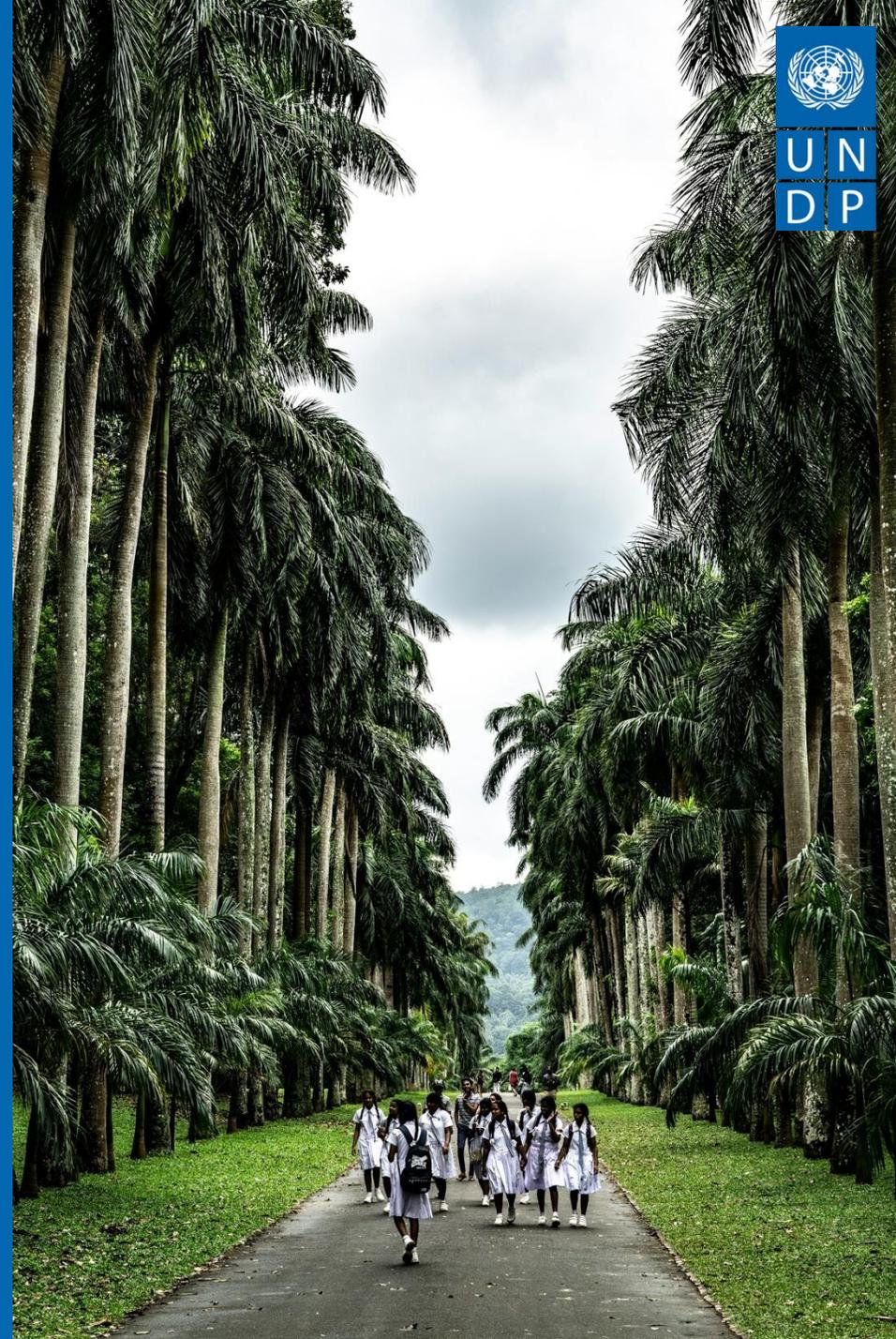


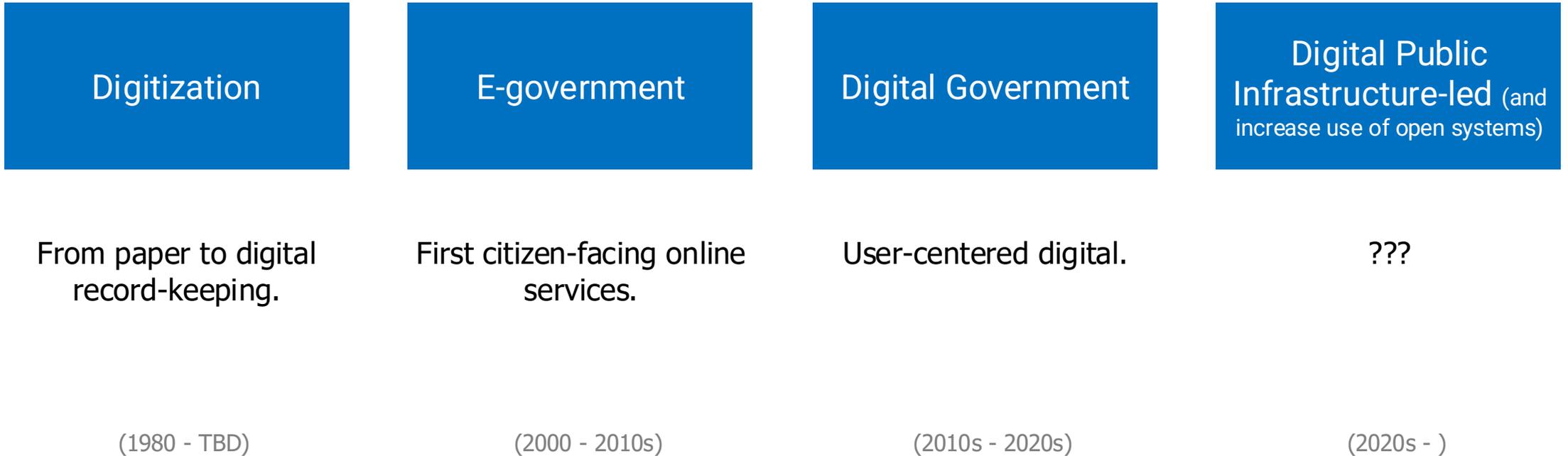
Unpacking Digital Public Infrastructure (DPI)

April 2025





We are entering a new paradigm for how government use digital to service people and drive economic growth



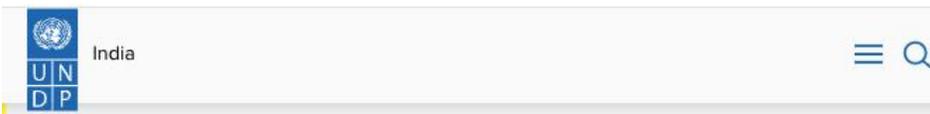
UNDP has been a leading advocate for DPI



Global leaders usher in a new era of digital cooperation for a more sustainable, equitable world

Countries from around the world committed to sharing digital public goods and best practices for the Global Goals. Funders committed US\$295 million to advance inclusive digital public infrastructure

SEPTEMBER 22, 2022



HOME / INDIA /

G20 DIGITAL MINISTERS RECOGNIZE DIGITAL PUBLIC INFRASTRUCTURE AS AN ACCELERATOR OF THE SDGS

G20 Digital Ministers Recognize Digital Public Infrastructure as an Accelerator of the SDGs

In support of India's G20 Presidency, UNDP serves as knowledge partner on digital public infrastructure

AUGUST 19, 2023



Global leaders have recognized DPI too

ET Government
Your Exclusive e-Governance Source

Technology · 1 Min Read

India, US to develop, deploy digital public infra in developing countries

A joint statement talks about developing a 'US India Global Digital Development Partnership' under which the two countries will bring together technology and resources from both countries to enable development and deployment of DPIs in developing countries.

ET Bureau
Updated On Jul 6, 2023 at 12:44 PM IST

The Compact should call for resilient, affordable, and accessible digital infrastructure, including minimum digital public infrastructure for digital inclusion and connectivity for all.

