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Digital Public Infrastructure (DPI) playbook for nations

Unleashing their digital potential

Navigate the playbook

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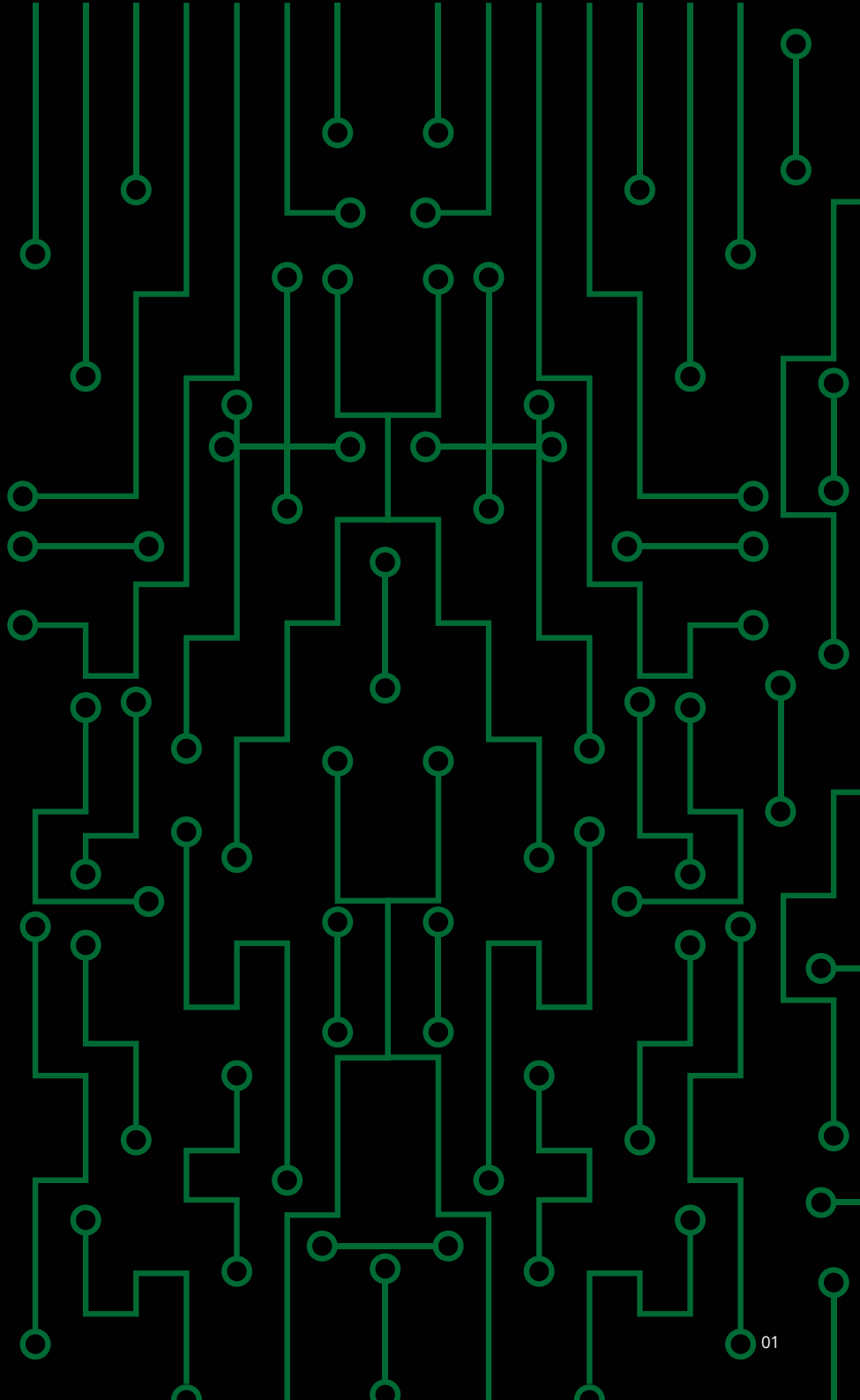


Leaders speak

Dr. R.S. Sharma
Distinguished Visiting Professor at IIT Kanpur
Former CEO, National Health Authority, Government of India

In our journey towards building a robust Digital Public Infrastructure (DPI) for our nation, we have witnessed remarkable strides in embracing technology and utilising it to address pressing challenges. The recent pandemic highlighted the significance of a resilient DPI, showcasing how existing digital systems played pivotal roles in our collective response. These digital platforms, including those for identification, payments, and data exchange, evolved into essential tools for the government, businesses, organisations, and individuals alike.

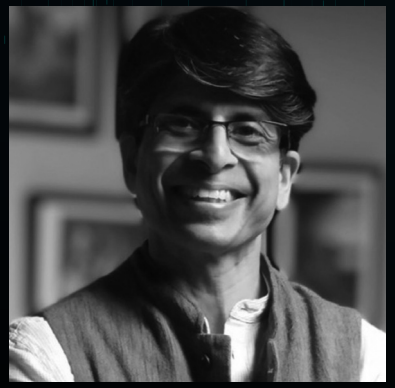
Over a decade ago, we embarked on a path to create a Digital Identity for each individual, a move that now stands as a foundational pillar of our digital landscape. This endeavour has grown to become an integral part of various processes, a testament to the concept of a plug-and-play model. Our unwavering focus on open standards, open APIs, and scalability has laid the groundwork for these digital public goods to seamlessly communicate across systems through standard APIs, enriching our digital ecosystem.

However, it is essential to acknowledge the challenges that accompany such transformation. Achieving widespread digital adoption, especially in remote and smaller settings, remains a hurdle. Simplifying user interfaces and ensuring ease of use for all stakeholders, including medical professionals and citizens, calls for continuous innovation. Striking the right balance between privacy, security, and customer engagement requires meticulous design, built around principles of minimal data collection, encryption, consent, and purpose limitation.

As we expand our focus, digital emerges as a critical realm that demands our attention. The lessons from the pandemic reinforce the importance of a robust digital backbone. Bridging the digital divide becomes vital and will serve as a resource multiplier as well.

I invite you to delve into the pages of this DPI playbook, which aims to illuminate the path forward, drawing insights from real-world experiences and lessons learned from our journey. As we progress, we stand united in our commitment to harness technology for the greater good, ensuring that the benefits of a robust and inclusive digital infrastructure reach every corner of the world.

Leaders speak



Dr. Pramod Varma
Former Chief Architect of Aadhaar and India Stack
Chief Technology Officer, Ekstep Foundation
Co-Chair, Center for Digital Public Infrastructure

Diversity is the cornerstone of India's identity. With a population of 1.4 billion, our nation's tapestry is woven with a myriad of cultures, languages, and perspectives. When looked at with the right lens, this diversity isn't merely a challenge; it is our greatest asset. As we navigate the digital age, this diversity necessitates an equally diverse array of solutions. This playbook, meticulously prepared by Deloitte, delves into the realm of Digital Public Infrastructure (DPI) and its potential to harness our nation's unique complexities for transformative change.

Having been part of the journey with Aadhaar, India Stack, UPI, Account Aggregator, DIKSHA, ONDC, and other crucial elements of our digital ecosystem, I stand as a witness to the power of Digital Public Infrastructure and Digital Public Goods. Our technological landscape forever changed when these foundations were laid in 2009. These were collaborative efforts, a coming together of brilliant minds and audacious ideas, that set the stage for India’s inclusive digital economy. The Digital Public Infrastructure is the backbone for progress—an avenue that entrepreneurs, innovators, and dreamers can build on to usher in a new era of possibilities.

As we navigate the pages ahead, consider this playbook not as a mere guide, but as a roadmap to shape a future where technology is an enabler, a bridge that closes gaps, and a force that uplifts every Indian. Let us embrace the opportunities that DPI presents, ensuring that no one is left behind in this digital revolution. Together, let us build, innovate, and create solutions as diverse as our nation.

Leaders speak

Mr. Shankar Maruwada
Co-founder and CEO of EkStep Foundation

In a rapidly changing, tech-driven world, Digital Public Infrastructure (DPI) has emerged as a transformative force. DPI, in essence, encompasses solutions and systems that deliver essential societal functions and services. It is an underlying infrastructure that supports public, private, and not-for-profit sectors' growth while preventing digital monopolies and safeguarding rights and freedom. This overarching perspective underscores the need for digital ecosystems built on open architectures, allowing for collaborative innovation, while preventing the pitfalls of vendor lock-ins and rigid proprietary solutions. Digital societies in the 21st century need digital public infrastructure in the same way that roads, rails, ports, airports, and telecommunication infrastructures powered developments in the 20th century.

As India's educational landscape grappled with the challenges brought about by the pandemic, our nation emerged as an exception with a successful DPI implementation. As the driving force behind India's transformative Digital Infrastructure for Knowledge Sharing, DIKSHA showcased unparalleled resilience. The playbook highlights key learning from first-hand experiences with DIKSHA, which was built on Sunbird, a set of open-source building blocks, initially created with philanthropic investments from EkStep Foundation. It sheds light on the amalgamation of well-structured policies, adaptable frameworks, and fundamental principles that can pave the way for a sustainable digital public infrastructure.

As the global education landscape evolves, this playbook can serve as a guide for cultivating inclusive, adaptable digital ecosystems. As I envision a future where technology is driven by collaborative open-source innovation, I appreciate Deloitte's endeavour to come up with a much-needed playbook for DPIs.

Leaders speak

Mr. Srikanth Nadhamuni
Founder CTO Aadhaar
Founder and CEO Khosla Labs
Chairman 10BedICU

In 2003, Nandan Nilekani and I started the eGovernments Foundation to create a suite of digital products to run a city municipality and deliver better services to its residents.

This was our first attempt at creating digital public goods at a local city level, through a suite of municipal e-governance products for financial accounting, property tax collections, civic works project management, etc. We learnt valuable lessons on taking digital solutions to governance-related challenges, which eventually led to the creation of the DIGIT platform and its implementation across cities over 20 years. Digital platforms improved decision-making, customer convenience, and service delivery.

This in some sense emboldened us to take up Aadhaar, India's online and portable national ID programme, to provide a unique ID to every Indian across sectors. Nandan was made the chairman of the programme, and I was asked to be the CTO and set up the technology centre in Bangalore. Aadhaar was our first national Digital Public Infrastructure (DPI) project, which would be the basis either technically or conceptually for many other DPIs that would follow.

What is Digital Public Infrastructure?
It is a set of digital building blocks or protocols with certain engagement rules, created as an open platform for the community, government, and industry (samaj, sarkar, and bazaar) to innovate and build on. When you create well-designed DPIs, such as Aadhaar, you see several solutions that emerge on the innovation platform.

What has Aadhaar achieved since its inception?

Enrolled 1.3 billion people
Reached 80 million authentications per day
Reduced the cost of KYC from INR 500 to INR 3 (from US$6 to 0.5 cents)
Enabled US$310 billion in direct cash transfers, making government spending more efficient and targeted. The Prime Minister's Jhan Dhan Yojana helped create bank accounts for 80 percent of the population in six years, which would have taken about 50 years to achieve

Identity, in a philosophical sense, is fundamental to our existence and a sense of who we are. From an administrative and delivery of services lens, it helps focus on individuals and not amorphous groups of people. This ability to uniquely identify and focus on each individual (even in a population of 1.3 billion) for delivering services was path-breaking and made possible through digital technology.

Like the internet and GPS (Global Positioning System) that set in motion a whole slew of innovations, the powerful underlying Aadhaar identity system also set in motion digital innovations or DPIs, including the following:

eSign – Aadhaar-based digital signature or eSign
DigiLocker – Verified and digitally signed store of documents and certificates with 140 million users. Stores Aadhaar, vaccine certificates, vehicle registrations, etc. UPI (Universal Payment Interface) – Performs 9.5 billion payment transactions/month, rapidly ushering in a cashless economy. AEPS (Aadhaar-Enabled Payment System) and APB (Aadhaar Payment Bridge) were responsible for delivering cash transfers to about 51 percent of the population during the pandemic. Cowin Helped deliver 2 billion COVID-19 vaccinations in two years.

The economic value that these DPIs can deliver is staggering. Studies have shown that they can move the GDP needle by 3 to 13 percent. More importantly, the ability of Aadhaar and digital technology to specifically target the economically backward classes can bring about true inclusion and overall development through our welfare programmes.

DPIs are making India a data-rich economy. This digital footprint can be used to harness and unbundle value for all sections of society. Data and flow-based lending can unlock loans for the underserved, many of whom were left out of the growing economy. Data, if used responsibly, can be a force for good and an asset, and not just a liability from a privacy and data protection perspective.

My experience at Aadhaar taught me that recognising diverse stakeholders, including governments, organisations, and civil society groups is crucial to the sustainable proliferation of DPI in the country. While governments bear the initial responsibility of setting standards and protocols, private-sector engagement and innovation is equally instrumental in accelerating adoption, solutions, and subsequent growth.

DPIs have become a hot topic of discussion at G20 this year. India is uniquely positioned to help the world imagine and implement DPIs to deliver on governance and growth and bring inclusion and equity. Our experience building these DPIs from Aadhaar to UPI can transform economies, scale them to billions of people, and deliver equitable growth.

Leaders speak

Mr. Romal Shetty
Chief Executive Officer
Deloitte South Asia

In an era marked by unprecedented technological advancements, we stand at the cusp of a monumental shift in the way societies, businesses, citizens, and government operate, communicate, and evolve. The rapid proliferation of digital technologies has reshaped all facets of our lives, created boundless opportunities, and redefined the contours of progress. As we navigate this journey, it is imperative that we lay the foundation for a Digital Public Infrastructure layer that can underpin and accelerate sustainable digital transformation, propelling us towards a future characterised by inclusive growth and economic development.

The concept of a Digital Public Infrastructure layer is not just a technical construct; it is a call to action, a clarion call for nations to come together and harness technology to create a solid framework upon which a thriving digital ecosystem can flourish. This framework will serve as the bedrock on which digital services, applications, and innovations can be built, fostering seamless connectivity, secure data exchange, and efficient governance.

At Deloitte, we firmly believe that the time is ripe for the government, industry, and academia to unite in a shared commitment to establish this critical infrastructure layer. It is through this collaborative effort that we can unlock the full potential of emerging technologies, such as AI, blockchain, and the Internet of Things, paving the way for enhanced citizen services, streamlined administrative processes, and a resilient and agile economy.

This endeavour is not without its challenges, and demands a comprehensive and holistic approach. By utilising the principles of openness, decentralisation, and inclusivity, we can forge a path towards digital empowerment that leaves no one behind.

The journey ahead is both exciting and arduous, but it is one that holds immense promise for our collective future. It requires concerted effort from policymakers, technologists, entrepreneurs, and citizens alike to shape a digital landscape that is sustainable, equitable, and prosperous.

On this journey to shape a resilient digital landscape, the DPI playbook will serve as a pivotal kick-starter kit, strategically redirecting governments, think tanks, industry champions and technologists towards a blueprint for DPIs with core design principles and a pragmatic building block approach, equipping countries with an essential launchpad to assess their existing DPI landscape. Ultimately, this DPI playbook will help nations orchestrate a collective response to an ever-evolving
digital paradigm.

Leaders speak

NSN Murty
Partner, Government & Public Services Consulting Leader
Deloitte India

We are thrilled to present this DPI playbook, a dynamic roadmap to guide nations on their transformative journey towards Digital Public Infrastructures (DPIs). Its multifaceted approach, meticulously crafted by experts, is designed to empower countries with the tools and knowledge required to navigate the complex terrain of digital transformation.

