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Assessing the Socioeconomic Impacts of Digital Public Infrastructure

Results from the 2024-25 Pilot and Way Forward

Implemented by

GDN Global Development Network

Supported by

CO CO-DEVELOP

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Preface

Digital Public Infrastructure (DPI) represents foundational, society-wide digital systems, such as digital identification, digital payments, and data exchange platforms that are expected to accelerate inclusive participation in today's increasingly digital economies and polities. These systems are designed to be interoperable and publicly accountable, forming the backbone of digital service delivery in both public and private sectors. DPI is increasingly viewed as key to development in the Global South, yet there is **limited empirical evidence** of its micro- or macro- socio-economic effects. This evidence gap is problematic: without a robust understanding of DPI's impacts, countries risk misallocating resources or pursuing **inefficient digital investments** which may not advance their development efforts.

There are many questions to be asked and answered about the link between DPI and development, and these range from its definition to its characteristics to its impacts, each of these being important in shaping public expenditure towards it. DPI is considered by many to be a pure public good that automatically warrants public subsidy but many DPI components exhibit elements of rivalry or exclusivity (e.g., bandwidth can congest, services can charge fees or require logins), meaning DPI is not automatically non-excludable or non-rival in the classic sense. Given its positioning as a tool for advancing development and its push within the Global South, is it more useful to think of the true economic imperative of DPI as to whether it generates **social benefits beyond private gains**. For example, network externalities where each additional user increases the value for others. If such positive externalities (or conversely, social costs) exist that individual market actors cannot capture or internalize, is there a strong case for **policy intervention** (such as subsidies, regulation, or public investment) to align DPI expansion with the public interest? How do we design and redesign DPI by harnessing local research in a way that continuously improves its propensity to contribute towards development?

If DPI is a response to pressing market failures, a **rigorous economic framework** is needed to distinguish genuine market failures from ordinary market outcomes, or in other words, to know under which conditions, if at all, DPI can deliver on the promise of accelerated development, justifying large-scale investments in this domain across LMICs. Grounding the DPI debate in sound socio-economic analysis will help ensure that its potential is realized in an efficient, inclusive manner, maximizing public benefits without imposing undue burdens on governments or citizens. It will guide governments to debate and decide on how to adopt and adapt DPI to accelerate their own vision of development

Against this backdrop, the Global Development Network (GDN) has been actively exploring a **global research program** to study the socio-economic impacts of DPI. GDN brings extensive experience in conducting "fit for purpose evaluative research", a mixed-method, quasi-experimental approach. Over 2017–2021, GDN's partnership with the European Investment Bank demonstrated that quasi-experimental evaluations can provide rigorous evidence more quickly and on more variables that can be captured by the surveys that typically constitute traditional experiments. This pilot on DPI builds on that experience. **DPI is not a singular, discrete intervention** that lends itself easily to randomization; it is an evolving ecosystem of platforms and policies that must adapt to local contexts, and fit within existing bureaucracies and models of public and private action. The remainder of this report details the results of GDN's DPI pilot program, evaluates what we have learned about the socioeconomics of DPI, and outlines a path forward for scaling up this initiative in partnership with the broader development community.

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Pilot Overview

Between July 2024 and March 2025, **GDN** implemented a pilot program titled "*Assessing the Socio-Economic Impacts of Digital Public Infrastructure*," with funding and strategic support from **Co-Develop**, a global non-profit fund leading the "50-in-5" initiative to accelerate DPI adoption in 50 countries within five years. The program launched three country-level pilot studies in **Bangladesh**, **Benin**, and **Ethiopia**, bringing its unique model of local research capacity building coupled with selected studies that involved high-quality, research-driven evaluation. Each pilot was executed by a **local research institution** selected by GDN, ensuring that the work was led by in-country experts embedded in the national context. The three implementing partners were: the South Asian Network on Economic Modeling (SANEM) in Bangladesh, the African Center for Equitable Development (ACED) in Benin, and the Ethiopian Economics Association (EEA) in Ethiopia. GDN facilitated collaboration among these teams, that worked in parallel and shared methodological approaches and data strategies throughout the pilot. Regular exchanges (both virtual and in-person) enabled the researchers to compare notes on defining DPI, accessing data, and choosing appropriate analytical tools. This collaborative approach not only improved the quality of each case study but also helped build a nascent network around DPI evaluation across the three countries.

Each pilot study was tailored to the country's context and policy priorities as they were understood by the principal investigators.

In **Bangladesh**, the research focused on quantifying DPI's contribution to socio-economic development at both household and regional levels. The SANEM team examined how access to foundational DPI systems (like digital ID and digital financial services) correlates with measures of household welfare and broader economic activity.

In **Ethiopia**, the study led by EEA centered on the use of the national digital ID (Fayda) and related e-governance platforms, assessing their macro-level impacts on growth, service delivery, and governance outcomes.

In **Benin**, ACED's researchers investigated a specific DPI use-case in the transport sector: the country's adoption of the X-Road interoperability platform through an application called "SECUROUTE." This case provided a window into how DPI can improve sectoral governance and service delivery (in this instance, vehicle registration, tax and safety compliance).

Table 1 (page 5) summarizes the focus of each pilot project for quick reference.

GDN's role went beyond funding these studies, and facilitated a process of co-constructing research agendas based on a seed grant model, with an aim to scale up both these individual studies and the overall approach over the coming years. The local teams co-constructed their research questions with government counterparts overseeing DPI implementation, to ensure relevance and buy-in. Each team also received guidance from an assigned **Scientific Advisor**, an external expert in impact evaluation. These consisted of Prof. Jaideep Prabhu (Cambridge University), David Eaves (UCL), and Jonathan Dolan (Digital Impact Alliance).

Therefore, GDN and its partners pursued **fit-for-purpose evaluation strategies** tailored to each country's situation. Across the pilots, such approaches proved **equally, if not more effective,** in generating evidence to inform policy adaptation and implementation of DPI. GDN's networked evaluative research model leverages local researchers' deep understanding of policy roll-out and data access, augmented by mentoring from global experts, to produce high-quality evidence faster and with fewer resources than traditional methods. This pilot was premised on that model, aiming to elevate **Southern-led, evidence-based insights** on DPI to the global stage.

COUNTRY	LOCAL RESEARCH PARTNER	DPI USE-CASE RESEARCH FOCUS	EVALUATION APPROACH
Bangladesh	South Asian Network on Economic Modeling (SANEM)	National DPI systems (e-ID, digital payments, etc.) and their impact on households and regions	*Quasi-experimental and qualitative interviews:* Propensity Score Matching on household survey data; Instrumental Variable analysis using Night-Time Lights as a proxy for economic activity; Key Informant Interviews with stakeholders.
Ethiopia	Ethiopian Economics Association (EEA)	Integration of the **Fayda national ID** with tax administration, e-services, and financial inclusion; broader digital ecosystem mapping	*Panel data econometrics and qualitative interviews:* Fixed-effects regressions on 23-year panel of development indicators and DPI proxies (e.g., e-Government Development Index); Policy analysis and institutional mapping; stakeholder interviews (key informants across ministries).
Benin	African Center for Equitable Development (ACED)	**X-Road interoperability platform** – studied via the SECUROUTE application for road transport governance (vehicle registration, tax and safety enforcement)	*Mixed methods, descriptive:* Mapping of existing DPI (e-ID, PKI, electronic payments, X-Road) through qualitative research; participatory workshops to co-design an evaluation framework; development of indicators for transparency and service delivery outcomes in SECUROUTE.

Table 1: Overview of DPI Pilot Projects in Bangladesh, Ethiopia, and Benin

GDN's Coordination and Technical Backstopping

Throughout the pilot, GDN pursued a model for managing the project, which involved continuous learning on the part of all stakeholders including stocktaking and updates where necessary. This was due to the lean nature of the pilot in terms of duration and resources as well as the need to align concepts and goals given the particularly local nature of DPI implementation differentially lending itself to research in each country. This model includes both close interactions with the program team at GDN and self-paced interactions with the independent scientific advisors. While the latter helped maintain analytical rigour, the former coordinated each project separately to ensure comparability, while allowing flexibility for each country's unique situation.