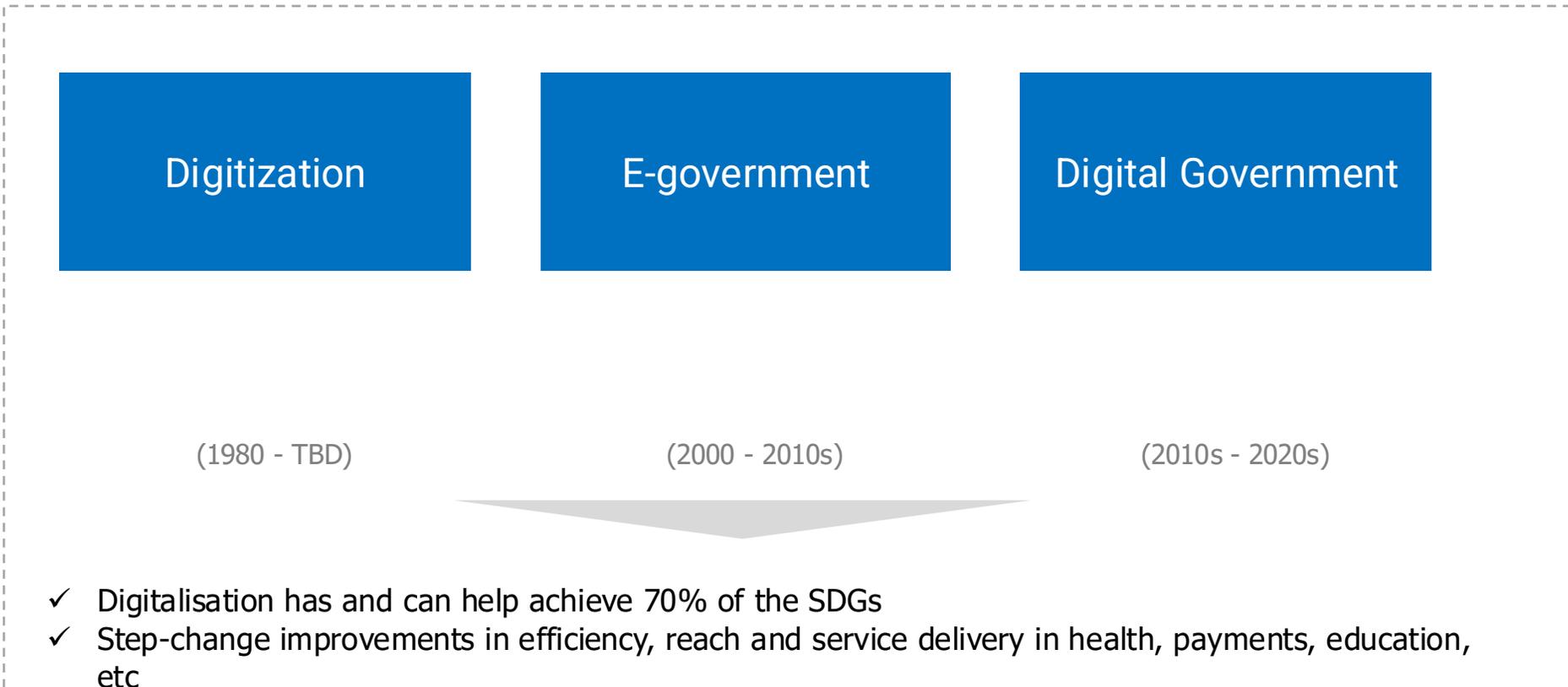
G77-submission to the Global Digital Compact



50in5

50-in-5 is an UN-supported global DPI Advocacy Campaign that has +10 countries advocating for inclusive DPI

Past decades of digitalization has driven significant prosperity and inclusion – but with challenges too



But also...

- High failure rate
- High costs

Government digital projects are prone to cost overruns, delays, and full or partial failures

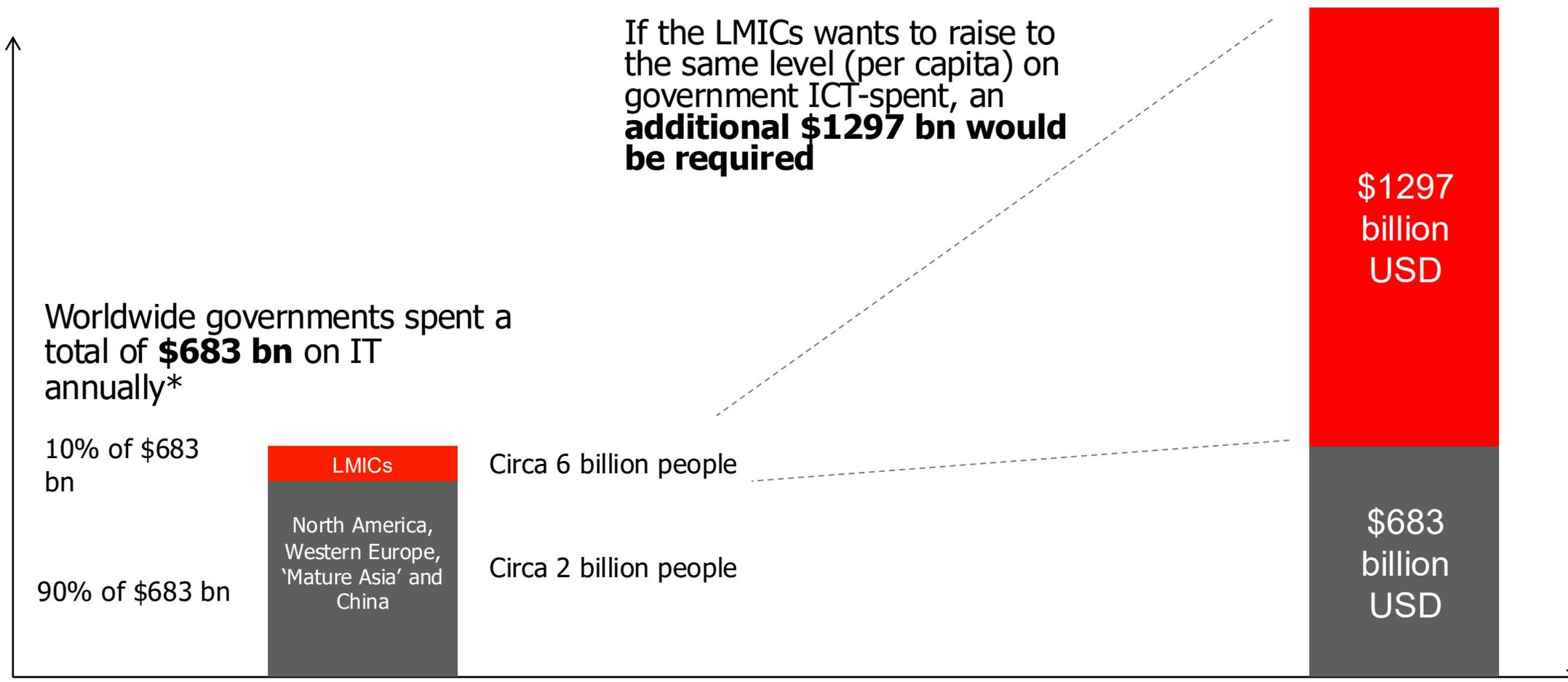


Percent of digital government project that **do not fully meet expectations**

80%

A large, solid red circle containing the text '80%' in a bold, white, sans-serif font.

Business as usual is not affordable for most LMICs



LMICs need a more cost-effective approach to (government) digital transformation

What if digital transformation in government was more like how we develop and govern physical infrastructure?



Digital Public
Infrastructure

What if digital transformation in government was more like how we develop and govern physical infrastructure?



Physical
Infrastructure

- Generates economic opportunity through shared investment
- For public benefit
- Public governance and oversight
- Standardized, for ease of use
- Interoperable, for multiple use cases

Infrastructure: Create once and has many use cases

Gov

Ministry of
Education

Ministry of
Health

National
tax/
revenue
authority

Businesses
, CSOs,
non-gov's,
etc.

