



India Stack: Global Lessons from a Digital Public Infrastructure Revolution

BOT Digital Finance Conference 2023





Chapter 1: Understanding the Digital Public Infrastructure Approach



The logo for India Stack, with "India" in a light grey font and "Stack" in a bold black font. Above the "Stack" text is a graphic of three stacked rectangular blocks in orange, red, and green.

What do you think India Stack is?

IndiaStack

What do you think India Stack is?

A



The logo for India Stack, with the word "India" in a light grey font and "Stack" in a bold black font. Above the "Stack" part is a graphic of three stacked rectangular blocks in red, orange, and green.

What do you think India Stack is?

A



B



IndiaStack

What do you think India Stack is?

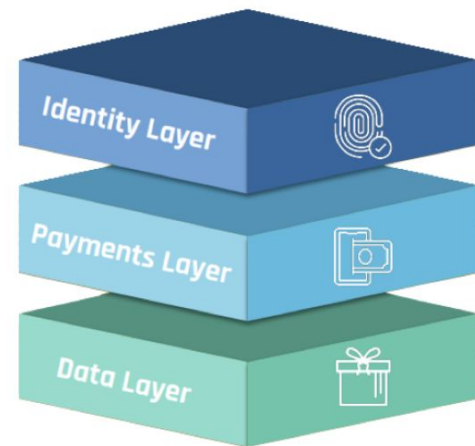
A



B



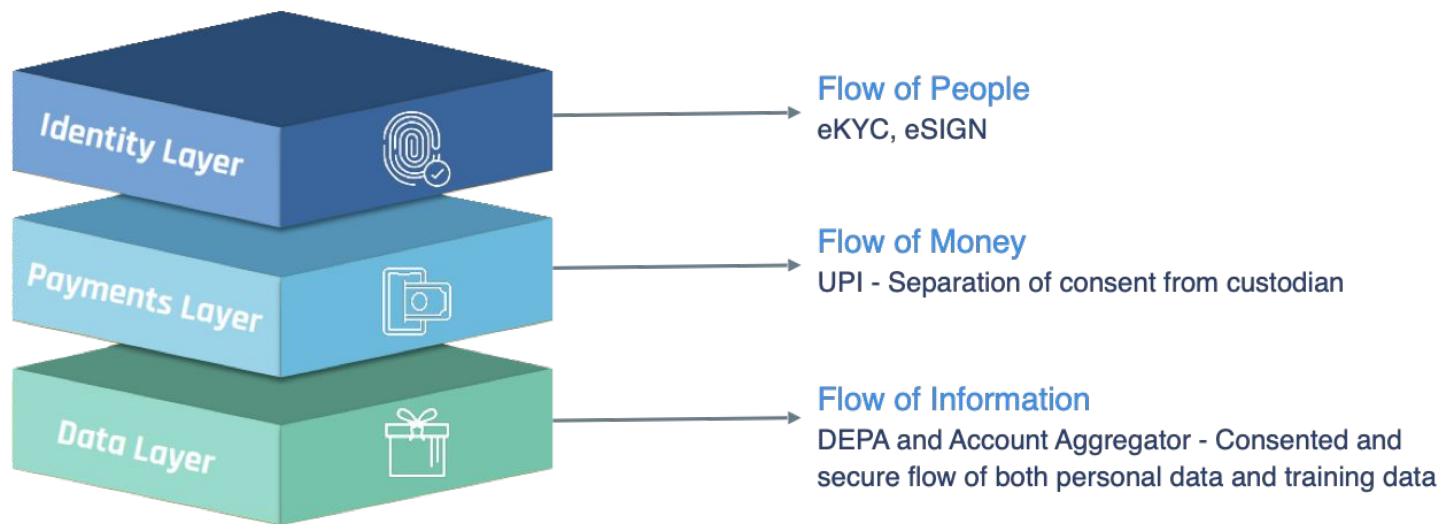
C





India Stack

A Conceptual framework for Digital Public Infrastructure



India's approach offers unique insights for:



IDENTITY



PAYMENTS



DATA

IDENTITY

What is the purpose of an identity system?

Traditional purpose of identity: Foundational



- Authentication
- Availing welfare services
- Census and demographic data
- Taxation and emergency services
- Benefits limited to the sovereign territory



Aadhaar (means *foundation*)



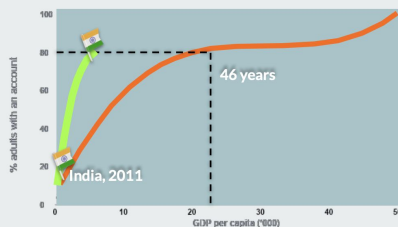
Aadhaar: Availing welfare services

Before Aadhar subsidy leakages were worth 2% of our GDP!

