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Executive Summary

This case study, A Comparative Analysis of Nigeria's and India's Approaches to DPI Adoption, examines how Nigeria can leverage lessons from India's successful implementation of Digital Public Infrastructure (DPI) to address its socio-economic and governance challenges. Digital Public Infrastructure, including systems like digital identity and digital payments, plays a transformative role in fostering financial inclusion, governance efficiency, and socio-economic development. While India's Aadhaar (digital identity) and Unified Payments Interface (UPI) have set global benchmarks for scalability, interoperability, and inclusivity, Nigeria faces unique challenges, including weak infrastructure, low digital literacy, and limited regulatory enforcement. Nigeria's efforts, including the National Identity Number (NIN) and Bank Verification Number (BVN) programs, aim to formalize the economy and enhance service delivery. However, the country's fragmented approach to DPI adoption highlights critical gaps in stakeholder engagement, digital skills, and infrastructure. This study applies systems-thinking and design-thinking frameworks, complemented by strategic foresight, to identify actionable solutions tailored to Nigeria's context. Key findings reveal that Nigeria must overcome significant barriers, such as its rural-urban divide, regulatory weaknesses, and a lack of digital literacy, to achieve scalable and inclusive DPI. Strategic foresight identifies three potential futures for Nigeria's DPI adoption: maintaining the status quo, fostering collaboration and innovation for inclusive growth, or facing setbacks due to policy and infrastructural failures. The study emphasizes the importance of adaptive leadership, stakeholder alignment, and phased implementation to navigate these uncertainties.

Proposed Solutions

To address Nigeria's challenges, this study recommends a multi-faceted approach:

1. Infrastructure Investments: Expanding broadband access, particularly in underserved rural areas, and developing renewable energy-powered data centers to support sustainable growth.

2. Regulatory Enhancements: Strengthening the enforcement of Nigeria's Data Protection Regulation (NDPR) to build trust and safeguard user data while establishing clear metrics to measure DPI's impact.

3. Digital Literacy Programs: Launching nationwide initiatives to equip underserved populations with the skills to engage with DPI effectively, delivered through partnerships with educational institutions and NGOs.

4. Stakeholder Collaboration: Encouraging public-private partnerships to create scalable and interoperable systems while involving civil society and international organizations in advocacy and technical support.

5. Iterative Pilot Programs: Testing small-scale DPI implementations in urban and rural settings to refine solutions before national rollout.

By adapting lessons from India and tailoring solutions to its socio-economic realities, Nigeria can build a resilient, inclusive, and scalable DPI framework. These efforts will bridge the digital divide, enhance governance, and empower communities. Through stakeholder collaboration, adaptive leadership, and phased implementation, Nigeria has the potential to lead Africa's digital transformation while ensuring equitable and sustainable development.

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Part I: Introduction

Purpose

The purpose of this case study is to explore Nigeria's approach to adopting Digital Public Infrastructure (DPI) by analyzing and comparing it with India's well-established model. The study aims to identify the challenges, successes, and potential risks in deploying DPI systems in Nigeria and proposes actionable insights for creating inclusive, scalable, and sustainable digital ecosystems. By leveraging India's successes and lessons, the study seeks to inform strategies that can address Nigeria's socio-economic realities, particularly in bridging the rural-urban divide, improving digital literacy, and enhancing governance efficiency through DPI.

Objectives

1. Comparative Analysis: Examine the similarities and differences between India's and Nigeria's approaches to DPI adoption, focusing on essential enablers such as connectivity, policy frameworks, and digital skills.

2. Identify Challenges: Highlight the unique barriers Nigeria faces in adopting DPI, including infrastructural deficits, regulatory uncertainties, and the uneven distribution of digital resources and literacy.

3. Assess Risks and Opportunities: Explore the VUCA [1] (volatility, uncertainty, complexity, and ambiguity) characteristics of DPI adoption and their implications for both countries, particularly Nigeria.

4. Inform Policy and Practice: Provide recommendations for Nigeria to develop an adaptive DPI framework by learning from India's successes, focusing on safeguards, infrastructure investments, and human capacity development.

5. Promote Inclusive Development: Ensure that proposed solutions address digital inclusion and socio-economic equity, creating opportunities for underserved communities, especially in rural areas.

6. Contribute to Global Understanding: Offer insights into the global potential of DPI, emphasizing scalable, interoperable, and inclusive systems that align with both local needs and international best practices.

Part II: Deliverables

The deliverables of this case study provide a comprehensive roadmap for Nigeria's Digital Public Infrastructure (DPI) adoption by comparing its approach with India's successes. They include an exploration of Nigeria's DPI challenges, an Internet Impact Brief highlighting the need for open and inclusive systems, and strategic foresight outlining phased implementation across three horizons. Systems and design-thinking tools emphasize stakeholder alignment and human-centered solutions,

[1] The VUCA framework (volatility, uncertainty, complexity, ambiguity) originated at the U.S. Army War College in the late 1980s to describe the post–Cold War strategic environment and has since been widely adopted in strategic-leadership and management curricula.

while leadership strategies focus on building trust, adaptability, and resilience in a VUCA environment. Together, these deliverables offer actionable insights to guide Nigeria's journey toward a scalable and inclusive DPI framework.

2. Problem Statement

2.1. Introduction

This case study aims to be a comparative analysis of India and Nigeria's approaches to the inclusive adoption of Digital Public Infrastructure (DPI). India used the platform of its G20 presidency to showcase the benefits of DPI (such as financial inclusion and expedited service delivery) in the hopes of accelerating its global adoption during 2022/23. Since then, a major digital development drive ensued across Africa, where countries such as Nigeria have made commitments to deploy this digital development approach in the hopes of delivering streamlined essential services and expanding economic opportunity. Similarities between India and Nigeria include a British colonial legacy, youthful and highly populous societies as well as emerging market economies. The assumption is that the success of India's DPI stack will be transposed as success in the Nigerian context. In India, robust digital infrastructure and a government-driven push for digital inclusion have led to success stories, however, challenges remain, particularly in bridging the rural-urban digital divide and the threat of increased government surveillance. Nigeria, on the other hand, has made strides in promoting mobile connectivity and expanding access to digital services, but it faces significant hurdles in terms of regulatory uncertainty, economic volatility, and the uneven distribution of digital resources and skills. Our intention with this case study is to conduct a comparative analysis of DPI adoption approaches in India and Nigeria by considering connectivity, policy, and digital skills — as essential enablers of DPI— in order to identify the potential successes and risks of this digital development approach. We hope to highlight any additional safeguards, considerations and investments which many be required in an African context in order to ensure the inclusive adoption of DPI.