As you embark on your DPI journey, consider this playbook as your trusted companion. It outlines a clear path, offering step-by-step guidance on assessing your current DPI landscape. Government leaders, decision-makers at all levels, and digital champions will find invaluable insights to foster collaboration and effective governance structures.

Technologists, driven by a passion for problem-solving, will discover opportunities to contribute their expertise and shape the technological backbone of DPIs. Funders, seeking to drive socio-economic impact, will uncover strategies to support and finance DPI initiatives.

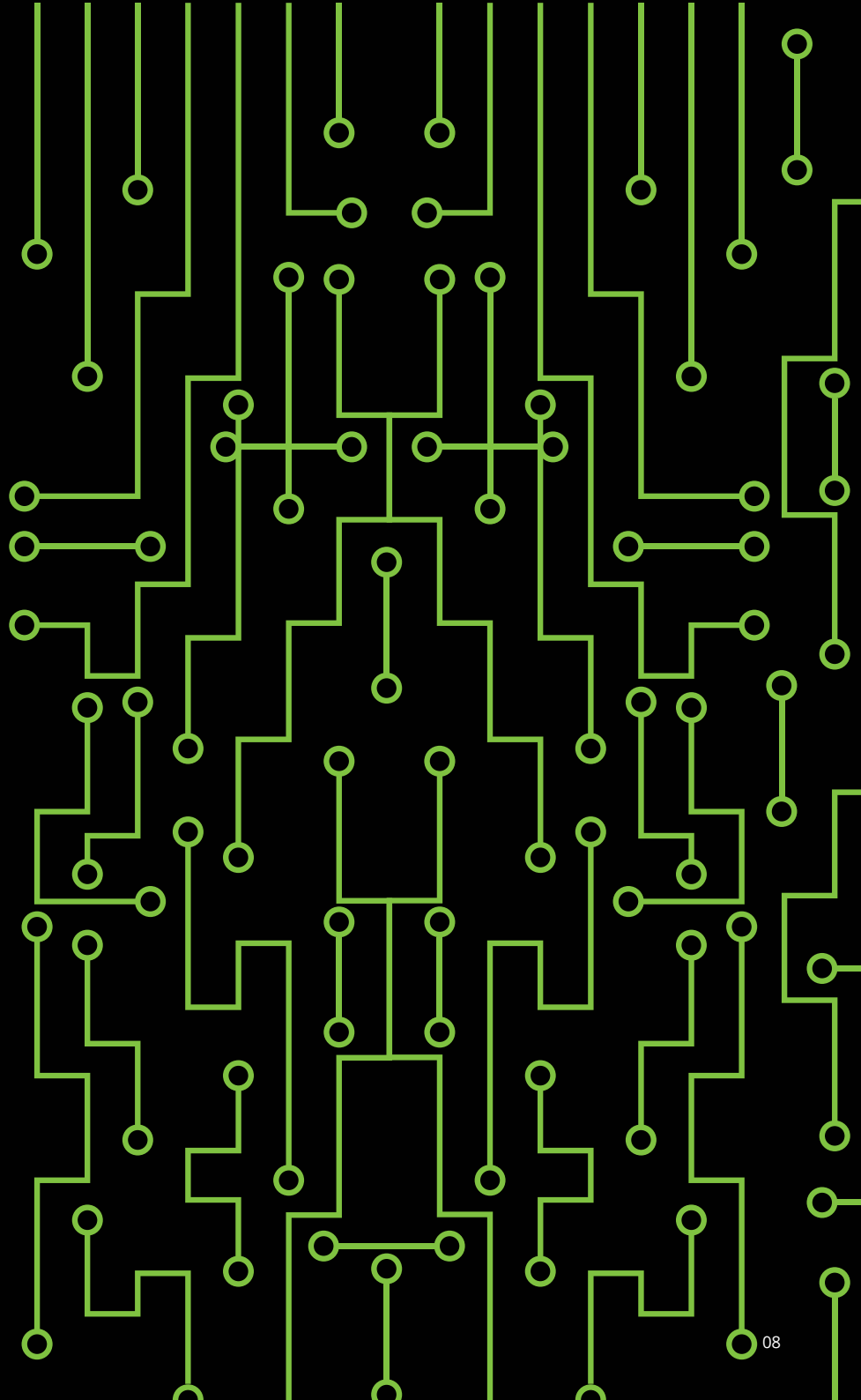
For international development agencies, this playbook offers a roadmap to aid nations in their digital evolution. Civil Society Organisations (CSOs) will appreciate its emphasis on digital inclusion, transparency, and citizens' participation.

Start-ups and entrepreneurs, take note: this playbook presents a canvas of innovation, where your solutions can align with DPI goals and become enablers of progress.

In essence, this playbook is a collaborative call to action, bridging borders and fostering inclusive growth. It is a catalyst for nations to chart their unique DPI roadmap, shaping a brighter, more connected future for all.

1

Purpose and scope



Purpose and scope of the playbook

This DPI playbook is a comprehensive resource designed to help countries understand, implement, and harness the potential of Digital Public Infrastructures (DPIs) to accelerate digital transformation while fostering inclusive and sustainable economic development. By delving into the intricacies of DPIs, this playbook highlights the role that such infrastructures play in enabling interoperability, scalability, and growth across sectors.

The primary purpose of this playbook is to equip countries with the tools and knowledge necessary to effectively assess their current DPI landscape. By conducting a thorough diagnostic analysis, countries can identify existing strengths, challenges, and gaps within their technological infrastructure. This playbook will enable countries to determine the required elements for a sector-agnostic DPI foundation.

A fundamental aspect of this playbook is the emphasis on key design principles and a building-block approach. By focusing on resource reuse and adopting a strategic and sustainable transformation strategy, countries can maximize the impact of their DPI initiatives. The playbook outlines step-by-step guidance, combining existing resources with new developments.

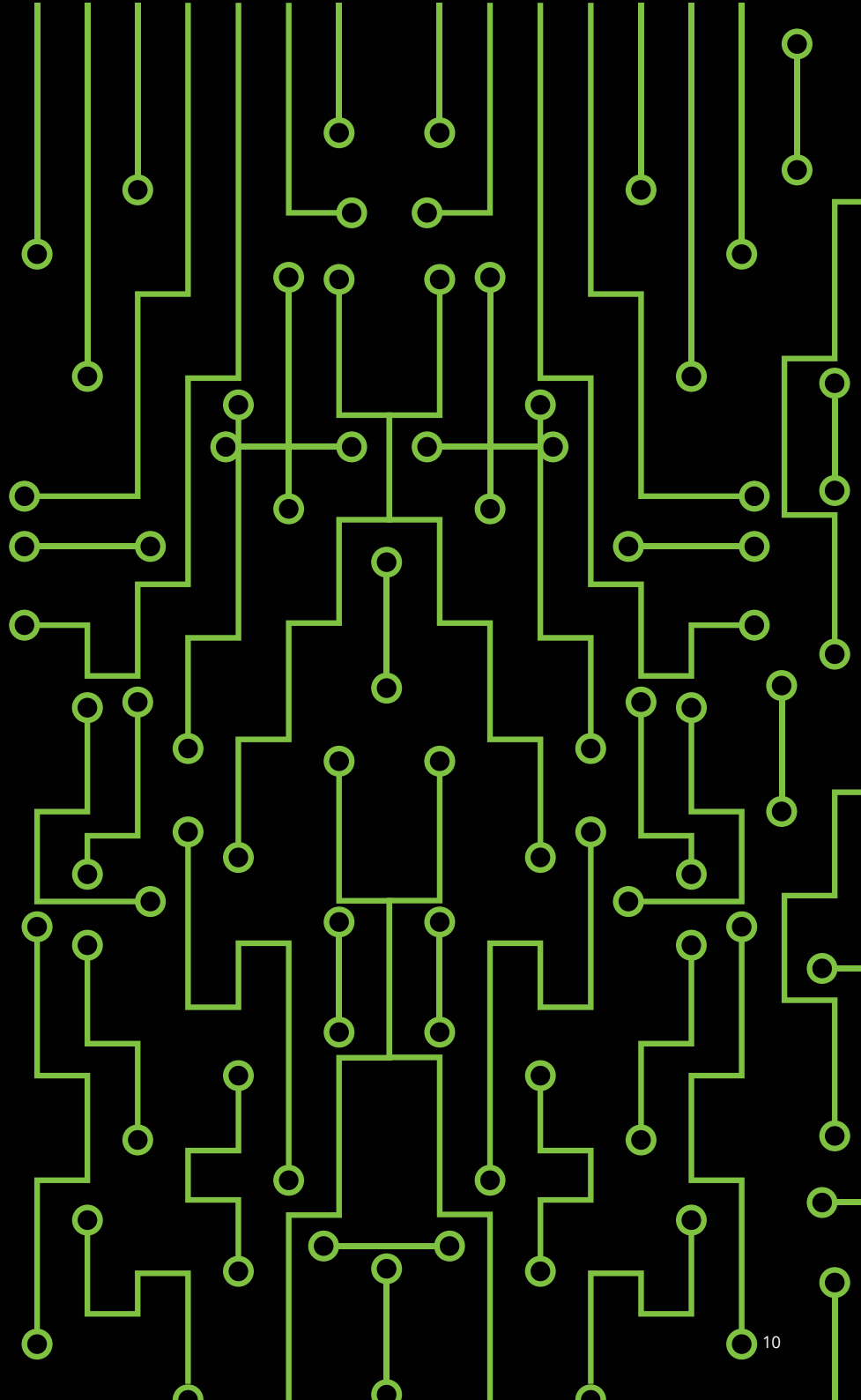
The playbook facilitates defining distinct goals and objectives for countries, placing digital inclusivity at its core. By doing so, countries can attain success, effectively advancing their prioritized DPI roadmap through policy interventions and stakeholder mapping, while aligning their ambitions with essential policy actions.

The playbook also attempts to address funding and outreach strategies, emphasizing the significance of securing financial support and engaging the right set of stakeholders and change managers.

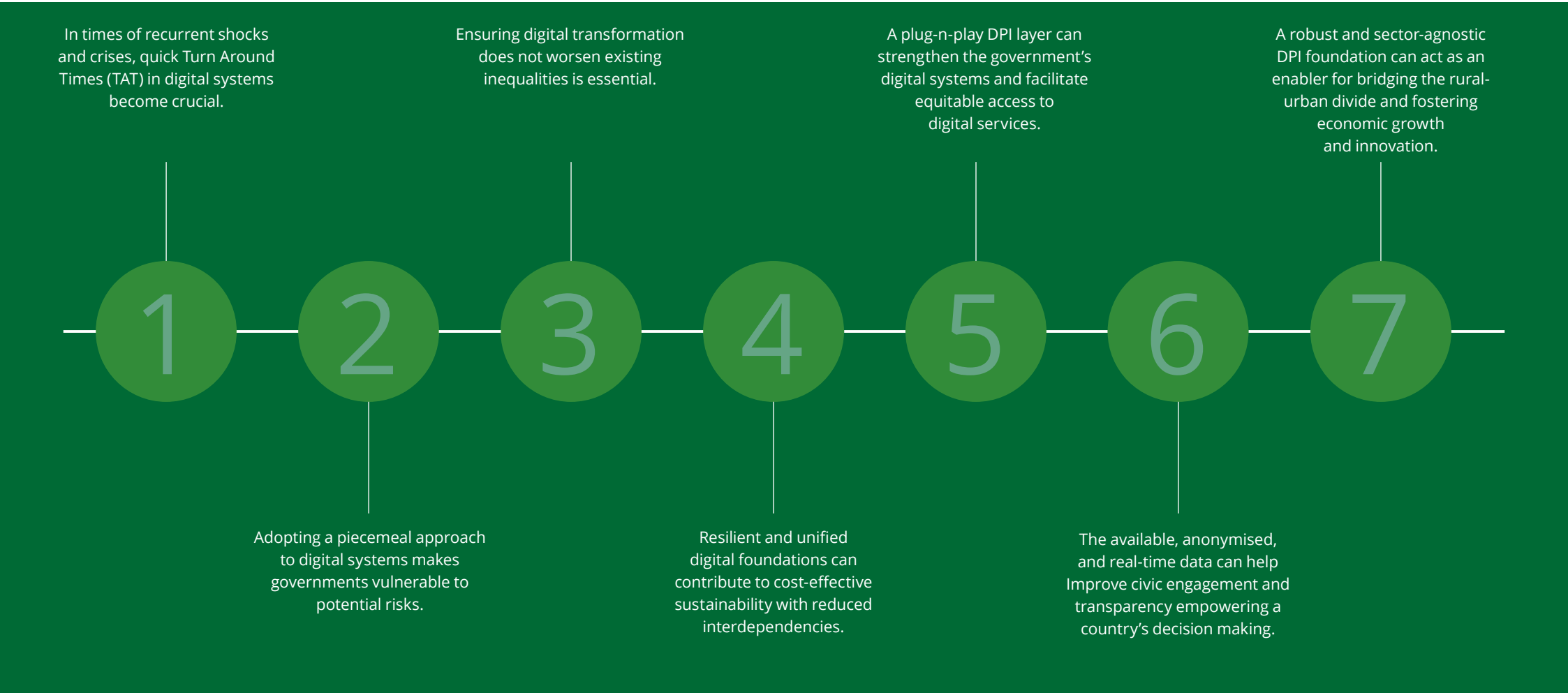
This DPI playbook acts as a call to action for policymakers and stakeholders who have been trying to define a DPI roadmap journey for their respective countries, solving for security and scale as a sustainable, affordable digital transformation strategy.