<p>310+ federal schemes</p> <p>600+ state schemes</p>	<p>\$322 Bn</p> <p>transferred directly so far</p>
---------------------------------------------------------------------	-----------------------------------------------------------

Enabling account opening via paperless eKYC ...

India took just
A decade to get to 80+ %
bank account
penetration which
otherwise would have
taken 5 decades!!



Reduced cost of customer onboarding

LARGE BANK	LARGE TELECOM	LARGE ASSET FIRM
6 days to 1 hour	1 day to 4 min	4 hours to 2 min
Reduced drop offs	Saved ₹15 per SIM issuance	Freed up capacity
Eliminated back office paperwork	Enhanced consumer experience	Enhanced customer experience
Branch capacity increased by 10%	Saved 15000 trees	Statement processing in minutes

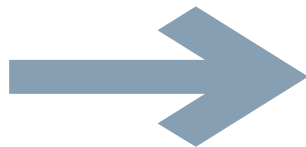
IDENTITY

As we slowly progress towards a data economy, the role of ID has to be more than just authentication

Traditional purpose of identity: Foundational



- Authentication
- Availing welfare services
- Census and demographic data
- Taxation and emergency services
- Benefits limited to the sovereign territory



As the world moves towards a data economy

Foundational remains relevant but modern identity needs



- Privacy-preserving consent-based architectures.
- Secure sharing of financial and health data
- Since data flow is global, ID standards need to move beyond sovereign territory

MOSIP: 100 million IDs issued across 10 countries

An open source platform on which national foundational IDs are built

Enabling robust digital identities across the globe

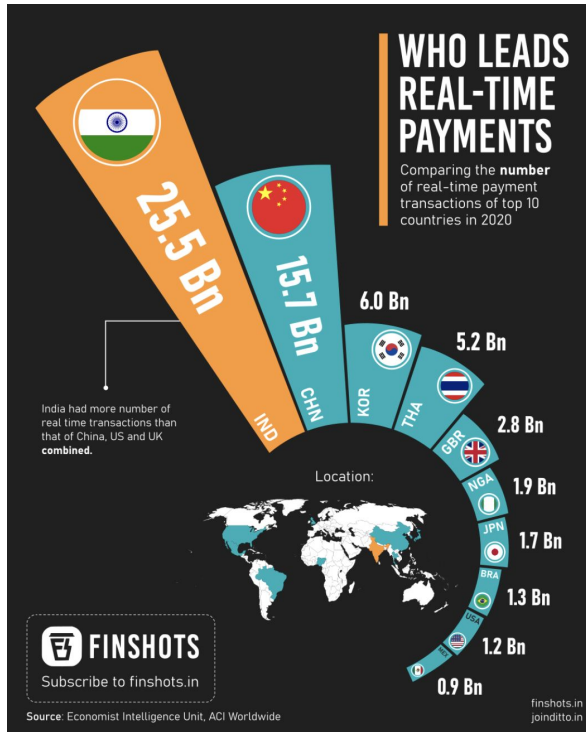
94,492,815

People Registered on MOSIP-Based Systems



PAYMENTS

India's real time payment system: UPI, offers four unique insights into how we look at payments!



BUSINESS

UPI Breaks All Record: Annual Transactions Cross \$1 Trillion Mark With 102% Growth In 1 Year!

By Shreya Bose — Last updated Apr 2, 2022

PAYMENTS

India's real time payment system: UPI, offers four unique insights into how we look at payments!



Separation of consent from the custodian



One custodian multiple consent collecting platforms

Two factor authentication



Using your mobile to do two factor authentication

Payment address system



Virtual Payment Addresses - Email for payments

Secure and real-time



Guaranteed real-time payments

UPI's staggering growth!