By the end of the pilot, the three teams had not only produced new evidence on DPI in their countries but had also built stronger networks with policymakers (e.g., ministries of finance, IT agencies) and with each other. This **pilot collaboration between GDN and Co-Develop** thus served as a proof of concept: locally-led, globally supported and fit-for-purpose evaluative research can generate policy-relevant insights on digital infrastructure within a short time frame, and in close coordination with national stakeholders. The next sections of this report delve into each country's case study, extract cross-cutting findings, and outline how GDN and Co-Develop plan to scale up this effort with interested partners and collaborators.

Case Studies

In the following section, we present three country case studies from the pilot: Bangladesh, Ethiopia, and Benin. Each case study includes a brief profile of the implementing team and advisors, it examines specific DPI use cases relevant to the national level, describes the methods employed by the research team, and presents key evidence generated.

Prior to analyzing country-specific cases, it is important to establish how 'digitalization' and 'Digital Public Infrastructure (DPI)' were interpreted within the scope of the studies, particularly given the absence of an agreed-upon analytical definition distinguishing DPI qualitatively from broader digitalization efforts. This distinction matters: confusing DPI with digitalization can lead to misguided policy, such as funding short-term dematerialization efforts instead of long-term infrastructure, as well as unnecessary duplication of digital solutions across sectors. Moreover, if DPI is designed and implemented like digitalization, i.e., without necessarily having inclusion at its core, it risks reinforcing digital divides in more profound ways.

All teams grappled with distinguishing general digitalization efforts from true DPI. In Bangladesh, the researchers emphasized DPI as the foundational digital systems enabling various services, in contrast to broader digital initiatives which might not meet the interoperability or public-good criteria of DPI. The Ethiopian team explicitly defined terms: digitalization as analog-to-digital conversion, digitalization as broader digital transformation of services, and DPI as the integrated platforms (like ID, payment, data exchange) that undergird multiple applications. This conceptual clarity, albeit preliminary, was a notable contribution of the pilot, ensuring that each study targeted core DPI elements rather than generic ICT projects. With this understanding, we now turn to the country-specific findings.

Bangladesh

LOCAL IMPLEMENTATION PARTNER

SANEM
RESEARCH | KNOWLEDGE | DEVELOPMENT

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USE CASE AND CONTEXT

Bangladesh's case study explored the socio-economic impacts of the country's growing digital public infrastructure. Bangladesh has made significant strides in DPI, laying a broad foundation of digital services and platforms. Notably, the government's flagship *National ID (NID)* system covers over 95% of the adult population, providing a unique digital identity to almost every citizen. Building on this, services like the *Porichoy* digital verification platform and the *Surokkha application* (used for COVID-19 vaccination registration) demonstrate the deployment of DPI for the registration and immunization of more than 131 million individuals. Additionally, Bangladesh has established more than 9,000 "Digital Centres" across the country: one-stop service hubs that blend physical access points with digital tools (often termed "phygital" infrastructure). These centers bring over 300 public and private services (from birth registration and land records to bill payments and telemedicine) to citizens' doorsteps, especially benefiting rural and marginalized communities. This highlights the need to view DPI as an integrated part of existing state infrastructure: not a substitute, and certainly not a replacement for human interaction. Given this advanced yet evolving digital ecosystem, the Bangladesh pilot asked:

How is DPI usage actually translating into socio-economic development for citizens?

METHODS

The SANEM research team in Bangladesh employed a **mixed-methods, quasi-experimental design** to answer this question. Quantitatively, the core analysis leveraged a recent national survey on ICT use (2023) to identify households and

individuals with access to key DPI services.

Using this dataset, the team constructed a socioeconomic status index (combining indicators of income, assets, education, etc.) and compared outcomes between those who use DPI and those who do not. Because individuals were not randomly assigned to "use" DPI, the team applied **Propensity Score Matching (PSM)** to create a statistically comparable control group. In simple terms, each DPI user was matched with a non-user of similar socio-economic profile (in terms of age, education, location, etc.), to isolate the effect of DPI access.

The researchers also innovatively incorporated Night-Time Lights (NTL) satellite data as a proxy for economic activity. By linking higher night-light intensity in a region to greater economic output, they used NTL to infer whether areas with more DPI penetration experience higher growth.

An **instrumental variable (IV)** strategy was tested as well, using regional variation in NTL as an instrument for DPI usage, to tackle potential endogeneity. On the qualitative side, the Bangladesh team conducted key informant interviews with government officials and digital service providers to understand the institutional and policy factors behind DPI rollout and usage patterns. These interviews provided context on challenges like data governance, digital literacy, and inclusion, complementing the quantitative findings.

EVIDENCE AND FINDINGS

Despite data constraints, the Bangladesh pilot yielded evidence that DPI access is associated with **improved socio-economic outcomes** for citizens. Households with access to DPI services were found to have a higher average socioeconomic index than similar households without DPI. Specifically, the PSM analysis showed that, after matching, individuals using DPI scored about 4.8 points higher on a composite socio-economic index (on a scale normalized around 0-100) compared to non-users. This difference was statistically significant, suggesting a meaningful positive impact. Put simply, **having access to digital ID, digital payments, and related services correlates with higher welfare.** The study team cautions that this is an observational result; DPI users may differ in unobserved ways but the rigorous matching procedure lends credibility to a causal interpretation.

The analysis of regional night-time light data reinforced these findings. Regions of Bangladesh with **greater DPI uptake showed higher night-time luminosity**, indicating more robust economic activity, even after controlling for urbanization and other factors. In other words, digital inclusion at the regional level tends to go hand-in-hand with development i.e., the next developed region has more DPI which corresponds to better economic outcomes as measured by night-time luminosity. A cross-country growth regression (using global data) further found that a higher e-government development index (a proxy for national DPI maturity) is associated with significantly higher GDP per capita.

Bangladesh's own performance in that global context was around the expected level and not an outlier, which implies it has room to improve its DPI to reach the income levels of more digitally advanced peers.

On the qualitative front, Bangladesh's DPI journey has yielded tangible benefits as well as challenges. The pilot documented that digital public services like the 9,000 Union Digital Centers have saved citizens time and money (for example, by reducing travel for government services) and improved transparency in service delivery.

Marginalized groups, such as rural women, have gained new access to services through these centers and mobile financial services. However, the research also highlighted critical gaps that could hinder inclusive DPI impact. Data systems in Bangladesh's public sector remain somewhat fragmented and inaccessible, making it hard to integrate services and perform unified analysis. Low

levels of digital literacy, especially among the elderly and less-educated, mean that many citizens still cannot fully utilize DPI offerings. Cybersecurity threats and data privacy concerns were noted, as Bangladesh has rapidly expanded digital services without equally robust legal frameworks for data protection. The pilot's disaggregated data show that DPI usage is lower among women, the poor, and rural residents, risking the **exacerbation of existing inequalities** if not addressed by design.

LOOKING AHEAD

The Bangladesh team, throughout their analysis of the Smart Bangladesh Initiative and use cases in health data systems, suggested areas of future inquiry. These include the governance implications of open vs. closed digital platforms, the intersection of trust and privacy in DPI usage, and the institutional dynamics that affect the uptake and utility of DPI at the sub-national level. These gaps could form the basis for more targeted research in future scaled-up studies, particularly around data governance and citizen-state interfaces in digital systems.

TEAM AND ADVISORS

The Bangladesh pilot was carried out by **SANEM**, a leading economic research institute based in Dhaka. The study team was led by Dr. Selim Raihan (Professor of Economics at Dhaka University and SANEM's Executive Director) and included researchers Eshrat Sharmin, Lubaba Mahjabin Prima, and Takrem Ferdous Surid. These researchers brought expertise in development economics and applied econometrics, which was vital for designing the PSM and IV analyses. The team engaged closely with Bangladesh's a2i (Aspire to Innovate) government program and the ICT Division to gather data and validate findings, reflecting a strong policy link.

During the project, the team received conceptual methodological mentorship from Jonathan Dolan of the Digital Impact Alliance including written feedback on their initial project proposal. This combination of local knowledge and external expertise helped SANEM navigate technical challenges (like addressing endogeneity) and produce a high-quality study. By the project's end, the Bangladesh team not only contributed valuable evidence for national policy dialogues (e.g., how to target DPI investments in lagging regions), but also strengthened their own capacity in cutting-edge evaluation methods such as the usage of NTL and remote sensing tools. The experience has positioned them to continue researching digital inclusion and to inform Bangladesh's ambitious digital transformation agenda with solid empirical analysis.