DPI in India

Digital Public Infrastructure (DPI) encompasses the foundational digital systems that enable essential services like digital identity, data exchanges, and digital payments which are open source, interoperable and designed with data minimization and modularity in mind. In India, DPI exemplifies a collaborative model where the government partners with the private sector and civil society to deliver services and increase financial inclusion through initiatives such as Aadhaar (digital identity), UPI (Unified Payments Interface), and CoWIN (vaccination platform). India's commitment to DPI is founded on scalability and inclusivity, aiming to integrate a diverse population into the digital economy, while ultimately driving economic growth and social welfare of its 1.3 billion residents. India's approach to DPI contrasts with Estonia's, where a strong government-led framework emphasizes secure data exchange and integration, as well as a stronger focus on public sector collaboration.

DPI across Africa and Nigeria

Many countries in Africa are reporting significant strides in DPI adoption, with use cases for Digital Public Goods in places such as Kenya, Rwanda, Ghana, Uganda, Sierra Leone and Malawi. While many initiatives are still funded through external aid, there's a growing awareness of the need for local resources and homegrown expertise. Most African governments focus on interoperability and open standards, primarily in digital identity and government-to-person payments. Despite this progress,

challenges such as inconsistent internet access, limited infrastructure, and low digital literacy hinder effective DPI implementation and constrain its potential benefits. In Nigeria, President Bola Tinubu emphasized the importance of DPI for accessing essential services. Current initiatives, including the National Identity Number (NIN) and Bank Verification Number (BVN), aim to streamline government services. However, issues such as data privacy concerns, infrastructural limitations, and digital literacy gaps pose significant hurdles to inclusive DPI adoption.

VUCA Characteristics Applied to DPI Adoption

The adoption of DPI in both India and Nigeria is characterized by VUCA: volatility, uncertainty, complexity, and ambiguity.[2]

1. Volatility arises from rapid technological advancements and shifting socio-economic conditions related to technological advancements, policy priorities as well social dynamics. In both countries, factors such as evolving connectivity standards, fluctuating market conditions, and the fast-paced development of technology (and the required digital skills) can cause unpredictable shifts in the adoption and implementation of DPI. These changes significantly impact the ability of governments to provide inclusive access to essential services such as education and healthcare.

2. Uncertainty: Technological change is often accompanied by unpredictable developments in regulatory frameworks, political and policy environments, and the availability of international cooperation. For example, in Nigeria, while there is strong government interest in promoting digital inclusion, the nation's reliance on oil revenues and its vulnerability to external economic shocks make long-term investment in DPI infrastructure difficult to predict. In India, although there is a solid foundation for DPI through initiatives such as Aadhaar, the country's regulatory environment and data privacy concerns introduce uncertainty into the future trajectory of these programs.

3. Complexity: Implementing DPI involves the integration of various components, including technology infrastructure, policy frameworks, human capital, and social systems. In both countries, this complexity is compounded by their diverse and often fragmented socio-economic landscapes. India, with its vast population and wide-ranging regional disparities, must balance the needs of rural and urban populations, each with distinct challenges in terms of access, digital literacy, and affordability. In Nigeria, complexity arises from similar disparities, where urban centers like Lagos experience rapid digital growth while rural regions lag behind. Both nations must grapple with intricate issues, such as developing effective policies that account for local realities while aligning with global trends in digital governance and cybersecurity.

4. Ambiguity: Both India and Nigeria face significant uncertainty regarding the long term impact of DPI adoption. A lack of clarity persists in measuring success and defining digital inclusion in an ever-evolving technological world. In India, the Aadhaar system raises questions about data privacy and exclusion of marginalized groups, while Nigeria grapples with the early stages of DPI adoption, resource mobilization and the requisite skills for development and maintenance. While the contexts of India and Nigeria share similarities and differences, both nations must continuously adapt to the challenges of a VUCA world, ensuring that DPI contributes to sustainable economic growth, social inclusion and innovation. Through a comparison of these two countries, the study will highlight the need for flexible approaches to DPI adoption, enforcement of safeguards and investments into

[2] The VUCA framework (volatility, uncertainty, complexity, ambiguity) originated at the U.S. Army War College in the late 1980s to describe the post–Cold War strategic environment and has since been widely adopted in strategic-leadership and management curricula.

infrastructure and human capacity development. Successful use cases and the identification of risks in both India and Nigeria provide insights into how countries can navigate volatility, manage uncertainty, address complexity, and mitigate ambiguity while driving inclusive digital transformation through DPI adoption.

3. Internet Impact Brief

3.1. Abstract

This internet impact brief investigates Nigeria's approaches to the inclusive adoption of Digital Public Infrastructure (DPI). India utilized its G20 presidency to highlight the benefits of DPI— such as financial inclusion and expedited service delivery—aiming to foster global adoption in 2022/23. In response, Nigeria has committed to similar digital development strategies to improve essential services and economic opportunities. Both countries share a British colonial legacy, youthful populations, and emerging market economies, leading to the assumption that India's successes could be mirrored in Nigeria. While India has made significant strides through robust digital infrastructure and government-driven initiatives, challenges like the rural-urban digital divide and surveillance concerns remain. Nigeria has advanced mobile connectivity but faces hurdles in regulatory uncertainty, economic volatility, and unequal access to digital resources. This study examines the critical properties of DPI and highlights enablers related to connectivity, policy, and digital skills as critical, aiming to identify potential successes and risks while emphasizing the need for tailored safeguards in the Nigerian context.

3.2. Background

Digital Public Infrastructure (DPI) refers to the foundational digital systems and frameworks that support public services and internet-based activities, including digital identity systems, payment platforms, and data exchanges. In Nigeria, the adoption of DPI presents both positive and negative impacts on the internet ecosystem, particularly in areas of connectivity, digital literacy, and policy. The adoption of DPI can significantly improve internet connectivity by providing streamlined access to digital services. For example, DPI frameworks enable easier access to government services online, such as digital identities and e-payment systems, which can facilitate faster, more efficient transactions and reduce dependency on traditional offline services. This infrastructure enhances the overall digital experience for users and accelerates the growth of a digital economy by enabling e-commerce, mobile banking, and online education. According to the Nigerian Communications Commission statistics the Nigeria broadband penetration stood at 43.53 percent in March 2024. This include the accumulation of Mobile GSM, Mobile Code Division Multiple Access (CDMA), Fixed Wired, Wired and Wireless, including Voice over Internet Protocol (VoIP) subscriptions, formed the total number of active internet subscribers. However, inadequate infrastructure in rural and underserved areas remains a challenge. The reliance on DPI assumes consistent internet access, which is not uniformly available across Nigeria. Poor connectivity in rural areas can deepen the digital divide, leaving many without access to the benefits of DPI services. Additionally, DPI can put a strain on existing networks if not managed efficiently, potentially leading to congestion or slower internet speeds in densely populated areas. DPI adoption can drive the need for greater digital literacy, as citizens will increasingly rely on online platforms to access public services and financial systems. This could lead to government-led or private-sector initiatives aimed at educating the public on how to use digital tools, improving overall digital skills. Enhanced digital literacy empowers people to take