380+ banks/wallets, 66 apps, 22 languages, millions of merchants!
 10 Billion txns a month, \$1 trillion moved on UPI last year

US	VISA	MasterCard	PayPal	AMERICAN EXPRESS	DISCOVER
Canada	VISA	MasterCard	PayPal	AMERICAN EXPRESS	paybright
Mexico	VISA	MasterCard	PayPal	AMERICAN EXPRESS	Klarna, OXXO
UK	VISA	MasterCard	PayPal	AMERICAN EXPRESS	bacs
Spain	VISA	MasterCard	PayPal	Klarna	
Germany	VISA	MasterCard	PayPal	Klarna	SEPA
France	VISA	MasterCard	PayPal	Klarna	
Sweden	VISA	MasterCard	Klarna	swish	
India	VISA	MasterCard	RuPay	Paytm	PhonePe, UPI, M, JioMoney, buddy
Korea	VISA	MasterCard	PayPal	BCcard	KB
Japan	VISA	MasterCard	Kuon	ANCOMAT SpA	¥
Italy	VISA	MasterCard	ANCOMAT SpA		
Brazil	VISA	MasterCard	pix	Boleto	
Australia	VISA	MasterCard	PayPal	afterpay	
China	Alipay	WeChat Pay			



An average Indian has 30 fast payment platforms to choose from !

Source: Company Reports, Bernstein Analysis

DATA

As the world became data rich, two frameworks to look at this data economy evolved



In the west

Economically rich + Data rich

Data used to drive an advertisement led business model

Personalised ads



In India

Became data rich before becoming economically rich

Data used to empower user rather than to sell things to the user

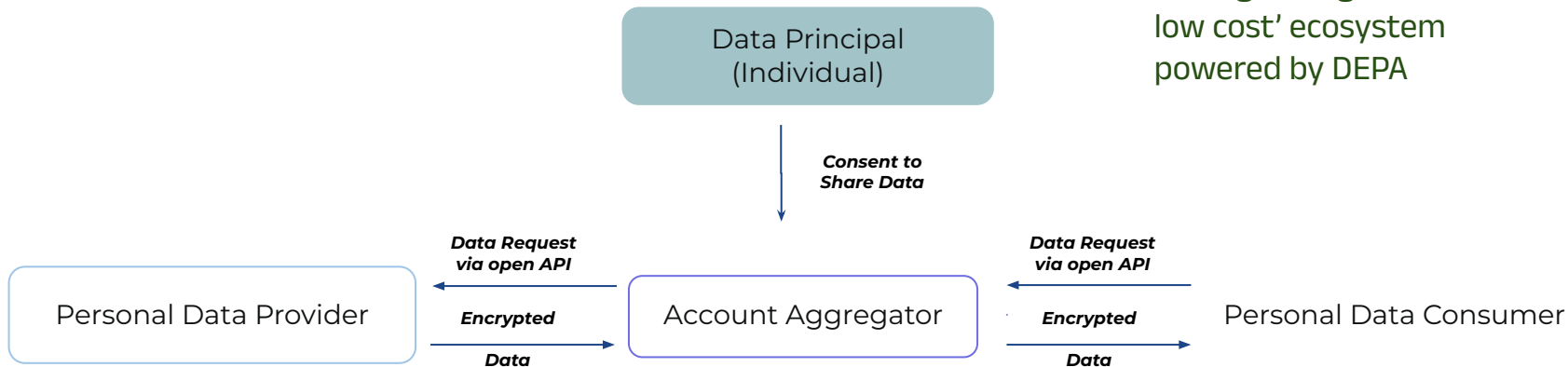
Personalised loans, personalised healthcare, personalised education etc.



DATA: Inference cycle

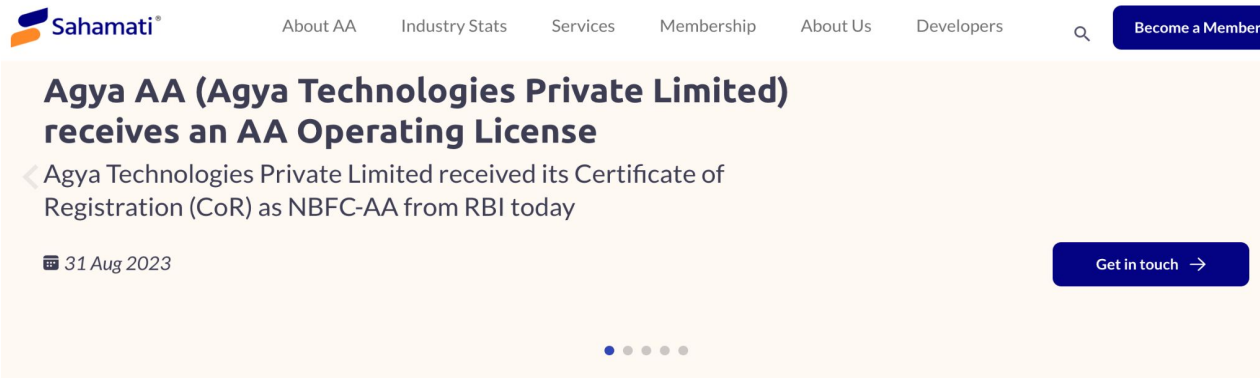
Account Aggregator System: Consented & Purpose Limited Personal Data Sharing to Receive Predictions from AI Models

