



**Harnessing Digital Public
Goods and Infrastructure to
Achieve the SDGs**

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Harnessing DPGs for SDGs

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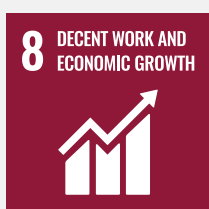
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SDGs are underpinned by good governance at population scale

Governance matters to achieve the SDGs:

The UNDP states “we know that improvements in governance, including its transparency, inclusiveness and effectiveness are important in themselves and as foundations upon which to structure and implement policies to accelerate progress towards the goals and their targets.”¹ Foreign aid support to government revenues in developing countries, and therefore to their spending on education, health, and infrastructure, will most likely decline if economic growth continues to exceed that of donor countries. Total government revenues of low income countries are only about 22% of GDP – raising those revenues and capacity for expenditure requires increasingly strong and capable governance.

Robust public sector delivery underpins several SDGs:

When considering the SDGs, their achievement is predicated on the ability to deliver high quality public goods and services in each country.

1. Several SDG indicators focus on outcomes that come from effective public systems. Take for example a national identity system that enables citizens to register their identity with the public sector is foundational to their ability to access a wide range of public services from birth certificates (SDG 16.9), land titles (SDG 1.4), bank accounts (SDG 8.10), public social protection schemes (SDG 1.3), access to public schools (SDG 4.1) and health clinics (SDG 3.8)². The SDGs also look at the experience of populations with public services (SDG 16.6.2)³. Seen together, there is a robust focus on ensuring accessible and quality public service delivery within the SDGs.
2. The SDGs also focus on fiscal efficiency and effectiveness of the public sector such as primary government expenditure as a proportion of the original approved budget (SDG 16.6.1), proportion of domestic budget funded by domestic taxes (SDG 17.1.2) along with sectoral indicators on government spending viz. total govt spending on essential services (SDG 1.a.2), agriculture (SDG 2.a.2), Water and Sanitation (SDG 6.a.1), and Energy (SDG 7.a.1). This underscores the financial sustainability aspect of the SDGs⁴.

¹ Hughes, B.B., Hanna, T., McNeil, K., Bohl, D.K., & Moyer, J.D. (2021). Pursuing the Sustainable Development Goals in a World Reshaped by COVID-19. Denver, CO and New York, NY: Frederick S. Pardee Center for International Futures and United Nations Development Programme

² Ingram, G., McArthur, J.W., Vora, P. (2022). How can digital public technologies accelerate progress on the Sustainable Development Goals?. Brookings Global working paper #174. Brookings Centre For Sustainable Development

³ <https://sdgs.un.org/goals/goal16>

⁴ <https://sdgs.un.org/>

State capacity is a constraint on public sector delivery:

Public sector delivery depends on the ability of countries to mobilize and harness resources to achieve public objectives. The ability of a state to collect taxes, enforce law and order, and provide public goods and services can be seen as state capacity⁵. When trying to deliver public sector services, it is critical to factor for state capacity when designing programs and setting targets.

A key principle is to design for current levels of state capacity. This means avoiding transplanting complex procedures and institutional structures that have evolved over decades and centuries in other countries (aka isomorphic mimicry⁶), and instead designing policies and procedures that are more suited to the local context. This allows the public sector to develop plans that are implementable, leading to effective service delivery on the ground.

Similarly, when collecting taxes, starting with a complicated regime can increase the burden on taxpayers to comply, while creating avenues for rent seeking within the public sector. By right-sizing expectations (both internal and external) on the states' capacity to deliver, it is viable to both set realistic targets and achieve them, thus building confidence within the public sector and trust with the public. As the public builds trust in the state's capacity to deliver, the willingness to pay taxes increases, thus helping improve resource mobilisation of government.

State capacity can be built over time:

While we treat state capacity as a starting constraint, we invest in building it to meet the needs and aspirations of the public over time. To improve state capacity, we propose two tracks, namely

1. Enhancing state capacity by investing in local institutions, staffed with personnel with the requisite skills to administer the relevant services or functions of government, and
2. Augmenting state capacity by procuring technology, expertise, and manpower to bootstrap the operations of public sector programs.

The Enhance track recognises that, in the long-term, states are best served by having in house capacity to shape public policy and execution. The Augment track recognises that, while building long-term state capacity, there is still an imperative to deliver public services in the short term — this in itself is needed to build trust and social and political capital for the long-term journey. Augment is ideally a self-obsolencing track; as local state capacity is built over time, the reliance on external expertise can be tapered down, and operational management can be transitioned to the state's own institutions.