Ethiopia

LOCAL IMPLEMENTATION PARTNER

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ETHIOPIAN ECONOMICS ASSOCIATION

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USE CASE AND CONTEXT

Ethiopia's pilot study took a broad look at how digital public infrastructure interfaces with development and governance in a country at an earlier stage of digital transformation. Ethiopia has been investing in various components of DPI for instance, launching the **Fayda national digital ID** program, digitizing tax administration through an **Integrated Tax Administration System (ITAS)**, introducing e-procurement for government purchasing, and expanding digital financial services. However, these efforts are relatively nascent and Ethiopia's overall digital readiness lags behind some peers. By 2024, about 12.7 million Ethiopians had enrolled for a national ID (roughly 15.5% of adults), and electronic government services were being piloted in select areas.

The Ethiopian Economics Association (EEA) team framed their study by distinguishing different layers of the country's digital evolution: basic digitization of information, wider digitalization of services, and the higher-order DPI that connects systems and enables interoperability. They identified key DPI elements in Ethiopia to focus on, including the Fayda ID, e-tax and e-customs systems, digital payment platforms, and various e-government portals. The central research question was:

How do these DPI elements correlate with socio-economic development and governance outcomes in Ethiopia, and what are the barriers limiting their impact?

METHODS

The Ethiopia pilot combined **econometric analysis of macro-level data** with qualitative assessments of the policy and institutional environment. The EEA research team assembled a panel dataset spanning over two decades (2001–2022) to analyze trends. This dataset included indicators of development (e.g., GDP per

capita, human development index, structural change metrics) and governance (e.g., measures of corruption, government effectiveness), alongside proxies for digital advancement (mobile subscriptions, internet usage) and specifically DPI-related indices. Notably, the team drew on international benchmarks like the UN E-Government Development Index (EGDI) and the E-Participation Index (EPI) to gauge Ethiopia's progress relative to other countries. Using this data, they ran **panel regressions with fixed effects**, examining whether improvements in digital infrastructure indices are associated with gains in economic and governance indicators within Ethiopia over time. They controlled for other factors such as physical infrastructure and education levels to isolate the digital contribution.

In addition, cross-country comparisons were performed to see if Ethiopia's trajectory diverges from global patterns in order to essentially ask, for a given level of DPI, is Ethiopia getting the same development payoff as others or is it underperforming?

Qualitatively, the EEA team conducted **field mapping and stakeholder interviews** to understand Ethiopia's DPI landscape. They mapped existing digital platforms (e-ID, ITAS, e-procurement, etc.) and assessed their usage, coverage, and integration. They interviewed 12 key informants from agencies like the Ministry of Innovation and Technology (MInT), Ministry of Finance, and others, to capture insights on **adoption barriers, data availability, and regulatory readiness**. This helped interpret the quantitative findings by providing context on issues like low digital literacy, fragmented systems, or recent conflicts that disrupted digital services.

EVIDENCE AND FINDINGS

The Ethiopia pilot found that **digital public infrastructure, where implemented, shows positive correlations with development outcomes**, but the country's progress is hampered by significant challenges. Econometric results indicated a **strong positive relationship between e-government and human development indicators**. Periods of improvement in Ethiopia's e-government index tend to coincide with higher GDP per capita and advances in structural transformation (i.e., movement of labor into higher productivity sectors). This aligns with global expectations that digital governance can enhance efficiency and economic opportunity. The analysis also showed that increased use of ICT (like internet penetration) correlates with **improvements in governance metrics** over time in Ethiopia, such as reductions in bureaucratic delays and some aspects of transparency.

However, a sobering finding was that Ethiopia's gains appear **weaker than global averages,** meaning, relative to other countries, Ethiopia is not yet realizing the full development impact one might predict from its level of digital investment. One reason identified is the **disruption caused by conflict**: the imposition of nationwide emergency measures and internet shutdowns in recent years (due to internal conflicts) led to sharp declines in the country's E-Government and E-Participation indices (EGDI and EPI). Essentially, progress in rolling out DPI was stalled or reversed in conflict-affected periods, undercutting its contribution to development. This highlights that **political stability and infrastructure security** are prerequisites for DPI to deliver benefits.

On the DPI usage side, Ethiopia's numbers show both **potential and gaps**. For instance, the national digital ID (Fayda) enrollment of 12.7 million (15.5% of adults) is a solid start, but leaves a vast majority of the population unregistered. The pilot noted that digital tax and e-procurement systems were expanding, yet low **digital literacy and system integration issues** limit their uptake. Many businesses and citizens still file taxes or procure manually because the digital systems are not fully user-friendly or widely enforced. The research also pointed out large gender and **rural-urban digital divides** in Ethiopia. For example, urban residents are far more likely to use online services than rural ones, and men

more likely than women, a pattern corroborated by national ICT surveys. These disparities mean that DPI's benefits are unevenly distributed and could even widen inequality if not addressed.

Another key insight from Ethiopia's case was the importance of **data infrastructure and governance**. The EEA team struggled to obtain up-to-date, granular data on DPI usage and outcomes because of siloed databases and the absence of open data policies. This itself is a finding: a **data ecosystem upgrade** (integrating databases, ensuring interoperability, and open access where appropriate) is needed for effective DPI evaluation and adaptive management. Despite these hurdles, the Ethiopia pilot succeeded in mapping out the country's DPI status and raising critical questions. It confirmed that Ethiopia is lagging in some digital indicators, not due to a lack of vision, but due to constraints like connectivity gaps (internet access remains around only one-third of the population), institutional inertia, and shocks (conflict, COVID-19). Impressively, even with these constraints, the positive association found by EEA between governance and DPI (perhaps confounded by the inclusion of e-government in governance) is promising because of the nascency of these digital services. The real payoff, however, lies ahead if Ethiopia can accelerate and broaden its DPI rollout under more favorable conditions.

LOOKING AHEAD

The Ethiopia team explicitly proposed several future research questions in their concluding section. Key among them is the need to assess the long-term socio-economic impact of DPI-led digitization on rural inclusion and welfare. They also suggested investigating how human-centered design interventions such as digital intermediaries or assisted digital access points affect uptake and usage across different demographic segments. Additional questions pertain to the effectiveness of federated architectures in fragile or federal settings, and whether DPI can tangibly improve service delivery in decentralized administrative contexts. The team also proposed examining the sustainability of DPI infrastructure in low-resource settings, especially in terms of institutional capacity and funding models.

TEAM AND ADVISORS

The Ethiopia study was implemented by the **Ethiopian Economics Association (EEA)**, a policy research institution. The research was co-led by Dr. Degye Goshu and Mezid Nasir, economists with experience in macroeconomic analysis and development policy. The team's composition allowed for a blend of quantitative rigor (econometric modeling) and qualitative policy analysis. Notably, the EEA team acknowledged the support of their Scientific Advisor, Prof. Jaideep Prabhu, who guided the framing of the proposal and provided written feedback for the initial proposal. The team also coordinated with Ethiopian government stakeholders, for instance, Ethiopia's ID program authorities and IT regulators, to gather information and validate assumptions. This collaborative ethos paid off: the EEA management was sufficiently convinced of the study's importance that they committed additional budget for primary data collection, such as stakeholder interviews. Such in-kind support reflects local buy-in. By the end of the pilot, the EEA team had strengthened relationships with key digital agencies and contributed to a baseline understanding that Ethiopian policymakers can build on. They have provided recommendations (detailed in the full country report) including investing in digital literacy programs, ensuring high-level coordination for DPI initiatives, and insulating digital projects from political disruptions. The EEA's involvement in this GDN pilot has also strengthened its capacity to independently evaluate tech-driven development programs in the future, using both quantitative and qualitative lenses.

Benin

LOCAL IMPLEMENTATION PARTNER

ACED

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USE CASE AND CONTEXT

Benin's pilot differed from the others by focusing on a **specific DPI-enabled service in one sector**, i.e., road transport governance as a microcosm of DPI impact. The Government of Benin, in its drive to digitize public administration, adopted **X-Road**, an open-source interoperability platform originally developed in Estonia, to enable different government systems to securely exchange data. Benin's most prominent deployment of X-Road is a system called **SECUROUTE**, launched in recent years to digitalize vehicle-related services (such as vehicle registration, roadworthiness inspections, insurance verification, and the motor vehicle tax). Prior to SECUROUTE, these processes in Benin were largely manual and fragmented across agencies, leading to issues like tax evasion, fraudulent paperwork, and low compliance with regulations. The pilot research, led by ACED, set out to investigate the **ex-post impact of X-Road/SECUROUTE on governance, transparency, and socio-economic outcomes in the transport sector.** Essentially, SECUROUTE was treated as a case study of how DPI can transform a public service ecosystem. An important part of this study was also to assess **readiness for a fuller impact evaluation**: identifying data availability, potential indicators, and conditions necessary for a future experimental or quasi-experimental evaluation of SECUROUTE's impact.

