

Synergising Digital Public Infrastructure and Digital Commons for Sustainable Development

Vy Dang, Aliasger Bootwalla, Eva Lynders, Wulf Reiners

Introduction

India's G20 presidency has made digital public infrastructure (DPI) a central offering, showcasing the country's beneficial experience of technology and digitalisation and its relevance to countries of various income levels. Expositions on DPI focus on it being inclusive, trustworthy, and serving the global good, as well as ways in which DPI can support the [Sustainable Development Goals \(SDGs\)](#). India has taken a pioneering role in developing an effective DPI ecosystem through [India Stack](#). Its vast and valuable experience offers learnings for other countries and world regions.

Similar discussions are taking place in other regions, notably within the European Union (EU). The EU is at the forefront of the regulation of digital markets and services, introducing "digital commons" as an innovative model for shared and collective governance of essential digital resources. The EU has demonstrated a strong commitment to including digital commons in its digital strategy, aiming to assert the Union's values and norms, to bridge geographic gaps and accelerate the progress towards SDGs.

In its report "[The Age of Digital Interdependence](#)", the UN Secretary General's High Level Panel on Digital Cooperation coined the term "digital public goods" for digital technologies and content that can accelerate the achievement of the SDGs if they are "freely and openly available, with minimal restrictions on how they can be distributed, adapted and reused" (UN, 2019). In late 2019, the governments of Norway, Sierra Leone, UNICEF and [iSPIRT](#), an Indian non-profit organisation that has played a vital role in the development of DPIs in India, formally initiated the [Digital Public Goods Alliance](#) as a follow-up to the High-level Panel.

Given the immense potential of DPIs, digital commons and digital public goods, especially in the context of advancing SDGs, there is a pressing need to align these diverse perspectives, experiences and debates. Such alignment will foster the development of shared visions and the effective utilisation of DPIs and digital commons to establish "an open, free, and secure digital future for all" (UN, 2023). Additionally, this synergy will contribute to the ongoing discussions surrounding the UN Global Digital Compact, planned for ratification during the Summit of the Future in September 2024.

Nevertheless, a significant challenge in this endeavour is a terminological confusion. This paper aims to address this confusion by unpacking the terms “DPIs”, “digital commons”, and “digital public goods”, and considering their use by India and within the EU. India’s DPI experience has been mainly practitioner-led, and a body of academic work has yet to be developed. There is also only limited literature on the relation between DPIs and digital commons, and between DPIs and digital public goods in advancing SDGs. We identify the shared and compatible elements of DPIs and digital commons and highlight areas where India and the EU converge and diverge in their policies and approaches. We also advocate for the G20’s role in facilitating consensus building and promoting knowledge exchange on DPIs and digital commons.

The paper is structured as follows. It begins by introducing the concept of DPI and its core elements, presenting India’s approach and experience in this domain. It then examines the concept of digital commons, outlining the EU’s approach and priorities. Following that, the paper elides these two concepts, arguing that DPIs and digital commons should be designed and implemented as digital public goods to fully unlock their potential as drivers of progress toward achieving SDGs.

India’s approach to digital public infrastructure

The term “DPI” broadly refers to open and interoperable technologies that enable essential functions for both public and private service delivery (Kapoor & Watson, 2023). In this way, it covers a broad spectrum of software and service elements, including digital payments, information systems, data exchange and identity systems. India perceives DPIs as a tool to achieve development goals and socio-economic and development policy aims through large-scale digital technologies and enhanced public and private service delivery (Gupta & Nair, 2023). India aims to establish decentralised and interoperable networks through DPIs, employing a model of public–private partnerships in which DPIs assume a unique platform-like role (Vaidya, 2023). Public services mainly provide a network or gateway built on open application programming interfaces (APIs). Individual entities, whether public or private, can then build independent but interoperable digital services on top of these networks.