Driving data innovation through a 'high trust and low cost' ecosystem powered by DEPA



Account Aggregator: Success story

20 million+ consent request raised, 440+ participants



Sahamati About AA Industry Stats Services Membership About Us Developers [Become a Member](#)

Agya AA (Agya Technologies Private Limited) receives an AA Operating License

Agya Technologies Private Limited received its Certificate of Registration (CoR) as NBFC-AA from RBI today

31 Aug 2023 [Get in touch →](#)

• • • •

Accounts Linked
19.72 Million

Consent Requests
20.48 Million

Participants
440+

[Live Dashboard →](#)

Empowering the user!



With the Account Aggregator, she can demand:

- her Tax returns
- her Bank & Account Data
- her home Loan repayment record

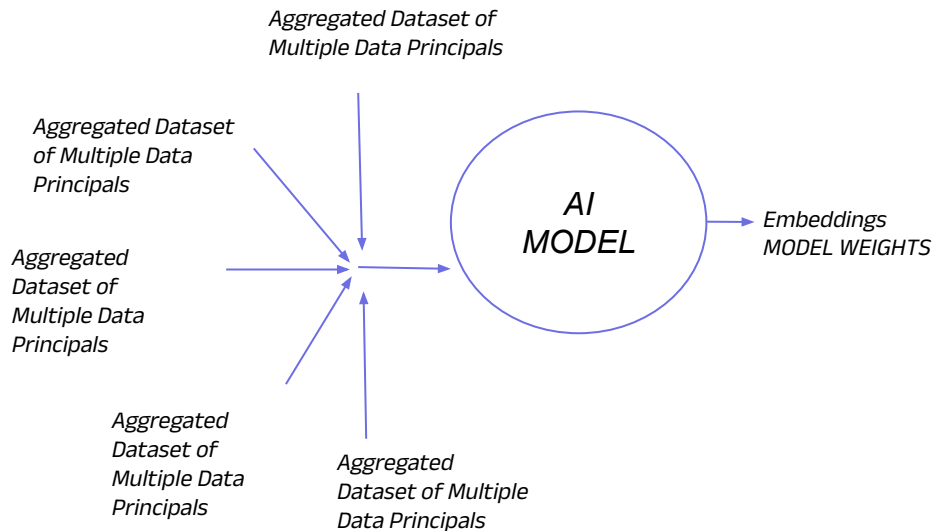
be shared with Lenders

thus, securing a loan with her richer digital footprint in a **high trust and low** cost fashion!!

DATA: Model Economy, going a step further!

The inference cycle has helped create aggregate datasets to develop a model economy

Model Training
Secure and Privacy-Preserving Aggregate Dataset Sharing
through DEPA 2.0



Enablers of DEPA Training Cycle

Techno-legal approach for data sharing for model training is empowered by ADEPTS principles