METHODS

The Benin team used a combination of **descriptive analytics, administrative data mining, and stakeholder engagement** to evaluate SECUROUTE's performance.

First, they established a conceptual framework to define DPI in the Benin context and situate X-Road within it. They cataloged the existing DPIs in Benin

(which include the national digital ID system e-ID, a Public Key Infrastructure for digital signatures, the national electronic payment platform PNPE, and X-Road for data exchange). With this mapping, ACED narrowed in on **SECUROUTE as the pilot use-case**. They then collected and analyzed administrative records from the SECUROUTE system itself and related agencies. This included data on the number of vehicle registrations processed, tax payments made via the platform, fines issued for non-compliance, and other service metrics before and after SECUROUTE's implementation. Where direct data was lacking, the team conducted user surveys and focus group discussions (FGDs) with vehicle owners, transport operators, and officials to gather evidence on changes in service delivery. They also engaged in participatory workshops with stakeholders (transport ministry, national police, tax authority) to jointly interpret findings and identify key performance indicators for SECUROUTE moving forward. This participatory approach served to build consensus on what success looks like for the system and what data would be needed to rigorously measure impact (e.g., comparing regions or time periods with and without SECUROUTE). Though time was short for a full impact evaluation, the team effectively set the stage for a future quasi-experimental study by proposing an 18-month evaluation design using comparisons across communes stratified by urban/rural areas.

EVIDENCE AND FINDINGS

The findings from Benin's SECUROUTE case study illustrate how a well-implemented DPI can yield **substantial governance improvements** in a specific sector, while also uncovering challenges that need to be addressed. The study identified **five key areas of impact**:

1. Transparency and Governance:

Real-time data sharing via X-Road has directly improved transparency among institutions involved in road transport. Before, separate agencies had their own siloed records for vehicles, taxes, and fines. Now, under SECUROUTE, agencies like the National Transport Agency (ANaTT), the Tax Authority (DGI), and traffic police access a **shared, up-to-date dataset** on vehicle compliance. This interoperability has reduced opportunities for fraud (for instance, it's harder to fake a tax receipt or use a duplicate registration) and strengthened accountability, since any update (like a payment or penalty) is visible across the system. Key informants noted a marked decline in petty corruption, as **digital records replace discretionary paper-based processes**.

2. Administrative Efficiency:

The digitization of workflows through SECUROUTE has significantly **cut processing times** for various services. The study documented that tasks such as vehicle registration, payment of the vehicle tax (TVM), and issuance of roadworthiness certificates, which used to take days or weeks with manual steps, now take hours or even minutes in many cases. Overall, **processing times dropped by over 70%** for these services after SECUROUTE's launch. This translates into less bureaucratic burden for both citizens and public servants. For example, citizens can pay fees online or via mobile money instead of traveling to an office, and officials spend less time on paperwork and more on oversight.

3. Revenue Mobilization:

A very concrete impact of SECUROUTE is the improvement in **tax revenue collection** from vehicles. The Motor Vehicle Tax (TVM), which historically had low compliance, saw a notable uptick. In 2025 alone, **42,663 vehicles paid the TVM through SECUROUTE**, contributing an estimated **CFA 853 million to 2.56 billion** in tax revenues for that year. (The range reflects different engine power categories – higher-power vehicles pay more tax.) This expansion of the tax base demonstrates how digital systems can capture revenue that was previously lost to evasion or administrative inefficiency. It's an example of DPI directly **strengthening the fiscal capacity** of the state.

4. Road Safety and Compliance:
SECUROUTE has improved enforcement of road safety regulations. By centralizing verification (e.g., via QR codes on digital documents), the system makes it easier to check if a vehicle is properly registered, has passed its technical inspection, and carries valid insurance. According to the pilot findings, **insurance compliance among vehicles improved significantly**. By 2025, about 60.5% of vehicles on record had valid insurance, whereas previously a large fraction were effectively uninsured (one metric cited was a 30.6% "lapse rate" before SECUROUTE, indicating many policies would lapse without renewal). Similarly, compliance with the annual technical control (safety inspection) increased. These improvements enhance road safety outcomes, as insured and regularly inspected vehicles pose less risk. The platform has thus contributed to **safer roads and greater protection for motorists**.

5. Service Accessibility:
A perhaps less expected finding is that digital interconnection via SECUROUTE has extended the reach of transport services to **rural areas**. In the past, citizens outside major cities often had to travel long distances to complete vehicle registration or pay fines, leading many to postpone or evade these obligations. SECUROUTE introduced **remote payment options** (through mobile money) and enabled local enforcement (police in any region can update the system). As a result, rural vehicle owners can now comply with regulations without costly travel, and they benefit from more equitable service delivery. Several rural respondents in the survey noted that what used to be a day-long trip to a capital office is now possible via a mobile phone. This shows DPI's potential to bridge urban-rural service gaps when thoughtfully applied.

While these outcomes are promising, the study also highlighted **persistent challenges**. One major issue is that despite improvements, overall compliance rates still have much room to grow. For instance, only **12.8% of registered vehicles actually paid the vehicle tax (TVM)** in 2025. This indicates that a large majority are still non-compliant, pointing to either gaps in enforcement or continued public reluctance. Additionally, **digital literacy and connectivity constraints** remain serious problems, especially in rural Benin. Many citizens are not fully comfortable with the online system or lack internet access, limiting the usage of SECUROUTE's features. Some users reported **misunderstandings about e-payments** (e.g., confusion between different mobile payment channels) and even concerns about unfair fines due to system errors or lack of user knowledge ("unjust fines" were mentioned as a complaint). These challenges underline that technology alone isn't a silver bullet; user education, system refinements, and offline support channels are needed.

LOOKING AHEAD

The Benin pilot proposed concrete **improvements and next steps**. Policy recommendations included passing legal reforms to solidify data interoperability mandates and protect personal data, investing in telecom infrastructure to improve network coverage in underserved areas, and implementing **user-centric enhancements** to SECUROUTE. For example, introducing **SMS notification alerts** (to remind vehicle owners of upcoming deadlines or confirm payments) could greatly reduce inadvertent non-compliance. Likewise, simplifying the payment interface and adding more local offline touchpoints (kiosks or assistant centers) would help users who aren't tech-savvy. The researchers also encouraged scaling X-Road to other sectors: the success in transport could be replicated in health, education, or land administration to drive similar improvements. Finally, the team designed a roadmap for a rigorous **impact evaluation** of SECUROUTE in the future, suggesting an experimental setup where some communes adopt certain features earlier than others, to allow comparison. Implementing such an evaluation would provide causal evidence of DPI's impact in Benin and inform further scale-up.

TEAM AND ADVISORS

The Benin study was carried out by the **African Center for Equitable Development (ACED)**, a policy research NGO known for its work on agriculture and sustainable development, now extending into digital governance. The research team comprised Frejus Thoto, Rodrigue Castro Gbedomon, and Kevil Ngoma. ACED collaborated closely with the Agency for Information Systems and Digital (ASIN), which is the government body overseeing digital infrastructure in Benin. This collaboration was crucial in accessing system data and understanding the technical workings of X-Road. The team also drew on guidance from GDN's experts in evaluation design to formulate the future experimental framework. A combination of an initial conversation with DPI expert Professor David Eaves and the GDN team's continuous engagement allowed ACED the strategic freedom to pivot from a largely qualitative assessment to incorporating elements of quantitative design (for example, identifying indicators like vehicle compliance rates, revenue figures, etc., and thinking about baselines and endlines). One noteworthy aspect of the Benin pilot was the **co-creation with stakeholders** by involving the Transport Ministry, tax officials, and others in workshops which helped the researchers ensure their findings resonated with on-the-ground realities and gain official endorsement. This approach turned the evaluation into a learning opportunity for the implementers themselves. By the end of the pilot, ACED had positioned itself as a **key knowledge partner** for the government on DPI matters. The team's work was well-received, and there is now momentum in Benin to pursue a full evaluation of DPI impacts with ACED and partners, leveraging the baseline insights from this pilot.