Infra



...but this is not how digital usually works in government

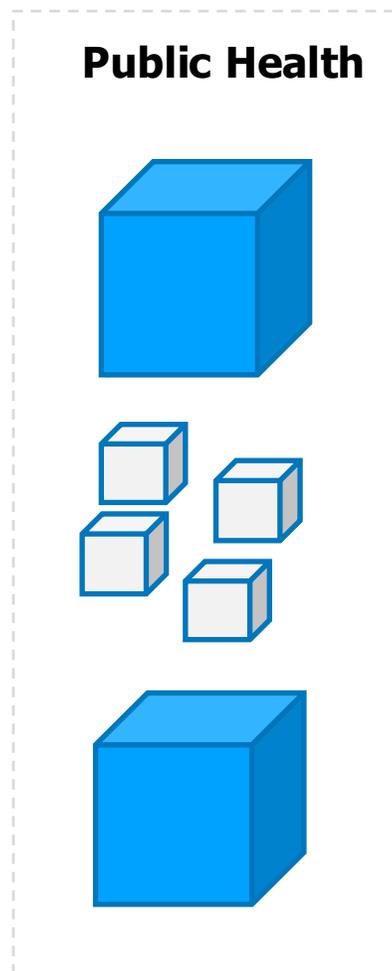
Government ICT is generally siloed



Digital public services

Supporting applications and systems

Data



👩‍⚕️ "Maria needs to schedule an appointment with her doctor online"

👤 "Tao must submit a request for government-assisted lower drug prices"

- E-portal for to find the doctor
- Scheduling systems
- SMS or e-mail confirmation
- Identity verification check
- Eligibility-check
- Payments gateway
- Overview of all doctors
- Drug price guideline excel file
- Verified e-mails or sim-number
- Population or patient registry
- Tax or social security info
- Bank account details

Government ICT is generally siloed



Gov departments

Public Health

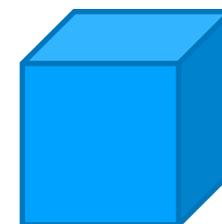
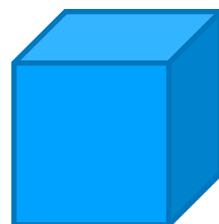
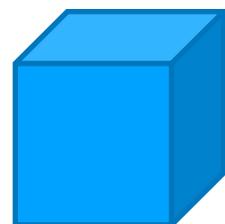
Education

Social Services

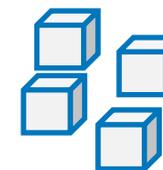
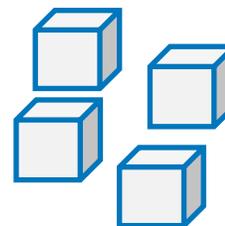
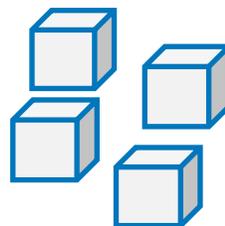
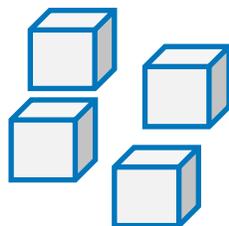
...

Institutional
logic

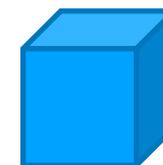
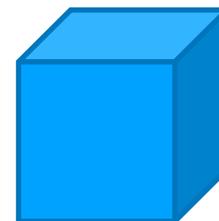
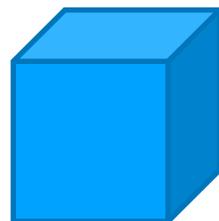
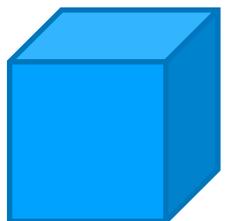
Digital public
services



Supporting
applications
and systems



Data



ACCOUNTABILITY

OVERSIGHT AND CONTROL

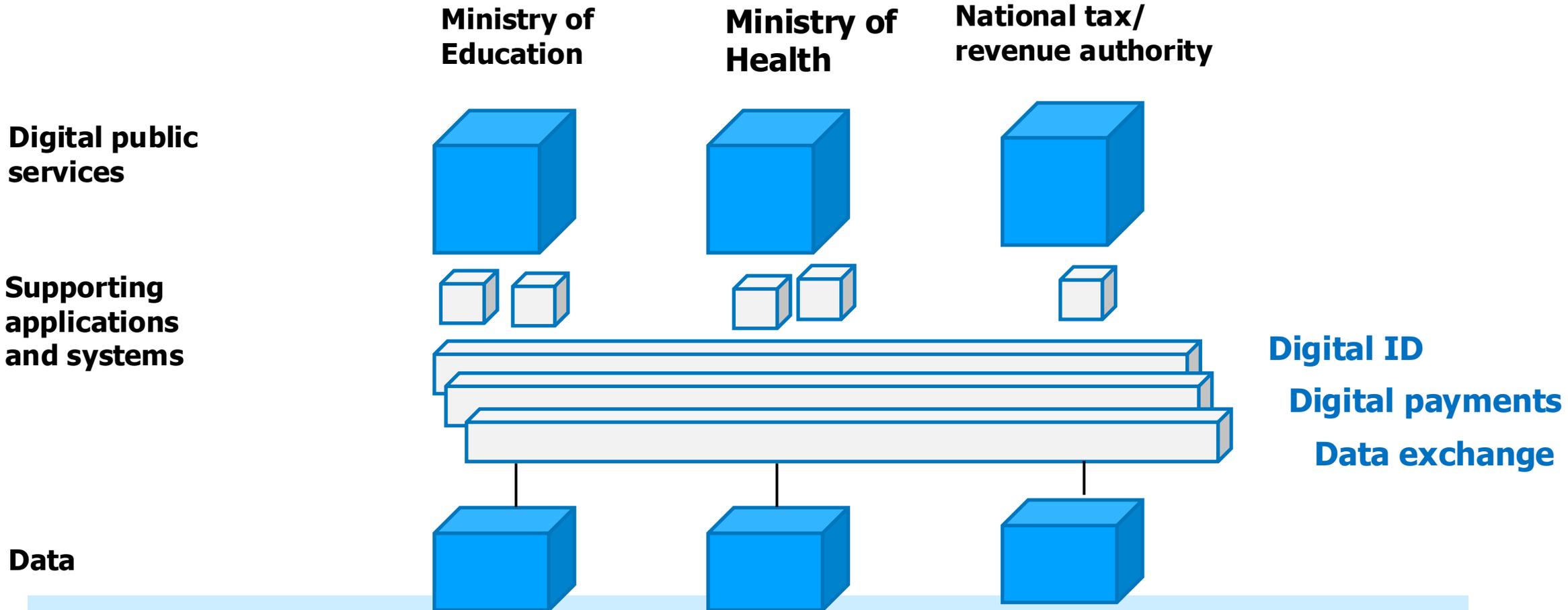
BUDGETING



Leads to duplicating IT systems, little standardization, messy UX, re-submitting info in gov forms...

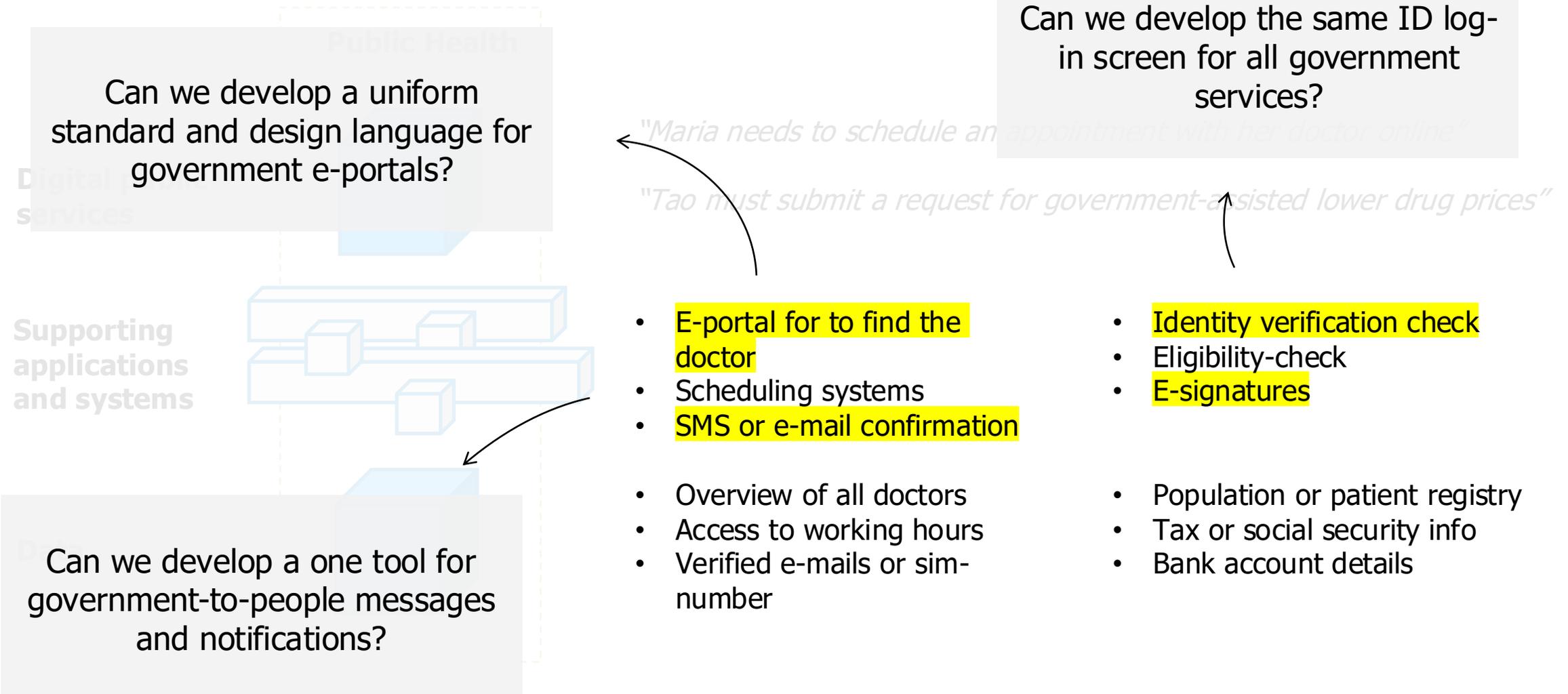
DPI introduces 'building blocks' that are shared

- +
- ×
- +
- +



What does this look like in practice?