Accountability and Transparency



Electronic Contract

Democratisation



Fair access to data & benefits

Evolvability



Adaptable to future policies

Privacy and Security

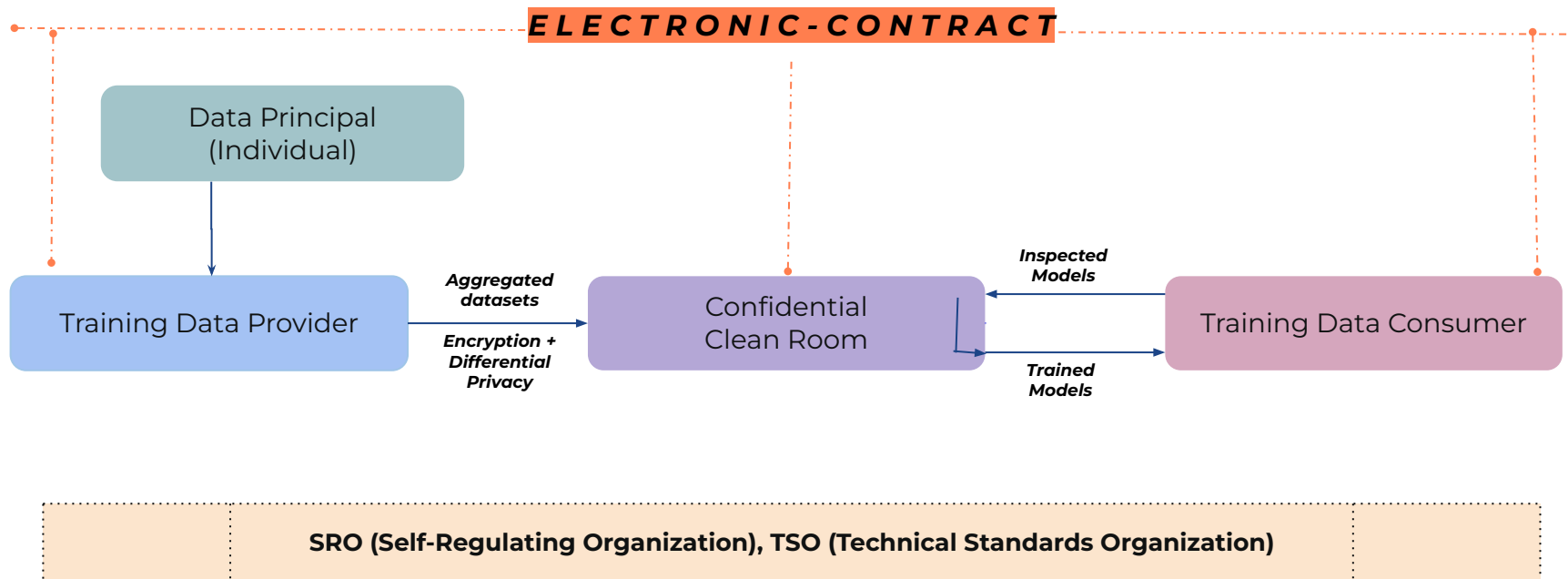


CCR & Differential Privacy

ADEPTS Principles stand for Accountability, Democratisation, Evolvability, Privacy, Transparency and Security

DEPA Training Cycle

Data sharing in confidential clean rooms for model training with privacy & security verification