full advantage of internet services, participate in the digital economy, and increase their employability in tech-driven sectors. On the other hand, the rapid adoption of DPI without adequate investment in digital literacy programs may exclude large portions of the population. Many Nigerians, especially in rural or low-income areas, may lack the necessary skills to interact with digital platforms effectively. Presently, over 50 percent of Nigeria's population, which exceeds 200 million people, lacks digital skills and is unable to utilise data services (as indicated in the 2021 World Bank Development Report). Without addressing the digital literacy gap, DPI could lead to the marginalisation of digitally illiterate populations, creating a new form of inequality and limiting the potential impact of DPI on national development. On the policy front, DPI adoption can lead to better governance and transparency. Through systems like digital identity management, government services can become more accessible and efficient. DPI could also support regulatory frameworks for fintech and e-governance, ensuring that services are securely delivered. With proper policies in place, DPI can also enhance data protection and ensure that the personal data of users is managed responsibly. However, policy challenges may arise with regard to data privacy, surveillance, and security. If DPI systems are not carefully regulated, they could be used for excessive surveillance, infringing on citizens' privacy rights. There is also the risk of data breaches or misuse if data protection regulations are weak or poorly enforced. The policy framework around DPI adoption needs to be robust to prevent unintended consequences, such as cybercrime, while ensuring digital rights are protected. While DPI adoption in Nigeria offers significant opportunities for improved connectivity, digital inclusion, and better governance, it must be accompanied by efforts to address infrastructure limitations, enhance digital literacy, and establish strong regulatory frameworks to mitigate potential risks. In October 2023, the Federal Ministry of Communications and Digital Economy of Nigeria published its strategic blueprint detailing its agenda for 2023 to 2027, wherein in which it committed to the development of a National Policy on Digital Public Infrastructure. DPI is acknowledged as foundational to digital inclusion, and the policy is intended to clarify Nigeria's approach to DPI adoption and streamline the integration between digital identity, payments and data exchange systems. Key metrics of success are identified and include: 1) A collaboration with the National Information Technology Development Agency (NITDA) to develop a DPI regulatory standard by the end of 2024. 2) The development of a Nigeria Stack by 2025. 3) The deployment of the Nigeria Stack by 2027 with the objective of improving service delivery and social relief. President Bola Tinubu of Nigeria, Africa's largest economy, was very recently quoted saying that "DPI is the backbone that enables access to essential services, from healthcare and education to financial inclusion and social welfare. It is through robust DPI that we can ensure every Nigerian, regardless of their background or location has the opportunity to participate fully in our nation's growth"2. Nigeria has agreed to collaborate with India for further adoption of this approach, but current DPI use cases include National Identity Numbers (NINs) and Bank Verification Numbers (BVNs) which are aimed at streamlining government services, while the Nigeria Inter-Bank Settlement System (NIBSS) and Remita facilitate financial transactions. Additionally, the Nigeria Data Protection Regulation (NDPR) Act represents an effort to secure data exchange and ensure transparency. Despite the enthusiasm and high level political will, several challenges hinder the effective and inclusive adoption of DPI in the context of Nigeria. These include security concerns related to data privacy and cybersecurity and infrastructure limitations. Challenges related to inclusivity remain pressing, especially among women and rural communities, which hinders broader financial inclusion. The Gates Foundation, a key development partner, has emphasized the need for further investment to enhance these systems, as they are essential for secure access to services in both the public and private sectors. DPI is seen as a key driver of economic growth, with integration of digital IDs, payments, and data-sharing tools offering opportunities across sectors like finance, health, and agriculture. However, rural areas face slower adoption due to inadequate infrastructure, such as a lack of telecommunications assets. Efforts to increase public awareness of

DPI are ongoing, with stakeholders organizing forums to highlight challenges and propose solutions for more inclusive adoption. Continued investment and a focus on inclusivity will be critical to the successful implementation of DPI across the country.[3][4][5][6]

3.3. Potential Effects of DPI Adoption on the Critical Properties of the Internet Way of Networking

Table 1. Summary of DPI adoption effects on the critical properties of the Internet Way of Networking

Critical Property	Potential Positive Effect	Potential Risk	Net Assessment
Accessible infrastructure with a common protocol	DPI services — identity, payments, data exchange — give government a direct incentive to extend broadband and last-mile access.	Benefits accrue only where infrastructure already reaches; rural and underserved users are excluded, hardening the digital divide.	Positive, conditional on sustained infrastructure investment
Open architecture of interoperable, reusable building blocks	India's Aadhaar and UPI demonstrate that modular, interoperable blocks enable seamless service delivery and third-party innovation.	Agency-by-agency procurement in Nigeria risks proprietary silos and divergent standards.	Positive in principle; depends on open standards being mandated
Decentralized management and a single distributed routing system	Coordinated data exchange reduces duplicated and incompatible government systems.	A centralized national stack concentrates control and creates single points of failure, in tension with distributed management.	Negative — the strongest structural risk identified
Common global identifiers	National identity systems (Aadhaar, NIN) give unbanked and undocumented populations a verifiable identity.	National-scope identifiers are not globally interoperable and can become gatekeepers to essential services.	Mixed — inclusion gains offset by exclusion and lock-in risk
Technology-neutral, general-purpose	India's open-source, modular stack supports a wide range of applications built on shared rails.	Mandating a single national stack can privilege particular technologies and crowd out alternatives.	Positive if the stack remains open-source and non-exclusive

3.3.1. Accessible Infrastructure with a Common Protocol

Digital Public Infrastructure (DPI) relies on the underlying accessibility of the Internet, particularly for enabling services like digital identity, payments, and data exchanges. In India and Nigeria, DPI adoption could either enhance or limit this accessibility depending on infrastructure investments. India's robust infrastructure allows for widespread digital services; however, rural areas still face

[3] Federal Ministry of Communications, Innovation and Digital Economy (Nigeria), Strategic Blueprint 2023–2027, 14, https://fmcide.gov.ng/wp-content/uploads/2023/11/blueprint.pdf.

[4] "With 43.53% Spread, Nigeria Still Far From Attaining 70% Broadband Penetration by 2025," ThisDay, May 16, 2024, https://www.thisdaylive.com/index.php/2024/05/16/with-43-53-spread-nigeria-still-far-from-attaining-70-broadband-penetration-by-2025/.

[5] "Tinubu Reaffirms Commitment to Transformation of Service Delivery to Nigerians," ThisDay, September 17, 2024, https://www.thisdaylive.com/index.php/2024/09/17/tinubu-reaffirms-commitment-to-transformation-of-service-delivery-to-nigerians/.

