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POLICY BRIEF: DIGITAL PUBLIC INFRASTRUCTURES

Policy Brief
Center for the Governance of Change
December 2023

INTRODUCTION

The seamless and efficient flow of people, money, and information has historically been a catalyzer of human development. [1] Indeed, socioeconomic dynamics have long been shaped by these three flow components and the broader infrastructure that has facilitated their expansion. From roads and bridges to railway and telecommunication networks, these public goods have generated immense value for the economy by allowing to connect people and capital and solve ever-bigger problems. Yet, as we head deeper into the future, we need a new set of infrastructures to support the data flows that enable modern applications and digital transactions.[2] The question, however, is how to govern these *digital* infrastructures to ensure they can be sufficiently scalable, sustainable, and flexible to address the interlocking challenges of tomorrow and promote a thriving data economy.[3]

This policy brief, based on **ISPIRT's** recent policy paper for the **Center for the Governance of Change**, lays out a conceptual framework for DPIs and explores the foundational components that make up its different layers: identity, payments, and data. Drawing lessons from India, a country that has completely transformed its digital ecosystem through the use of DPIs,[4] it unpacks the main benefits, challenges, and potential mitigants associated with such a model, in view of identifying concrete policy recommendations for Europe's own digital journey.

Key recommendations:

	IDENTITY LAYER	PAYMENTS LAYER	DATA LAYER
Elements to replicate	▪ Minimalist, interoperable design. ▪ Straightforward user experience.	▪ Ecosystem manager institution. ▪ Robust security features.	▪ Account Aggregator framework. ▪ Open Networks for credit, e-commerce, etc.
Additional safeguards	▪ Stronger data protection and privacy provisions. ▪ Full control of users' data and record of data shares.	▪ Pseudonymization (data blindness). ▪ Make potential violations 'impossible by design'.	▪ Legal obligations on legitimate interest/fair processing. ▪ Right to access, correct, and delete user data.

BACKGROUND: DEVELOPING MODERN DIGITAL INFRASTRUCTURE

The way we think about infrastructure is changing.

Beyond roads, bridges, and even 5G antennas (i.e., *physical* infrastructure), there is a new range of *digital* infrastructures that will become increasingly important as we head deeper into the 21st century. Think of the "rails" that enable the provision of modern digital services such as e-health and mobile banking or the networks that allow for the free flow of information between public and private entities. In fact, many of these tools have already demonstrated their potential during the pandemic, when countries that invested in them were better able to monitor the spread of the virus and send stimulus payments to vulnerable households.[5] More broadly, however, these digital infrastructures will be key to governing the three flow components that drive socio-economic activity: people, money, and information.

Yet, in this sense, mainstream models have shown some important caveats. Indeed, the All-Government and Big Tech approaches championed by China and the United States, respectively, have allowed for rapid tech innovation and fast economic growth, but at a huge cost to society. The former, based on government-controlled platforms providing end-to-end services through monolithic systems, has been prone to injustices and errors due to its single point of control (and potential failure), while the latter, which places ownership of all platforms and applications in the hands of private tech corporations, has led to numerous privacy, interoperability, and monopolization concerns.

For its part, the EU has taken a somewhat different course with its Digital Decade program, which has promoted the development of modern digital infrastructures for a thriving data economy while emphasizing the importance of social inclusion and basic European principles, such as the right to privacy.[6] However, while this 'human-centered' approach has been well-received by citizens, and initiatives like the European digital identity[7] and digital euro[8] have attracted the attention of international observers, will it be enough to create a truly thriving data economy?

To succeed, these digital infrastructures will need to be sufficiently scalable to meet the country's growth potential, sustainable in terms of maintenance and cost-effectiveness, and flexible to adapt to changing technology and societal needs. So, how can policymakers achieve this?

TOWARDS SOLUTIONS: FOUNDATIONAL DPIs

One answer lies in a new form of public-private collaboration that is increasingly taking hold around the world: Foundational Digital Public Infrastructures. Simply put, these DPIs are a set of shared technology platforms and open Application Programming Interfaces (APIs) and protocols to which both public- and private-sector providers can 'plug in' to enable a myriad of modern applications and digital transactions. If properly designed, a DPI ecosystem that builds interoperability and adequate standards for data governance and security can unlock the latent potential of the data economy by enabling fair and competitive marketplaces while ensuring the safety of all participants. However, there are also risks and challenges that need to be kept in mind.