India Stack, at the forefront of India’s DPI efforts, has pioneered this approach. The platforms – verification, digital signature and payments – within India Stack are provided by the public service, and function as the underlying infrastructure upon which other applications and services can operate (D’Silva et al., 2019, p. 7-8). The development of DPIs, particularly within India Stack, has been closely associated with iSPIRT, a non-profit organisation that has cooperated on government projects such as Aadhaar and the Unified Payment Interface (UPI) (Vaidya, 2023). Aadhaar is a digital ID system, revolving around a 12-digit identity number linked to fingerprints and iris scans. When the Aadhaar is linked with a government-initiated bank account (the Jan Dhan Yojana) and an individual’s registered mobile phone number, it becomes a trinity used by the

citizen to access welfare payments and social services. Several fintech companies, such as Paytm and PhonePe, have leveraged the Aadhaar-based digital infrastructure, building private mobile payment and wallet applications that enable users to make digital transactions and payments. Meanwhile, UPI consolidates multiple bank accounts into a single mobile application, facilitating inter-bank peer-to-peer and person-to-merchant transactions. It operates as an open-source API on top of the Immediate Payment Service and the Aadhaar-Enabled Payment System (The Economic Times, 2023). India also sees payment systems such as UPI as a way to take back the control of data from big US tech companies (Hicks, 2019).

India Stack has been praised for stimulating innovation across both private and public sector (Alonso et al., 2023). It is perceived as an important driver for economic growth and development, with projects within India Stack such as Aadhaar and UPI enabled a significant value creation of 0.9% to India's GDP in 2022 (Gupta et al., 2024, p. 5). India Stack has also helped accelerate India's powerful innovation story of the last decade, with fintech and e-commerce at the forefront of private sector innovation. As a result, India has emerged as the world's third-largest ecosystem for start-ups, with the number of start-ups increasing from 68,000 in 2014 to 112,718 in 2023. India is also home to 111 "unicorns" in 2023, up from seven in 2019 (Invest India, 2024). Meanwhile, the public sector's utilisation of India Stack has helped to streamline government services, particularly during the pandemic. An example of this is the robust digital infrastructure of Co-WIN, which facilitated the administration of more than 2.2 billion COVID-19 vaccines across the country (Ministry of Finance, 2023).

However, there are concerns that India Stack is influenced by the for-profit sector, which contradicts India's objective of building a decentralised governance system. Industry standards, system architecture, regulations and more are directly shaped or designed by iSPIRT volunteers. Another concern is that the system operates outside a social contract, with market mechanisms and for-profit services reluctant to take responsibility for dealing with exclusion-related issues. While DPIs within India Stack were designed to reduce inefficiencies in welfare delivery, they may inadvertently have created new leakages (Vaidya, 2023).

Any innovation, new system or structure adjusts as it expands. As DPIs continue to grow, India must ensure that its digital strategies and data governance are inclusive, transparent, secure, and conducive to sustainability objectives. To achieve this goal, regulation of DPIs is essential. India has introduced the concept of "techno-legal regulatory frameworks" to meet this requirement (Anandaram & Kripalani, 2021). Techno-legal regulatory frameworks aim to achieve policy objectives, with a coordinated effort between public technology and public policy to govern technologies. This approach aims to enable regulatory measures to be proactively designed and adapted to keep pace with technological advancements, rather than constantly playing catch-up or reacting to them (T20 Task Force 2, 2023, p. 8).

A recent effort in this direction is the launch of India's [Data Empowerment Protection Architecture \(DEPA\)](#), which transforms the currently prevalent organisation-centric system to a human-centred one (Anandaram & Kripalani, 2021). DEPA operates on a consent-based and data-sharing framework, giving individuals control over the use and sharing of their personal data. This approach can foster trust in digital technologies and data governance (Schneider & Srinivas, 2023). Accordingly, in early August 2023, India passed the [Digital Personal Data Protection Act](#), marking the country's first comprehensive law on personal data protection across sectors.

