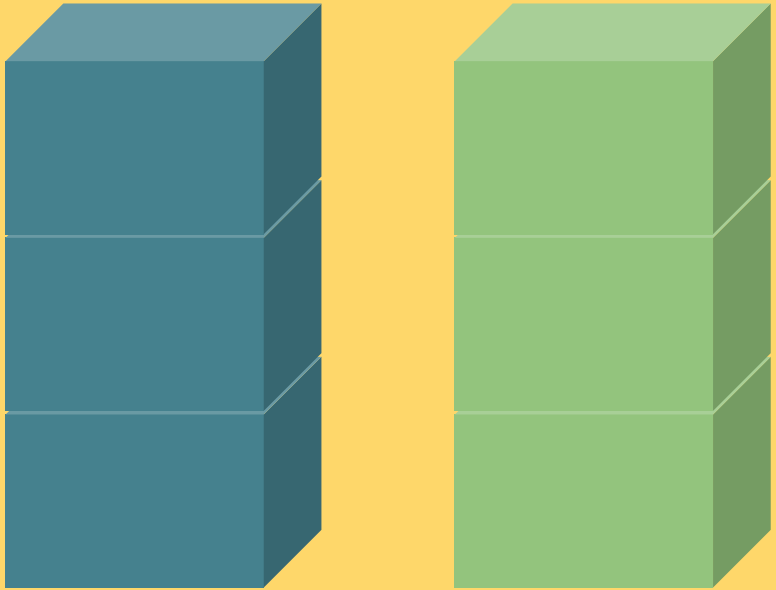
Private Only

Lack of interoperability
Lack of competition

- Market Apps
- Platforms, Appstores, OS
- Private Tech Companies

DPIs are NOT about digitization in silos ...

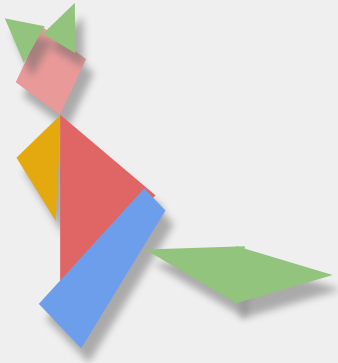
Attempting to build monolithic, centralized systems goes against the principles of good DPI design



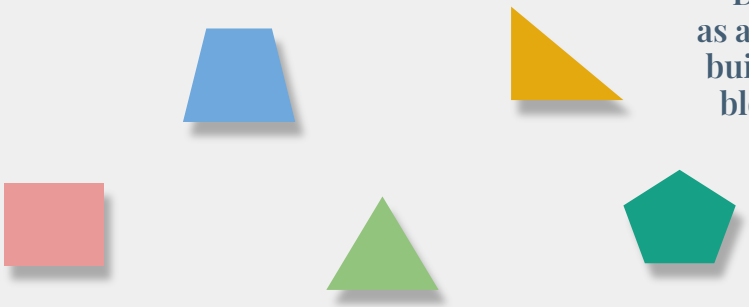
… and not about centralization

DPIs are
inherently decentralized,
managed by many,
evolved in different ways, and
need to work together to achieve
the transformation

They get connected and combined via
interoperability specifications/protocols



Solutions
built by
ecosystem



DPIs
as a set of
building
blocks

Defining **Digital Public Goods**

To help countries implement DPI faster & cheaper!

A set of well designed **assets/resources**

in the form of **specifications/software/data/content**

made **freely available**

having its **own lifecycle and governance**

allowing others to **build and operate their own DPIs**

Centre for Digital Public Infrastructure

Thank You!