[6] "How Can Nigeria Optimize Digital Public Infrastructure for Enhanced Public Service Delivery?," TechInAfrica, https://www.techinafrica.com/how-can-nigeria-optimize-digital-public-infrastructure-for-enhanced-public-service-delivery/.

barriers. Similarly, Nigeria's connectivity is uneven, especially in remote regions. The DPI Safeguards Framework emphasizes the need for DPI to be inclusive, accessible, and built upon the foundation of common Internet protocols to ensure that it doesn't fragment access to the global Internet (UN Safeguards). Without sufficient attention to infrastructural disparities, DPI could risk reinforcing the digital divide, particularly in under-connected regions like rural Nigeria. Moreover, if DPI systems are designed with proprietary or non-open protocols, they could limit compatibility with the broader, universally accessible Internet. This would threaten the principle of a common protocol and could result in fragmentation.[78]

3.3.2. Open Architecture of Interoperable and Reusable Building Blocks

DPI adoption heavily relies on interoperability, which aligns with the open architecture principle of the Internet Way of Networking. In India, the success of DPI initiatives like Aadhaar (digital identity) and UPI (digital payments) demonstrates how interoperable systems can facilitate seamless service delivery and collaboration between public and private entities. These systems use open, reusable building blocks that can be adapted for different use cases, enabling scalability and cross-sector integration. For Nigeria, the challenge lies in adopting similar reusable and interoperable architectures amidst fragmented regulatory and technical environments. If properly implemented, Nigeria's DPI systems, such as the National Identity Number (NIN) and Bank Verification Number (BVN), could follow India's example, promoting cross-platform operability. However, the risk is that without a strong framework for interoperability, Nigeria's DPI initiatives may create silos, where various systems are not fully integrated, diminishing the effectiveness of the open architecture approach. The key impact here is that a failure to ensure interoperable building blocks could hinder collaboration between systems, reducing the flexibility and adaptability of digital services. This would be detrimental to the broader vision of an open and connected Internet.[9]

3.3.3. Decentralized Management and a Single Distributed Routing System

A hallmark of the Internet's resilience is its decentralized management, which allows for diverse control across different regions and sectors. DPI adoption in both India and Nigeria presents a potential risk to this decentralization. In India, while the DPI system has been highly successful in delivering digital services, the central role of the government in managing DPI systems raises concerns about the potential for centralized control. A strong reliance on government oversight could lead to tighter control over digital services and information, limiting the decentralized nature of Internet governance. In Nigeria, regulatory and infrastructural challenges could further complicate the balance between central and decentralized management. Without clear regulatory frameworks and an emphasis on decentralized management, there is a risk that DPI adoption could lead to increased centralization of services, thereby weakening the single distributed routing system that characterizes the Internet. This could have harmful effects on Internet resilience and availability, particularly in regions that rely on local or alternative routes for connectivity. To protect the

[7] "Digital Public Infrastructure in India and Africa," Brookings Institution, 2023.

[8] Internet Society, Internet Way of Networking (IWN): Defining the Critical Properties of the Internet, 2020, https://www.internetsociety.org/wp-content/uploads/2020/09/IWN-IIAT-Defining-the-critical-properties-of-the-Internet.pdf.

[9] "Digital Identity Systems and DPI Adoption in Nigeria and India," World Bank Digital Development Report, 2023.

decentralized nature of the Internet, both India and Nigeria must ensure that DPI systems maintain a distributed control structure, allowing for flexibility and local governance within global frameworks.[10]

3.3.4. Common Global Identifiers

DPI systems in both India and Nigeria depend heavily on digital identity systems, such as Aadhaar and NIN. While these systems aim to create unique digital identifiers for individuals, their impact on the property of common global identifiers is significant. The adoption of national-level digital identifiers can improve service delivery within countries, but there is a risk of fragmenting global identity systems. The digital identity system is tightly linked to national infrastructure, which may not align with global standards for digital identity management. In Nigeria, the rollout of NIN faces concerns, particularly around the consistency of identifiers across borders. If national identity systems are not interoperable with global digital identity standards, they could create silos, undermining the Internet's principle of common global identifiers. To maximize the benefits, both India and Nigeria must ensure that their DPI identity systems are compatible with global standards and protocols, preserving the global nature of digital identity within the Internet framework.

3.3.5. Technology-Neutral, General-Purpose

The adoption of DPI initiatives in both countries has the potential to support technology-neutral, general-purpose uses of the Internet, which allows diverse applications and innovations to thrive. India's DPI stack, built on open-source and modular systems, has demonstrated a capacity for wide-ranging uses, from financial inclusion to healthcare service delivery. This aligns with the Internet's general-purpose nature by ensuring that no specific technology or platform dominates the ecosystem, allowing for flexibility and innovation. In Nigeria, DPI systems can potentially foster a similar environment, encouraging innovation across sectors. However, the risk of regulatory capture or over-reliance on specific platforms or technologies could compromise the Internet's neutrality. If DPI initiatives favor particular vendors or technologies, they could constrain the general-purpose use of the Internet, limiting innovation and the open, flexible nature that defines its architecture. Ensuring that DPI systems in Nigeria remain technology-neutral and open to multiple use cases is crucial to maintaining the general-purpose characteristic of the Internet.

3.4. The Potential Effects of the Proposed Change (DPI Adoption) on Enablers of an Open, Globally-Connected, Secure, and Trustworthy Internet

Table 2. Nigerian policy action and outstanding risk against the enablers of an open, globally-connected, secure, and trustworthy Internet

Enabler	Nigerian Policy Action to Date	Outstanding Risk	Net Assessment
Easy and unrestricted access, reachability	National Broadband Plan 2020–2025 (70% penetration target); SchoolNet Nigeria ICT-in-schools programme; NCC-supported fibre-optic backbone expansion under the ICT Roadmap; licensing of InfraCos to build out underserved areas.	The urban–rural connectivity gap persists; reachability targets depend on private capital that has been slow to arrive in low-density markets.	Strong policy framework in place; delivery is the binding constraint

[10] "Decentralized Management of the Internet and DPI Systems," Internet Governance Forum.