Shared 'building blocks': Example for Public Health



Examples of 'building blocks'

Gov.UK Design System (United Kingdom)

Can we develop a uniform standard and design language for government e-portals?

design-system.service.gov.uk

GOV.UK Design System

Search Design System

Get started Styles Components Patterns Community Accessibility

Design your service using GOV.UK styles, components and patterns

Use this design system to make government services consistent with GOV.UK. Learn from the research and experience of other service teams and avoid repeating work that's already been done.

[Get started >](#)

What's new

9 January: We've opened our user survey and released GOV.UK Frontend 5.8.0.

User Survey 2025

Complete the [GOV.UK Design System and GOV.UK Frontend Survey 2025](#) before it closes on 31 January.

Usage: 8.000+ designers using the design system



Joe Horton

GOV.UK Design System

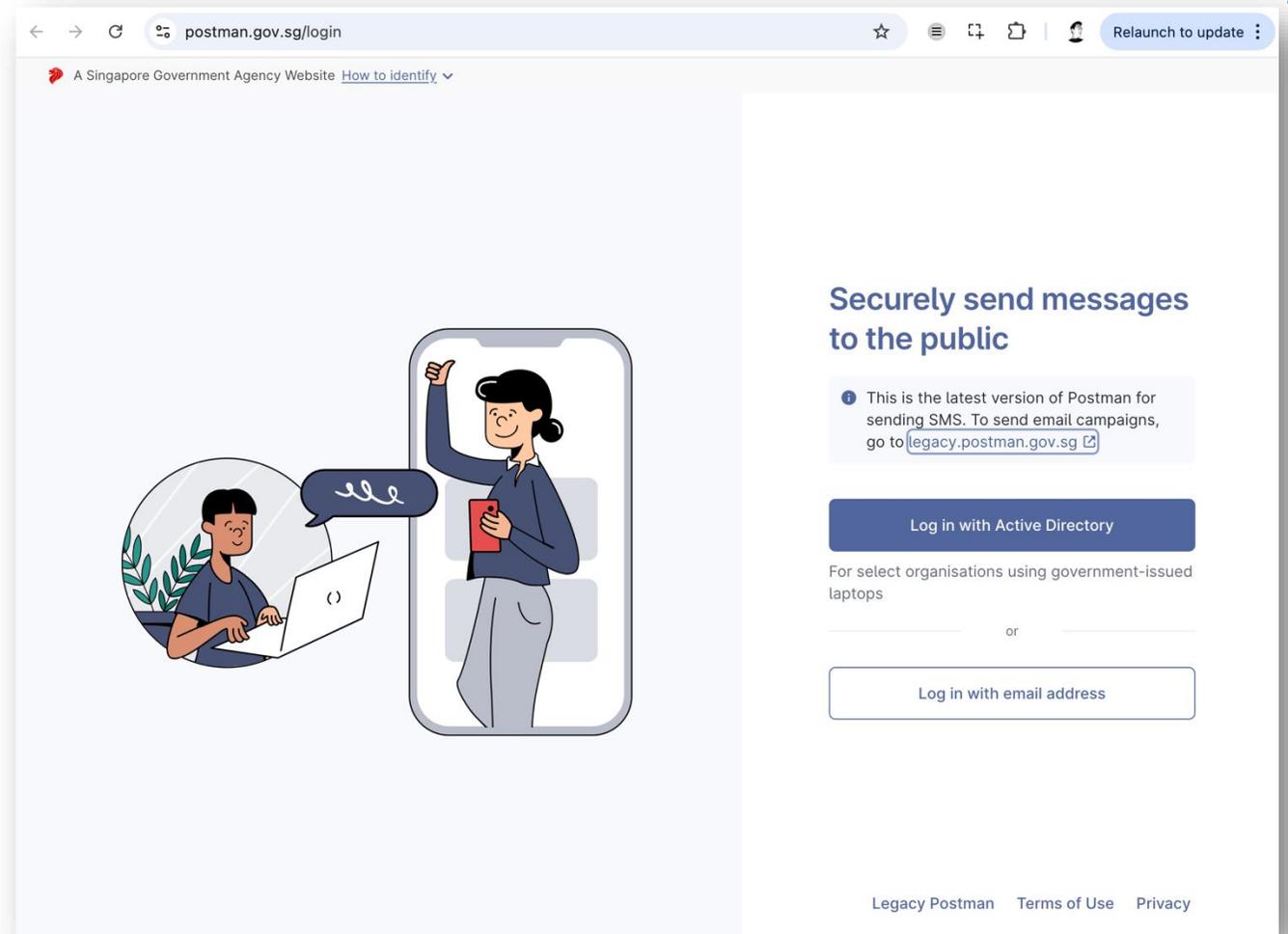
Design file • 305 • 8.9k users

[Open in Figma](#)

Examples of 'building blocks'

Postman for messages (Singapore)

Can we develop one tool for government-to-people messages and notifications?

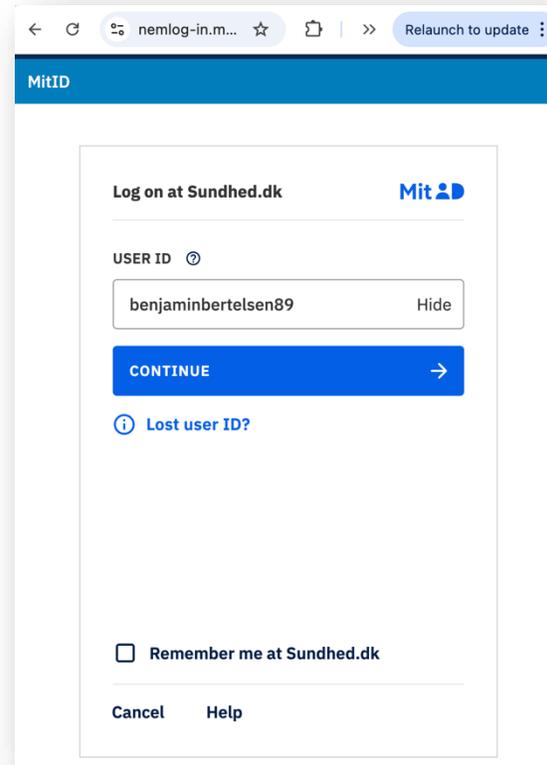


Usage: 246 systems integrated, 12 million e-mails and 49 million text messages delivered as of February 2025

Examples of 'building blocks'

MitID for 2-factor ID authentication and login (Denmark)

Can we develop the same ID log-in screen for all government services?



Log on at Sundhed.dk MitID

USER ID ⓘ

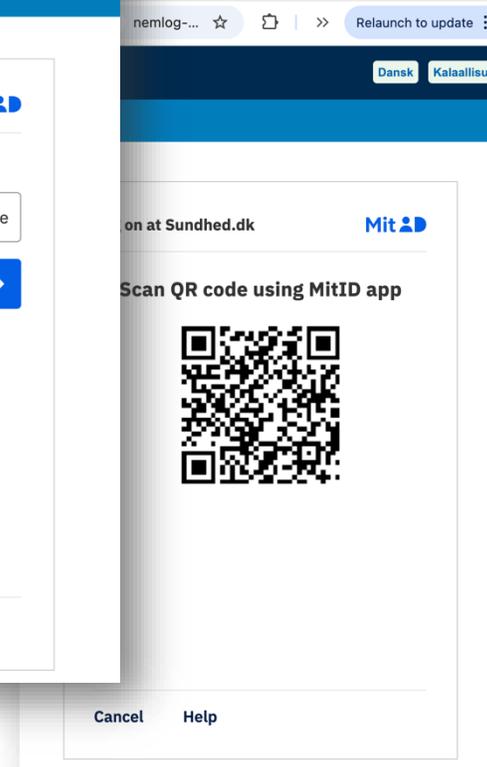
benjaminbertelsen89 Hide

CONTINUE →

? Lost user ID?