Consider the case of India, for example, one country that has clearly championed this third paradigm by providing digital infrastructures as a public good and encouraging private innovation with open access to these infrastructures.[9] Through India Stack, its DPI platform, the country has accelerated financial inclusion, improved government schemes, and provided individuals with access to a range of previously unavailable digital services.

However, India Stack has also created a system that could succumb to monopolization, authoritarianism, and digital colonization if it fell into the wrong hands. While the government has introduced several measures to address such risks, this raises several questions concerning the sort of safeguards needed to ensure that potential abuses remain impossible.

Against this backdrop, three key elements will need to be kept in mind to leverage DPIs to promote a healthy data economy:

1. **HOW TO GUARANTEE EFFECTIVE PUBLIC-PRIVATE COLLABORATION?**

2. **HOW TO ENABLE SEAMLESS INTEROPERABILITY AND OPEN NETWORKS?**

3. **HOW TO BUILD ROBUST AND COMPETITIVE LEGAL FRAMEWORKS?**

PILLAR #1
FLOW OF PEOPLE

INDIA STACK SOLUTION

- **Aadhaar**, a digital identity program providing every citizen with a unique 12-digit identity number to register their basic attributes, contact details, and biometric information.
- Thanks to an ambitious public outreach campaign, the program has effectively reached **99% of the Indian population**, granting virtually every citizen a digital identity.

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- The **EU Digital Identity** proposal, an initiative aiming to provide every European citizen with a personal digital wallet, or eID, to access both online and offline public and private services across the EU.
- **Shares many feature**s with Aadhar, including the ability to sign documents electronically and store all sorts of personal and financial statements in an online repository.

BENEFITS

- Provided public authorities with a bedrock for the **digitization of government schemes.**
- Gave private sector companies the **opportunity to engage in contractual agreements** with millions of previously undocumented citizens.
- Helped accelerate **financial inclusion, improve the delivery of direct benefits transfers,** and increase **access to other digital services** requiring personal authentication.

ELEMENTS TO REPLICATE

- **Minimalist, interoperable design** to help public and private service providers leverage these features in a simple and cost-efficient way.
- **Straightforward, easy-to-use user experience** to allow all people, whatever their age or digital literacy, to benefit from the tool.
- **Sufficient workarounds** to mitigate the risk of authentication failures, including biometric- and one-time-password-based authentication, as well as **grievance reversal mechanisms.**

MAIN CRITICISMS

- **Risk of authentication failures** resulting in people from marginalized communities being denied access to certain basic services.
- Concern over the government's handling of personal data and the possibility of it becoming a tool for **population surveillance.**

ADDITIONAL SAFEGUARDS

- Include **stronger data protection and privacy provisions** to prohibit any public or private entity from collecting, storing, or maintaining any information beyond the specific purpose authorized by users.
- Give users **full control** of the aspects of their identity they share with third parties and keep track of every such sharing.

PILLAR #2
FLOW OF MONEY

INDIA STACK SOLUTION

- **Unified Payment Interface (UPI)**, a homegrown, real-time payment system providing every mobile phone user with access to frictionless, affordable, and safe digital payments.
- Has quickly become one of the country's **premier modes of settlement:** in 2023 alone, it handled 10.5 billion transactions valued at around US$189 billion.[10]

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- The **digital euro project**, an initiative that would grant every European citizen unfettered access to digital payments that are settled instantly, on-demand, and in fiat currency.
- It is a Central Bank Digital Currency project, something **much more complex** than developing a fast payment system.

BENEFITS

- Completely transformed what had traditionally been a cash-driven society.
- **Lowered the adoption costs** for merchants trying to leverage digital payments.
- Provided a fee-free way for non-resident Indians to send **remittances** back home.
- Brought millions of Indians into the **formal economy.**
- Increased **tax revenue generation.**

ELEMENTS TO REPLICATE

- An **ecosystem manager**, like the NPCI,[11] to **get legacy providers, banks, and the public sector to collaborate and build adequate interoperability standards**, ensuring to implement the tool without additional charges for merchants & users.
- **Robust security features** like Virtual Payment Addresses, multi-factor authentication, and dynamic PINs, as well as data minimization, encryption, and limited government access.