The Augment track is also a recognition of the need for governments, civil society, and markets to collaborate effectively. By harnessing the capacities inherent in civil society and markets, governments can reimagine the possibilities of public sector delivery, beyond its internal capacity.

⁵ Johnson, N.D., Koyama, M. (2016). States and economic growth: Capacity and Constraints. Centre for the Study of Public Choice, George Mason University.

⁶ Pritchett, L, Woolcock, M, and Andrews, M. (2012). Looking like a state: Techniques of persistent failure in state capacity for implementation. CID Working Paper 239, Harvard Kennedy School.



1. To do this, governments need to be able to coordinate information flows and actions, across organisational boundaries and in a trusted manner, to ensure concerted action.
2. The practice and capabilities of information sharing are also essential to create greater transparency around the functioning of government; transparency is a key factor in creating trust, and also helps drive greater inclusiveness, as the status of a given program and what recipients it is reaching (vs. leaving out) will be evident for all to see and act upon.
3. Even after a government has tapered down its reliance on external expertise for its internal capacity, it may still find that it achieves economies of scale and efficiency gains by continuing to collaborate with civil society and markets in delivering public services.
4. A government that has once walked the Augment-to-Enhance journey can also become a provider of this resource to other governments, and is itself better placed to initiate and manage similar transformations in other sectors.



Digital Public Goods and Infrastructures: Building State Capacity to Deliver

In order to achieve effective coordination of actions between the government and other stakeholders, and to ensure robust, shared, and trusted data is used to make decisions, we can explore the application of digital technologies. Considerations of Digital Sovereignty require that these technologies are unconstrained by copyright regimes and proprietary ownership. Further, given the emergence of privacy and confidentiality of individuals as key human rights issues of the 21st Century, robust protections need to be built into such technologies.

Technologies that meet these criteria are now recognised as **digital public goods** and **digital public infrastructures**⁷.

Digital Public Goods can help achieve the SDGs:

Digital Public Goods (DPGs) are open-source software, open data, open AI models, open standards, and open content that adhere to privacy and other applicable laws and best practices, do no harm by design, and help attain the SDGs. DPGs have been recognised by the United Nations Secretary General in his Roadmap for Digital Cooperation as critical for all stakeholders including the UN. DPGs are recognised and certified against a global standard by the Digital Public Goods Alliance (DPGA⁸).

Certified DPGs address a number of constraints and considerations faced by governments:

1. **Preservation of Digital Sovereignty:** Open source software, AI models, standards, and content can be leveraged and reused by anyone without needing to enter into contracts with their creators. Governments can leverage DPGs in their digital transformation journeys, and evolve them as they see fit, without being subject to considerations of dependence on the original provider to modify or customise the DPG. Further, unlike in the case of proprietary digital systems, where host governments can pressure the software or service providers to deny or compromise service to other governments (e.g. Russia being shut out of the SWIFT networks as a response to the war in Ukraine), DPGs are less prone to geopolitical weaponisation, as the control over implementation rests in the hands of each implementing government.
2. **Mitigate Vendor Lock-in:** When selecting proprietary solutions, governments may end up being locked in with the vendor providing the solution; switching between different solutions becomes a costly affair, often involving a lot of rework and ab-initio data capture. With DPGs, governments can choose to switch vendors⁹ while retaining control over their systems, as well as be assured of their ability to migrate systems completely while retaining all the data generated till the date of migration¹⁰.
3. **Rationalise spend on technology components in digital transformation programs:** in resource-constrained environments, DPGs eliminate licensing and related fees of proprietary solutions, freeing up fiscal bandwidth to invest in other parts of the program, especially capacity building, awareness campaigns, and change management — which are equally crucial to program success.
4. **Aligned to Digital Development Principles:** The Digital Development Principles guide the creation of public interest technologies like DPGs to mitigate harms, improve user centricity, and ensure interoperability. The DPG Standard incorporates key principles, thus giving adopters the assurance that these principles are baked into any DPG they adopt.

⁷ [Unpacking concepts & definitions – digital public Infrastructure, building blocks, and their relation to digital public goods » Digital Public Goods Alliance](#)

⁸ <https://digitalpublicgoods.net/>

⁹ This presumes sufficient market depth in the vendor ecosystem, which can be substantiated by the emergence of vendor ecosystems around current proven DPGs like DIGIT, MOSIP and DHIS2.