2

Understanding the context

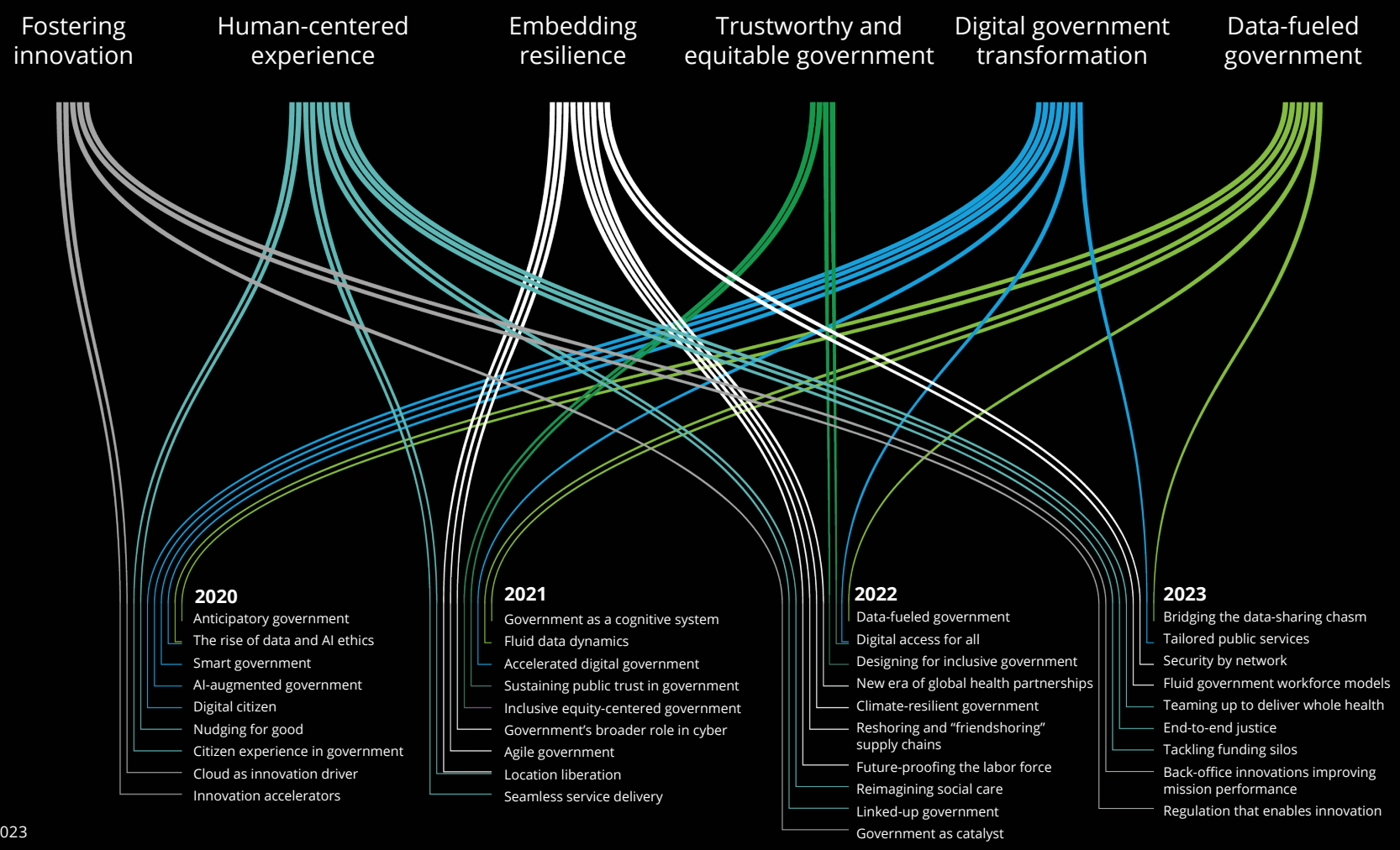


Resilient digital ecosystems: A catalyst for achieving sustainable development goals and inclusive development



Governments around the world are at an inflection point of digital transformation

Government trends evolution 2020-2023



Source: Deloitte – Government Trends 2023

Challenges to reach the other side of the inflection point

Inadequate infrastructure
Countries with inadequate infrastructure face challenges in providing reliable connectivity, high-speed internet access, and power supply for IT implementation. Globally, in 2018, there were 83 active mobile broadband subscriptions per 100 inhabitants, and the number was lower in developing countries and the least developed countries at 75, and 33, respectively.

Affordability and digital inclusion
High costs associated with IT hardware, software, and internet services can limit digital advancement. In Argentina, Colombia, Ghana, Guatemala, Paraguay, Peru and Rwanda, more than half the households limit their Internet use due to its costs.

Digital skills gap
Countries often face a shortage of skilled IT professionals who can drive technology initiatives and effectively manage IT systems. The percentage of the population with basic computer skills is 46 percent in developing countries and 65 percent in developed countries.

Cybersecurity
As countries embrace digital technologies, the risk of cyber threats increases. North America is the most impacted region, experiencing 33.5 percent of the total cyber issues reported, followed by Asia-Pacific at 23.5 percent, and Europe at 20 percent.

Interoperability and standardisation
The presence of restricted interoperability, such as a closed API, can act as a significant obstacle to entry into a market. In this scenario, a company would typically be required to provide users with a comprehensive range of services offered by the dominant player to effectively compete with their closed system.

Digital governance and policy
Creating frameworks for data governance, digital identity management, and open data initiatives can be complex tasks for countries. Out of 166 countries, 24 percent government organisations were classified as digitally advanced, delivering against transformation-focused digital initiatives.

Scalability and sustainability
Digital technologies are responsible for 3.7 percent of global Green House Gas emissions. Implementing IT solutions at a national or large-scale level requires careful planning for scalability and long-term sustainability.

Privacy and data protection
As digital technologies collect and process vast amounts of personal data, ensuring privacy and data protection becomes crucial. Only 137 out of 194 countries had implemented legislation to secure data and privacy.

Vendor lock-in and dependency
Over-reliance on a single technology vendor or proprietary solutions can limit flexibility, competition, and hinder innovation. Over 80 percent enterprises expressed notable levels of apprehension regarding being locked to a single public cloud platform.

Integration of emerging technologies
The adoption of emerging technologies, such as AI, blockchain, Internet of Things (IoT), and cloud computing presents both, opportunities and challenges. Approximately 89 percent companies, are facing significant obstacles in integrating new technologies and solutions, which is impeding their efforts towards digital transformation.

Source:
https://unctad.org/system/files/official-document/tir2020_en.pdf
UNCTAD based on ITU (2018, 2019)
https://www.idgconnect.com/article/3674314/which-countries-and-industries-are-suffering-the-worst-cyber-attacks.html
https://one.oecd.org/document/DAF/COMP/WD(2020)89/en/pdf
https://www.gartner.com/en/newsroom/press-releases/2021-10-26-gartner-survey-finds-more-than-half-of-digital-govern
https://www.elastic.io/enterprise-application-integration/legacy-system-integration/
https://theshiftproject.org/wp-content/uploads/2019/03/Lean-ICT-Report_The-Shift-Project_2019.pdf
https://unctad.org/page/data-protection-and-privacy-legislation-worldwide
Stratoscale Survey
MuleSoft Report

Building resilient nations: An introduction to digital public infrastructure

What is digital public infrastructure?

Often touted as "digital rails" of the 21st century, DPI, as a concept, is still evolving. However, it consists of three main pillars as follows:

Interoperable, open tech-standards, protocols and software solutions that enable access to day-to-day digital services for citizens.

Facilitative governance mechanisms and policies

A vibrant business ecosystem consisting of developers and system integrators

Key tenets of DPIs

- Inclusive
- Foundational
- Interoperable
- Publicly accountable
- Privacy by design
- Scalable

How to imagine a Digital Public Infrastructure?

The user is here

App layer

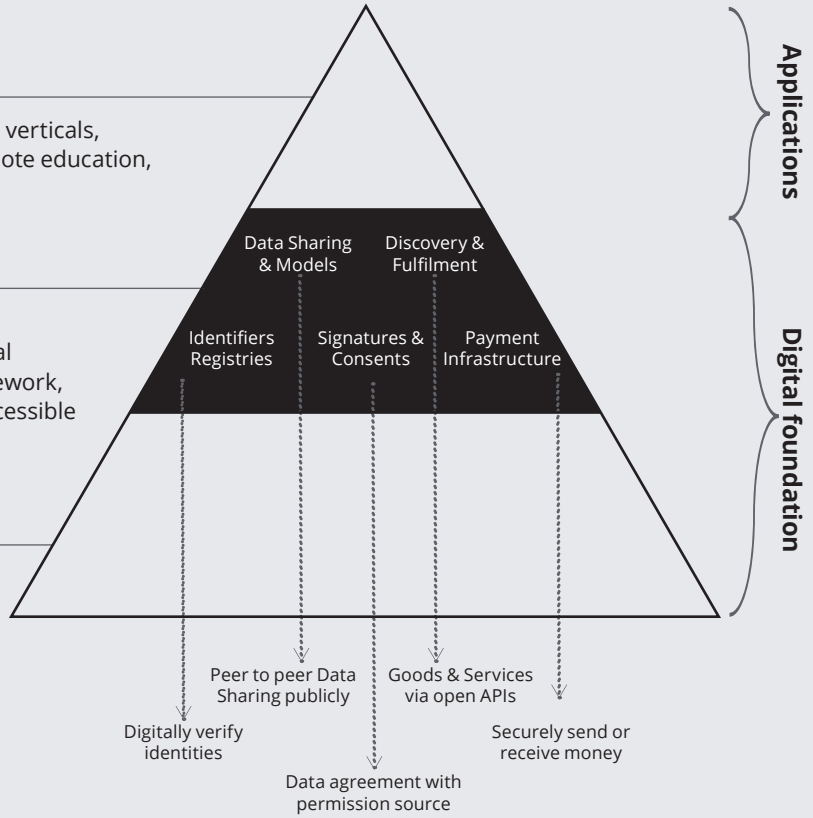
Information solutions for various verticals, e-commerce, cash transfers, remote education, telehealth, etc.

DPI layer*

The connecting sector-agnostic intermediate layer contains digital building blocks (standards, framework, solutions) to build a common, accessible DPI layer

Physical layer

The physical layer includes the physical infrastructure required (connectivity, devices, servers, data centers, routers, etc.)



*Source: https://docs.cdpi.dev/dpi/readme

How can DPIs take nations...

Digital exclusion and disparity
Unequal or limited access to services, leaving certain segments at a disadvantage

Fragmented citizen experience
A fragmented and restricted citizen experience

Digital silos
Siloed data ,services, functions and systems running in parallel

Broken service delivery
Inefficient and opaque digital public services

Piecemeal digital transformation
High development cost and time

Intuition-based decision-making
Limited data availability

Red tapism and vulnerability
Inaction, fragility, neglecting challenges, unpreparedness

...to the other side of the inflection point?

Digital inclusion and empowerment
Universal access to services across all segments

Unified citizen experience
Reducing fragmentation of services and service providers

Digital backbone
Plug-and-play, reusable sector-agnostic, interoperable digital building blocks.

Enhanced service delivery
Efficient, transparent digital public services enabled

Fast-tracking digital transformation
Reduced design and development cost and time

Data-driven decision-making
Availability of data across government services and value chains

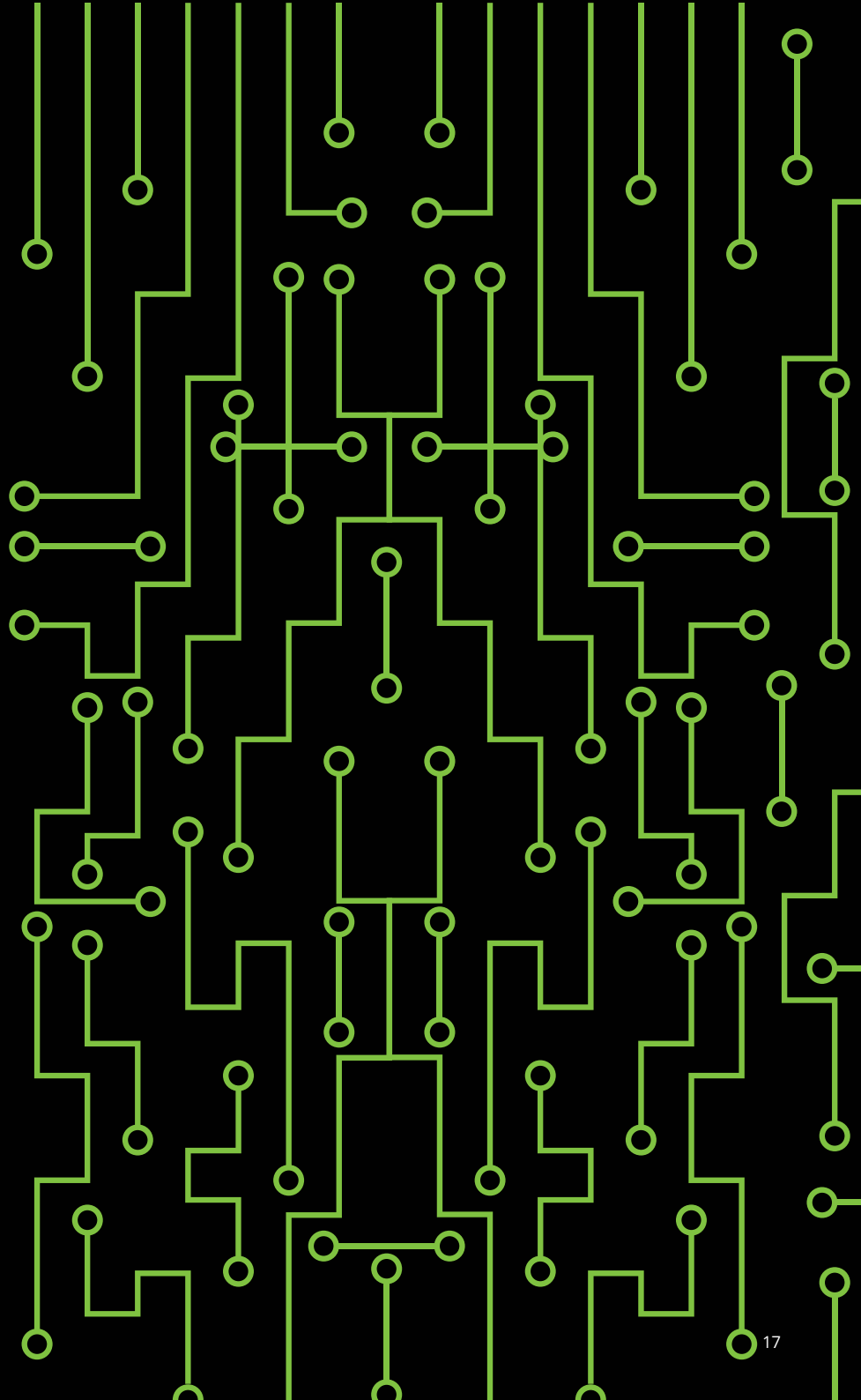
Crisis response and resilience
Rapid resource mobilisation through DPI

A world with DPIs: Mapping a citizen's life experience with Digital Public Infrastructure

	Birth to early childhood	Primary education	Secondary education	Higher education	Early career	Mid career	Retirement
Without DPI	Riya is born in a small town with limited health care facilities.	Riya starts primary school but lacks access to quality educational resources	Riya's secondary education might be marked by a lack of a wide variety of digital resources and tools.	Riya needs to undertake travel to different campuses for admissions and examinations. Collaborating with peers from diverse locations becomes challenging.	Riya desires to upskill and stay relevant in a rapidly changing job market.	Riya could face challenges in accessing government services, pension information, and health care benefits and face bureaucratic delays.	Riya reaches retirement age and seeks to manage her health care needs and insurance coverage effectively.
With DPIs	Maternal and child health apps provide Riya's parents with essential information and guidance on childcare. Digital health records enable accurate and accessible medical records for him, ensuring continuity of care.	Interactive educational apps on DIKSHA improve Riya's learning experience and engagement. Digital learning centres equipped with computers and internet access ensure that Riya can easily access DIKSHA's educational resources.	She gains access to academic databases and interoperable online learning platforms. Collaborating with classmates and students from around the globe becomes effortless through video conferencing. Virtual internships and apprenticeships become viable options, expanding her exposure to practical skills and real-world scenarios.	DPI empowers Riya during higher education by providing an online one-stop application process for multiple colleges where he can directly upload certificates from Digilocker for universities, saving time and resources.	Virtual collaboration tools and e-learning platforms support Riya in continuous learning and knowledge sharing.	DPI ensures Riya's mid-career phase is smoother. She can access government services online, manage her pension digitally, and access her health records seamlessly. This empowers her to focus on her career growth and personal well-being	Riya utilises a digital health app which not only allows her to securely access her health records, schedule appointments, and communicate with health care professionals online but also access information on insurance providers. The insurance marketplace is also integrated with the government's digital health record systems, which allows Riya to compare and purchase various insurance policies, such as health insurance and retirement plans, tailored to her specific requirements.

3

From theory to practice: Applications and case studies



Why a country needs a technology foundation layer which is sector-agnostic, reusable, and globally applicable

Understanding and designing reliable digital public infrastructure is key to ensuring governments meet their development goals and transform the way we connect and work while weathering major global challenges.