MAIN CRITICISMS

- Like Aadhar, UPI has also raised **concerns about security, fraud**, and its potential use by the government as a **financial surveillance tool.**
- UPI is also vulnerable to more common financial frauds such as **phishing, malware, and SIM cloning.**

ADDITIONAL SAFEGUARDS

- Introduce **stringent pseudonymization measures and make potential violations impossible by design**, for example, by transferring the handling of personal data (something often required by law to comply with Know-Your-Customer regulations) to financial institutions that are already subject to the highest data privacy standards.

PILLAR #3
FLOW OF INFORMATION

INDIA STACK SOLUTION

- **Data Empowerment and Protection Architecture (DEPA)**, a framework for a secure, consent-based data-sharing system that allows users to seamlessly access and share their information with third parties for a predefined purpose.
- Governed by **"Consent Managers"** who protect user information and ensure that third parties can only access the specific information they agreed to, for a limited time, and for a single purpose.

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- **Gaia-X**, a federated, secure, European data infrastructure that aims to develop a sovereign data-sharing ecosystem based on trust between all involved actors.[12]
- Promotes openness, fairness, privacy, security, and transparency, in the hope of **addressing the lack of trust** that exists in the current landscape of storing, sharing, and handling data.
- Still **under development**.

BENEFITS

- Empowered individuals by giving them **more control over their data** with a tool that allows them to select what data they share with third parties and for how long.
- Allowed India to create a set of **"Open Networks" to facilitate the free flow of information** between buyers and sellers, giving service providers the chance to focus on building customer experience instead of worrying about infrastructure, permissioning, and access.

ELEMENTS TO REPLICATE

- The **Account Aggregator framework**, a set of regulated entities that help individuals share their information with other institutions in the network with granular, step-by-step permission and control.
- **Open Networks** for credit, e-commerce, etc., to empower micro, small, and medium enterprises (MSMEs), increase choice and competition, and level the playing field across many digital services.

MAIN CRITICISMS

- Concerns related to **data sharing and control** abound: Is consent a **strong enough** safeguard in a world where most people don't read terms and conditions?
- Unable to solve long-standing grievances, like the **digital divide** between rural and urban India, the **concentration of data** in the hands of large corporations, or the **misuse of personal data** for commercial purposes or targeted profiling

ADDITIONAL SAFEGUARDS

- Develop a **stronger techno-legal framework** to empower people with something more reliable than a consent-based mechanism, for example, by introducing legal obligations on **legitimate interest and fair processing** and granting users the **right to access, correct, and delete their data**, thereby reducing the burden on individuals to play privacy professionals.[13]

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ENDNOTES

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2 Suzman, M. (2022) *Why we need digital infrastructure.* Bill & Melinda Gates Foundation https://www.gatesfoundation.org/ideas/media-center/press-releases/2022/12/digital-public-infrastructure

3 Ngodup, K. and Sharma, D. (2021) *Digital public infrastructure can help solve global challenges. This is how to implement it.* World Economic Forum https://www.weforum.org/agenda/2022/09/6-first-principles-for-making-digital-public-infrastructure-impactful/

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9 D'Silva et al. (2019) *The design of digital financial infrastructure: Lessons from India.* Bank of International Settlements https://www.bis.org/publ/bppdf/bispap106.htm

10 Kumar, H. and Mashal, M. (2023) *Where digital payments, even for a 10-cent chai, are colossal in scale.* New York Times https://www.nytimes.com/2023/03/01/business/india-digital-payments-upi.html; National Payment Corporation of India (2023) Monthly Metrics. NPCI

11 National Payment Corporation of India, an organization comprising the country's top financial institutions and the central bank, which was established as a non-profit to build the country's digital financial architecture.

12 For more information, visit https://gaia-x.eu

13 Bellamy, B. and Heyder, M. (2015) *Empowering individuals beyond consent.* IAPP https://iapp.org/news/a/empowering-individuals-beyond-consent/

This policy brief was produced within the framework of the Center for the Governance of Change's research program *The Digital Revolution and the New Social Contract*, and in particular its second work package, which studies the emergence and governance of the data economy, and how it can be fair, competitive, and safe.

It is based on the latest policy paper of the package, authored by Sharad Sharma, Madhumitha Ramanathan, Arun Iyer, and Vivek Abraham. "Digital Public Infrastructures: Lessons from India for a Thriving Data Economy", IE CGC, November 2023

You can access the paper and learn more about the program here: https://www.ie.edu/cgc/research/new-social-contract-digital-age