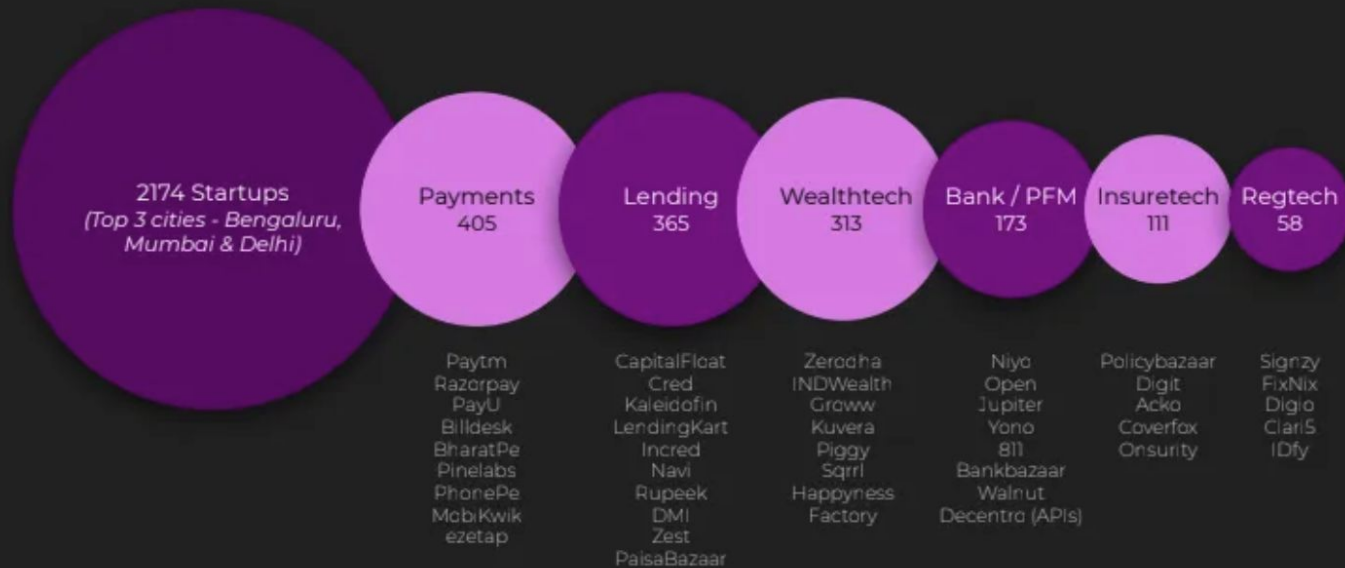
Chapter 2: The Benefits of DPI

India Stack aims to address two deficits in India

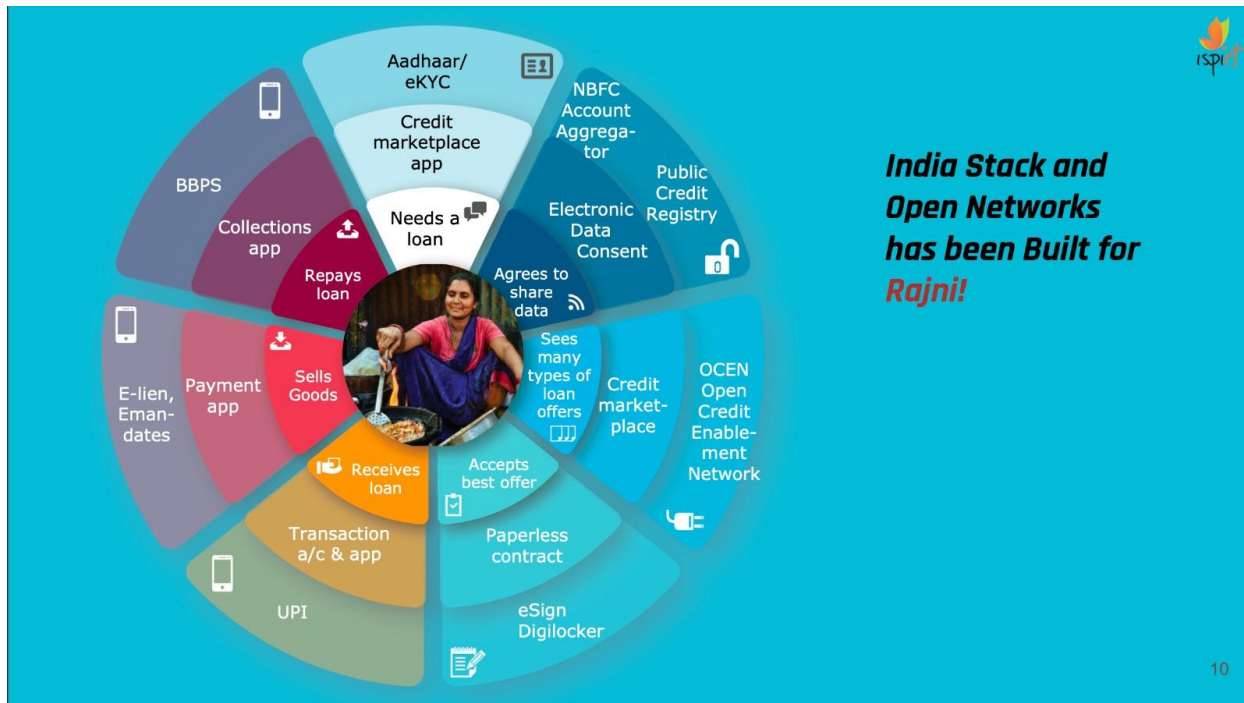
Innovation Deficit

Thriving ecosystem that leverages India Stack

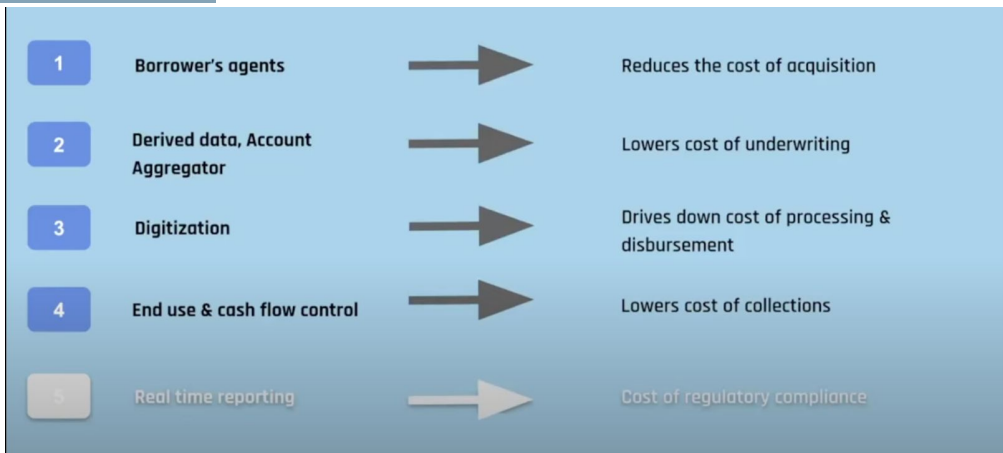
Over \$12.2 Bn in VC investments over last 5 years