This legal framework was preceded by many consultations and discussions. For instance, in March 2023, India hosted the [Asia Consultation on the Global Digital Compact](#) to address DPI-related issues. The consultation involved various stakeholders from government, civil society, the private sector, academia, and international organisations. Among the recommendations was the suggestion that countries should implement or strengthen governance mechanisms for existing DPIs. For future DPIs, recommendations include “advisory and safety panels before systems go live” (Global Digital Compact, 2023 p. 2). Outcomes of a work session dedicated to the “Role of Digital Public Goods (DPGs) and Digital Public Infrastructures (DPIs) in the GDC to achieve the 2030 SDG Agenda” acknowledge that the private sector should be encouraged to participate in the DPIs but also underline that the “interoperability and scalability of DPIs must ensure ‘privacy by design’”. Further recommendations envision the UN Global Digital Compact developing governance principles for DPIs “towards fairness, and equity and disallowing new kinds of rent-seeking” (Global Digital Compact, 2023, p. 1).

The EU's approach to digital commons

The EU terminology for elements discussed under the term DPI is closely linked to (and sometimes used interchangeably with) terms like “digital commons” and “public digital infrastructure” (Gupta & Nair, 2023). Digital commons, as a subset of the broader commons framework,¹ encompass digital resources such as data, information, culture and knowledge, generated and/or managed online. They promote open access, fair benefit-sharing models and digital rights management among participating members – both those who bring the resources to life and those who enhance and enrich them (Dulong de Rosnay & Stalder, 2020; Keller, 2022). Examples of digital commons are open-source software, open data and open AI. Digital commons are understood as a foundational support for the EU's digital sovereignty and the [European Digital Rights and Principles](#) (including privacy protection, inclusion and decentralisation)

¹ In recent years, there has been a resurgence in the study of “commons” and “communing”, notably recognised through Elinor Ostrom's 2009 Nobel Memorial Prize. Commons refer to a resource collectively designed, governed and (re)produced by a community, endorsing fair management and benefit-sharing rights (Ostrom, 1990). Ostrom's initial framework on traditional commons has been recently extended and applied to “knowledge commons” and “digital commons”.

(European Commission, 2023a; European Working Team on Digital Commons, 2022). Furthermore, they can provide a leverage to bridge geographic disparities and be a potential accelerator for the implementation of the SDGs (Delegation of the EU to the UN in New York, 2023).

“Public digital infrastructures” refer to services and platforms that facilitate user connections and exchanges at both individual and institutional levels, for example communication platforms, storage, and identity services. Ideally, they should be maintained and governed as digital commons (Keller, 2023). For them to qualify as public, they must be accessible and controlled by their creators, users, employees and maintainers, rather than being proprietary and controlled by private entities.

The EU’s current initiatives related to digital commons and public digital infrastructures are predominantly visible at the level of Member States (Keller, 2023). One example is the [Sovereign Tech Fund](#) in Germany, which was launched in October 2022 and is still in its initial stages. The fund aims to provide support for the development, enhancement and maintenance of open digital infrastructure to encourage innovation and economic growth. Another illustration is the [French Digital Commons Initiative](#). During its Council presidency in the first half of 2022, the French Ministry of Foreign Affairs convened a working team on digital commons, comprising representatives from 18 EU Member States. They published a report titled “[Towards a Sovereign Digital Infrastructure of Commons](#)”. Through this report, the working team calls upon both the EU and its Member States to invest in digital commons and suggests the establishment of a European foundation for digital commons. While formal financial commitments are yet to be solidified, the proposal has gained support from 17 EU Member States, indicating a general alignment among Member States with this approach (Keller, 2023).

On the EU level, the initiative [EU Next Generation Internet \(NGI\)](#) aims to construct a more trustworthy, secure, inclusive and human-centred internet. NGI offers financial support to grassroots open-source development projects, with 80% of these projects dedicated to creating open-source software. The [European Data Governance Act](#), as part of the [European Data Strategy](#), aims to increase the availability of data across Member States and to build “common European data spaces” (EU Data Governance Act, (2)) across various sectors, including health, mobility, public administration and agriculture. The European Data Governance Act has been applicable since September 2023. Further initiatives, including an [EU wide eID](#) and an [EU space-based secure communication system](#), are still in planning stages.²

Like India, the EU also sees digital commons and public digital infrastructures as a measure to counter the dominance of private tech giants in crucial digital infrastructure (Keller, 2023).

