

What Is the DPI Approach?

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Digital public infrastructure (DPI) is a brand-new approach to the digitisation of large-scale systems. It has the potential to revolutionise the way in which public services are delivered, since it is much more than a software or a technology infrastructure—it is a framework that encompasses technology, markets, and governance. It offers nation states unprecedented agency over their own digital journeys. It is designed to ensure the sovereignty of core public services, enabling capabilities that are critical to national growth. Crucially, it helps governments unlock the power of market innovation and entrepreneurship, creating competition and strengthening local and potentially global digital ecosystems.

Certain properties of DPI are instinctively understood in nations that have adopted the approach, even if they themselves do not as yet use the abbreviation “DPI.” Whether it is Brazil, Estonia, or India, there is an intuitive appreciation for the vast potential of DPI. Yet, for many parts of the world, this language is only beginning to be understood in its entirety.

This essay intends to describe the DPI approach. It is authored from the perspective of building bridges of understanding between communities, countries, and global institutions invested in interoperable and life-changing systems for the delivery of public service at scale. DPI is a relatively new theory of change. The language around DPI is only now being constructed for global absorption. Whether it is at the G20 or in bilateral negotiations between countries, this approach and the language that defines it are only now being established. The aim of this essay is to clarify how the DPI approach can be institutionalised while providing negotiators, diplomats, and technologists the language that is potentially necessary to define an idea whose time has come.

WHAT DEFINES THE DPI APPROACH?

The DPI approach is underpinned by three core concepts.

1. **Common design:** DPIs typically follow a common design philosophy that makes it possible for the ecosystems they create to flourish. They are all built on principles of openness, interoperability, and scalability, which enables nations to establish inclusive and flexible digital ecosystems in the most efficient manner. The architecture is designed to be modular, allowing components to be independently developed while still ensuring that they can be seamlessly integrated into the rest of the ecosystem. This enables them to be upgraded independently of the rest of the infrastructure when required. This novel approach to technology design ensures that digital public infrastructure is resilient, adaptable, and capable of evolving to meet the changing needs of the market as it grows to population scale. In short, there is a high

degree of agility built into the design of DPIs, which allows for quick adaptation and change depending on the need of the hour.

2. **Robust governance:** Governance is central to the DPI approach. In addition to ensuring that the right mix of policies, regulations, and institutions is in place, since the DPI ecosystem is digital from end to end, regulators have new ways to think about governance. They can embed legal obligations directly into the architecture of the infrastructure, ensuring that participants comply with the law through the mere act of participation. Additionally, privacy features are coded into the system. All participants in the DPI ecosystem would be obliged to conform to a set of common standards, thereby enabling trust, transparency, and accountability in the ecosystem. It safeguards citizens' rights and privacy while promoting responsible data use and management. DPIs are designed for inclusion. Following the DPI approach, governments can create coordinated approaches for connecting the last mile. This includes onboarding low literacy and low connectivity areas while building greater trust and accountability.
3. **Private sector participation:** Significantly, the DPI approach ensures the active participation of the private sector. This allows market innovation and service delivery to power user experiences and customer adoption. It has every potential to encourage fair competition and propel market participants to continuously innovate and upgrade their services to provide the customers with a better user experience than their competitors. This ensures better and more innovative solutions, fosters job creation, and provides guarantees for the long-term sustainability of the ecosystem.

These three principles collectively define the DPI approach. In certain countries, [such as India](#), [Brazil](#), [Thailand](#), and [Indonesia](#), adopting aspects of such an approach have proven to be a powerful strategy for transforming the delivery of public services and empowering countries to leapfrog several stages in the traditional developmental journey.

In order to better understand what DPI encompasses, it is important to dig deeper into each of these three elements.