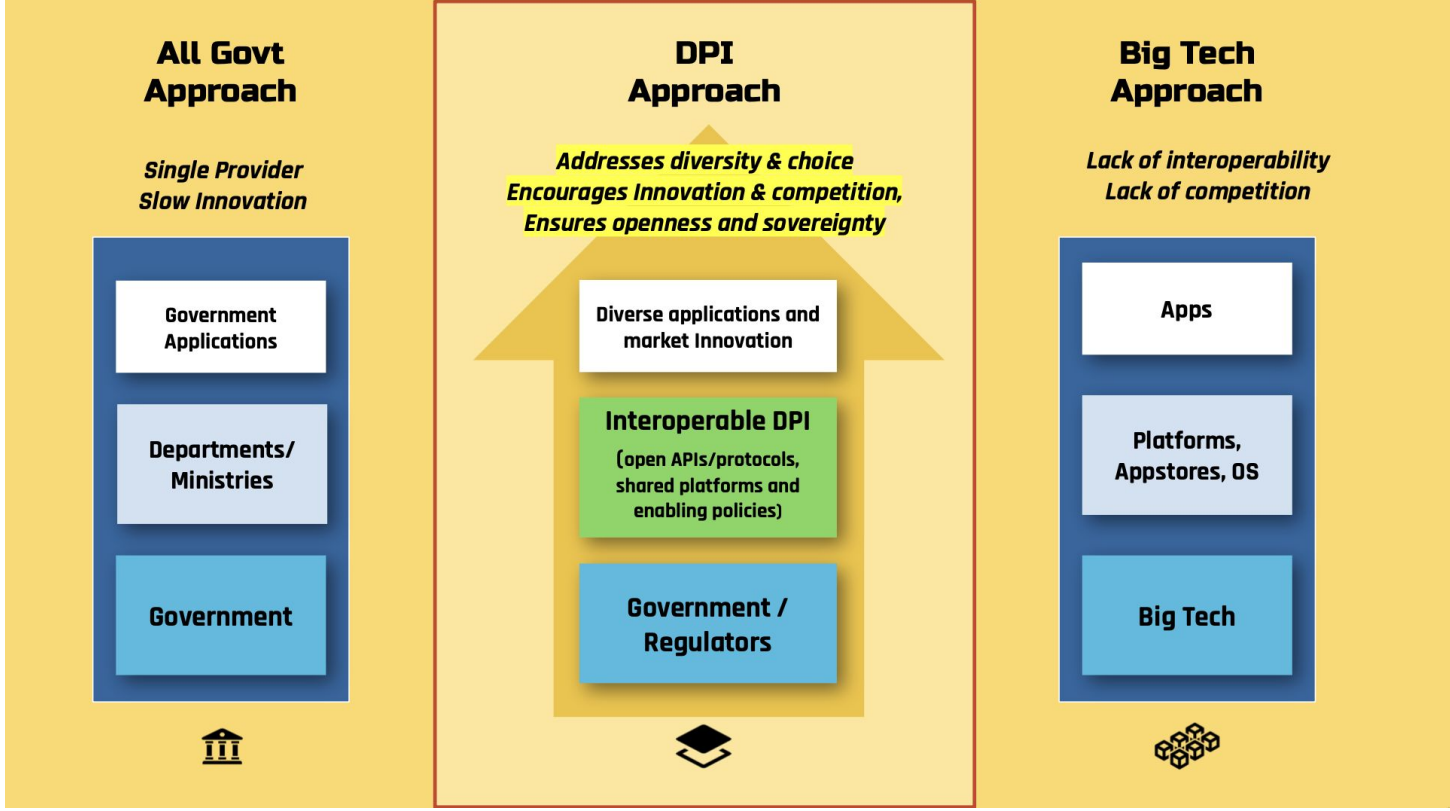
Deficit of jobs : Helping the MSMEs



Deficit of jobs : Helping the MSMEs



The third way!