Countries require a technology foundation layer that is sector-agnostic to foster innovation, efficiency, and inclusivity in their digital landscape. By establishing a versatile and adaptable technology infrastructure that transcends specific industries or sectors, they can create a cohesive and interconnected digital ecosystem.

A sector-agnostic foundational layer can enable the co-creation of digital services and encourage digital adoption. Interoperable technologies, coupled with privacy by design, applicable laws and best practices, can be reused while lowering costs and creating opportunities for citizen-centric needs.

For example, DIVOC a DPG from India was used to generate secure and verifiable COVID-19 vaccination certificates in various countries, such as Sri Lanka, Jamaica, and Indonesia. It enabled a vaccination credentialing backbone for diverse countries working with an existing DPI block and supported trade and borders openness amidst the pandemic in a timebound manner.

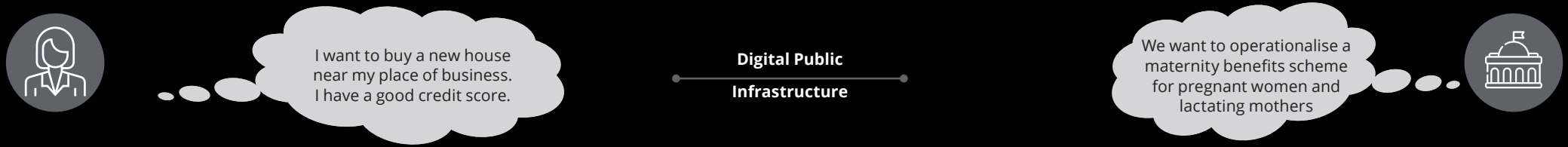
Co-Win is a great example of a DPI that is powered by DIVOC, a Digital Public Goods offering with reusable open-source building blocks to solve for scale and urgency, thus contributing to resilience.

Features of a well-structured DPI

- **Interoperability:** A standardised framework and common infrastructure that allows different sectors, such as healthcare, transportation, education, and finance, to seamlessly connect and exchange information
- **Efficient and cost effective:** Avoid duplicative efforts and redundant infrastructure development. DPI promotes resource optimisation by leveraging a common digital infrastructure for multiple sectors
- **Flexible and adaptive:** Allows for the integration of new services, applications, and technologies without significant reconfiguration or rebuilding of the underlying infrastructure keeping pace with evolving requirements and advancements
- **Effective and proactive governance:** Framework outlines, regulations, and standards that entities operating within the digital ecosystem must adhere to
- **Cross-sector collaboration:** Promotes collaboration and information sharing among different sectors. It facilitates the exchange of best practices, knowledge, and insights, enabling cross-sectoral innovation and problem-solving.
- **A citizen-centric DPI:** Adapts to local needs, ensuring intuitive and inclusive digital services for efficient local service delivery ecosystems
- **Scalable:** A foundation that can accommodate the growing demands of different sectors and scale up to support increasing volumes of data, transactions, and users

What will the envisioned DPI foundational layer look like?

How can the same common infrastructure work for different sectors, users and purposes?



1	I locate a lending institution on an interconnected open network for lending enabled by the government	Discovery and fulfillment	We set up a decentralised open health network to enable free access to health services, appointments, and drugs by eligible beneficiaries
2	I approach a lending institution where my identity is verified via a unique ID registry	Identity and registries	We set up a beneficiary registry with linked bank accounts and a verification mechanism integrated with the RCH/MCH system
3	I share/access my credit score and financial history through an account aggregator framework, which indexes my records and allows secure access to the lending institutions	Consented Data Sharing	We link and index medical records of different maternity and women's schemes with beneficiary consent via the account aggregators framework
4	The bank approves my request for a loan and instantly transfers the amount to my bank account	Digital payment infrastructure	We directly transfer financial benefits to the linked bank accounts of the uniquely verified eligible beneficiaries
5	The associated documents can be e-signed by the bank and can be accessed digitally	E-signature	All authorisations, reports and compliance documentation can be e-signed by the respective authorities participating in the scheme

*Note – The DPI blocks mentioned in this slide are illustrative and not comprehensive, as countries may have unique requirements and may need unique DPI blocks

How do I assess which DPI blocks my country needs?

Software and standards are open to contribution and use, welcoming anyone, regardless of their location to share and reuse, thereby benefiting a diverse array of individuals. When developing these foundational elements, prioritising the ecosystem is crucial, such that everyone can engage and collaborate in crafting solutions for collective benefit.

The DPI approach has been embraced by numerous countries worldwide, manifesting in various forms and formats, rooted in the same fundamental principles and building blocks. DPI inherently embodies openness, accessibility, and inclusivity, requiring only minimal capital commitment.

To evaluate the suitability of these building blocks in any given sector, addressing critical questions is of utmost importance.

01 What are the sector-specific needs and pain points? What is the country's long-term vision for the sector?

02 What purpose will the DPI solve? What services does it aim to provide?

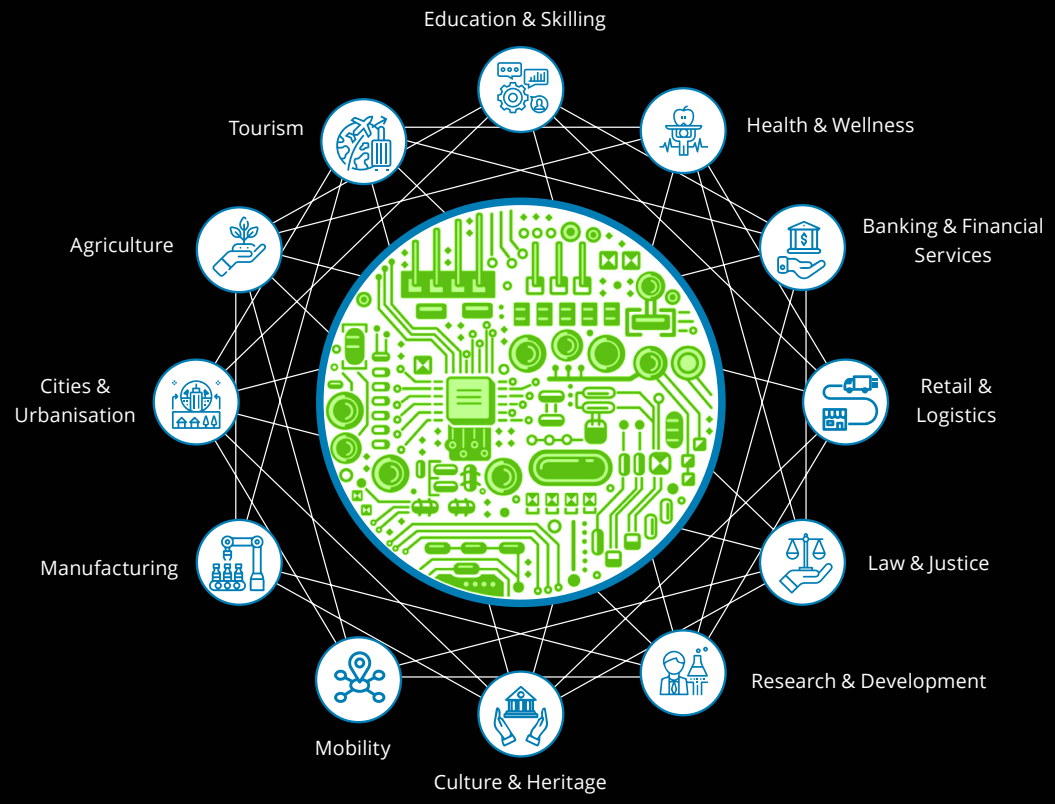
03 What does the ecosystem look like and who are the participants?

04 What is the degree of technology penetration in the sector? Will all participants be able to regularly use the solution

05 What would the governance mechanism be? Who will be publicly accountable for the entirety of the solution?

06 What is the funding landscape and who can be potential partners?

Embrace reusability: A building block approach that is reusable and common across sectors



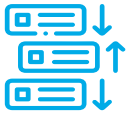
* This is an indicative list of sectors and not exhaustive

The next steps...

Once the need for DPI in a sector is established, it is important to plan the next steps

Strategise

Create a sector DPI architecture blueprint or strategy identifying the core building blocks and the sector-specific building blocks, security and privacy standards, trust infrastructure and data exchange mechanisms. Establish which building blocks are already available and what needs to be created at this stage.



Consult and prioritise

Stress test the strategy via multi-sector consultations and coordination with country-specific stakeholders, citizens, multilateral organisations, and DPI groups. Harbour stakeholder feedback and define a DPI policy blueprint and execution roadmap per national priorities and sector readiness on MVP for developing a digital backbone.

Institutionalise and create urgency

Institutionalise the idea by establishing a driving workforce that can spearhead, engage, support, monitor, and remove roadblocks.

Communicate the urgency and engage right from the bottom to the top to drive real impact and seed change management.

Assess and build

Assess existing building blocks, what can be adopted from another country and the DPI ecosystem, and what may need to be built. Build and adapt DPI building blocks in an agile, iterative manner with room for stakeholder consultation, pilots, and course correction like a game of **"Lego blocks".**

Launch and manage change

Enable a three-phase approach for launch and adoption—**voluntary; incentivise; penalise,** powered by awareness, capacity building, early wins, pilots, and change management.

Monitor progress and enable course correction.

Putting the puzzle together: Reuse what is available, build missing pieces

A building block is a package of functionality defined to meet one or more business needs, it is interoperable in nature and can be reused independently or can be plugged in with other digital solutions or building blocks enabling a seamless business workflow. A sector-agnostic building block is usually highly configurable and can be contextualised to multiple use cases and contexts, making them reusable at scale. Each building block can also form the basis of a "digital public good" that can be used by any entity with the capability to be combined to address specific developmental challenges. There are two ways of building a DPI layer – use or build proprietary building blocks which may raise the cost of transformation, create vendor lock-ins and may thus affect long-term sustainability. An alternate way is to reuse DPGs or open-source solutions, software, protocol, standards and specifications to build the DPI layer thus solving problems of security and scale while also enabling cost-effectiveness, reducing dependencies on external factors/vendors and facilitating long-term sustainability.

Several forward-thinking countries have taken significant strides in creating digital public goods that are readily available for reuse and benefit the global community. These digital public goods

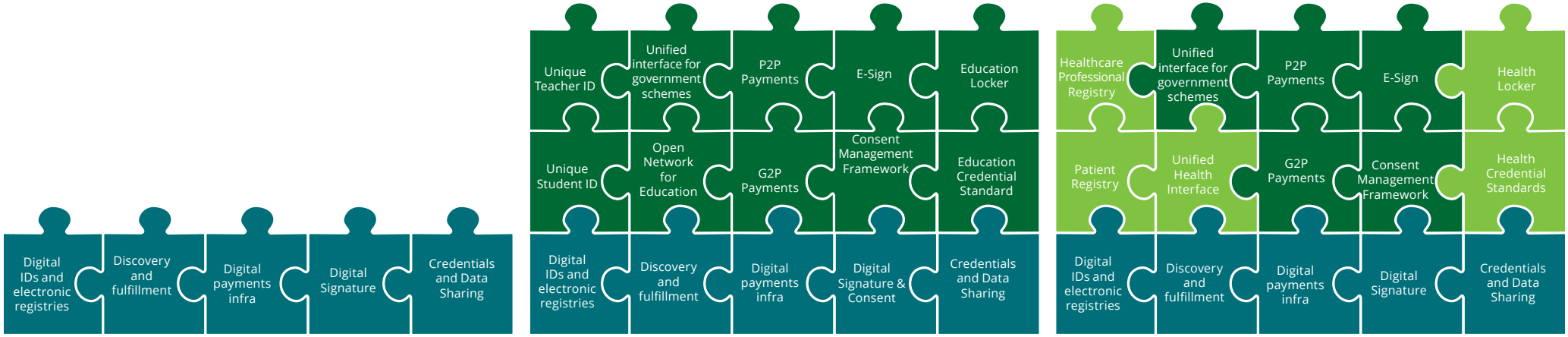
By investing in and fostering these shared assets and repurposing them for your country's needs like a Lego block in the DPI layer development can fast-track a country's DPI journey for building a sustainable digital backbone. The analogy that works best for this approach is "putting a puzzle together"—reuse what is available and only build what couldn't be found or is a niche to the country's requirements, culture, and economics.

The DPI movement only encourages the reuse of what is already available and building of missing components. As illustrated below, if a country has the primary building blocks, they can build on this base to come up with a digital public infrastructure for skilling and education. These building blocks can be further used to create and expand to a health DPI. A parallel in this regard can be drawn with construction of a building: bricks, doors, window frames, each is a type of building block that serves a particular purpose, but they can be used in a variety of projects from a house to an office building. Additionally, they compound in value when they are combined to create downstream solutions.

Digital building blocks have four important characteristics:

- They are autonomous and provide a standalone, reusable service
- They have generic capabilities and are flexible across use cases
- They are interoperable and interact with other building blocks through specified protocols
- They are evolvable to suit the solution and context.

Putting the puzzle together: Reuse what is available, build missing pieces



Foundational building blocks
Create individual basic blocks to build a foundation

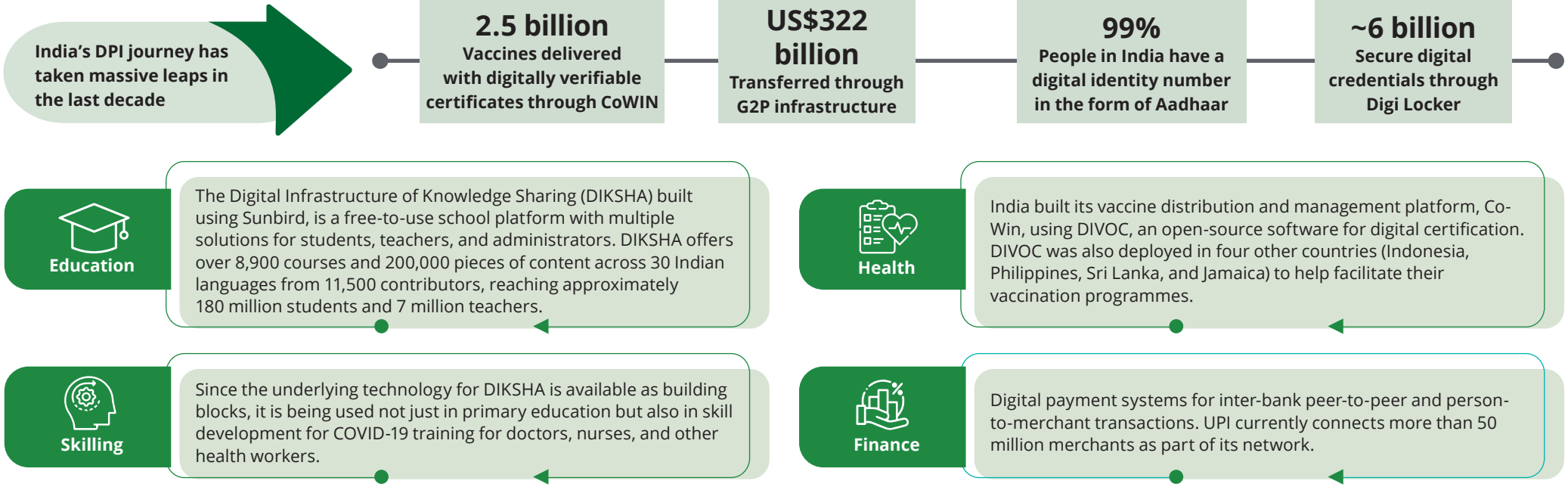
Education DPI
Use existing foundational building blocks, contextualise them, and add more sector-specific blocks as illustrated

Health DPI
Reuse the architectures already built and contextualise them to apply to any sector

Source: https://docs.cdpi.dev/dpi/readme

Deriving inspiration from countries who have implemented DPIs

India's DPI story



Other areas of DPI intervention

- ONDC: Open Network for Digital Commerce built using Beckn protocol
- Namma Yatri: first open network mobility application for multi-modal services without middlemen
- Bhashini: AI-led language translation platform built using Sunbird and AI4Bharat
- National Urban Stack built using DIGIT
- Account aggregator framework built on DEPA to enable secure transfer of financial data

Source: https://www.elibrary.imf.org/view/journals/001/2023/078/article-A001-en.xml#A001fig06
https://ekstep.org/
https://sunbird.org/
https://divoc.egov.org.in/
https://becknprotocol.io/

e-residency DPI initiative in Estonia

Abstract

Estonia has gained recognition for its advancements in technology and its innovative proposals in the field of regulations and institutions.