Remember me at Sundhed.dk

Cancel Help



Log on at Sundhed.dk MitID

Dansk Kalaallisut

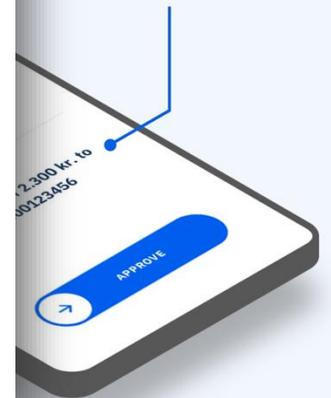
Scan QR code using MitID app



Cancel Help

Protect your MitID

Always check what you are about to approve

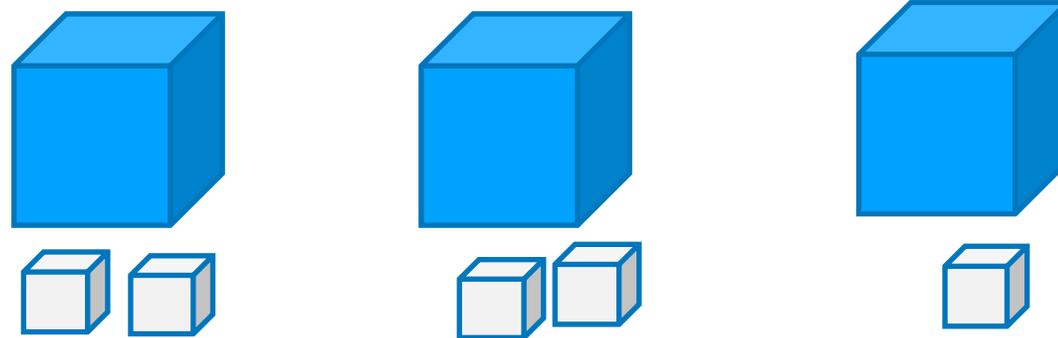


Usage: 87% of people use MitID at least once a week (survey, 2024)

DPI: Leaving the “harder infrastructure” out of focus

(for better or worse)

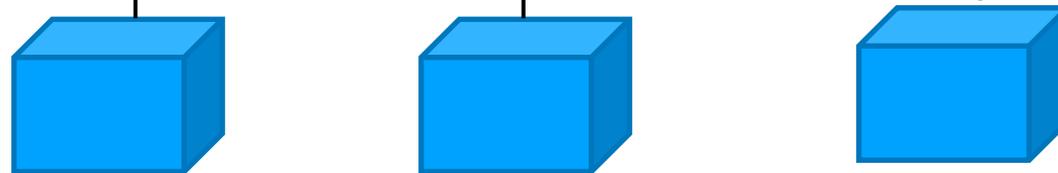
Digital public services



Digital Public Infrastructure

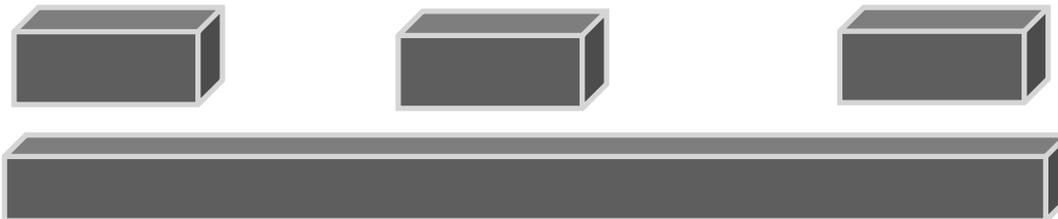


Data



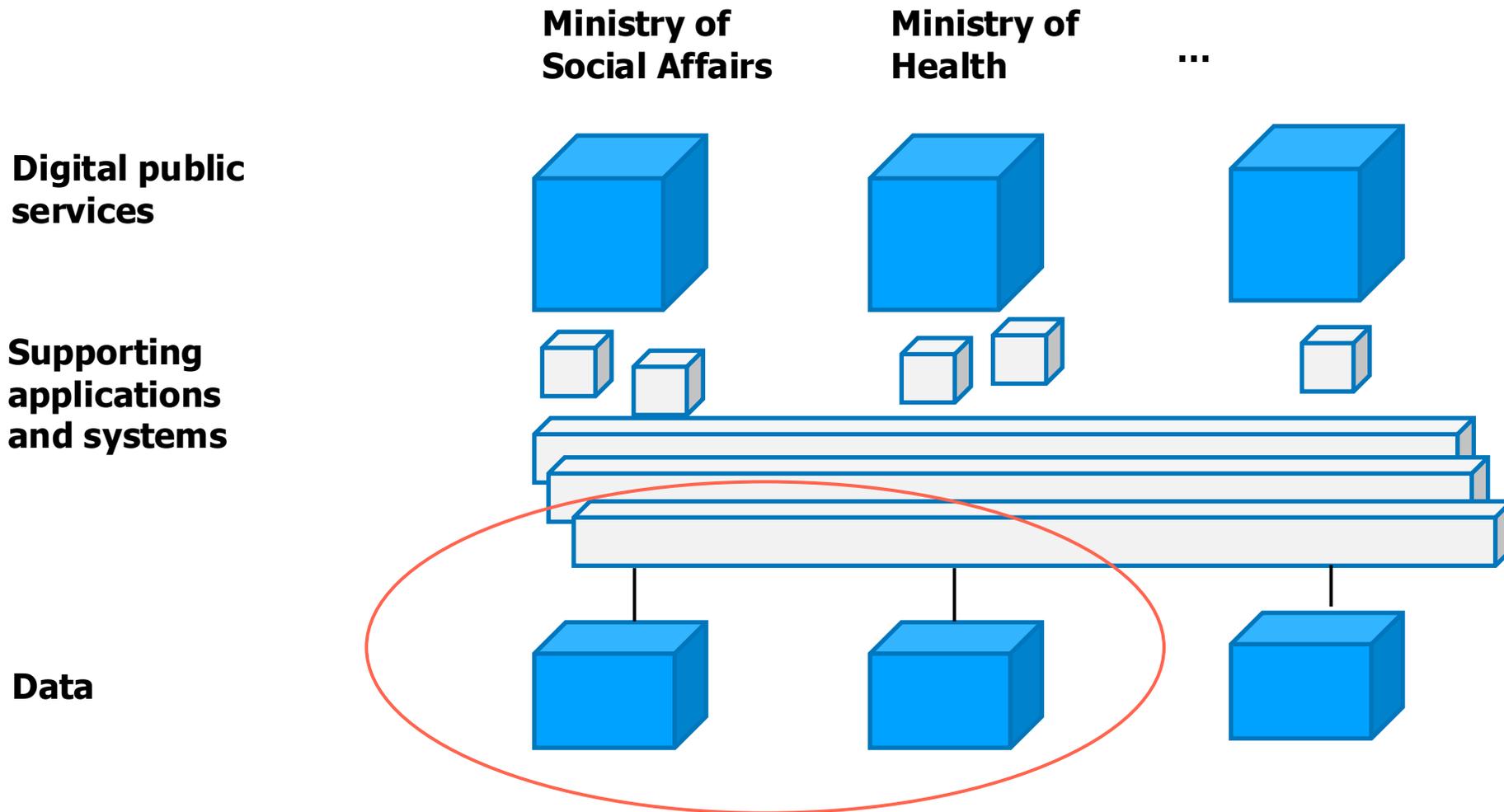
“Harder infra”

Servers,
compute
Connectivity,
electricity





Focusing on the DPI-led data sharing between orgs



Digital public services

Supporting applications and systems

Data

Data sharing in DPI: Bringing down the cost and complexity for sharing data (with necessary safeguards)

Scenario (Ministry of Health)

Chief Digital Officer

We need to make it possible for users to submit a request for government-assisted lower drug prices...

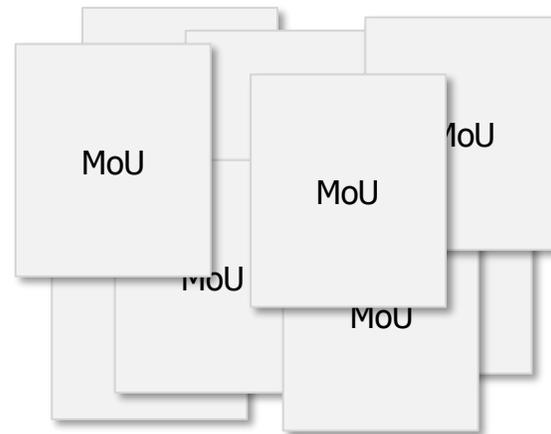
Product Manager

Hmm.. To do that we need data from the social authorities to confirm applicants are eligible for government assistance.