² For the main EU initiative on infrastructure projects in cooperation with partner countries and other world regions in various sectors including the digital sector, see the [Global Gateway](#) initiative.

Through collective creation and shared ownership, digital commons can expand the availability of software, data and knowledge outside the realms of commercial tech enterprises (Keller, 2023). With this, they can be a substantive support for the [European Digital Rights and Principles](#), including for privacy protection, inclusion and decentralisation (European Commission, 2023a; European Working Team on Digital Commons, 2022).

With [its contribution to the UN Global Digital Compact](#), the EU underlines the need for a modern regulatory framework as a prerequisite for fostering a more equitable and values-driven digital environment. Over recent years, there has been a growing willingness to regulate the digital space with the explicit goal of upholding democratic values and individual rights. Two crucial elements of these regulatory efforts are the [Digital Markets Act](#) and the [Digital Service Act](#). However, these regulatory efforts primarily aim to regulate and curb the power of dominant commercial platforms, treating the current platform ecosystem as inevitable (Keller, 2023). While essential, these efforts fall short of innovating, designing and building an alternative model to digital infrastructure and services provided by private tech giants that would safeguard the digital values and sovereignty that the EU aspires to attain.

Besides comprehensive regulatory frameworks and governance structures, addressing questions of fairness, accountability and inclusivity in digital infrastructures is only possible when such infrastructures are state-backed, incorporating responsive accountability mechanisms, including, but not limited to, audit systems and grievance redressal mechanisms (Keller, 2023).

Converging digital public infrastructure and digital commons via the G20?

Both India and the EU recognise the potential of DPIs and digital commons in progressing SDGs. To achieve this, it is crucial to design and implement DPIs and digital commons as digital public goods. A digital solution can be classified as a digital public good³ when it embodies open-source principles, adheres to privacy standards and other best practices, and is highly relevant to the pursuit of the UN 2030 Agenda (Digital Public Goods Alliance, 2023).

However, on the global scale, a significant challenge of implementing digital public goods lies in the uneven distribution of existing digital public goods in terms of language, content, and the required local infrastructure to access them (UN, 2020, pp. 8-9). Even when a relevant digital public good or open-source solution is identified, substantial support and additional investment are often necessary to implement and test them, then to scale up effectively in order to put them into practice. Recognising these challenges, the UN Secretary-General's Roadmap for Digital

³ Digital Public Goods Alliance (2022) established the Digital Public Goods Standards, which outlines a set of specifications and guidelines aimed at fostering consensus about whether a digital solution aligns with the definition of a digital public good.

Cooperation emphasises the need for a concerted global effort to create digital public goods a critical step in advancing progress towards SDGs (UN, 2020, p. 9).

In this context, a multilateral forum such as the G20 offers a platform for knowledge-sharing, consensus-building on DPIs/digital commons and how to implement these tools as digital public goods on a global scale. The key step for the G20 is to establish a joint understanding of core principles and values that govern digital resources. Rather than solely concentrating on technical aspects, the G20 should focus more on the broader supportive ecosystems for DPIs. While arriving at a singular definition for DPI might be challenging and not feasible, outlining a framework that offers a fundamental structure for comprehending DPIs is attainable (Kapoor & Watson, 2023). The evolving mutual comprehension of DPI and digital commons could potentially pave the way for a joint vision that guides their future development. This vision should draw from extant practices in different world regions, such as India’s vast experience in DPIs or the EU’s ongoing efforts in formulating regulatory frameworks and governance structures. Thus, the G20 can play a central role in advancing global cooperation in the digital realm.