It has also made significant progress in developing one of the most effective electronic government systems globally.

The e-residency programme stands out as a crucial flagship DPI initiative that positions Estonia on the international stage.

After successfully completing the e-residency process, an individual will receive an ID card that consolidates various functions, including the ability to conveniently manage tax information and perform online tasks in one place.

While the e-residency ID card does not grant physical travel privileges, it provides the same rights and opportunities as any other digital business operating in Estonia.

Reinvented way of doing business

Run businesses from anywhere in the world with **round the clock** and remote access to government e-services with a **digital ID**

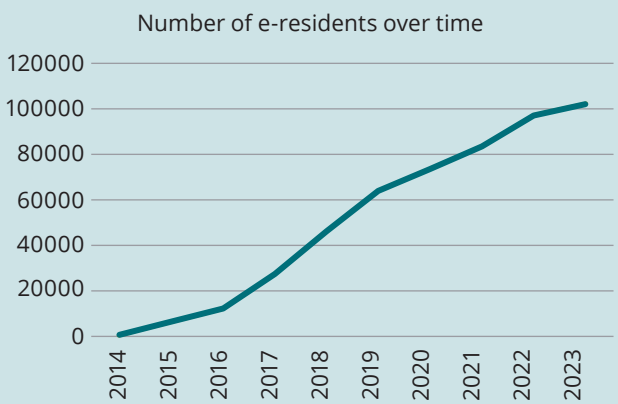
Seamless company operations in Estonia's open and digital business environment

Start and manage a paperless company quickly using an e-residency card, eliminating the need for travel in administrative matters

A distributed data exchange layer facilitates secure and encrypted data transfers between decentralised databases in a transparent and safe manner.

Impact

Attract businesses and entrepreneurs from all over the world



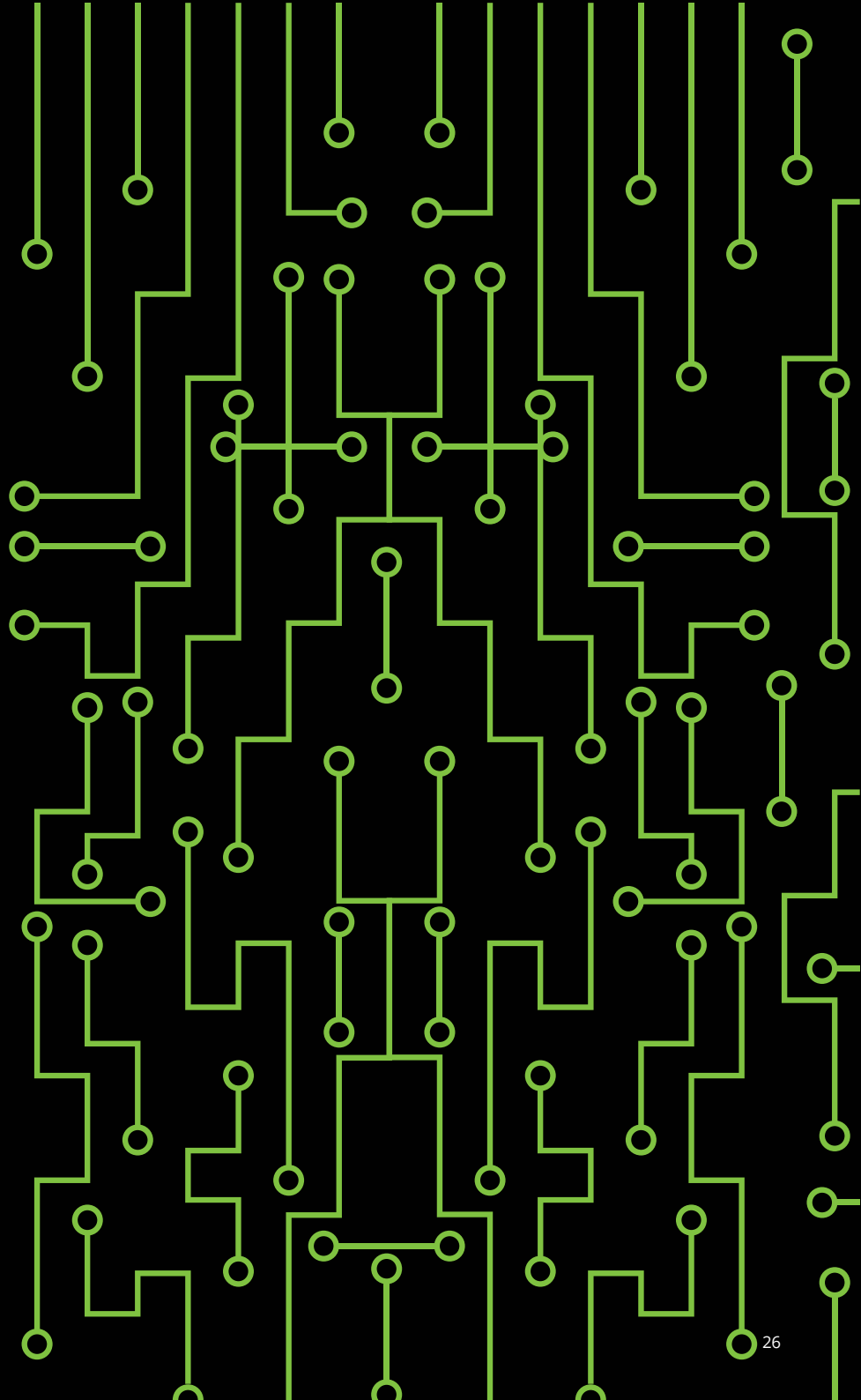
Innovation and economic growth:

These e-residents have set up over 12,000 companies in Estonia, and they have contributed **over €1 billion** to the economy.

Source: https://www.e-resident.gov.ee/dashboard/

4

A step-by-step guide: Design, governance, and implementation



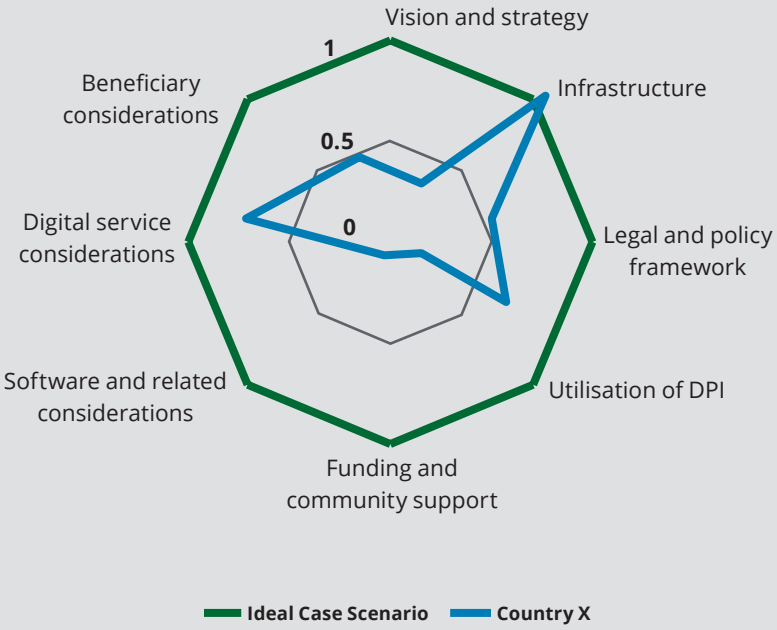
Readiness assessment: Assess and evaluate your current DPI capabilities

There is no one-size-fits-all approach to DPI implementation. Countries are at different stages of their digital transformation journey, and they exist within different political, economic, and social contexts with various needs. Each country needs to assess its current capability and align its DPI journey per the findings.

Readiness assessment matrix

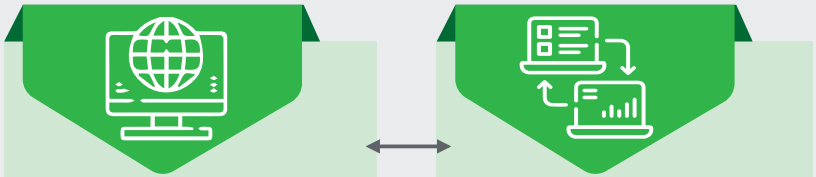
#	Contours	Sub- contours	Low	Mid	High
1	Vision and strategy	Clear vision and strategy on DPI			
2	Infrastructure	Presence of enabling physical infrastructure including connectivity, devices, servers, data centres, routers			
3	Legal and policy frameworks	Enabling laws/rules/policies to implement DPI strategy, such as on privacy, etc.			
4	Utilisation of DPI	Cross-sector utilisation			
5		Cross-country utilisation			
6	Funding and community support	Source of funding and revenue			
7		Developer, contributor, and implementor community engagement			
8		Community governance			
9	Software and related considerations	Software roadmap			
10		User documentation			
11		Technical documentation			
12		Software productisation			
13		Interoperability and data accessibility			
14		Security			
15		Source code accessibility			
16		Scalability			
17	Digital service consideration	Presence of design-based, modular, and reusable microservice architecture in the current model of digital services			
18	Beneficiary considerations	Beneficiary's awareness			
19		Beneficiary's choice			
20		Beneficiary's ability to use			
21		Beneficiary's ability to access			

Assessing DPI Readiness



Readiness assessment: Assess and evaluate your current DPI capabilities

Case in point: No one size fits all



Bottom-up - Where digital portals already exist or are being created to facilitate public service delivery, an interoperable infrastructure may be built for better integration
Example – UHI, India

Top-down – It may start from the need to facilitate data exchange between public entities, leading countries to establish a standardised, interoperable, and secure data system. **Example – a DPI-first approach, Lebanon**

Other models for readiness assessment

HKS approach for maturity mapping based on Wardley's model – From DPG to DPI

Experimental: In the first stage, DPGs emerge from informal collaborations between public servants and should not be burdened with complex governance requirements that impede flexibility and prevent them from achieving basic success before they scale.

Tailor-made: This applies to a single stakeholder or a small group of stakeholders with specific and unexplored DPG needs. In this case, one (government) stakeholder is likely to control the governance structure and may interact informally with other (government) stakeholders who may at least fork and adapt the code for their own use.

Product: This applies to a (slightly) larger group of stakeholders with a more stakeholder-agnostic DPG need. In this case, at least two government entities share, use, and develop the same or partially the same source code in an institutionalised governance structure. Either the governance structure is led by government entities, or they are the main consumer of the DPG.

Standardised infrastructure: A large group of stakeholders with a stakeholder-agnostic DPG need, which in turn, becomes a DPI. Here, a large group of stakeholders, including government entities, share, use, and develop at least partially the same source code in an institutionalised governance structure.

Best Practices for the Governance of Digital Public Goods David Eaves, Leonie Bolte, Omayra Chuquihuara, and Surabhi Hodigere

Build a sustainable DPI strategy: Assess and contextualise

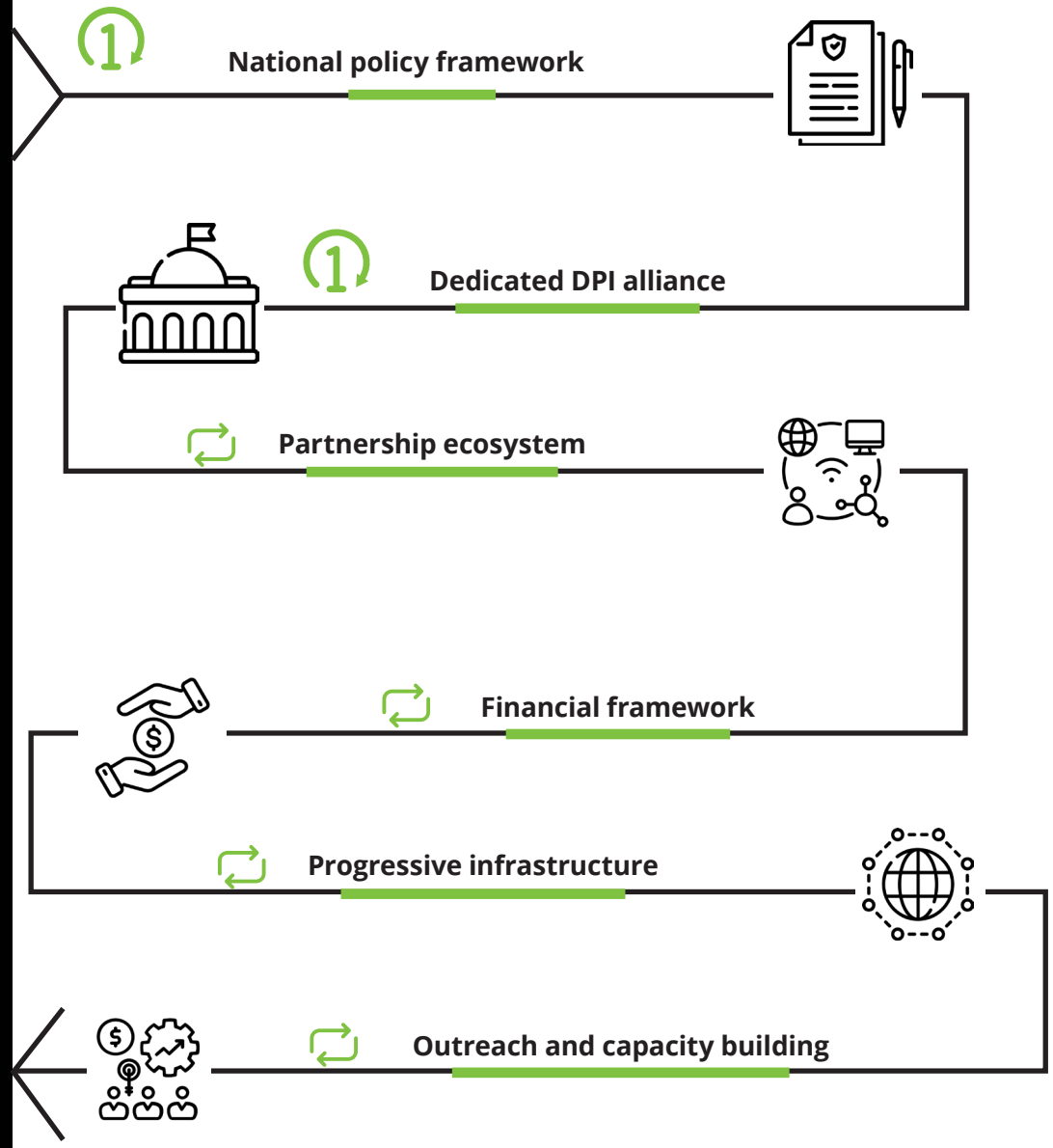
Ideas may start small, but a good foundation can help them become big

"Good" DPI is more than just "tech", given the vast population-scale impact. As countries embark on the journey of building, maintaining, and scaling their DPI, it is imperative to understand that the technology, no matter how powerful and essential, does not exist in isolation and cannot solve problems by itself. To optimise the benefit of DPIs in delivering innovative citizen-centric solutions while addressing potential risks, the "non-tech" layers comprising legal and regulatory frameworks, institutional accountability, change management, and ecosystem preparedness are equally crucial. More importantly, even if a country starts small, it is crucial to get the governance design right to avoid the repercussions of creating a "bad DPI".