Emerging Evidence and Questions

Bringing together the findings from Bangladesh, Ethiopia, and Benin, the pilot program provides **early evidence** that digital public infrastructure can indeed generate socio-economic benefits. But it also raises important questions for further investigation. Across all three countries, **DPI usage was correlated with positive development outcomes**. In Bangladesh, individuals and households with access to DPI showed higher welfare indicators (a robust finding after matching users with non-users). In Ethiopia, improvements in e-government and digital services were associated with gains in GDP and human development over time. In Benin, the introduction of a digital platform in the transport sector clearly improved governance efficiency, revenue, and service delivery outcomes. These cases, diverse in scope, while collectively supporting the notion that **investing in DPI has potential for advancing development goals,** also sound early warning signs that DPI, when not designed for equity and inclusion, would widen disparities because of propensities of access and usage, i.e., better-off citizens will benefit more and earlier than others. They also illustrate different facets of DPI's impact: Bangladesh highlights the household-level and micro-economic benefits (e.g., time savings, inclusion of marginalized groups), Ethiopia underscores macro-level and institutional linkages (e.g., how national digital systems tie into growth and governance), and Benin provides a sectoral success story (showing DPI's value in improving a particular public service).

At the same time, the pilots were largely **correlational and exploratory** in nature. It is important to emphasize that these studies were conducted in fewer than 39 weeks with limited data, which hampers their ability to fully prove causality. For instance, while Bangladesh's PSM analysis strongly suggests DPI causes better socio-economic outcomes, unmeasured factors could still be at play. Ethiopia's regressions show associations but leave open questions about direction of causality (does better governance enable DPI, or DPI enable better governance – likely both). Benin's results demonstrate improvements after SECUROUTE, but a formal impact evaluation would be needed to conclusively attribute changes to the platform. The aim of the pilot was not primarily to answer the question 'what are the socio-economic impacts of DPI?' but the question 'under what conditions can a national research community successfully investigate the socio-economic impacts of DPI, and with what opportunities and limitations?'. The pilot, ultimately, wants to illuminate the way forward for investments in high-quality local research on DPI, and identify opportunities to structure cumulative and comparative learning across LMICs, including to feed into ongoing national investments into DPI design and roll-out. Therefore, one emerging question is **how to move from correlation to causation** in DPI impact research. What kinds of data and research designs will allow us to conclusively say that a given DPI intervention causes specific development outcomes? The pilot indicates some very useful methodological options: using **instrumental variables** (as attempted in Bangladesh), **finding natural experiments or phased rollouts** (unimplemented at this stage but possible in Benin's case), or conducting **randomized encouragement designs** where feasible. Going forward, a more structured and well-resourced research effort can deploy these tools to tighten the causal inference.

Another cross-cutting insight is the **critical role of context**. DPI is not one-size-fits-all product; local conditions heavily influence outcomes, but also design. Bangladesh's near-universal ID system could yield benefits quickly because the country had a relatively high literacy rate and widespread mobile network coverage, and because it set up manned hubs across the country to facilitate access to digital services.

Ethiopia, with lower internet penetration and recent conflicts, has seen slower progress, not because DPI is ineffective, but because **contextual barriers** blunt its impact, as they would have in a non-DPI scenario. Benin's targeted use-case thrived in a sector with strong political will and clear metrics (revenue, compliance), suggesting that political and institutional buy-in is a key enabler and driver of DPI - not necessarily a vision for a more inclusive society. Thus, an important question is: **How do contextual factors shape DPI design and roll-out and what determines its positive impacts on development outcomes?** The pilots hint at some answers: political stability, baseline digital literacy, existing IT infrastructure, and the legal-regulatory environment all matter for DPI as well as for development. For example, without reliable electricity and internet (a challenge in parts of Ethiopia and rural Benin), even the best digital system will falter. Without adequate data protection laws, citizens might mistrust digital IDs or payments, limiting uptake. Future research should investigate these factors systematically and understand the precise impact that is attributable to DPI while controlling for these factors, perhaps through comparative studies across more countries (as GDN's scale-up will do).

The pilots also underscore the need to further refine **the definition and scope of DPI** in a way that can make it universally intelligible. Given that countries do not have unambiguous definitions of DPI even as they implement it, as a consequence of which policy and implementation move faster than theory and evidence, it becomes crucial that research catches up if the goal is to adjust DPI investments to reach faster development outcomes. All teams initially had to delineate what counts as DPI versus general digitalization. They made good first steps (e.g., identifying foundational systems like ID, payments, data exchange as DPI), but there were gray areas. For instance, is a platform like SECUROUTE itself a DPI or an application enabled by DPI? The answer could be debated; SECUROUTE uses the X-Road DPI, but might be considered a digital service riding on DPI. This semantic clarity is not just academic; it affects **what we measure and evaluate**. The emerging consensus is that DPI should be reserved for core, interoperable, reusable systems that enable multiple services. Yet, countries will understandably focus on specific use-cases to justify investments. The pilots raise the question: **How do we maintain a focus on DPI "infrastructure" while measuring its sectoral impacts?** A multi-tier evaluation approach may be needed, assessing both the performance of the DPI itself (e.g., uptime, security, interoperability metrics) and the outcomes in sectors that leverage it (health, transport, finance, etc.).

One of the most important emerging insights is the recognition of **data as both a resource and a roadblock**. All teams faced data hurdles – from accessing disaggregated government records to dealing with outdated or incompatible datasets. Yet, in trying to overcome these, the teams actually created new data frameworks. Bangladesh, for example, compiled a first-of-its-kind index of DPI usage by combining survey and satellite data files. Ethiopia's team pieced together global indices and local stats to map their digital trajectory. Benin's team defined indicators for SECUROUTE's performance (like compliance rates, processing times) that had not been tracked rigorously before. These efforts are laying the groundwork for a **data architecture around DPI evaluation**. A pressing question is: **How can we institutionalize better data collection for DPI?** Potential answers include establishing open data repositories of DPI metrics, encouraging governments to publish regular DPI usage statistics, and leveraging big data (e.g., mobile phone data) in privacy-respecting ways. **A strong institutional partner** like the World Bank and similar multilateral agencies that have buy-in with country governments' development objectives would potentially unlock access to such data through MoUs that involve knowledge sharing and uptake. The pilot experience strongly suggests that without better data, DPI's true impact will remain difficult to quantify. "What gets measured gets improved", holds true. In summary, the emerging evidence from GDN's DPI pilot is **encouraging but preliminary**. DPI initiatives in three very different environments all show promise in advancing development goals: raising household welfare, improving state capacity, and enhancing service

delivery. However, these early studies also raise **critical questions for policymakers and researchers**. How do we ensure these correlations translate into sustained, causal impacts? What pre-conditions must be in place for DPI to flourish equitably? How do we measure success for something as broad as digital infrastructure? And importantly, how do we prevent DPI from inadvertently widening gaps (digital divides, regional disparities) even as it solves others? These questions form the basis for the next phase of work. The pilots have laid a strong foundation by clarifying concepts, building initial data frameworks, and demonstrating that local researchers can generate actionable insights on DPI. The challenge now is to build on this foundation with larger-scale, more definitive research and a continuous learning approach. The following section discusses how GDN plans to address these challenges and lessons in the way forward.

Way Forward

The DPI pilot has proven to be a crucial learning experience that enabled GDN to map a way forward for investment in research in this space. This section outlines the key challenges in evaluating DPI, the lessons learned from managing the pilot (including feedback from participating teams and mentors), and GDN's strategic "four-gear" approach to scaling up the program.