Chief Digital Officer

...Ah. Loop in the legal office, and contact the Ministry of Social Affairs to set-up meetings to develop and agree on the data-sharing MoU.

Business as usual



An MoU defines:

- What data is being shared
- In which format (JSON, CSV, etc.)
- How frequently is the data updated
- What is the specified use of the data
- Who are the authorized users
- Where is the data stored and how are access-control undertaken
- ...etc.

The DPI approach (simplified)

Define the technical architecture for data sharing

- Pooling (e.g. KROENET, South Korea)
- Direct (e.g. X-Road, Estonia or UGhub, Uganda)
- Decentralized (e.g. e-wallets, verifiable credentials)

Standardize, starting with the most shared data

- Semantic: Shared understanding of terminology
- Format: Data structure, schema's, standards
- Technical: Encoding and encryption for transfer
- Ethical and legal: Compliance, fairness, non-bias

Develop an **interoperability framework** (transforming MoUs into standardized blocks of code, Combined with regulation to ensure legal validity)

```
app.use((req, res, next) => {
  const requestingAgency = req.headers["agency"];
  if (!authorizedAgencies.includes(requestingAgency)) {
    return res.status(403).json({ error: "Unauthorized access" });
  }
  next();
});
```

Handhold first use cases, build capacity and scale



DPI introduces 'building blocks' (and data) that is shared



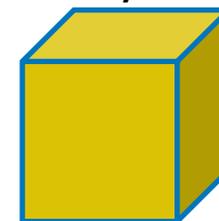
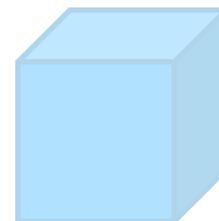
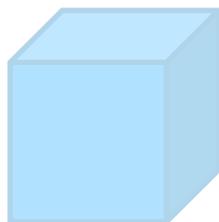
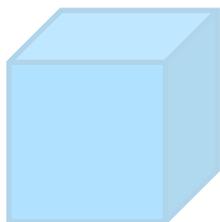
Ministry of Education

Ministry of Health

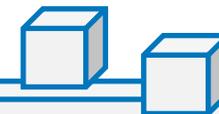
National tax/ revenue authority

Banks, insurance, telcos, delivery services, etc.

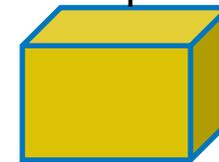
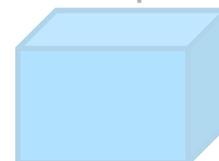
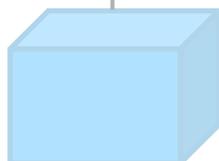
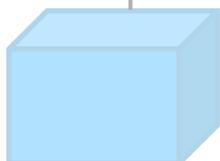
Digital public services



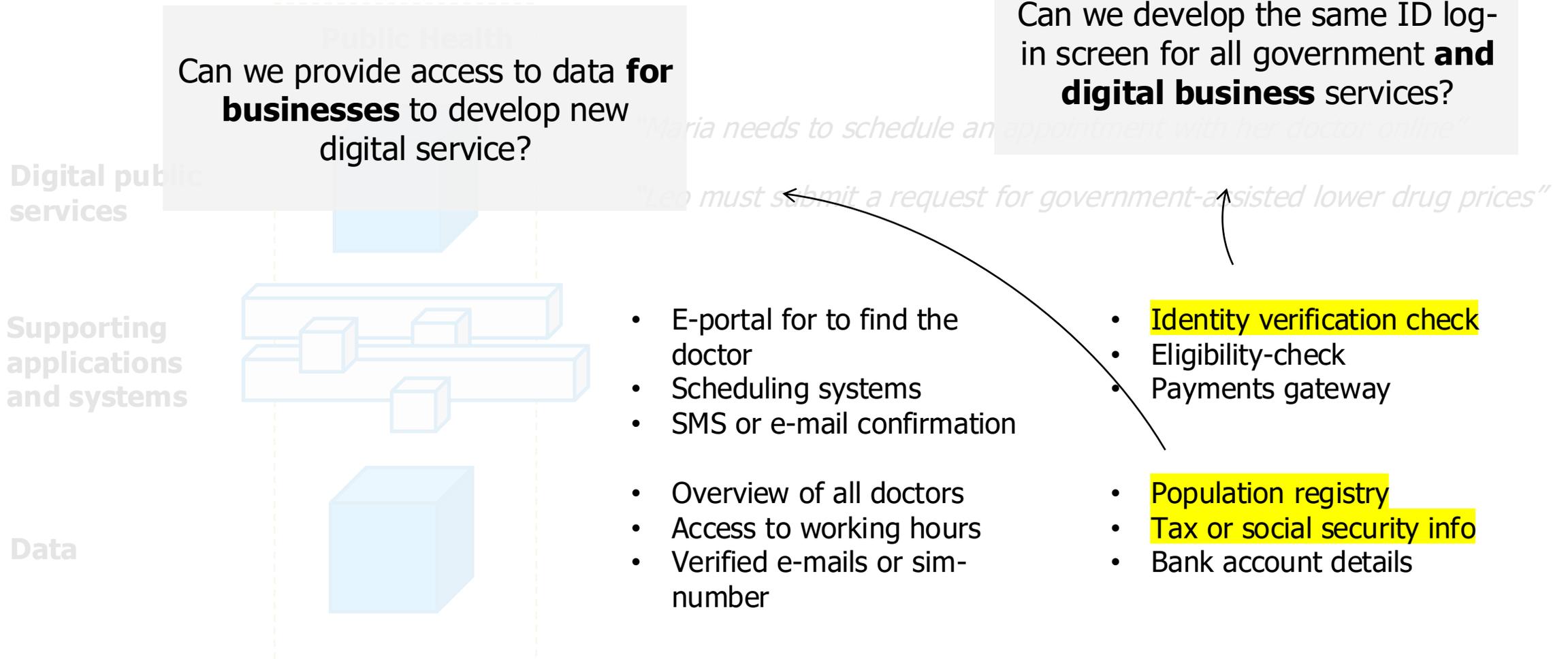
Supporting applications and systems



Data



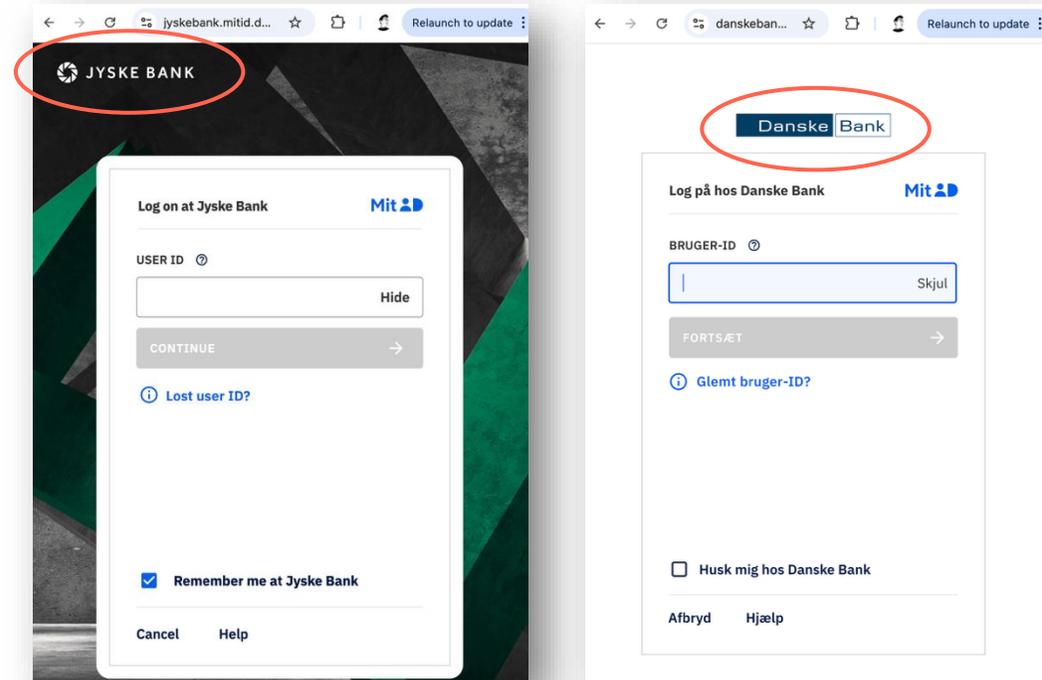
Shared 'building blocks' (and data)



Example of an open 'building block' in business

use
 MitID for 2-factor ID authentication and login to banking services
 (Denmark)

Can we develop the same ID log-in screen for all government **and digital business** services?