- The sequential progression of the six steps illustrated on the right-hand side is determined by the country's maturity assessment findings. The observations derived from this assessment will play a pivotal role in establishing the optimal order for the implementation of these steps. Based on assessment results, it may be feasible to initiate multiple steps concurrently, further streamlining the process and maximising efficiency in the pursuit of digital transformation.
- As indicated, some of these steps are iterative in nature.

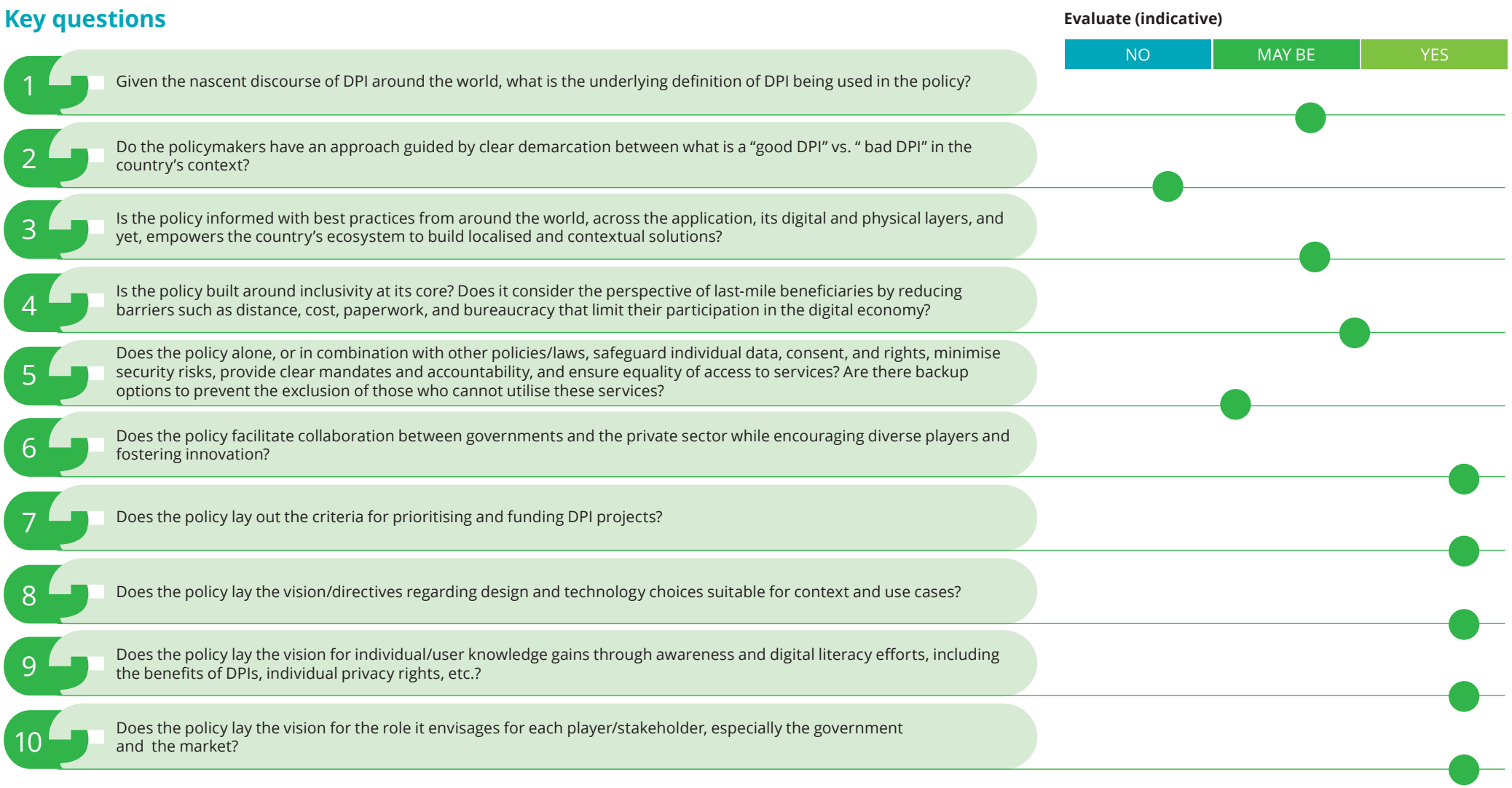
One-time effort

Iterative effort



National policy framework: Questions for the stress test

Key questions



Dedicated DPI alliance: Design and establish a DPI alliance at the national level

Set a vision, build an alliance charter with a clear mandate

- The same set of questions (refer to slide 24) or values that guide the sector-agnostic policy on DPI, will enable the vision setting and building of a charter for the alliance.
- The findings from the readiness assessment matrix (refer to slide 22) will help envisage the nature of this alliance on whether it needs a shape of an executive body/quasi-governmental/advisory body, etc.

Need for a participatory approach

- Given the fast-paced, dynamic and unique nature of DPI and the fact that it's based on an open-technology, it has a large and diverse composition of community members ranging from governments to developers, start-ups, academia, system integrators, civil society organisations, etc.
- Building digital infrastructure requires expertise in various specialised fields at once, such as technology, design thinking, and social sciences. This is only possible through collaboration.
- An alliance formed to serve this objective **needs to strike a balance between ensuring a full spectrum of representation while also maintaining a degree of leanness** to ensure a well-functioning, transparent, fair, and equitable DPI ecosystem.

Decide on enabling vs. building?

- While these two are not watertight compartments, given the socio-economic scenarios and the associated risk and scale, such a body may choose to tend towards playing a central role in building DPIs or acting as an enabler for DPIs.
- Enabling can be through research and advocacy on DPIs around its potential impact, the need and the means to ensure privacy by design and security, equitable access to DPIs, etc.
- Creation of enabling environments may also include **opportunities for sandbox testing, incentive-based innovation challenges/hackathons, incubation centres, and other test beds** that provide avenues for meaningful participation.

Design for continuity but design for an evolving role

- As discussed earlier, the maturity assessment of DPI in the country bears a direct implication on the nature and power of the alliance.
- Irrespective of maturity levels, the body that is leading digital transformation and interoperability in a country, should be designed for continuity.
- At an early stage of DPI maturity, such an organisation can play an advisory role with the increased scale and maturity of DPI, strategic decision-making roles can be added to its ambit.

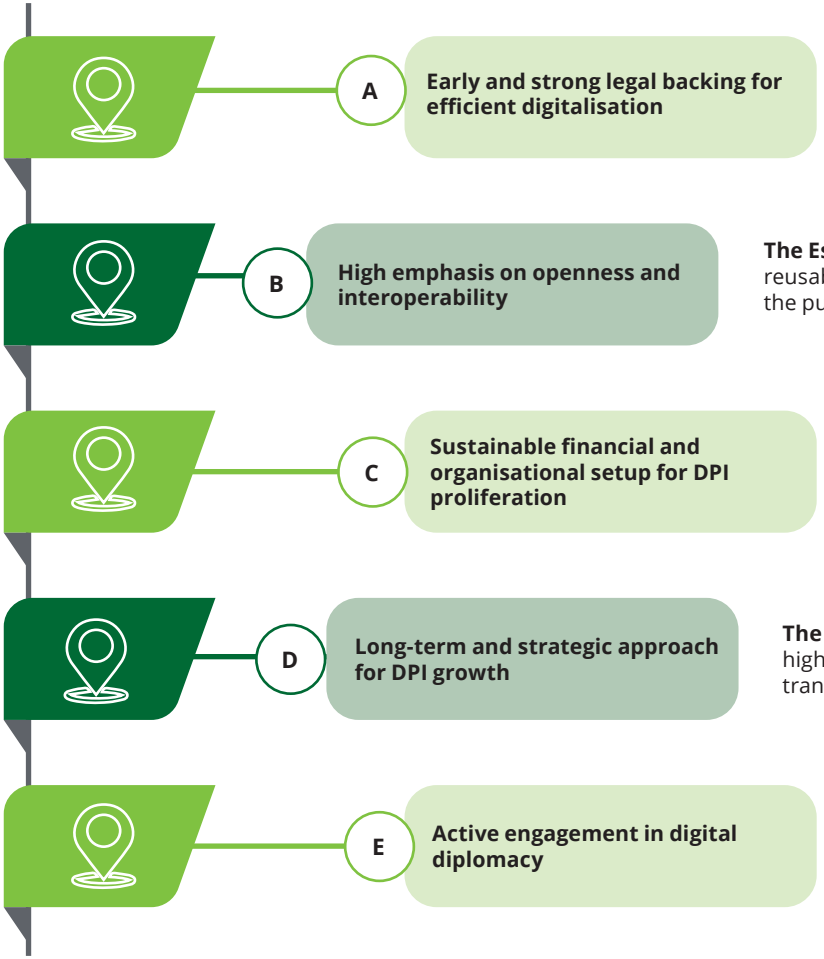
Centre for international cooperation

- The alliance can act as a focal point for coordinating and collaborating with other countries on DPI-related initiatives. It can also play an enabling role in cross-border digital services and interactions.
- International cooperation on DPI requires addressing complex security and privacy concerns. This body can participate in the formulation of robust security frameworks and privacy regulations that safeguard data while facilitating cross-border services.

Role as an evangelising, incentivising, monitoring, and enforcement body

- In the context of DPI development, the alliance can assume a multi-faceted role that evolves with the maturity of DPI in the country. Initially, in the DPI's early stages, the body can focus on advocacy, diligently promoting the benefits of DPI, removing roadblocks in adoption, forging strategic partnerships, and instilling confidence amongst stakeholders. As DPI gains traction and investment increases, it can transition into a monitoring entity, ensuring adherence to common minimum standards for DPI development. Ultimately, as trust and institutional credibility grow, the body can also explore a standards enforcement role, ensuring robust implementation and governance of the DPI nationwide.

Lessons in governance and policy: How Estonia got it right



A **Early and strong legal backing for efficient digitalisation**

- **Estonian Information Policy, adopted in 1998,** shows a broad understanding of the potential of digitalisation and stresses collaboration between private and public sectors in this process.
- Incorporation of the **principle of "once only"** in the Databases Act and later in the Public Information Act demonstrates Estonia's commitment to efficiency and data reusability.

B **High emphasis on openness and interoperability**

The Estonian Interoperability Framework emphasises openness and reusability of data, making compliance with open standards compulsory for the public sector.

C **Sustainable financial and organisational setup for DPI proliferation**

- Creation of the Nordic Institute for Interoperability Solutions (NIIS0 in 2017) which is responsible for the development and maintenance of DPIs for cross-border data sharing and service delivery.
- In Estonia, the Estonian Information System Authority (RIA) coordinates the development and management of state information systems, including public key infrastructures related operations, such as the X-road but also the state portal, the administration system of the state information system (RIHA), and the electronic document exchange centre (DVK).

D **Long-term and strategic approach for DPI growth**

The AI action plan for 2022-2023 which uses AI solutions to build reusable building blocks, and the high development targets set for 2025 showcase Estonia's strategic and long-term approach to digital transformation, ensuring sustainable and systematic growth in its DPI and DPG initiatives.

E **Active engagement in digital diplomacy**

- Estonia integrates digital technologies into its foreign policy strategy and promotes resilient digital infrastructures globally. It participates in various initiatives, such as the Digital Commons Working Group, EU D4D Hub, and GovStack, to foster digital cooperation.
- Estonia's e-governance academy plays a crucial role in sharing its digitalisation experience worldwide and supporting the implementation of open digital infrastructures across countries.

Source: https://joinup.ec.europa.eu/sites/default/files/custom-page/attachment/2020-06/DIGIT%20-%20D01%20-%20Study%20on%20public%20sector%20data%20strategies%2C%20policies%20and%20governance%20v3annexes.pdf
https://www.weforum.org/agenda/2021/10/how-to-build-digital-public-infrastructure-estonia/
https://joinup.ec.europa.eu/sites/default/files/inline-files/Digital_Government_Factsheets_Estonia_2019.pdf
https://data.consilium.europa.eu/doc/document/ST-11406-2022-INIT/en/pdf
https://e-estonia.com/data-as-an-enabler-estonias-ai-task-force-pushes-for-widespread-artificial-intelligence-uptake/
https://international-partnerships.ec.europa.eu/policies/programming/projects/au-eu-digital-development-d4d-hub-shaping-joint-digital-future_en

Build a partnership ecosystem

01 Map the stakeholders and assess their roles in the ecosystem.

02 Ensure stakeholders' representation.

03 Ensure legitimacy and support through active stakeholder engagement.

04 Balance competing needs with end-user centricity and inclusivity at the centre.

05 Per assessed maturity levels, stakeholders to be involved in strategic decision-making.

06 The bigger the scale of DPI, the higher the need for a consultative and partnership-based decision making

Activators
Organisations/institutions that catalyse the spread of DPI

Facilitators
Organisations/Institutions that remove obstacles/facilitate DPI's growth trajectory

Investors
Organisations/institutions that fund solution building for DPI

Builders
Organisations/institutions that build and implement DPI

Illustrative assessment of partnerships

Activators	**Investors**
Facilitators	**Builders**

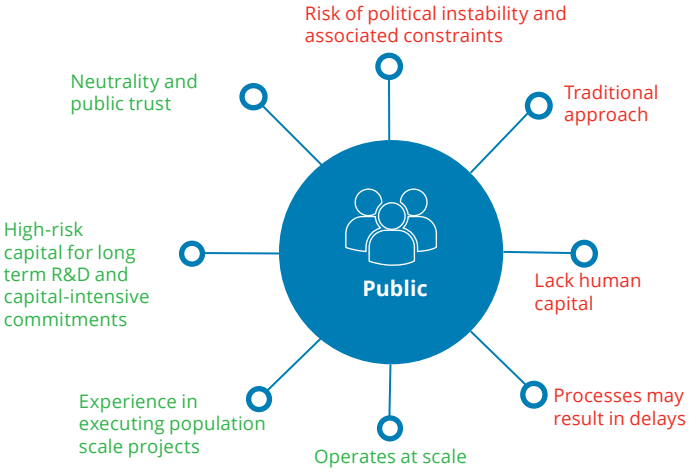
- Private sector including tech companies
- Tech-based NGOs including open data publishers
- System integrators
- National and sub-national government
- Multilaterals
- Development organisations

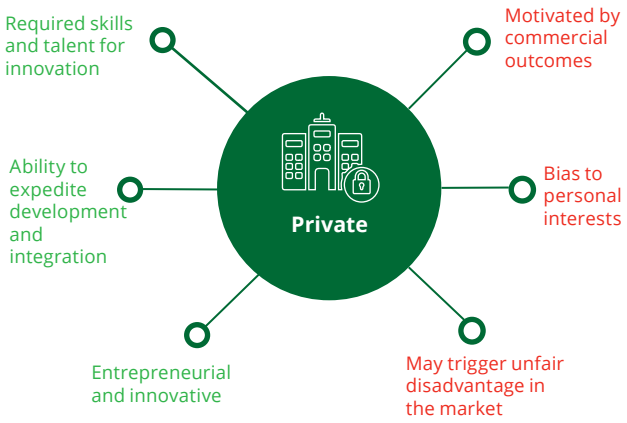
- Partnership landscape mapping is based on a **qualitative analysis of the primary role of each actor,** and relates to recent, ongoing, and planned activities of each stakeholder.
- This **does not mean a given actor operates exclusively in that role;** many have a variety of programmes or activities that serve multiple/different roles.
- The map is an **indicative tool, not a determinative one,** and should exist as a living document that can continue to be updated and modified to reflect changes in the landscape and an improved knowledge of it.