CHALLENGES IN EVALUATING DPI

The pilot experience revealed several inherent challenges in rigorously evaluating DPI impacts:

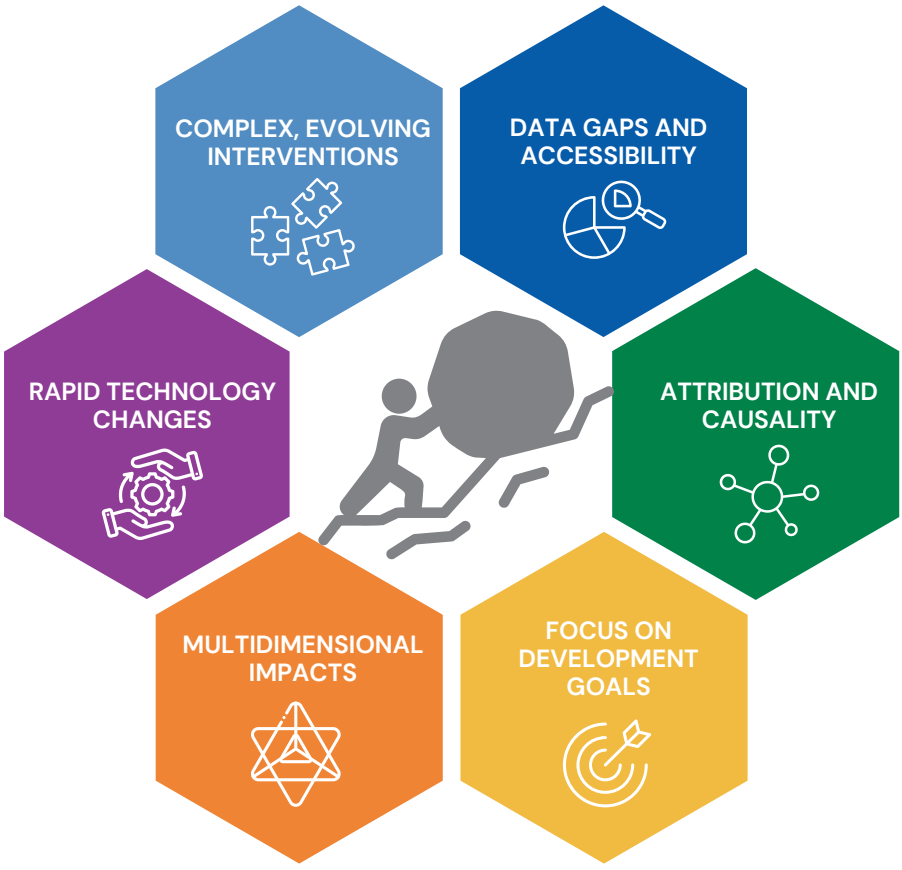


Figure 1: Core challenges in evaluating DPI

1. COMPLEX, EVOLVING INTERVENTIONS	Unlike a single intervention (e.g., distributing textbooks or cash transfers), DPI is a moving target that cannot be defined solely by its global push rather requires ownership by the government and local actors who are adopting and adapting it to suit their development objectives, an evolving set of platforms that continuously integrate with new and existing services. This makes it difficult to define clear treatment and control groups or baselines. An evaluative framework must accommodate DPI's **dynamic nature** (frequent updates, expanding user base, policy changes) and possibly aim for real-time or iterative assessment rather than one-off evaluations, processes that typically require local research, tight networks with relevant actors, and long-term engagement.
2. DATA GAPS AND ACCESSIBILITY	As noted in each pilot, data is a major bottleneck. Much of the data needed (transaction logs, user statistics, etc.) is held by governments and often not readily accessible to researchers. Data may be sensitive (raising privacy issues) or siloed in systems that do not talk to each other. This is exacerbated by the fact that the lack of clear definitions means that governments do not know what data is relevant to conduct research on DPI, which also risks non-measurement. The pilot teams often had to spend considerable time just obtaining and cleaning data, which in some cases limited the depth of analysis. The pilot's focus on defining and disentangling DPI from traditional digitalization also improves the understanding of what data to look for, and what data governments need to collect and maintain as part of monitoring and evaluation, which can then be harnessed by researchers for evaluative research. Therefore, **improving data access**, through partnerships, open data initiatives, or new data collection is thus a top priority for scaling evaluations.
3. ATTRIBUTION AND CAUSALITY	DPI rollouts are typically nationwide or large-scale, which means there is often no obvious comparison group for impact evaluation (since everyone is treated, or treatment is intertwined with national trends). Traditional RCTs are rarely feasible, and even quasi-experimental methods require creativity (as seen with Bangladesh using night-lights, IV, or Benin considering phased rollouts by commune). Crafting strategies to **attribute outcomes to DPI** amidst many confounding factors is challenging. It demands strong methodological guidance and possibly novel techniques (e.g., synthetic control methods, network analysis approaches, etc.).
4. FOCUS ON DEVELOPMENT GOALS	While DPI is expected to accelerate efforts aimed at solving a variety of development challenges and accelerate inclusive growth, developing a research agenda and program around DPI is also indispensable for guiding DPI implementation. While attributing

	outcomes that are ostensibly important for development to DPI in a precise and scientific way is important, the timing of research on DPI should not be constrained by the nature of DPI implementation and rollout itself as it risks missing the forest for the trees. A crucial learning from the pilot is that the nature of DPI and its implementation in several countries requires constant debate alongside action, and the former requires the participation of the research community through fit-for-purpose evaluation. The window of opportunity for research and evaluation begins even before the first DPI intervention breaks ground, given that local researchers are already embedded in the development ecosystems of their countries, and the scale-up initiative aims to harness this embeddedness so that DPI implementation can continuously be aligned to facilitate larger development objectives.
5. MULTIDIMENSIONAL IMPACTS	DPI can affect many aspects of society, including economic growth, inclusion, state capacity, innovation, etc. Capturing this multidimensional impact requires interdisciplinary approaches and a broad set of indicators. No single metric (like GDP or an index) can fully reflect DPI's impact, so evaluations must balance depth with breadth. This complexity can be resource-intensive and requires clear prioritization of research questions. This demands a bottom-up approach which depends on context-specific policy objectives. However, this also requires coordination from the very beginning with an evidence synthesis framework to later leverage comparative analysis, without compromising the details that are unique to that context.
6. RAPID TECHNOLOGY CHANGES	The tech landscape evolves quickly. By the time an evaluation is completed, the technology or platform might have upgraded or been replaced. This "moving goalpost" problem means evaluations must be timely and agile. It also suggests focusing on principles and frameworks (such as the protocols and standards that define DPI) that endure beyond a specific technology. Therefore, investing in the careful examination of definitions, forging relationships with the wide network of stakeholders, co-construction of research questions and agreement on first principles with them is a priority for any pilot or scale-up initiative that seeks to properly study the impact of DPI on development.

Table 2: Challenges in evaluating DPI.

Despite these challenges, the pilot also showcased ways to overcome them, which feed into the lessons learned.

LESSONS FROM MANAGING THE PILOT

Through implementing the pilot across three countries, GDN iteratively learned and implemented several management and design lessons:

1. LOCAL RESEARCH LEADERSHIP IS ESSENTIAL

One of the strongest takeaways from the pilot is that understanding DPI in context requires sustained, locally grounded research. The pilot demonstrated that local teams are not just capable of conducting high-quality evaluations of complex digital systems; they are uniquely positioned to do so. Their contextual knowledge, long-standing relationships with local institutions, and familiarity with both data environments and governance systems are critical assets. What proved most effective was not technical "capacity building" in a narrow sense, but rather iterative, long-term engagement: creating spaces for reflection, peer learning, and strategic mentorship. GDN's approach of linking research teams across countries and fostering exchanges with experienced mentors—helped sharpen analytical thinking, support methodological innovation where appropriate, and create a community of practice. Importantly, the most valuable outcomes came from research that was fit-for-purpose, policy-aware, and analytically engaged with both existing infrastructure and new layers of DPI. Going forward, evaluation efforts should be structured to embed research in local policy processes, where local researchers are not defined by geography or capacity constraints, but by their commitment to this scope of work and the relationships they have cultivated over time.