DPI helps build Open Networks

Open Networks help solve market asymmetries and misaligned incentives

ONDC

**Open Network for Digital
Commerce**



Selection

OCEN

**Open Credit Enablement
Network**



Collection

OHSN

**Open healthcare
Services Network**



Connection

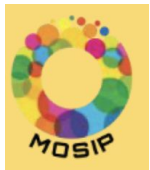
Chapter 3: Building a DPI

How to build public infrastructure

Much of the assets (protocols, software, policy templates, best practices, etc.) behind India's DPIs are **available freely** for others to build their own DPIs

Four organisations must come together

Public Tech



DEPA

Available for free
from India

System Integrators



Operators



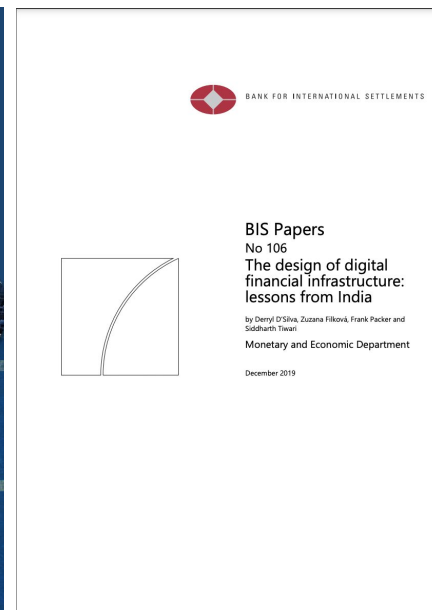
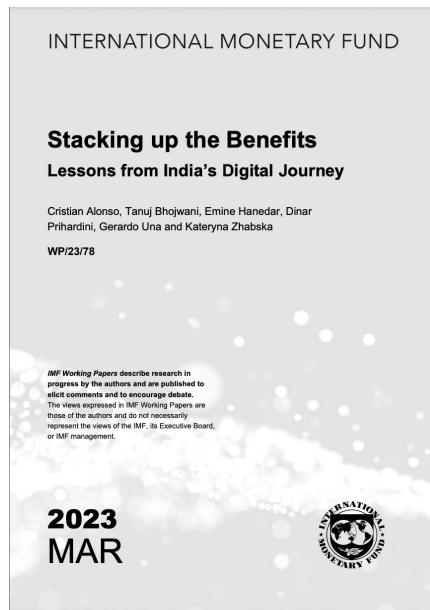
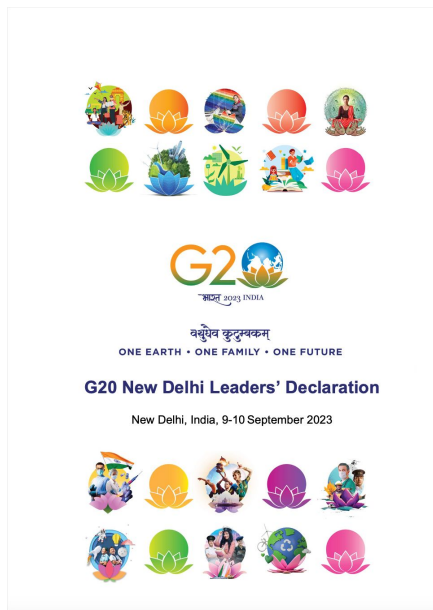
Bodies like NPCI
and Sahamati

Sponsor



Chapter 3: Global consensus - DPI proven effective!

DPI approach gains worldwide approval



Volunteer driven!

Faculty

Publications

Books

Working Papers

Case Studies

Research Labs & Initiatives

Behavioral Lab

Data, Analytics & Research Computing

Faculty & Research > Case Studies > iSPIRT: M&A Connect (Part A)

iSPIRT: M&A Connect (Part A)

By Sharique Hasan, Sara Rosenthal

2015 | Case No. E544A | Length 15 pgs.

Entrepreneurship

Part A of the case describes the founding of the Indian Software Product Industry Roundtable (iSPIRT, pronounced "ispirit"), a nonprofit organization formed in 2012 by a small group of Indian entrepreneurs and technology professionals who believed that India's tremendous engineering talent could be harnessed to transition the country from its role as the "back office of the world" into a "product nation" in its own right. Led almost entirely by volunteers, the group identified three major obstacles blocking the path of entrepreneurship and innovation in India: 1) obstructive government regulations and policies; 2) entrepreneur readiness (or lack thereof); and 3) the process by which

Related



Sara Rosenthal
Lecturer