Design Philosophy

The traditional vendor-led approach to digital infrastructure development typically involves identifying a national requirement (for example, an ID system, a payment system, or what in time might be considered a carbon registry within and between countries) and then soliciting proposals from vendors to build it. This often leads to monolithic software implementations and siloed systems, which have limited interoperability and extensibility. This in turn results in vendor lock-in with countries being heavily dependent on the suppliers of these software services for every tiny upgrade and feature refresh. It also limits interoperability between the systems created by different vendors in the same country. In contrast, the DPI approach allows the governments to actively participate in designing their countries' digital transformations.

A well-balanced and "good" DPI agenda will require governments to adopt common principles, which all the market participants building and leveraging DPIs ought to adhere to.

1. **Interoperability:** All building blocks of the DPI ecosystem should be designed to be interoperable so that different systems and components seamlessly interact with each other. This requires the adoption of a set of common standards and protocols designed to enable the integration of diverse services and technologies.
2. **Extensibility:** DPI must also be designed to be adaptable to the rapid evolution of the digital landscape. This requires the various modular building blocks to be designed in such a manner that allows them to be easily extended or modified. Such an approach will allow the relatively quick adoption of new technologies and functionalities as they emerge. Importantly, it means that new functionalities can be introduced minus the large transaction cost underlying the entire system to be redesigned.
3. **Protocols, not platforms:** DPI builders need to shift the thinking from platform-centric models to protocol-based systems. By setting out shared protocols, it is possible for a diverse range of players—from small startups to large enterprises—to participate, compete, and innovate within the ecosystem. This fosters a vibrant market of digital services that are responsive to user needs and preferences. The protocol-based systems also allow for an elasticity that is not easily available in the platform-centric approach.
4. **Federation of data:** DPIs ensure easy access to data and should be optimised to ensure the federated storage of the same. At the same time, and crucially, it is possible to make sure that data is not consolidated into a central repository—increasing the risk of data breach and misuse—and instead kept “at the edges.” This also significantly reduces the surveillance risk that is implicit in any population-scale digital ecosystem.

By adopting these design principles, governments can ensure that they remain in control of the digital public ecosystems on which they depend for the delivery of public services. Including multiple market participants ensures long-term sustainability of DPIs for the provision of digital services to the ultimate beneficiaries—the people.

Governance Frameworks

As important as it is to ensure that DPIs are built according to the correct design principles, it is just as critical to ensure that they are subject to strong governance frameworks. DPIs have the potential to accelerate inclusion—or to exclude and surveil people. Therefore, ensuring a people-centric approach in governance is fundamental to safeguard their rights. Looking into the future, this “techno-legal” approach, if it can be referred to as such, promises to ensure fair competition, privacy protection, and user autonomy while enabling market innovation and consumer protection.

In designing and supplementing the rights-based governance framework, certain elements of this approach should be kept in mind.

1. **Privacy by design:** DPIs should implement “privacy by design,” incorporating privacy-enhancing technologies and insisting on appropriate organisational measures that leverage the digital systems to improve privacy outcomes. This includes ensuring that the system

implements secure data practices at all stages of the workflow. By ensuring that the system is designed to address privacy concerns by default, it is possible to build trust and confidence in the digital ecosystem.

2. **User autonomy:** Empowering users to take greater control over their data ensures that they can decide when, how, and with whom their data is shared. This promotes transparency and accountability and empowers citizens to make informed decisions about their data usage. Building governance frameworks that are optimised for user autonomy will address many of the concerns pertaining to data protection and consumer protection raised by these ecosystems.
3. **Protocol-based supervision:** Establishing a regulatory framework that allows regulators to exercise control over the protocols that underpin these ecosystems offers them the opportunity to influence policy outcomes more directly. If regulators can affect policy change by tweaking the protocols, they can influence policy outcomes more directly than through the enactment of regulations. DPI offers a more effective regulatory oversight mechanism by allowing regulators to assume direct control over the ecosystem.
4. **Obligations in code:** Well-designed digital ecosystems have end-to-end digital workflows. As a result, obligations between participants can be established automatically through the operation of the ecosystem. Since the performance of these obligations is assured through code, governance frameworks can be redesigned to reduce the compliance burden on market participants.