2. CO-CREATION WITH STAKEHOLDERS ADDS VALUE

The pilot included elements of GDN's policy lab approach, which have two main outcomes: to create research agendas of direct interest to policy constituencies on a specific issue and the creation of an early demand for research findings amongst potential users in policy and practice. Even in the short pilot, involving government stakeholders in formulating questions and interpreting results greatly enhanced relevance and the potential for uptake of the findings from a scaled-up initiative. In Benin, workshops with the Transport Ministry helped shape indicators that the ministry cares about (like reduction in accident rates or revenue gains), aligning the research with policy needs. In Ethiopia and Bangladesh, engaging the ID program officials and creating a working committee ensured the study considered the latest developments and challenges in the ID rollout and understanding the state of DPI, respectively. Such co-creation not only improves the quality of research (through access to information and reality checks) but also fosters **ownership of findings** among policymakers and a demand for the planned results. A lesson is that evaluation should

	not be done in an academic silo; it should be a collaborative exercise with those implementing and affected by DPI. This increases the likelihood that findings will be used to inform decisions (contributing to closing the "feedback loop" between evidence and policy).
3. FLEXIBILITY AND ITERATION ARE CRUCIAL	The three pilots each took a slightly different path, and GDN's management had to remain flexible. Initially, all teams set out with quasi-experimental ambitions, but realities forced adaptation. Benin pivoted to a descriptive case study when it became clear more groundwork was needed for an experiment; Ethiopia had to combine data sources when primary data collection was delayed. GDN learned that a pilot (especially in a novel area like DPI) requires **adaptive management**. Being open to iterative design changes, allowing scope adjustments, and providing rapid troubleshooting support (e.g., helping a team access an international dataset last-minute) were all necessary. This lesson will inform the scale-up: while the programme will be structured, it must allow for mid-course corrections and tailored support to researchers in each country.
4. NETWORK AND PEER LEARNING EFFECTS	By running multiple pilots in parallel, the program benefited from cross-pollination of ideas. The teams actively learned from one another. For example, Bangladesh's use of night-time lights data inspired the Ethiopia team to consider similar remote-sensing approaches; Ethiopia's framing of "digitization vs DPI" informed how Bangladesh articulated their concept section. We learned that creating a **community of practice** (rather than isolated projects) yields substantial value. Peer review of each other's work improved quality and created a sense of collective mission. This justifies GDN's plan to scale via cohorts and networks rather than one-off studies.
5. MENTORSHIP AND GLOBAL EXPERTISE	The involvement of world-class advisors added credibility and technical robustness to the pilot. Mentors helped refine methodologies and ensured the teams didn't "reinvent the wheel" (by pointing them to existing research, proven methods, etc.). We learned that a structured **mentoring program** is invaluable. However, it also requires managing expectations and time of busy experts. In feedback, some teams indicated they would have liked even more frequent engagement with mentors. In scaling up, we plan to formalize the mentor roles, ensure regular check-ins, and possibly have a panel of rotating thematic experts who can be consulted on specific issues (e.g., one expert in digital ID, another in digital payments, etc., for domain-specific guidance). The pilot has also suggested a need for systematising this knowledge exchange in a more comprehensive and static form, through primers that comprise world-class methods and theory.

6. OPERATIONAL SUPPORT AND FUNDING ADEQUACY	The pilot was run on a very small seed grant per country (the pilots were essentially seed projects of USD 8,000 each). One lesson is that while much can be achieved with modest resources (thanks to the dedication of local teams), **a more substantial investment** is needed for full-fledged evaluative research. For example, conducting baseline and endline surveys, or building data dashboards, was beyond the pilot budget but would be incredibly useful. GDN also learned to streamline operational support: helping teams with contracting, expense management, etc. so they could focus on research. The scale-up will incorporate more robust project management support tools and potentially a centralized data platform to help teams share and store data securely.

Table 3: Lessons from managing the pilot

GDN'S 4-GEAR APPROACH TO SCALE-UP

Drawing from these lessons, GDN identified four areas that are essential to enabling research on DPI. These four key dimensions, which we refer to as the "four gears" are **People, Data, Theory, and Uptake** (Figure 2):

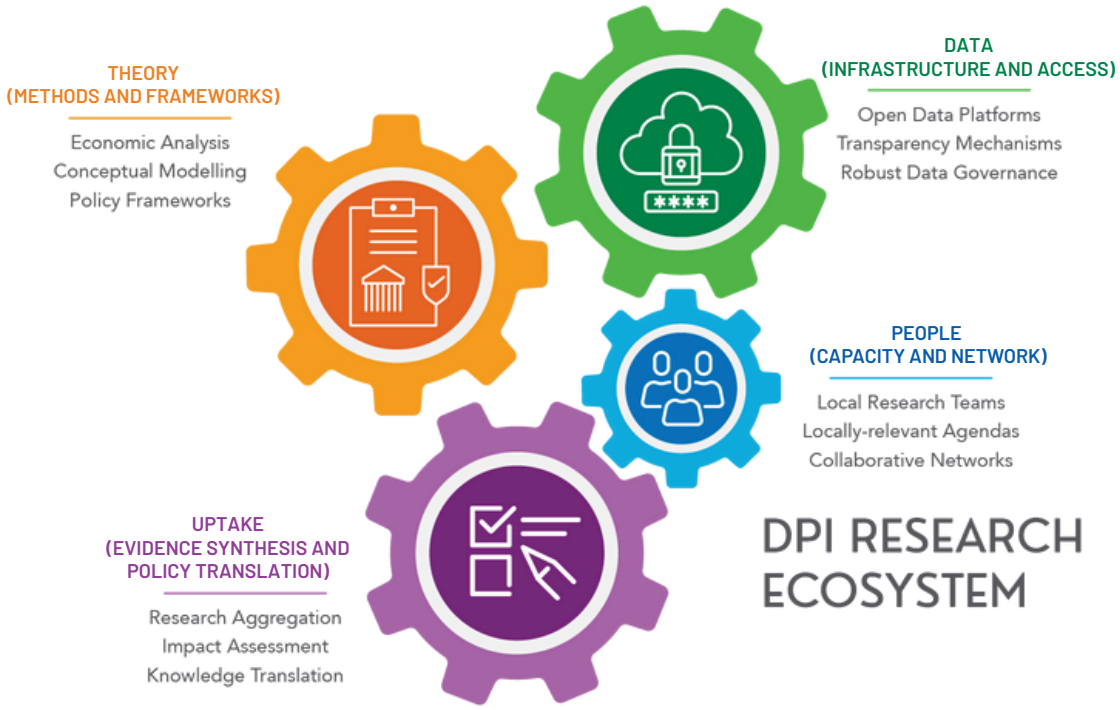


Figure 2: GDN's Four Gear Approach for a DPI Research Ecosystem

People (Capacity and Network): This gear focuses on building the human capital and networks required. The pilot confirmed that local research capacity and networks are foundational to DPI evaluation, but also for its design and adaptation to country context. All three pilot teams were commissioned from LMIC institutions and embedded in national contexts. They navigated access to government stakeholders, conducted technically sound

analyses, and built their work atop existing institutional knowledge. Regular virtual exchanges with scientific advisors and the GDN team allowed for cumulative learning. This people-first approach showed that harnessing existing capacity in-country rather than relying on external consultants enables context-aware evaluations and builds long-term evaluative ecosystems.

Theory (Methods and Frameworks): This gear is about advancing the methodological and conceptual framework for DPI evaluation. Methodologically, the pilot demonstrated both the promise and the gaps in evaluating DPI. Teams experimented with quasi-experimental approaches such as PSM, IV analysis, and spatial econometrics, often adapting them to the limitations of DPI data. Yet the conceptual frameworks guiding DPI evaluation remain underdeveloped. For instance, few existing models adequately address the platform effects, interoperability dynamics, or the feedback loops between digital infrastructure and development outcomes. Recognizing this, GDN and Co-Develop convened an **Economics of DPI conference** in June 2025 to co-create a research agenda, laying the foundation for a more robust theoretical infrastructure.

Data (Infrastructure and Access): Data is required to test as well as inform theory, ultimately contributing towards high-quality evaluative research. Each pilot project worked with distinct datasets ranging from satellite-based Night-Time Lights in Bangladesh to administrative DPI usage data in Ethiopia and digital road safety platform data in Benin. The pilots revealed how fragmented and uneven access to DPI-relevant data can be, especially when it comes to proprietary platform data or disaggregated indicators. However, the pilots also highlighted pathways for overcoming these barriers: leveraging government partnerships, tapping into publicly available data sources, and advocating for better data logging practices. These experiences underscored that data access is not just a technical challenge but a governance issue tied to institutional trust and policy alignment.

Uptake (Evidence Synthesis and Policy Translation): The uptake gear focuses on translating research into action and building a coalition to champion evidence-based DPI scaling. The pilot emphasized that generating evidence alone is insufficient. Research must be embedded in a feedback loop with policy stakeholders. All three pilot teams actively engaged with national DPI authorities, either through validation workshops or ongoing collaborations. Their findings informed not only academic debates but also real-time policy thinking on digital identity linkages, transparency in procurement, and regional inclusion. The pilot demonstrated that when researchers are seen as partners rather than auditors, the uptake of findings improves significantly. It also affirmed GDN's emphasis on multi-stakeholder coalitions and the need for continuous evidence communication.