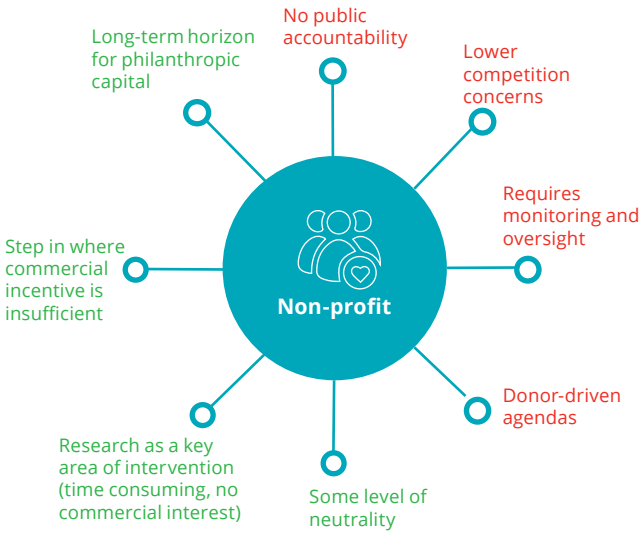
Financial framework: Creating a funding pipeline for DPIs

Map the financial landscape

Funds for design, development, and operation of DPIs can broadly come from three major categories of entities as illustrated below. It is advisable to map the current financial landscape and assess the strengths and shortcomings of each category to carefully design the ideal level of their involvement.







Key considerations while creating a funding strategy

01

What is the estimated cost to roll out the DPI project? Has a comprehensive cost assessment been done? What are the timelines for completion?

02

What are the long-term sustainability plans for the DPI? Is it a self-sustaining model or would it require a stream throughout?

03

In case it is a self-sustainable model, have the cashflows been forecast along with revenue generation, cost recovery, and financial viability over the project's duration

04

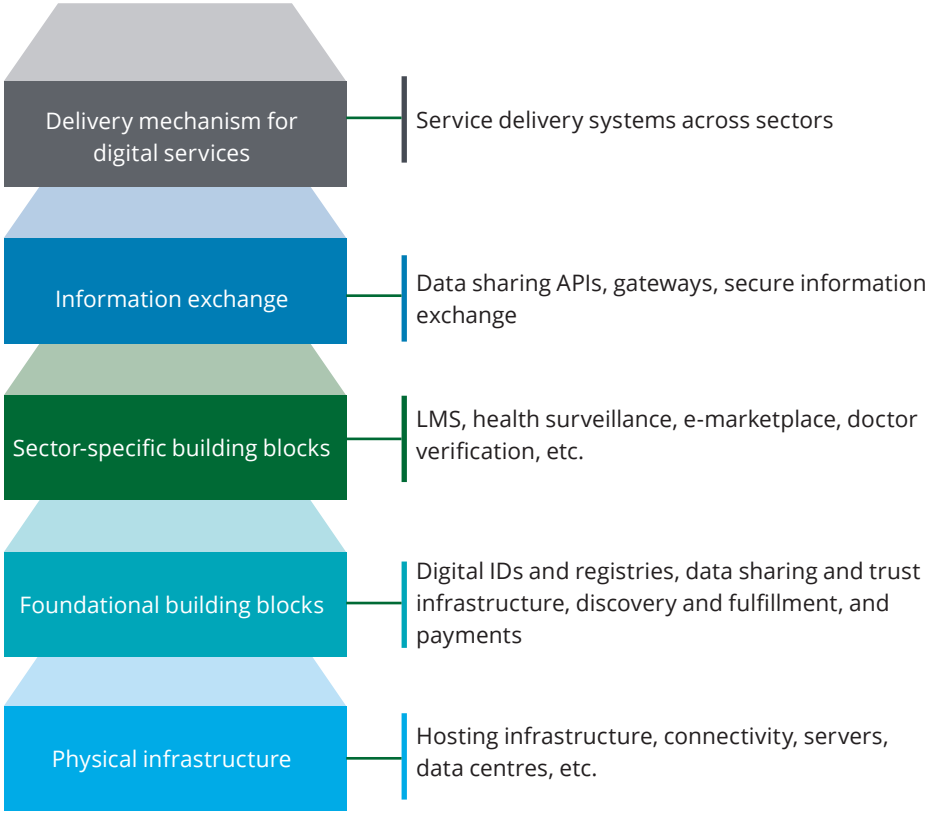
What are the potential risks associated with funding the DPI? Are there any regulatory or legal constraints or compliances?

05

What are the mechanisms for financial accountability and governance?

Progressive infrastructure: Designing a robust Digital Public Infrastructure

DPI is expert-driven and community-based and includes the participation of multiple stakeholders to bring together expertise for strengthening a government's cross-sector architecture view.



This architecture can be used by any institution across sectors to build new services without having to redesign the basic infrastructure

Suggestive design principles for developing the DPI layer

The SDG Digital Investment Framework, developed by the International Telecommunication Union (ITU) and the Digital Impact Alliance (DIAL), has formally defined the criteria that these building blocks must meet:

- Reusable software components
- Facilitates one or more generic Workflows
- Licensed as open source, proprietary, or freely available with Open Access to data
- Applicable in multiple SDG use cases across sectors
- Interoperable with other ICT Building Blocks
- Designed for extensibility
- Designed for scalability
- Standards-based conformance or compliance

Additionally, the Digital Public Goods Alliance has created a definition of Building Blocks

Source: https://govstack.gitbook.io/specification/architecture-and-nonfunctional-requirements/introduction
https://dial.global/research/sdg-digital-investment-framework/
https://digitalpublicgoods.net/DPI-DPG-BB-Definitions.pdf

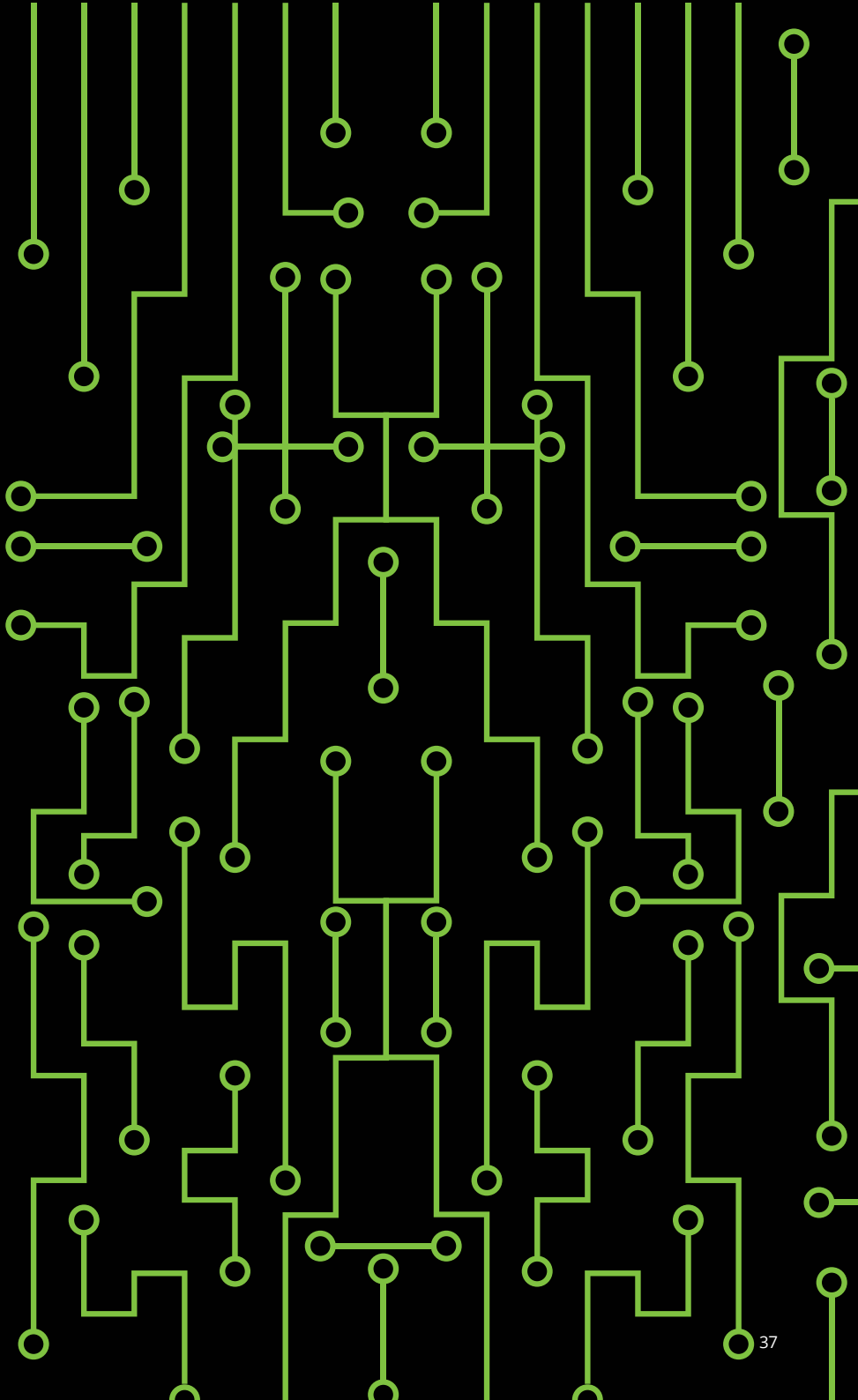
Driving successful DPI adoption

A targeted outreach and adoption strategy can accelerate the adoption and implementation of DPIs, unlocking a future of limitless possibilities.

- Create urgency and the need for DPI adoption with open communication and touchpoints.
- Establish a policy-driven change management and adoption strategy from the very beginning.
- Create groups of stakeholders who can propagate the need for DPI (enablers, evangelisers, influencers, academia, etc.).
- Design experience centers from the perspective of all stakeholders in the ecosystem.
- Channel feedback through discussion forums for continuous improvement.
- Reach out to multilateral agencies or like-minded countries to seek partnership and collaboration opportunities and unlock global potential.
- Establish information dissemination channels though seminars, workshops, advocacy papers, social media handles, instructional videos, etc.

5

From Deployment to Integration & Monitoring: DPI's Next Chapter



Scaling and integration: Next steps for seamless DPI expansion

Go big or build small: The great dilemma

Going big

- **Big vs. small:** The debate in DPI, like other digital projects, will centre around going big with high-profile projects or starting small with incremental wins.
- **Advantages of going big:** Connect the digital services programme to bold, public goals to create excitement and socio-political wins. This approach may inspire action during a crisis and lead to sustained momentum.
- **Risks of going big:** High expectations can lead to trust rupture if a public-facing project fails. Going big might require strong executive sponsorship for success.

Building incrementally

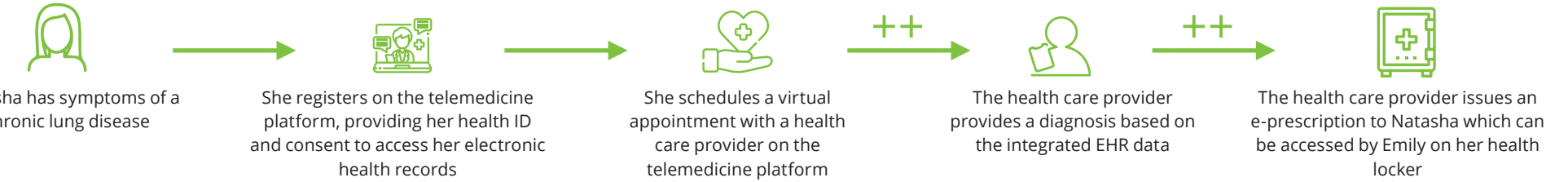
- **Going small and building incrementally:** Teams without early executive support focus on delivering high-value, "quiet" projects to build political capital gradually. Being small allows room for incremental value delivery and experimentation.
- **Challenges of going small:** Success may be deemed less powerful, and small teams need to define their value and strive to become indispensable.

Tactics for both

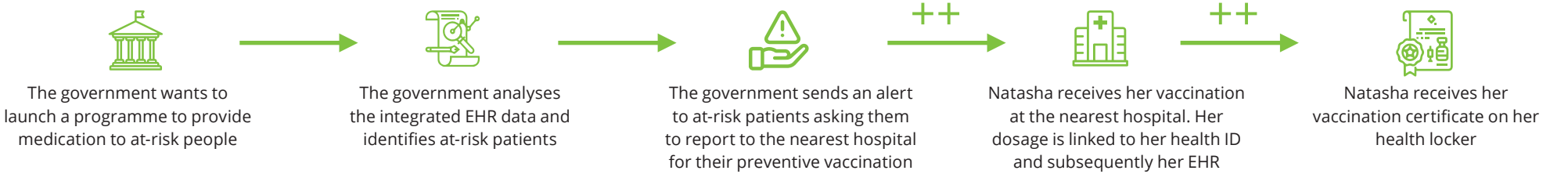
- **Tactics for both approaches:** Find external champions and enthusiastic government partners to achieve buy-in and success.
- **Cultivating champions:** Identify and create champions for digital government outside of the digital team. Sustainable champions will prioritise partnerships with digital teams.
- **Utilising existing work:** Go where work is already happening to find quick wins and unmet needs. Utilise the urgency of other teams to support digital transformation.
- **Striking the right balance** between quick wins and transformative projects, along with finding champions and utilising existing work, are key to successful digital government transformation.

Let us have a closer look into Natasha's story to understand DPI integration at work

++ Depicts integration



A few months later, a disease outbreak in the country impacts people with chronic illnesses



DPI initiative monitoring toolkit

To ensure effective monitoring and evaluation of each DPI initiative, it is imperative to define clear and actionable monitoring objectives and key performance indicators (KPIs) that are closely aligned with the initiative's maturity level and the country's overarching DPI framework/policy.