Enabler	Nigerian Policy Action to Date	Outstanding Risk	Net Assessment
Unrestricted use and deployment of Internet technologies	Digital Economy Policy and Strategy 2020–2030 promoting cloud, AI and blockchain; Nigerian Data Protection Regulation; Nigeria Startup Act 2022 reducing regulatory friction for tech firms.	Enforcement and institutional capacity lag the legal framework; overlapping regulators create compliance uncertainty for deployers.	Enabling — the framework supports open deployment
Collaborative development, management, and governance	Briefings to permanent secretaries on a centralized DPI approach; workshop with ICT directors across all agencies; #DevsInGovernment community of practice; request for a Presidential declaration to align agencies behind a data exchange, with a five-agency pilot.	Collaboration to date is largely intra-government; civil society, the private sector and the technical community are not yet structurally embedded. Debate over the degree of centralization remains unresolved.	Partial — coordination is improving, but multistakeholder governance is thin
Data confidentiality and privacy	Nigerian Data Protection Commission established 2022; Nigeria Data Protection Act 2023; mandatory registration of data controllers; compliance mechanisms for MDAs; active investigation and fining of breaches, including allegations against NIMC.	UN Universal DPI Safeguards Framework warns that poorly designed DPI increases exposure to unauthorized access, identity theft, fraud and surveillance. Weak redressal mechanisms and under-resourced institutions could erode public trust.	Encouraging trajectory, contingent on the NDPC remaining independent, resourced and technically capacitated

3.4.1. Easy and Unrestricted Access, Reachability

The adoption of Digital Public Infrastructure (DPI) can have a profound impact on the enablers of an open, globally connected, secure, and trustworthy Internet. The Nigerian government has taken several steps to address the enablers. Some of this steps include:

- National Broadband Plan (NBP) 2020-2025: The Nigerian government launched the NBP to expand broadband penetration to 70% by 20251. The plan focuses on improving internet access across urban and rural areas through increased infrastructure investments, particularly in underserved regions.[11]
- ICT Infrastructure in Schools: Initiatives such as "SchoolNet Nigeria" are aimed at providing internet access and ICT infrastructure in secondary schools, helping increase digital literacy from a young age.
- Fiber-Optic Backbone Projects: The Nigerian government, through the NCC, has supported private investments in expanding fiber-optic backbone infrastructure, which ensures better connectivity and reachability for users across the country. Projects like the "Nigeria ICT Roadmap 2017-2020"3 focus on improving telecom infrastructure and making services more reachable, including underserved regions[12]

[11] Nigerian National Broadband Plan 2020–2025, 55, Digital Rights Lawyers Initiative, https://digitalrightslawyers.org/wp-content/uploads/2021/01/Nigerian_National_Broadband_Plan_2020-2025.pdf.

[12] Nigeria ICT Roadmap 2017–2020, Nigerian Economic Summit Group, https://nesgroup.org/download_policy_drafts/Nigeria_ICT_Roadmap_2017-2020_1661853858.pdf.

- Licensing of Infrastructure Companies (InfraCos): To boost the reachability of internet services, the government licensed InfraCos to build broadband infrastructure across the country, particularly in less connected areas. These efforts are meant to bridge the urban-rural connectivity gap and enhance the reach of digital public services.

While these initiatives mark significant progress, several challenges remain. The National Broadband Plan and Fiber-Optic Backbone Projects have improved reachability, particularly in urban areas, but rural regions still face connectivity gaps due to inadequate infrastructure. Programs like SchoolNet Nigeria are advancing digital literacy, but the overall impact is limited by insufficient resources and poor internet penetration in some regions. Similarly, while InfraCos have contributed to extending broadband reach, the urban-rural divide persists. If these enablers do not function effectively, the goals of Easy and Unrestricted Access and Reachability will be compromised. Poor infrastructure in rural areas may leave populations disconnected, and without proper digital literacy programs, large segments of the population may struggle to utilize DPI services. Additionally, if the infrastructure remains underdeveloped, the potential for widespread connectivity and digital inclusion will remain limited, stifling economic growth and the full realization of DPI benefits. Therefore, addressing these gaps is critical to ensuring that the positive impact of DPI adoption is widespread and inclusive across Nigeria.13

3.4.2. Unrestricted Use and Deployment of Internet Technologies

Nigeria's adoption of Digital Public Infrastructure (DPI) is key to driving the country's digital transformation, aligning with global trends and enhancing economic growth. Through policies like the:

- Digital Economy Policy and Strategy (DEPS) 2020-2030: The DEPS provides a roadmap for Nigeria's digital transformation and supports the development and deployment of various internet technologies. It includes the promotion of emerging technologies like cloud computing, artificial intelligence, and blockchain while ensuring cybersecurity and regulatory compliance.[14]
- Nigerian Data Protection Regulation (NDPR): In support of secure deployment, the NDPR was introduced to regulate the collection, processing, and storage of personal data. This policy promotes trust in digital platforms by safeguarding user data from misuse.7[15]
- Support for Startups and Innovation: The Nigerian government passed the Nigeria Startup Act (2022)3, providing a legal framework for tech companies and startups to deploy internet-based solutions without unnecessary regulatory hurdles. This law encourages innovation and the use of new internet technologies While Nigeria's DPI initiatives, such as DEPS, NDPR, and the Startup Act, create an enabling environment for the unrestricted use and deployment of internet technologies, challenges remain. Policies like NDPR ensure data security and build trust in digital systems, while the Startup Act encourages innovation and reduces regulatory barriers. However, the success of these initiatives depends on their effective implementation. If infrastructure limitations, inconsistent policy enforcement, or inadequate digital literacy are not addressed,

[13] "NCC Commences 2nd Phase InfraCo Licensing," TechBuild Africa, https://techbuild.africa/ncc-commence-2nd-phase-infraco-licensing/.

[14] National Digital Economy Policy and Strategy 2020–2030 (Nigeria), https://ndpc.gov.ng/Files/Policy-National_Digital_Economy_Policy_and_Strategy.pdf.

[15] Nigeria Data Protection Regulation – Implementation Framework, https://ndpr.gov.ng/wp-content/uploads/2021/01/NDPR-Implementation-Framework.pdf.

these enablers may fail to function optimally. In such cases, the deployment of internet technologies may remain restricted, limiting the full potential of Nigeria's digital transformation.[16]

3.4.3. Collaborative Development, Management, and Governance

For this enabler, we consider whether the standards being developed for DPI in Nigeria are being developed and governed in a way that facilitates and enhances openness and collaboration. Key considerations here are whether said collaboration is consistent during the developing, operating and governing DPIs in Nigeria, inclusive of the applications/services built on top of the proposed Nigeria Stack. In October 2023, Minister Tijani issued a white paper on Transforming Public Services in Nigeria, making the case for a centralized approach to DPI adoption. Nigeria's decision to adopt a centralized approach to DPI involves developing shared standards and assets across all government ministries, agencies, and parastatals. This approach brings several advantages, including reducing overhead costs, improving the delivery of public services, and increasing innovation. By minimizing fragmentation, the centralized model allows for more integrated public services and fosters a collaborative environment where government agencies can experiment with new technologies. This approach also strengthens cybersecurity oversight, ensuring better protection for critical DPI. Steps taken by the Ministry by June 2024 include:

- Presented to permanent secretaries to emphasize the importance of a centralized DPI approach and the need for data exchange across government agencies to enhance Nigeria's cybersecurity for critical DPI.
- Held a workshop with ICT directors from all government agencies to raise awareness and develop an integrated plan to strengthen DPI in Nigeria.
- Launched #DevsInGovernment, a community of practice for civil servants in technology roles, providing a platform to share knowledge and gain support across the ICT sector.
- Submitted a request for a Presidential declaration to align all government agencies behind the goal of implementing a data exchange system. It is anticipated that an initial pilot covering at least five agencies will be operational by the end of the 2024.