¹⁰ This follows from the DPG standard requirements that need DPGs to have mechanisms for extracting and importing non PII data, as well as platform independence to be able to migrate between different underlying components.

Digital Public Infrastructure helps countries realise value from DPGs:

Digital Public Infrastructures (DPIs) are solutions and systems that enable the effective provision of essential, society-wide functions and services in the public and private sectors, including digital ID, civil registration, payment, data exchange, and information systems. **Critically, while a digital public good exists as potential value, DPIs help countries realise their value in working, population-scale implementations.**

Unlike physical infrastructure, the incremental cost to governments of providing access to digital public infrastructures to citizens is minimal, as they can be scaled exponentially with relatively small investments in the underlying hardware/cloud infrastructure.

1. Well-functioning DPIs have shown a significant impact on the ability of governments to improve public service delivery, especially where physical infrastructure is not a binding constraint.

- For example, between 2014 and 2016, the Government of Sierra Leone developed OpenG2P to provide cashless payments to front line workers during the Ebola epidemic. The same system was leveraged again during the COVID-19 pandemic to enable social protection transfers, and is now being expanded to multiple other social protection programs.
- India's investments in the Aadhaar National ID system, the Jan Dhan program, and the increase in mobile connections (popularly known as the JAM trinity) led to a significant proportion of the population gaining access to banking within a decade (without the underlying DPI, the same journey would have taken 47 years). When COVID-19 hit India, in addition to leveraging the DPI for social protection programs, other DPIs like CoWIN and the National e-pass system helped it weather the initial wave of lockdowns, and vaccinate its billion plus population in a timely manner. DIGIT, a governance-focused DPG, is being leveraged as a DPI by over 800 Indian cities to provide municipal public services to all citizens, and is now being scaled nationally to cover all cities by 2024.

2. DPIs enable governments to ensure more effective translation of policy intent into on ground execution – i.e. build state capacity:

- Where services can be delivered digitally (eg: registrations, licenses, certificates, assessments and payments of taxes and fees) the DPI can minimise the burden on government employees to deliver/manage these services, since most of the process can be completed digitally with minimal human intervention. By enabling governments to deliver more services digitally, DPIs can be seen as augmenting state capacity by reducing the load on human beings to deliver services. E.g. Trust-based issuance of trade licenses and birth certificates, supported by the digital submission and verification of documents, can reduce the burden of visiting government offices to avail these services.
- Where services are delivered physically, DPIs still play a role in managing the process and prerequisite information collection, management and dissemination, thus minimising coordination costs and reducing information related delays for all stakeholders. E.g. When applying for a water connection, all administrative steps preceding the actual physical connection of the household to the pipeline can be completed digitally, and the citizen can be notified of the expected date of receiving the physical connection.
- DPIs reduce administrative burdens on frontline employees, as the information they need to complete their work is available on their mobile devices. In addition, work-related reporting is autogenerated by the DPI as part of its functions. This frees up employee bandwidth to improve both the quality and quantity of services they deliver.
- As different departments are onboarded on to existing DPIs (or establish their own DPIs), the interoperability of these systems reduces information asymmetry, improves coordination of actions, and rationalises the expenditure of public funds.

- Over time, the data generated by these DPIs becomes a rich source of insight into the functioning and effectiveness of different policies across various contexts, thus enabling policymakers to iteratively refine policies and their implementation.

3. **DPIs enable reimagination of public service delivery by creating a foundation on which governments, civil society and markets can innovate:**