Criteria	Purpose	DPI maturity level
Setting monitoring objectives and KPIs across maturity stages	Define clear monitoring objectives and key performance indicators (KPIs) that align with the goals of the digital infrastructure.	○
Segmentation of infrastructure	Divide the digital infrastructure into logical segments, such as networks, servers, applications, databases, and cloud services. This segmentation allows for targeted monitoring and problem isolation.	◑
Real-time monitoring and alerts	Implement real-time monitoring capabilities to detect issues as they occur. Set up alerts and notifications to notify administrators or relevant teams promptly when anomalies or critical events are detected.	●
Performance monitoring	Continuously monitor the performance of critical components, such as servers, applications, and network devices. This helps identify performance bottlenecks and optimising resource allocation.	●
Security monitoring	Deploy security monitoring tools to detect and respond to potential cyber threats and security incidents. Monitor for unusual activities, unauthorised access attempts, and potential data breaches.	◑
User-experience monitoring	Gather feedback from users and analyse user behavior to assess their satisfaction with digital services. Conduct surveys and analyse user interaction data to understand how well the infrastructure meets user needs.	◑
Data governance and privacy monitoring	Monitor data usage, access patterns, and data handling practices to ensure compliance with data governance policies and privacy regulations.	○
Capacity planning and resource management	Conduct capacity planning to ensure that the infrastructure can handle current and future demands. Monitor resource utilisation trends and optimise resource allocation for cost-effectiveness.	◑
Incident response and recovery monitoring	Track incident response and recovery processes to ensure that incidents are handled efficiently, and that the infrastructure can be restored in a timely manner.	●
Compliance and policy monitoring	Verify that the digital infrastructure complies with relevant regulations, policies, and standards. Regularly conduct audits to assess compliance.	○
Third-party vendor monitoring	If digital infrastructure involves third-party vendors or service providers, monitor their performance, security practices, and adherence to Service-Level Agreements (SLAs)	◑
Disaster recovery and business continuity monitoring	Regularly test the effectiveness of disaster recovery and business continuity plans to ensure data resilience and service continuity in case of any unforeseen events.	●

Paths for Course Correction post M&E outcome analysis

1. **Data-Driven Governance:** Collaborative analytics for agile DPI optimisation.
2. **Corrective Policy Measures:** Implement targeted policy adjustments for DPI refinement
3. **Future-Proof Innovation:** Embrace tech experimentation for sustained infrastructure readiness.
4. **Inclusive Empowerment:** Bridge identified accessibility gaps through partnerships and advocacy

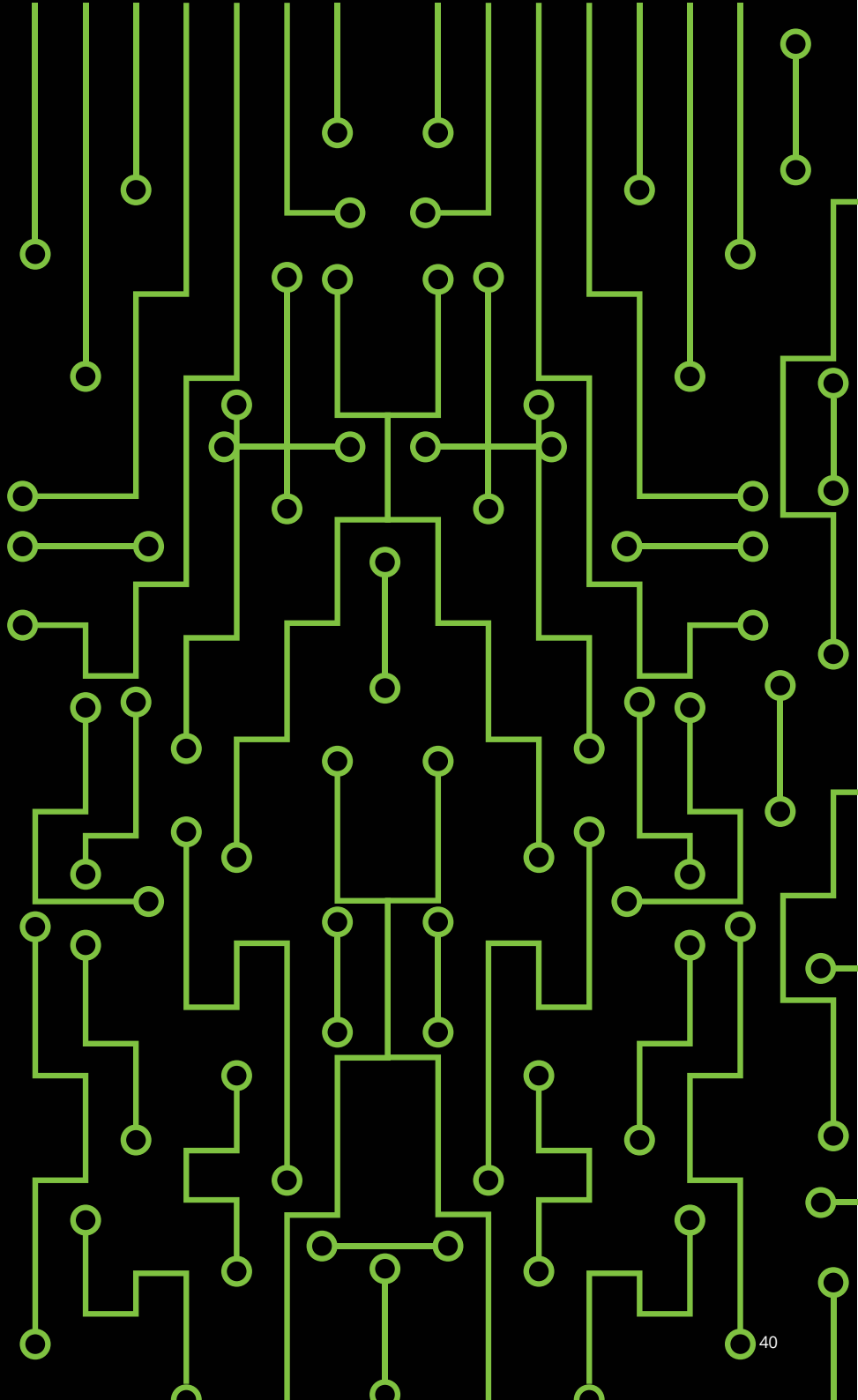
○ Monitoring to start from Initiation stage of DPI initiative. This includes DPI strategy, design, blueprint, policy (if any)

◑ Monitoring to start from intermediate stage of DPI initiative. This includes development, sandbox testing, requirement assessment of physical infrastructure

● Monitoring to start from Go-Live stage

6

Call to action



Call to action for stakeholders

Take the leap into a digital era of possibilities. Join hands today in building a resilient, inclusive, and robust Digital Public Infrastructure, empowering our nation with transformative services and opportunities for all.

Government

- Commit to making DPI development a national priority and allocate necessary resources and funding.
- Establish a dedicated task force or department to oversee and coordinate DPI implementation.
- Enact supportive policies and regulations that foster innovation, competition, and digital inclusivity.
- Collaborate with private-sector partners, civil society, and academia to share expertise and resources.
- Regularly assess progress, make data-driven decisions, and be open to course corrections.

Private sector

- Invest in research, development, and deployment of digital infrastructure technologies and services.
- Engage in public-private partnerships to support the government's DPI initiatives.
- Promote cybersecurity best practices within your organisation and offer solutions to enhance overall DPI security.
- Participate in skill development programmes to ensure a workforce equipped for the digital age.
- Build solutions and offerings using DPGs for faster DPI adoption.

Academia and research institutions

- Conduct research on emerging digital technologies and their potential applications in DPI development.
- Establish collaborations with the industry and government to address specific challenges and share insights.
- Offer training programmes to equip individuals with digital skills needed for the evolving job market.
- Encourage innovation and entrepreneurship by supporting start-ups and technology incubators.
- Provide data and expertise to help shape evidence-based DPI policies and strategies.

Civil society and NGOs

- Advocate for digital inclusivity and access to DPI services for all citizens, especially vulnerable groups.
- Partner with the government and private sector to support digital literacy programmes.
- Monitor DPI implementation to ensure transparency, privacy protection, and ethical use of data.
- Create awareness campaigns to inform citizens about the benefits and responsible use of digital services.
- Collaborate with the government to provide feedback and suggestions for DPI improvement.

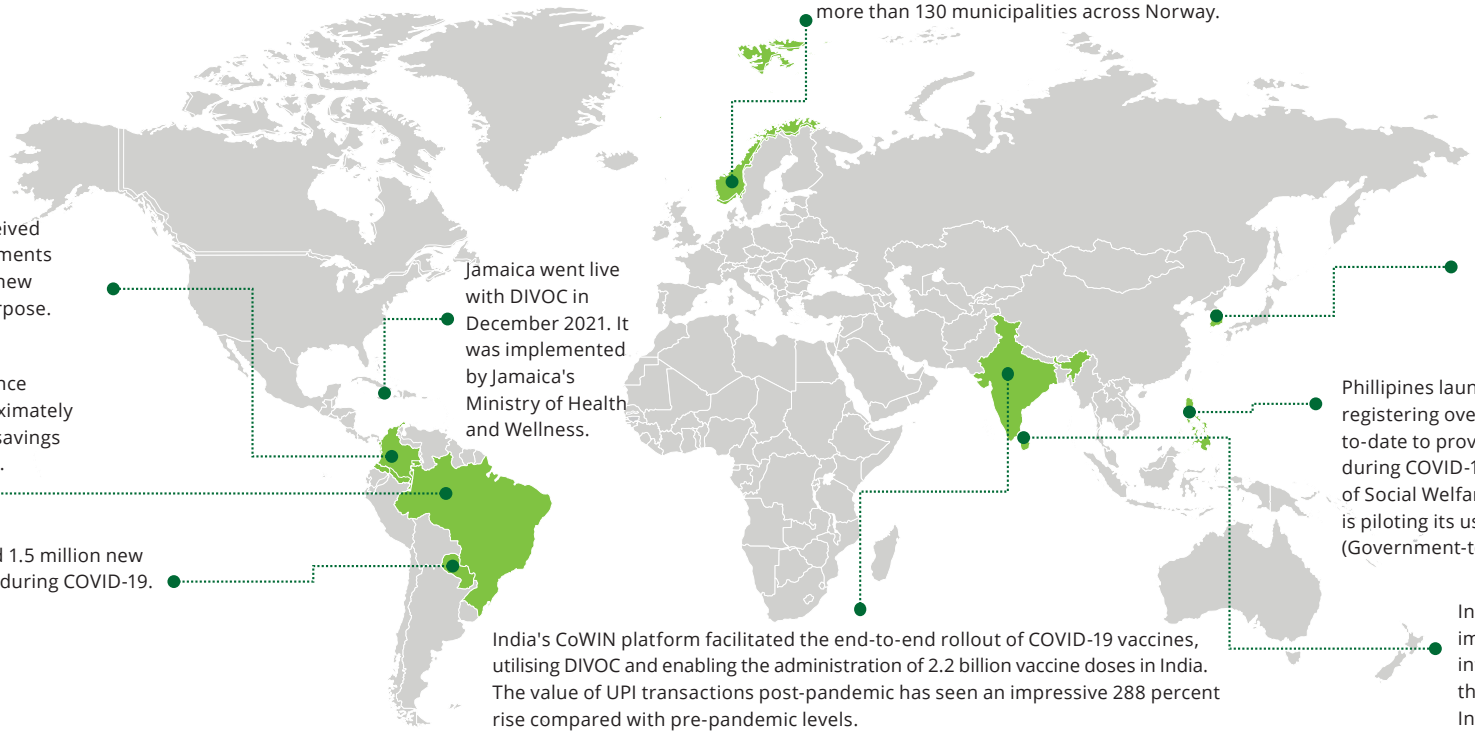
Citizens

- Embrace and actively use digital services offered by the DPI for convenience and efficiency.
- Participate in digital literacy programmes to enhance digital skills and online safety awareness.
- Provide feedback on DPI services and actively engage in discussions about its development.
- Report cybersecurity incidents or suspicious activities to relevant authorities promptly.
- Support initiatives that promote digital inclusivity and bridge the digital divide.

Multilateral bodies

- Advocate for financial resources and funding mechanisms to assist countries in implementing their DPI projects, including grants and support for public-private partnerships.
- Foster collaboration amongst member countries to enhance cybersecurity capabilities and establish international frameworks for tackling cyber threats related to DPIs.
- Facilitate knowledge exchange, sharing best practices, and promoting policy alignment in digital infrastructure to support interoperability and seamless cross-border digital services.

Navigating COVID-19: How DPIs strengthened global response and recovery



The DHIS2 core team developed a digital solution adopted by more than 130 municipalities across Norway.

In Colombia, around 3 million people received COVID-19-response social assistance payments through an account, and over 1.3 million new mobile accounts were created for this purpose.

Jamaica went live with DIVOC in December 2021. It was implemented by Jamaica's Ministry of Health and Wellness.

South Korea built a system of extensive contact tracing and monitoring based on DPI.

Brazil's COVID-19-response social assistance programme provided payments to approximately 70 million beneficiaries through a digital savings account, enabling remote access to funds.

Phillipines launched PhilSys, registering over 72 million Filipinos to-date to provide social assistance during COVID-19. The Department of Social Welfare and Development is piloting its use to facilitate G2P (Government-to-Person) payments.

Paraguay created 1.5 million new mobile e-wallets during COVID-19.

India's CoWIN platform facilitated the end-to-end rollout of COVID-19 vaccines, utilising DIVOC and enabling the administration of 2.2 billion vaccine doses in India.
The value of UPI transactions post-pandemic has seen an impressive 288 percent rise compared with pre-pandemic levels.
Utilising DPI initiatives, PFMS efficiently transferred funds to nearly 500 million beneficiaries during the COVID-19 outbreak.
eSanjeevani, the National Telemedicine Service, has served more than 92 million patients from its launch in November 2019 until end-January 2023.

In July 2021, Sri Lanka implemented DIVOC, integrating it with the District Health Information Software (DHIS2), to generate COVID-19 certificates for its citizens.

Global
DPI
footprint

1.7 billion people
In LMICs received covid response social assistance payments through DPI.

51 percent
of the population was catered to in countries using DPIs as against 16 percent in countries with no DPI.

73
LMICs covering 2.4 billion people use DHIS2, world's largest open-source health management information system.

While a lot of countries are adopting the DPI approach, there continues to be untapped potential for innovation

Source: https://blogs.worldbank.org/voices/covid-19-crisis-showed-future-g2p-payments-should-be-digital-heres-why
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Envision a world where DPI emerges as a transformative force, reshaping the dynamics of international engagement

Trade and supply chain: Amidst bustling ports, digital IDs and electronic registries help in efficient custom clearance, enable supply-chain visibility, enforce counterfeit prevention, manage trade finance documentation, and expedite trade dispute resolution. Containers bearing goods are seamlessly tracked and authenticated. Data sharing and credentialing harmonise KYC process in logistics, ensuring swift cross-border movement.

Black swan events: Cross-border crisis planning, real-time information sharing, and resource allocation optimise resilience. Early warning systems and predictive modelling based on data sharing and credentialing can be established to detect emerging risks, such as sudden market shifts, supply-chain disruptions, or environmental changes.

Tourism and cross-mobility: Across borders, DPI brings a frictionless experience to travellers. Universal digital IDs facilitate efficient passport control, while electronic signatures expedite customs procedures. In the realm of medical tourism, seamless data sharing ensures prompt and accurate treatment through shared medical histories, collaboration between health care providers, digital health records, etc.

Financial landscape: Navigate the global financial landscape with confidence, bolstered by DPI's secure payment platforms. Digital wallets simplify cross-border transactions, while electronic signatures provide secure verifications and open doors for simplified and traceable cross-border investments. Consent mechanisms empower individuals with control over their financial data, curbing fraud.

The bedrock of DPI's transformative power lies in its common building blocks. Together, they forge a foundation for a future where international trade thrives, crises are met with resilience, and cross-border mobility becomes seamless. Welcome to a future defined by possibility and shaped by DPI's potential.

While each individual piece may hold its value, it is the orchestrated harmony of interoperability that unveils the symphony of boundless opportunities where the sum of parts becomes far greater than the whole

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