Currently there remains debate centered on whether a centralized or decentralized approach should be adopted during DPI implementation. As we explore this topic, its clear that a centralized approach—often seen in government-led DPI initiatives—can streamline service delivery and ensure greater control and security. However, this comes with the risk of undermining the foundational principles of the Internet, which are based on decentralization and distributed control. A decentralized approach aligns more with the open, interoperable nature of the Internet, promoting innovation and resilience.

3.4.4. Data Confidentiality of Information, Devices, and Applications, and Privacy

We consider whether data confidentiality is considered in the adoption of DPI in Nigeria. This includes ensuring that both the content and identities of users remain secure, fostering a safer Internet. The question therefore is whether DPI deployment will improve or weaken confidentiality, both during data transmission and storage, and whether they strengthen or weaken the Internet's security protocols. With regards to privacy, we consider whether DPI adoption in Nigeria enhances or reduces users' control over their data and whether it affects their ability to remain anonymous or use pseudonyms. The recently released Universal DPI Safeguards Framework by the United Nations Tech Envoy highlights that poorly designed and implemented DPI can increase exposure to

[16] Nigeria Startup Act, 2022, https://drive.google.com/file/d/1Hq1VXKPC7NjM32rNLV-0G7HpAV4J0BhV/view.

unauthorized access, cyber security infringements, identity theft, fraud and increased surveillance. Additional stress factors are a lack of redressal mechanisms and weak institutional capabilities that could erode public trust and/or result in reduced adoption rates of DPI services. The whitepaper mentioned previously expressly states that an "an interoperable infrastructure will facilitate seamless data exchange and collaboration between federal and state agencies and also strengthen Nigeria's cybersecurity oversight for critical DPI". Increased confidentiality is therefore clearly one of the main intensions of their chosen DPI approach. The Nigerian Data Protection Commission (NDPC) was also established in 2022, followed by the passing of the Nigerian Data Protection Act of 2023 (although regulations were in place since 2019). During this year, the NDPC mandated the registration of data controllers, initiated the process to establishing data compliance mechanisms for all MDAs and has commenced with investigating (and fining) actors such as banks for data breaches. One such investigation is into allegations that the National Identity Management Commission (NIMC) has exposed citizens to data harvesting sites which were selling off the personal data of Nigerian residents. These allegations were denounced by NIMC, who assured residents that their data infrastructure is in compliance with "stringent ISO 27001:2013 Information Security Management System Standard, with annual recertification and strict compliance with the Nigerian Data Protection Law"and went on to urge residents to exercise the necessary caution when sharing their details online. This example is illustrative of both the risks and complexities surrounding data governance and privacy in DPI deployment. The NDPC has hit the ground running in terms of its mandate, which is very encouraging. Ensuring that the Commission remains well-resourced, independent and technically capacitated will be absolutely imperative to give effect and ensure enforcement of the various legal instruments that have been put in place. The deployment of technical solutions, such as India's Account Aggregator model could also empower data providers to be better custodians of their personal data.

Summary Analysis of Strongest Effects

The adoption of Digital Public Infrastructure (DPI) in Nigeria has several significant effects, including:

- Improved Connectivity: DPI initiatives have the potential to enhance internet accessibility and usability, particularly through government services that facilitate digital transactions.
- Increased Digital Literacy Requirements: As citizens increasingly rely on digital platforms for public services, there is a pressing need for digital literacy programs to equip the population with necessary skills.
- Policy and Governance Enhancements: DPI can promote better governance and transparency through digital identity management and data-sharing frameworks, though it may raise concerns regarding data privacy and surveillance.

3.4.5. Explanation of Impacts

Connectivity: Improved infrastructure investments can boost broadband penetration and service accessibility. However, uneven connectivity, especially in rural areas, could reinforce the digital divide, limiting the benefits of DPI for underserved populations. Digital Literacy: The shift towards DPI necessitates a comprehensive approach to digital literacy. Government and private sector initiatives must focus on educating the public, particularly in rural and low-income areas, to prevent exclusion. The current gap in digital skills, with over 50% of the population lacking adequate training, highlights the urgency for targeted programs. Policy and Governance: While DPI can facilitate better governance through increased efficiency and transparency, it also poses risks related to privacy and surveillance. Without robust regulatory frameworks, data misuse and breaches could erode public trust in digital services, hindering the adoption of DPI initiatives.

3.4.6. Conclusion and Recommendations

The adoption of DPI in Nigeria presents substantial opportunities for enhancing connectivity, promoting digital literacy, and improving governance. However, to fully realize these benefits without harming the integrity of the Internet, several recommendations should be considered:

- Enhance Infrastructure Investments: Focus on improving connectivity in rural and underserved areas to bridge the digital divide. This includes increasing investments in broadband infrastructure and ensuring equitable access to digital services.
- Implement Comprehensive Digital Literacy Programs: Develop targeted initiatives to improve digital skills, particularly among populations in rural and low-income areas. Partnerships with educational institutions and NGOs can facilitate effective outreach.
- Establish Strong Regulatory Frameworks: Ensure robust data protection and privacy laws are in place to safeguard personal information and prevent misuse. Continuous monitoring and enforcement of these regulations will build public trust and encourage DPI adoption.
- Promote Interoperability and Decentralization: Design DPI systems that adhere to open standards and promote interoperability to prevent fragmentation of services. Emphasizing a decentralized approach can foster innovation while maintaining the integrity of Internet governance. By addressing these areas, Nigeria can harness the full potential of DPI while safeguarding the foundational principles of an open, connected, and secure Internet.

4. Deployment of Strategic Foresight Tools

Figure 1. Nigeria's three-horizon DPI trajectory

HORIZON 1 Today – 2027	→	HORIZON 2 2027 – 2033	→	HORIZON 3 2033 – 2040
The current system under strain		The transition		The emerging future
Digital IDs and mobile money are in place, but ~43.5% broadband penetration, an unreliable grid and low digital literacy cap the reach of DPI.		The Nigeria Stack comes into full deployment, agencies interoperate, literacy rises and a digital economy takes shape — while vendor lock-in and the urban–rural gap remain live risks.		A fully interoperable, citizen-centred DPI underpins the economy and public services, powered by green infrastructure and positioning Nigeria as an African leader in digital governance.
Dominant task: build the base		Dominant task: connect and scale		Dominant task: govern and sustain

For this component, we apply the Three Horizon's Model by analyzing the driving forces of Social Dynamics, Technology, Economics, Environment and Political Affairs to Nigeria's deployment of Digital Public Infrastructure (DPI).[17]

4.1. Horizon 1 Analysis

Table 3. Three-horizon matrix: how each driver evolves across the trajectory

Driver	Horizon 1 — Today to 2027	Horizon 2 — 2027 to 2033	Horizon 3 — 2033 to 2040
Social dynamics	Broadband penetration at roughly 43.5% and digital IDs widespread, but low digital literacy and patchy	Digital literacy improves through government-led and private initiatives; women and rural communities gain	The digital divide is substantially closed and digital public services are a

[17] Bill Sharpe, Three Horizons: The Patterning of Hope, 2nd ed. (Axminster: Triarchy Press / International Futures Forum, 2020).