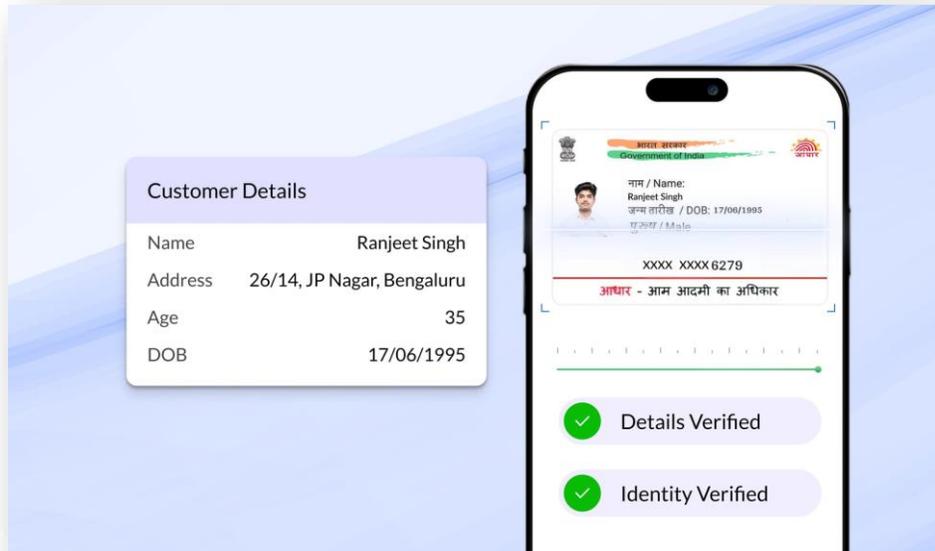


Banks, insurance providers, gambling sites, telco's, etc. use the digital identity login solution too

How do we scale data sharing to 1000s or 10.000s orgs, while ensuring it is safe and efficient?

India's DPI story

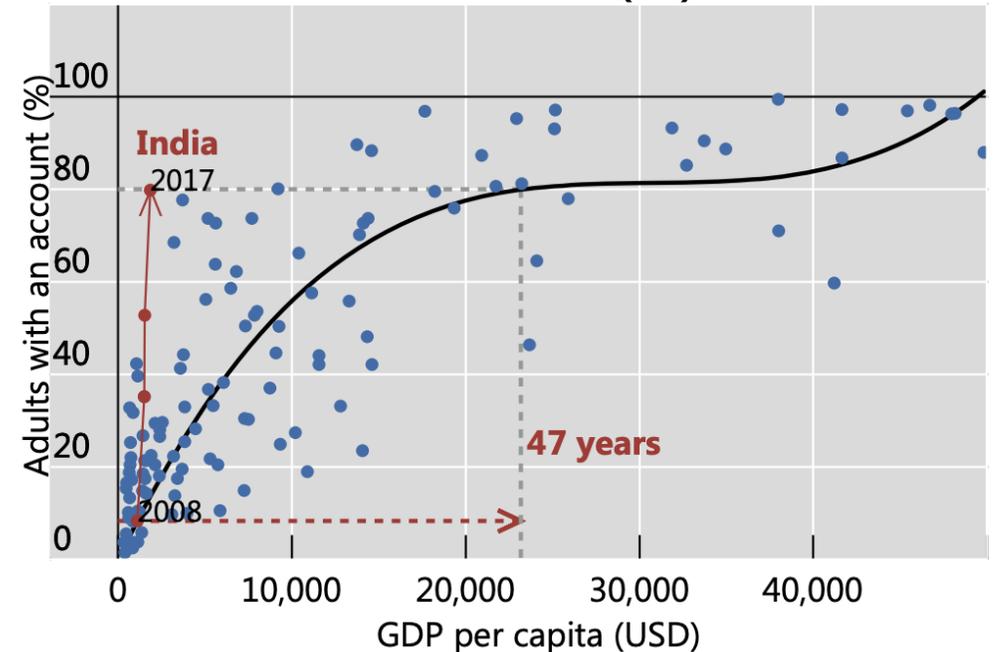
Reaping cost savings: The government estimates appx. \$29 billion USD have been saved in reducing fraud and leakage from government programmes due to uptake of digital ID.



Usage: 95-99% of India's are using the digital ID system (Aadhaar), 315 federal and 500 state-level schemes rely on system.

Boosting financial inclusion: In 9 years India to leapfrogged from 20 to 80% bank account penetration. Following a normal development trajectory, this would have taken 47 years.

Source: Bank of International Settlements (BIS)



Digital ID and data sharing eased identity verification and eligibility checks for better programmes targeting, reducing fraud. And it lowered banks' costs for eKYC, accelerating financial inclusion.

We are entering a new paradigm for how government use digital to service people and drive economic growth

E-government

Digital Government

Digital Public Infrastructure

Priority

Government designs and procures fully featured, end-to-end, "apps and platforms"
(developed and maintained by IT vendors)

Government leads on minimal "building blocks", interoperability and (mostly open) APIs.

Businesses, CSOs, etc. develops and run new services leveraging the DPI.

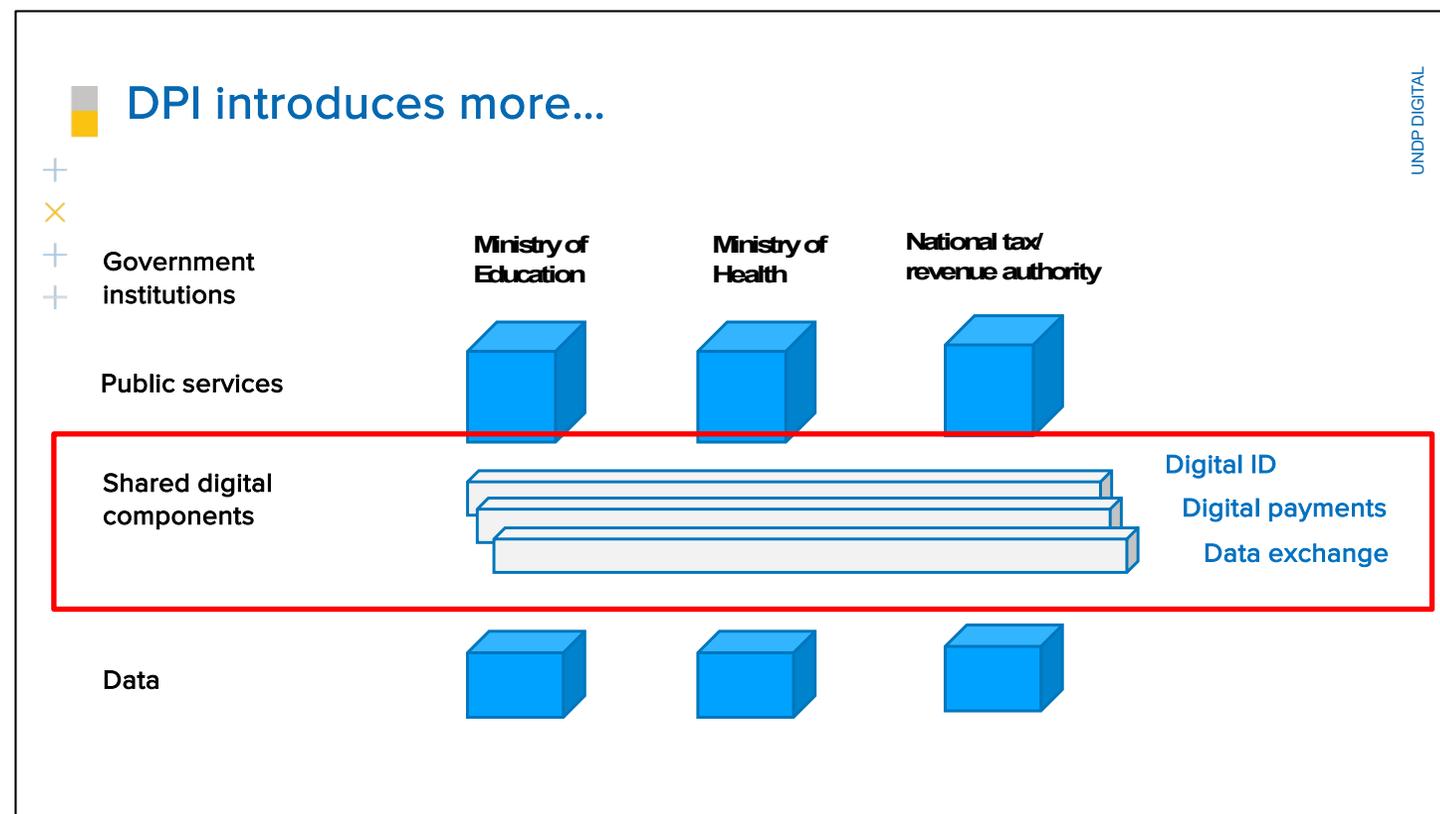
(2000 - 2010s)

(2010s - 2020s)

(2020s -)

Challenge: The shift in mindset away from silos

To succeed, stakeholders need to negotiate and respond to new questions related to shared governance of DPI



Who operates and maintains?