- As DPIs achieve scale and more public services are onboarded, they create a foundation for partnership between governments, civil society, and markets:
 - * Even in the 21st century, there is a significant level of internet poverty ¹¹ that can act as a barrier to accessing digital services ¹². Civil society organisations can be instrumental in overcoming these barriers by partnering with governments to intermediate access to digital public services for communities with high levels of internet poverty. Building such partnership models can act as a bridging strategy for countries, even as they continue to invest in improving connectivity infrastructure and access.
 - * Policy think tanks and research organisations face lower costs of research by leveraging trusted public data generated by DPIs. This allows them to focus their time and resources on investigating this data, as well as to sharpen the focus of primary data collection to augment/validate insights from public data. This can lead to greater depth and nuance in research efforts, bringing more actionable insights for policymaking and program implementation.
 - * Market actors can play multiple roles in supporting DPI-powered public service delivery, including: (a) implementation, support, and maintenance for the DPI, and (b) partnering with governments to extend DPI access through their on-ground networks/retail outlets.
- As DPIs are opened up for greater interoperability with external systems, this improves opportunities for collaboration and reduces trust barriers:
 - * Market players who are typically averse to working with governments due to issues of predictability of projects, payments, and approvals are more likely to participate if they have visibility into upcoming programmes and work plans, especially if the associated financial processes are also transparent.
 - * Private players can also leverage public digital infrastructure to lower their costs of operations (eg: reducing the costs of KYC, fraud prevention, payments, and transfers have all been achieved through DPIs in India)
 - * Data collaboration across government, private sector, and civil society using the DPI can help converge multiple data sets, enabling holistic problem-solving by cross-leveraging information.
 - * Over time, as more systems interoperate with the DPI, the quality of collaboration improves at a society wide level. For example, in Estonia, over 1,000 organisations directly and 52,000 organisations indirectly use X-Road to collaborate and exchange data, leading to over 1.5 billion transactions per year across over 3,000 e-services (representing over 99% of public services) ¹³. It is worth noting that this journey occurred over 2 decades, underscoring the fact that society-wide absorption of digital infrastructure is a marathon.
- As systemic behaviour shifts to leverage DPIs to support policy execution, it becomes easier to iterate and adapt policies for emerging problems.

¹¹ Ingram, G., McArthur, J.W., Vora, P. (2022). How can digital public technologies accelerate progress on the Sustainable Development Goals?. Brookings Global working paper #174. Brookings Centre For Sustainable Development

¹² [Last mile access to urban governance \(aapti.in\)](https://aapti.in/)

¹³ [X-Road - e-Estonia](https://x-road.ee/)

- * Proposed changes to policies can be trialled in ring-fenced regions, creating real-world sandboxes. E.g. A city that is planning on shifting to a new taxation regime can run a pilot in a limited area to test and refine the regime and implementation before scaling it up to the entire population – this can be easily achieved by designating the pilot region within the DPI, and enforcing the new regime there, while the neighbourhoods that are under the old regime act as control / comparison sites.
- * Given the flexibility that DPIs enable, governments can also explore new delivery pathways and models over time, leveraging collaborations with new actors. Public service delivery, for instance, can expand to include new partners who are better placed to extend the reach of these services. Such assisted-access models can bridge issues of access, convenience, trust, and literacy, with the DPI ensuring seamless coordination between the government and its partners. E.g. The Government of Andhra Pradesh has enabled assisted access through a network of over 5000 ward secretaries and ward volunteers, who visit communities to identify their needs and help access services at their doorstep across 114 cities. Similarly, in the city of Ajmer, the NGO CFAR has established community-run helpdesks to help low income communities access services, while also creating employment for the help desk operators. Both these interventions are focused on improving ease of access, overcoming literacy gaps, and building trust through human interaction.

DPIs can be harnessed to drive a systemic push to achieve the SDGs

Achieving the SDGs with speed requires coordinated action, shared information, ecosystem collaboration on a foundation of good governance.

1. As per UNDP's estimates, global progress on the SDGs has been set back by 6 years due to the impacts of COVID-19, essentially taking us back to square one. However, even before the pandemic, the world was not on track to achieve the SDGs by 2030. Some of the key challenges included:
 - Policy efforts and commitments supporting the SDGs vary significantly across countries. It is important to mainstream SDGs into national, local, and sectoral targets, strategies, and plans.
 - Need for greater management and coordination among government agencies, ministries, and departments at national and sub-national levels. This should be accompanied by a strong leadership from an agency with the authority to coordinate within the government system.
 - Limited access to financing, particularly in the case of the low-income countries (LICs) and lower-middle-income countries (LMICs) which lack market access to capital on acceptable terms.
 - Lack of availability and accessibility of real-time disaggregated data is critical for effective planning. It is difficult to compile metadata on SDG indicators at local and national levels. Less than half of the countries have internationally comparable data ([UN Stats](#)).
2. Building back requires us to not only recover the 6-year-loss, but also accelerate progress through improved multi-stakeholder coordination and execution. DPIs enable population-scale, multi-stakeholder coordination and execution:
 - **Interoperability of systems busts siloes:** Governance is the starting point of silo-busting, with a need to improve internal coordination among government agencies, ministries,

and departments. This should be accompanied by greater engagement with civil society and the private sector to harness their capabilities in delivering the SDGs. When systems interoperate, this leads to improved coordination between different stakeholders. DPIs foster coordination through interoperability by design.