Driver	Horizon 1 — Today to 2027	Horizon 2 — 2027 to 2033	Horizon 3 — 2033 to 2040
	connectivity in rural and low-income areas risk exclusion.	access, though adoption in remote areas continues to lag.	routine part of civic and economic life.
Technology	NIN and BVN are operational, but infrastructure limits and weak interoperability produce fragmented, siloed systems.	The Nigeria Stack reaches full deployment (targeted 2027), enabling cross-agency interoperability and innovation in fintech, health and agriculture.	A fully interoperable national infrastructure integrates government and private services on shared, open rails.
Economics	DPI drives financial inclusion, while economic volatility and inconsistent regulation deter sustained investment in digital infrastructure.	Digital financial systems and e-commerce expand and foreign investment grows in fintech and startups; urban–rural disparity persists.	The digital economy is a principal driver of national growth, sustained by local startups and SMEs alongside foreign investment.
Environment	Environmental impact is largely undiscussed; chronic power shortages affect the roughly 100 million people dependent on the national grid.	Energy consumption and e-waste emerge as material concerns, opening an opportunity to power data centres and ICT systems from renewables.	Green data centres run on renewable power and sustainable ICT practice manages e-waste; balancing growth with sustainability remains the standing challenge.
Political affairs	Strong political will led by the Federal Ministry of Communications and Digital Economy, set against regulatory uncertainty and privacy and surveillance concerns.	Digital governance consolidates as DPI integrates into public services; political resistance is possible on data privacy and surveillance.	Resilient, transparent and citizen-centred governance supports leadership in Africa and technological diplomacy, with surveillance and governance-balance risks enduring.

1. Social Dynamics

- Current State: Nigeria is experiencing both progress and challenges in the social adoption of DPI. Mobile connectivity is rising, with broadband penetration reaching 43.53% in 2024, but the digital divide, especially between rural and urban areas, remains significant and over 50% of the population lacks essential digital skills. Over 90% of the population Nigeria has been successfully enrolled for digital ID, which has become the key for citizens to access social uplift initiatives such as agricultural incentives for farmers, university funding as well as others such as "the National Youth Talent Export Programme, Renewed Hope City and Estate Housing initiative, the Skill-Up Artisans Programme".
- Challenges: The rapid digital transformation may leave behind populations with low digital literacy and connectivity, particularly in rural and low-income areas, potentially exacerbating social inequality.
- Opportunities: DPI initiatives have the potential to drive financial inclusion as well as enhance access to public services,especially in underserved areas. Programs focused on increasing digital literacy, particularly for marginalized communities, are critical to the success of DPI. It is therefore encouraging to learn that the Ministry of Communications, Innovation and Digital Economy recently announced at G20 that Nigeria has accumulated a $2billion investment in a 90,000km fibre optic network, extending their backbone from 35,000 to 125,000km and established a National Broadband Alliance in order to coordinate private and public sector investments to expanding connectivity. In addition, Nigeria has partnered with the EU and World Bank to expand the digital literacy capabilities for 70% of the population by 2027 by investing in the "world's largest technical talent acceleration programme (3MTT). The proliferation of generative AI, which

enables voice enabled search may also enable leapfrogging of the traditional skills required to navigate the online realm.

2. Technology

- Current State: Nigeria has made significant strides in adopting digital technologies, with systems like National Identity Numbers (NINs) and Bank Verification Numbers (BVNs) facilitating financial services. However, infrastructure remains uneven, with rural areas facing slower technological adoption.
- Challenges: Infrastructure limitations, especially in rural areas, may hinder the deployment of DPI at scale. A lack of interoperability could lead to fragmented systems, diminishing the potential of a unified digital economy
- Opportunities: By investing in open, interoperable systems, Nigeria could replicate the success seen in India's DPI approach. The adoption of Nigeria Stack by 2027 aims to enhance service delivery and improve the integration of digital identity, payments, and data exchange systems. Furthermore the government has also invested in a Digital National Identity Number (NIN) Business Continuity and Disaster Recovery Project, which is aimed to support business continuity, the provision of fault tolerance as well as the maintenance of security standard compliance.

3. Economics

- Current State: Nigeria's digital economy is gaining momentum with DPI initiatives aimed at driving financial inclusion and improving access to economic opportunities through mobile banking, e-commerce, and online education. Nigeria is actively funding its Digital Public Infrastructure (DPI) deployment through a combination of government initiatives, international partnerships, and private sector investments.
- Challenges: Economic volatility and inconsistent regulatory environments pose risks to sustained investment in digital infrastructure. Nigeria must balance investment between urban and rural areas to avoid exacerbating economic disparities.
- Opportunities: DPI could significantly boost Nigeria's economy by integrating digital payments, identity systems, and data-sharing frameworks, which would streamline government services and improve business efficiency. Nigeria has implemented regulatory and economic measures, such as the Nigeria Startup Act, to foster collaboration between the tech ecosystem and the government, encouraging local capital investment, venture capital, and the development of innovation hubs to ensure certainty for digital public infrastructure (DPI) adoption.

4. Environment

- Current State: The environmental impact of DPI adoption in Nigeria has not been widely discussed, but the expansion of digital infrastructure—such as fiber-optic networks and data centers—may contribute to environmental stress, including increased energy consumption.
- Challenges: Nigeria is prone to regular power shortages which have severely hampered approximately 100 million people who rely on the national electricity grid that cannot meet their energy demands which has been attributed to a range of reasons including government debt, insufficient tariff structures as well as a lack in investor confidence.Without a strong focus on sustainability, rapid digital expansion could lead to environmental degradation, particularly through increased energy demands from data centers and network expansions.
- Opportunities: Industry experts estimate that Nigeria needs $100 billion over the next 20 years to maintain current electricity services. The World Bank is funding $486 million for the Nigerian Electricity Transmission Access Project (NETAP), aimed at upgrading transmission infrastructure through the Transmission Rehabilitation and Expansion Program (TREP) to enhance the power

network and improve supply reliability.With proper planning, Nigeria can adopt eco-friendly technologies and energy-efficient digital infrastructure, reducing the carbon footprint of its digital economy. For example, by designing the DPI framework to support transparency in carbon tracking, ensuring circular economy practices for effective waste management and the reduction of greenhouse gas emissions together with establishing smart energy networks, DPI can be deployed to bolster climate resilience.