By synchronizing these four gears - People, Data, Theory, Uptake - the program aims to create an **engine of DPI evaluation and learning**. Our aim is that when all gears turn, we achieve a virtuous cycle: skilled local researchers generate new data and methods, which produce insights that are taken up by stakeholder coalitions to improve DPI, which then raises demand for more skilled researchers to evaluate further, and so on. The pilot taught us that neglecting any one of these dimensions can stall progress (e.g., without uptake, research may be ignored; without data, researchers are hamstrung; without researchers, data sits unused; without theory, uptake might be misguided).

Underpinning this phased approach are some **strategic partnerships and assumptions** that GDN has already started cultivating. We are engaging a consortium of funders - philanthropic, bilateral, multilateral - interested in digital and development, to broaden the financial base and reach of the program. hese partners (potentially including foundations like Rockefeller or Gates, agencies like USAID or GIZ, and development banks) will not only provide funds but also open doors to data and policy influence. At the national level, we will partner with World Bank country offices and UN agencies to align with their digital projects and gain local support (for example, using their convening power to bring ministries to the table). Another assumption is that world-class guidance remains available, hence securing commitments from leading academics and practitioners to serve as advisors and peer reviewers throughout the program. Lastly, we assume a continued global interest in digital public infrastructure given how DPI has risen on the development agenda.

We expect this interest to grow, especially as evidence from our program starts filling the current knowledge gap. However, we stay aware of risks (like shifting donor priorities or global economic downturns) and have designed the program to be modular and adaptable to changing circumstances.

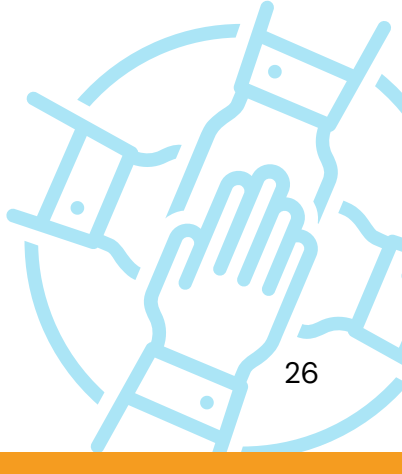
In conclusion, the way forward for GDN's DPI initiative is this **ambitious scale-up** that incorporates the pilot's insights. We plan to tackle evaluation challenges by building robust local capacity, improving data access, and innovating methods beyond the RCT mindset. By scaling our operations in a phased manner, we plan to ensure that evidence generation and uptake go hand in hand. The ultimate goal is not just 36 or 60 research papers. It is to embed a culture of evidence in the digital transformation journeys of countries. By doing so, we hope to amplify the development returns of DPI and avoid pitfalls (like blind tech investments) that evidence can help avert. The next and final section of this report issues a call for broader partnership in this effort because GDN alone, or even GDN and Co-Develop, cannot achieve this vision without a wider coalition of like-minded actors.

Call for a Global Coalition

The pilot's successes and the proposed scale-up strategy point to one clear imperative: we need a **global coalition** dedicated to advancing DPI through evidence-based policy and practice. This final section is a call to action for governments, development partners, the tech community, and researchers around the world to join forces in what could be a transformative movement for development facilitated by digitalization and DPI.

Why a coalition? The challenge of ensuring *inclusive, effective,* and *safe* digital public infrastructure is far too large and complex for any single organization or country to tackle alone. DPI, by its very nature, is a **public good with cross-border implications**: ideas and technologies spread, and one nation's experience can inform another's. We have seen, through this pilot, the benefits of collaboration: the partnership between GDN and Co-Develop brought together expertise in research and funding for digital public goods; the network of country teams spread lessons among themselves; stakeholders from various sectors contributed their perspectives.

To truly scale this up, we envision a coalition that operates at multiple levels:



AT THE GLOBAL LEVEL	We call on international development agencies, multilateral development banks, and philanthropic foundations to prioritize **fit-for-purpose DPI evaluative research as a thematic focus**. This could mean earmarking funds for research within large digital initiatives, sponsoring global public goods like the DPI data repository, or convening high-profile events to maintain momentum. A global scientific committee (as we plan to have) would benefit from the participation of leading minds from universities and think tanks. We invite those experts to lend their knowledge to guide this effort. Organizations such as the United Nations (e.g. UNDP's Chief Digital Office) and the World Bank's Digital Transformation Team are already championing DPI; we urge them to integrate our evaluative research approach into their programs, making evidence generation a core component of DPI support packages.
AT THE NATIONAL/REGIONAL LEVEL	We appeal to governments embarking on or accelerating DPI projects to join the coalition by becoming "learning champions." This means committing to **open up data and policy space for evaluations** in your country. For instance, a government could agree to let a research team access anonymized usage data of their digital ID system, or even design rollouts in ways that enable learning (like phased implementations). Being a learning champion also involves peer outreach. Countries like Estonia, India, or Brazil that have notable DPI successes can share experiences and data through the coalition to help others avoid mistakes and replicate successes. Regional bodies (e.g. the African Union's digital initiatives, ASEAN's ICT programs) can play a role by fostering regional knowledge exchange, supported by our coalition's evidence base.
PRIVATE SECTOR AND TECH COMMUNITY	Digital public infrastructure often leverages technologies and services provided by the private sector (for example, mobile network operators, fintech companies for payments, software firms for platforms). We call on these actors to engage in this coalition under a shared value proposition: **better evidence leads to better policies, which expand digital ecosystems in which companies also thrive**. Concretely, telecom companies could share aggregated mobile data to help measure digital inclusion; tech firms could provide tools or pro-bono support to researchers (such as analytics software or cloud computing for big data analysis). There is also a role for the burgeoning civic tech community and open-source developers who build DPI solutions. They should be part of the feedback loop, learning from research where user pain points are and iterating on solutions.

CIVIL SOCIETY AND END-USERS	Ultimately, DPI exists to serve citizens and the broader development objectives that benefit these citizens. We must include civil society organizations and even end-user representatives in the coalition to ground our work. Their participation ensures we ask the right questions (like impact on privacy, or on marginalized groups) and that findings are communicated in ways that make sense to the public, building **trust in digital systems**. For example, a digital rights NGO could collaborate with our researchers to evaluate the inclusiveness or rights implications of a DPI component, strengthening both the analysis and its credibility.

Table 4: Coalition at multiple levels

The coalition we propose is not a formal bureaucracy but rather a **networked alliance united by a common agenda**: to maximize the development gains of DPI through rigorous evidence and collective learning. GDN, with Co-Develop, is prepared to serve as a hub or secretariat for this coalition in its initial stages: coordinating information flows, hosting a platform for knowledge exchange, and organizing events. We are already seeing interest: as noted, findings from the pilot are scheduled to be presented at major fora in 2025, and we anticipate these will spark conversations leading to new partnerships.

In calling for this coalition, we draw inspiration from past global efforts that successfully aligned research and action for public good. One analogy is the global alliance on vaccine research (e.g. GAVI) which brought donors, researchers, and governments together to accelerate immunization. That model combined funding, knowledge, and political commitment. We envision something similar for **digital public infrastructure**: a multi-stakeholder alliance that drives investment into DPI where it's most effective, guided by empirical evidence and a commitment to inclusivity and sustainability.

From the pilot, one insight stands out: achieving the full promise of DPI, whether it's financial inclusion for the poorest, more accountable governance, or new economic opportunities, requires **intentional effort to learn and adapt**. DPI is not magic; it will not automatically yield positive results without the right environment and adjustments. By forming a coalition, the global community signals that it is intentional about learning: that we will measure, we will share, and we will course-correct based on evidence. This approach can save billions of dollars by steering resources to what works. For example, evidence may show that investing in digital literacy yields greater returns on DPI usage than subsidizing devices: a coalition can spread that insight. It can also prevent harms by identifying early when a digital system might be excluding people or posing risks, allowing timely mitigation.

By answering this call for a global coalition, you will be contributing to a future in which digital transformation truly leaves no one behind.

Together, we can ensure that DPI fulfills its potential as a driver of equitable growth and improved governance across the globe. Co-Develop and GDN, through the next phases of this program, are committed to this vision.

This pilot is the outcome of a collaborative effort led by the Global Development Network (GDN) team, including

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