- **Shared data leads to shared understanding:** Shared public data that is accessible within and beyond government enables faster identification of key issues, leading to shared understanding, and forms the basis for coordinated action. These changes again start within government, and extend with making this data widely available to all actors involved.
- **Coordinated actions and fulfilling commitments builds trust at scale:** Policy efforts and commitments that are broken down into action plans that can be tracked and operationalised by national and sub-national governments, supported by private sector and civil society involvement. As organisations agree on coordinated action plans and fulfil their commitments, to each other and to citizens, this improves trust between them and public trust as a whole. Trust is essential for undertaking long-term reforms, which can have the greatest impact on SDG achievement over time.
- **Improved Data, Execution and Delivery can improve access to finance:** As outcomes start getting delivered on the ground, with underlying performance data simultaneously visible, LMICs can leverage this to negotiate better terms when accessing capital from markets.



Connecting the dots by moving a single SDG indicator

Consider a single indicator from SDG 11: SDG 11.6.1 - *Proportion of municipal solid waste collected and managed in controlled facilities out of total municipal waste generated by cities.*

We will need to consider the whole municipal solid waste value chain and think about how the different actors in it can be supported by a DPI.

- Typically municipal solid waste is generated at the household level;
- It is collected by the municipal government or its contractors;
- It is transported to a sorting site to be segregated into different categories;
- It is then transported for processing to appropriate facilities (eg: some facilities specialise in paper wastes, others in plastic wastes, etc.) for reprocessing / recycling;
- Some cities require residents to segregate organic waste at the household level, which is typically redirected for composting.
- Waste which cannot be recycled or reprocessed is sent to landfills for scientific disposal.

A DPI could support cities by:

- enabling individualised route planning for municipal waste collectors;
- reporting tools for them to identify households that do not segregate household waste;
- logging tools to track waste collected and/or deposited at each facility along the way; and
- complaint/feedback/monitoring tools to prevent unauthorised dumping of waste.

This DPI would work well if it improved the ease of working of frontline workers throughout the value chain, while generating the data needed to monitor the amount of waste generated and treated.

- This data can be used by policymakers, city administrators, resident welfare associations, waste management companies etc. to manage their activities, implement behavioural interventions for improved waste management, and eventually bring the bulk of the city's waste under a process of scientific collection, treatment, and disposal.
- As an operational system it functions as a support to the city's sanitation systems, while reducing information exchange and coordination costs between different actors.

It is possible to identify several SDG indicators where DPIs help improve measurability, actionability, and coordination. While not all SDG indicators may be impacted by DPIs¹⁴, in areas where service delivery, social protections and welfare schemes have a role to play in moving SDGs, DPIs can form a crucial lever in driving SDG achievement. Even after the SDGs are achieved, the DPIs will continue to form the base infrastructure for continued development in each country, helping to sustain and build upon the gains achieved.

¹⁴ For instance, (5.5.1 Proportion of seats held by women in (a) national parliaments and (b) local governments)

Global Trends around DPGs and DPIs for the SDGs

While DPGs and DPIs have been around for some time, a greater focus has been placed on them in recent years. The momentum for this had been building before the COVID-19 pandemic, and has only accelerated since with a global shift to digital first means of working and communicating.