By adjusting traditional governance frameworks to take into account the special features of DPI, it is possible to develop a new approach to regulation that can not only offer a more efficient regulatory pathway but also reduce the compliance burden. By embedding governance into the architecture, it is possible to create transparent, accountable, and fair digital ecosystems that empower citizens and foster innovation while safeguarding essential rights and freedoms.

Market Forces

A DPI approach is only really successful when the private sector is fully engaged. The private sector plays a central role in its implementation—reaching the last mile, harnessing innovations, and improving efficiencies. By enabling market forces to actively contribute to the deployment and management of digital infrastructure, governments can create a more dynamic, sustainable, and inclusive digital ecosystem.

With this in mind, it is important that governments adopt a few key strategies in their DPI approach.

1. **Private sector involvement:** Governments need to ensure that the private sector plays a key role in the proliferation of DPI and the products and services offered. They need to make space for private players to leverage their resources, expertise, and innovation capabilities to power the growth of the ecosystem and achieve market penetration. More importantly, governments need to realise that the private sector is key to the widespread adoption of DPI,

without which it would be impossible for these initiatives to achieve the scale required to make them a success.

2. **Competitive market:** It is just as important to ensure that once private sector participation has been facilitated that the ecosystem allows for a level playing field that enables businesses of all sizes to participate. It is crucial to ensure that DPIs promote healthy competition and encourage innovation. Governments should take steps to implement regulations and policies that support open and competitive markets, allowing small startups in local ecosystems and large enterprises alike to participate and thrive.
3. **Alignment of incentives:** It is important to ensure that all incentives are appropriately aligned to avoid capture by powerful market players—not just of the commercial advantage but also of the standards and protocols that underpin the architecture. To this end, it is important to ensure that as much as private innovation and customer demand dictate the direction the underlying specifications would take in future, their design is left in the hands of truly independent technical standards organisations.

Only by enabling markets and actively involving the private sector in the DPI approach can nations benefit from the innovation, efficiency, and market reach that they offer. This not only fosters a vibrant digital ecosystem but also ensures the long-term sustainability and inclusivity of DPI.

TAKING THE DPI APPROACH “GLOCAL”

Globalising the DPI approach will take more than linguistic adoption—it will require a degree of inductive reasoning. [The DPI approach is in practice in India](#), Brazil, Singapore, Finland, Estonia, and Rwanda, amongst others. These use cases offer critical insights into how exactly other countries can drive inclusive growth, innovation, and empowerment through the thoughtful deployment of population-scale digital solutions. These experiences can help transform other economies. To be sure, the interoperable and open characteristics of the DPI approach allow for multiplication, taking the specific needs of a country and local contexts into consideration. Therefore, DPIs are quintessentially “glocal” in nature.

Building state capacity is an essential step in the glocalisation of the DPI approach. At present, state capacity training and adoption happen in an ad hoc manner. The architects who build India and Estonia’s DPIs, for instance, travel around the world socialising the aforementioned principles and training different global communities. The support from nongovernmental organisations has been key. Yet, these are not scalable models for the glocalisation of DPIs. There is a need to establish an institutional framework that can perform these functions. All too often, calls for institutional structures require large funding commitments. Though in the case of DPIs, they do not.

Creating a formal institution can help share expertise and build state capacities for the adoption of DPIs. It can institutionalise and generate consensus on the key principles mentioned above. It can also help serve as a live connection between countries, the private sector, multinational institutions, and diverse stakeholders (including startups and DPI architects). The core of expertise built in and around this institution could play a crucial role in building capacities in countries wanting to adopt DPIs and

those already in different stages of adoption. Importantly, it would allow DPIs in different parts of the world to follow common principles, making sure that different systems remain interoperable and scalable.