Under the Indian Presidency of the G20 in 2023, DPI has been prominently taken up in many discussions, ranging from [the G20 New Delhi Leaders’ Declaration](#), financial inclusion in the [Finance Ministers and Central Bank Governors meetings](#), the [Digital Economy Working Group](#), to [Task Force 2 “Our Common Digital Future: Affordable, Accessible and Inclusive Digital Public Infrastructure”](#) in the [Think20 \(T20\) engagement processes](#).⁴ It addresses questions on how DPI can serve the global good as well as its relevance for implementation of the SDGs. Related discussions also took place in the T20, the official engagement group of the G20 of Think Tanks. To illustrate, researchers and practitioners use the concept of “global digital commons” to exchange conceptual and definitional views of DPIs and digital commons.⁵

In this context, knowledge and access equality for the interoperability of real-time data and AI are considered important, as well as (geo)political will to address the increasing US–China tensions over digital topics, and the monopolistic digital capture of markets and spaces by private, for-profit players. Sufficient financial resources for digital commons/DPI are necessary to create a robust global ecosystem with relevant connectivity, interface devices and skills of users. Crucially, the research community calls for the development of global standards, bodies, procedures, security and quality for digital commons/DPI through international political (data) agreements.

⁴ For earlier work on the topic in the T20 context, see, for example, Anandaram et al., 2021.

⁵ See T20 Summit 2023 side event on “Utopias of global cooperation: Toward joint visions for global digital commons” jointly organized by [Gateway House: Indian Council on Global Relations](#) and [German Institute of Development and Sustainability \(IDOS\)](#).

Conclusion

The concepts of DPI and digital commons come with great potential for sustainable development. India is a pioneer in the field of DPIs, understood as open and interoperable technologies that facilitate essential functions in both public- and private-service delivery. DPIs are seen as a means to achieve development objectives and enhance public-service delivery through large-scale digital technologies. The main approaches to DPIs in India are public–private partnerships and platform-like roles.

Meanwhile, the term digital commons has gained substantial attention within the EU. It refers to digital resources that adhere to principles of open access, equitable benefit-sharing and management rights. According to the EU, digital commons are vital for bridging geographical disparities and promoting inclusivity and transparency. Unlike India’s extensive experience in implementing DPIs, concrete digital commons initiatives are mostly visible at the level of the EU Member States. The EU places greater emphasis on modernising regulatory frameworks and governance structures. For public digital infrastructures to remain independent from market forces and private for-profit entities, they must rely on public funding. Consequently, the establishment of a European Public Digital Infrastructure Fund is essential for building a free, open and democratic digital space in Europe. As outlined in the “European Public Digital Infrastructure Fund White Paper” (Keller, 2023), this fund should be created and financed at the EU level, either through a direct EU initiative or as a result of voluntary cooperation among multiple EU Member States. The realisation of such a fund remains to be seen.

Despite differences in priorities and implementation strategies, both India and the EU recognise the potential of DPIs and digital commons to counter the dominance of private technology giants in some critical digital infrastructures and, most importantly, as catalysts for advancing the SDGs. Implementing DPIs and digital commons as digital public goods entails adhering to open-source principles, upholding privacy standards, and ensuring a high degree of relevance to pursuing the UN 2030 Agenda. Such efforts align with the ongoing global initiative to create digital public goods, as outlined in the UN Secretary-General’s Roadmap for Digital Cooperation.

While achieving a singular and precise definition of DPIs and digital commons may not be feasible, the G20, as a multilateral governance forum, could serve as a platform to establish a broader consensus on these concepts. The focus should be on developing a comprehensive framework for understanding DPIs and digital commons. It could also draw on India’s extensive experience and the regulatory frameworks currently being developed by the EU. Additionally, it is crucial to engage with the interests and concerns of other stakeholders and countries, as exemplified by the outcomes of the side event held at the T20 Summit in 2023. This collaborative approach will ultimately contribute to policy discussions and negotiations during the Summit for the Future scheduled for 2024.

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