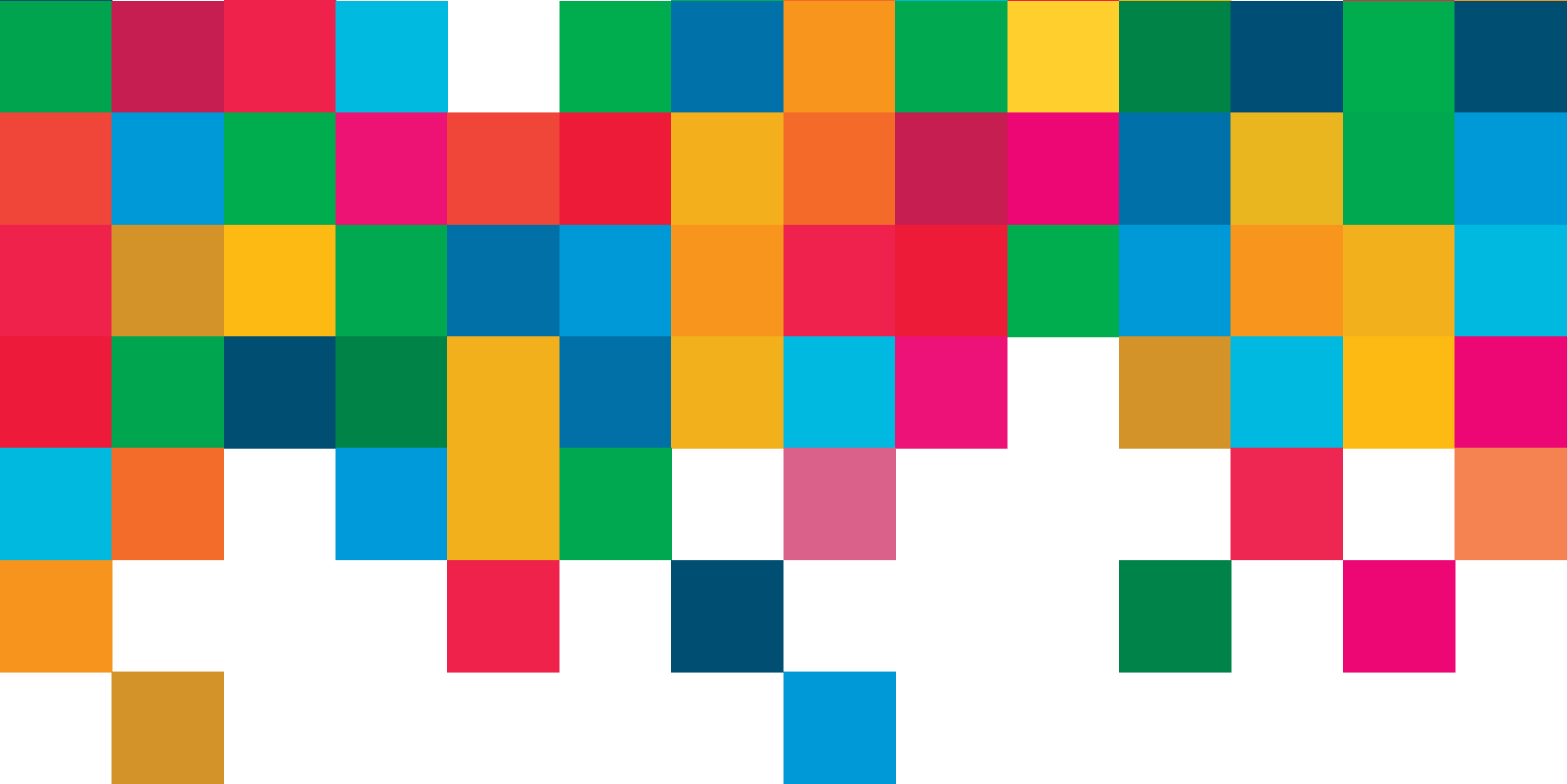
Global commitments to supporting DPGs and DPIs:

Some of the key tailwinds around DPGs and DPIs include:

1. Through the DPG Charter multiple countries, multilaterals and philanthropic foundations are making pledges to adopt and implement DPGs as part of their development goals and strategies. A list of pledges can be seen [here](#).
2. Existing funders of DPGs and DPIs are doubling down on their commitments to the DPG space, as well as mobilising funding coalitions like [Co-Develop](#) to crowd in funding for DPGs and DPI implementations.
3. Initiatives like World Bank's [ID4D](#) and [GovStack Global](#) are leveraging multilateral and bilateral resources and networks to catalyse digital ID and public service delivery programs in LMICs.
4. Multi-stakeholder initiatives such as [GovStack](#) are working to make DPGs and DPIS, as well as the expertise and capacity to operate them, available to multiple LMICs. They are developing [building block specifications](#), and — with funding support from entities such as the European Union — starting implementation in the Horn of Africa region.

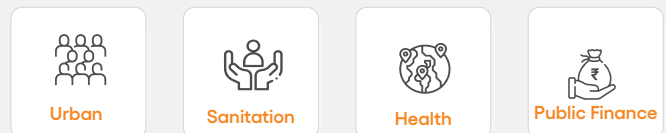






About eGov

eGov Foundation started its journey in 2003 towards building ease of access and ease of living for every citizen and has been early on the digital infrastructure initiatives. Over the last 19 years, we have worked across India to spur new solutions and enable local capacity to solve problems.



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