Who pays?

How is data privacy ensured?

What steps are taken to ensure inclusion?

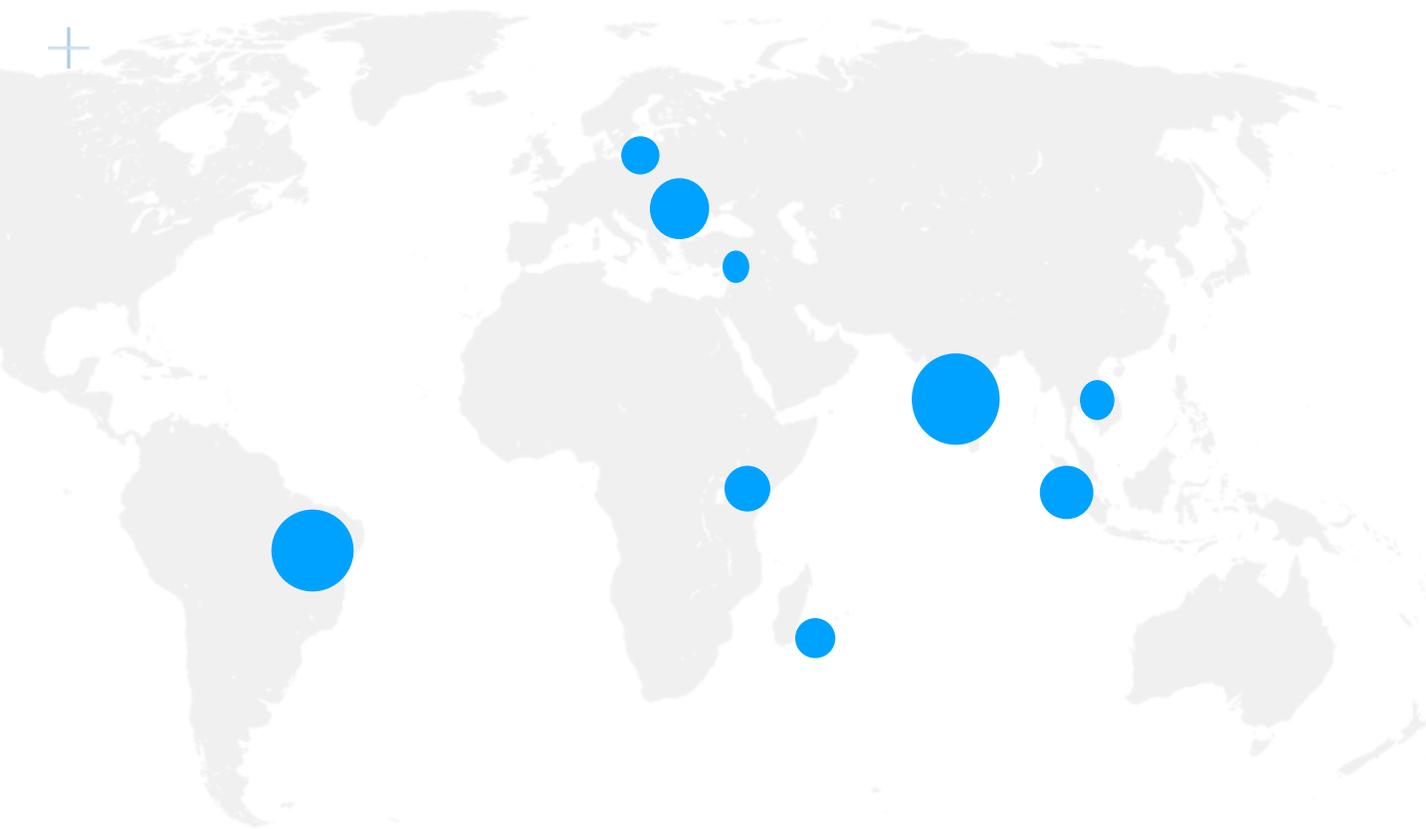
How is remediation handled?

Where is the connection between the DPI approach and digital public goods (DPGs)?

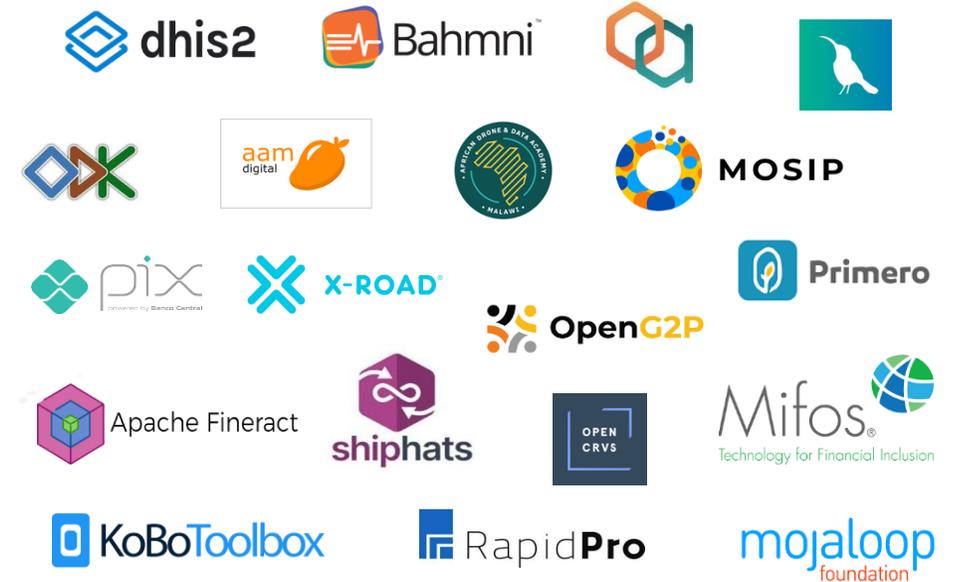


DPI is powered by building blocks including DPGs

Countries leading in DPI



Building blocks:
mostly DPGs or open-source,
sometimes proprietary solutions



Selected open-source solutions/DPGs powering DPI and cases of impact, from data exchanges to digital ID

 X-ROAD	Mauritius' data exchange	<p>Data exchange platform and citizen e-portal connecting 74 different government entities and providing +250 e-services to people.</p>	<p><i>Mauritius' data exchange is a DPI developed using X-Road, which is a DPG from Estonia</i></p>
	eGov Foundation (DIGIT)	<p>Urban government 'digital stack' implemented in +1.500 Indian cities, with +100 digital eco-system partners</p>	<p><i>DIGIT is DPI for cities and municipalities to deliver e-services (Sectoral DPI)</i></p>
 MOSIP	Digital ID in Philippines (Philsys)	<p>Open-source digital ID implementation underway in 7 countries, incl. in Philippines which issued eIDs within one year in pilot to 19 million people</p>	<p><i>Philsys is a digital ID system in Philippines, developed using MOSIP which is a DPG developed by IIITB in India</i></p>
	Open banking systems (Mifos)	<p>Open banking software for financial inclusion used in 56 countries, 500 institutions, reaching +20 million users</p>	<p><i>Mifos is a DPG that is one building block in a country's DPI, through its open financial infrastructure</i></p>

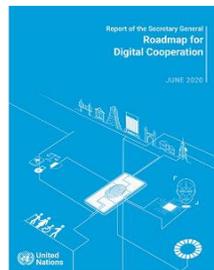


UNDP is co-leading the Digital Public Goods Alliance (DPGA) which stewards the DPG agenda

Global actors & processes



Digital Public Goods Alliance



(Local and regional) Implementers & supporters



Catalytic Partners



From the People of Japan



CO-DEVELOP



Tech stack & communities



X-Road® Community



Resources

DPI Safeguards (Resource Hub)

Center for Digital Public Infrastructure (wiki)

University College London – dpimap.org

A selection of UNDP publications



[Digital Public Goods for the SDGs-Case Studies](#)



[The Human and Economic Impact of Digital Public Infrastructure](#)



[Accelerating The SDGs Through Digital Public Infrastructure: A Compendium](#)



[The DPI Approach: A Playbook](#)

Thank you