Lastly, this institution could spur collaborations and knowledge transfer, which is the need of the hour. Once such an institution is in place, it could serve as a platform where policymakers, technologists, and businesses from around the world can collaborate to share experiences and best practices. Done right, this could be the genesis of a global community committed to leveraging the DPI approach for sustainable development.

This institution would have two key objectives.

Establishing Common Principles

The primary function of the institution would be to articulate a set of common principles that could help guide the technology and governance design of DPI as countries look to design their DPI strategies. These principles would need to be accompanied by a set of guardrails designed to prevent harm but also to nudge participants in the direction of positive behavior and outcomes. To be effective, an institution like this would need to be truly global. At the level of principle, countries may adhere to a common approach to building DPIs. Yet, at the practical level, they will of course shape their approach based on local requirements.

While it may be premature to look to develop standards at this early stage, the articulation of a set of clear but reasonably flexible principles can ensure that stakeholders work collaboratively, fostering a shared understanding of the potential risks and rewards associated with various technological and regulatory choices.

One of the principles that should be considered include inclusive design—the obligation to ensure that digital public infrastructure is, at all times, accessible to all citizens regardless of socioeconomic background, age, or ability. This will call for these systems to be user-friendly, affordable, and available in multiple languages. It would also be important to build in strong data protection measures adopting, where possible, principles of privacy by design, which prioritise the obligation to safeguard personal information and prevent unauthorised access, misuse, or disclosure. Finally, it is important to establish transparency and accountability by promoting the use of open data and establishing mechanisms for monitoring and evaluation.

Securing institutional buy-in for these principles will help forge global consensus on the need to incorporate them into national strategies, which will in turn help develop a shared vision for a common DPI approach that respects local contexts and priorities. As stakeholders align their efforts and gain experience in implementing these principles, it may eventually be possible to codify them into a set of technical and governance standards that will help drive sustainable development worldwide.

Capacity Building

It is equally important for countries embarking down this path to have the requisite technical and design capacity to continue to develop, evolve, and manage the DPI they implement. This is not just about developing a cadre of software developers capable of maintaining the systems that have been developed but also about inculcating an awareness of the design imperatives and strategic objectives of these systems in the regulators responsible for their supervision.

While it is up to countries to devise the strategies that will, in their respective contexts, motivate private sector players to develop the required technical skills, the institution can help them think through the structural incentives that could achieve this at scale. For instance, policies that incentivise private sector participants to improve strategic outcomes of DPI—by improving their existing workflows so that they can process a larger share of the pie than their competitors—could build skills by encouraging healthy competition.

In parallel, capacity-building efforts need to be strategically focused on regulatory institutions to ensure that they have the required skills to steer the participants toward the desired outcomes. This would call for a specific focus on enhancing the skills and knowledge of existing regulatory institutions and providing them training on technology trends, data privacy, and cybersecurity.

CONCLUSION

India's DPI efforts continue to demonstrate the transformative potential of this approach. Importantly, it also demonstrates the ability of this approach to make upgradations easily, as demands and needs change. It is combining technology design philosophy, robust governance frameworks, and private sector involvement to create inclusive, efficient, and empowering population-scale systems.

This year, as discussions in the Global Digital Compact, the G20, Transform Africa, and many other forums consider the DPI approach, an institutional framework that facilitates knowledge sharing, collaboration, and the adaptation of the model to local contexts will be of benefit.

The emphasis should be on strategic investments, efficient resource allocation, and a new theory of change for the emergence of the global DPI model. This balanced approach demonstrates both dedication and resourcefulness, inspiring confidence in the same. It is important to keep in mind that at least fifty countries are in different stages of DPI adoption. In some sense, the train has long left the station. Now is the time to find common ground on the DPI approach. This can help actively bank the last mile and digitally connect the last person in the last village to an approach that, as India clearly shows, can transform societies and economies.

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