5. Political Affairs

- Current State: Nigeria's government is showing strong political will to support DPI adoption, with the Federal Ministry of Communications and Digital Economy spearheading initiatives like the National Policy on DPI. This policy is supported by President Bola Tinubu's commitment to using DPI for public service transformation.
- Challenges: Regulatory uncertainties and concerns over data privacy, cybersecurity, and surveillance could undermine public trust in DPI systems. Strong, clear, and enforceable regulations are needed to address these issues and ensure the protection of citizens' digital rights. The political risks associated with Nigeria's DPI deployment are multifaceted, involving issues of governance, societal dynamics, security challenges, and public perception. Addressing these risks through transparent governance, inclusive policies, and robust legal frameworks will be crucial for ensuring the long-term success and sustainability of digital infrastructure initiatives in Nigeria.
- Opportunities: To ensure the political sustainability of its DPI deployment, Nigeria should focus on transparent governance, inclusive stakeholder engagement, and robust legal frameworks -all of which are steps which the government has taken. This goes hand-in-hand with establishing transparent oversight mechanisms, protecting citizen data through comprehensive legislation as well as enforcement, and fostering public-private partnerships to address local needs and consolidate digital sovereignty.

Summary: Horizon One Scenario

In Horizon 1, Nigeria's DPI deployment is advancing with rising mobile connectivity, widespread digital IDs, and government investments, yet significant challenges persist. The digital divide, especially between urban and rural areas, alongside low digital literacy, threatens to exacerbate social inequalities. Technologically, while systems like NIN and BVN have streamlined services, infrastructure gaps and lack of interoperability in rural regions hinder full adoption. Economically, DPI boosts financial inclusion and business efficiency, but regulatory inconsistencies and economic volatility create investment risks. Environmentally, the strain on power infrastructure and potential for increased energy consumption require eco-friendly solutions. Politically, while the government shows strong commitment, data privacy concerns and regulatory clarity are critical to maintaining public trust and ensuring long-term sustainability.

4.2. Horizon 2 Analysis: Emerging Changes and Shifts

1. Social Dynamics

- Emerging Shifts: As DPI adoption progresses, we expect a gradual improvement in digital literacy across Nigeria, driven by government-led initiatives and private sector involvement. Rural areas and underserved communities may begin to see increased access to digital services as infrastructure projects expand.

- Opportunities: Enhanced digital literacy will empower more Nigerians to engage with the digital economy, particularly women and rural communities. Social programs and educational initiatives that prioritize inclusive access to digital tools will reduce inequalities and improve social cohesion.
- Challenges: While digital inclusion efforts will expand, there remains a risk of slower adoption in remote areas unless the government addresses systemic challenges. Without tailored programs to accelerate rural adoption, disparities may persist, albeit at a smaller scale.

2. Technology

- Emerging Shifts: The rollout of key technological initiatives, such as the Nigeria Stack (targeted for full deployment by 2027), will facilitate interoperability between digital identity systems, payment platforms, and data exchanges. Technological capacity in rural areas will improve through increased investment in telecommunications and fiber-optic networks.
- Opportunities: With the Nigeria Stack in place, cross-sector collaboration will thrive, fostering innovation in areas like fintech, healthcare, and agriculture. The standardization of DPI frameworks will lead to smoother service delivery and foster an integrated digital ecosystem.
- Challenges: Ensuring that these systems remain flexible and open to innovation will be crucial. Over-reliance on certain vendors or proprietary technologies could stifle competition and create technological silos. Additionally, managing the cybersecurity risks posed by these interconnected systems will be paramount to maintaining public trust.

3. Economics

- Emerging Shifts: DPI will likely catalyze Nigeria's economic transformation, as digital financial systems and e-commerce expand. Increased efficiency in public service delivery, thanks to digital identity systems and online payments, will reduce bureaucratic costs and open up new revenue streams for the government.
- Opportunities: The rise of a robust digital economy will attract further foreign investment, particularly in fintech and tech startups, as Nigeria positions itself as a leader in the African digital marketplace. This will also lead to job creation, especially in the tech and service sectors, further enhancing economic growth.
- Challenges: Economic disparities between urban and rural areas may persist unless significant investment is made in infrastructure in underserved regions. Economic volatility and inflation could also threaten the broader deployment of DPI initiatives, reducing the expected returns on investment in the short to medium term.

4. Environment

- Emerging Shifts: As digital infrastructure continues to expand, environmental concerns related to energy consumption and e-waste management may begin to rise. Initiatives for energy-efficient digital technologies will need to become a priority to mitigate environmental degradation.
- Opportunities: There is an opportunity for Nigeria to become a leader in sustainable digital infrastructure by investing in renewable energy for data centers and ICT systems. This will not only reduce the environmental impact but also position Nigeria as a forward-thinking, green-tech economy.
- Challenges: Without proactive policies, the expansion of digital infrastructure could exacerbate environmental stress. Addressing e-waste management, energy consumption, and the carbon footprint of expanding digital services will be critical to balancing economic growth with sustainability.

5. Political Affairs

- Emerging Shifts: The government's ongoing focus on digital governance will solidify through the successful integration of DPI into various public services. The Nigeria Stack will likely become a cornerstone of national service delivery, supported by robust data protection and cybersecurity policies.
- Opportunities: Strong political support for DPI will enhance Nigeria's ability to lead digital transformation across Africa, positioning itself as a regional leader in digital public services. This will strengthen governance transparency, improve public trust in digital systems, and foster international collaboration, particularly with India and other emerging markets.
- Challenges: Political resistance to certain DPI policies may arise, especially regarding data privacy and surveillance concerns. Ensuring that DPI policies protect citizens' digital rights while allowing the government to maintain adequate control over digital infrastructure will require delicate balancing.

Summary: Horizon Two Scenario

In Horizon 2, Nigeria's Digital Public Infrastructure (DPI) transitions into a phase of emerging changes and shifts. Digital literacy is expected to improve as government and private sector initiatives expand access to digital services, particularly in rural areas. However, disparities may persist if systemic challenges aren't addressed. The Nigeria Stack rollout will enhance interoperability across sectors, fostering innovation in areas such as fintech and healthcare, though there are risks of technological silos and cybersecurity threats. Economically, DPI will drive growth in the digital economy, attracting foreign investment and creating jobs, especially in tech sectors. However, infrastructure gaps between urban and rural areas and economic volatility may limit the full potential of these advancements. Environmentally, concerns over energy consumption and e-waste management will rise, presenting both challenges and opportunities for Nigeria to adopt greener technologies. Politically, strong support for DPI will position Nigeria as a regional leader in digital transformation, improving governance transparency and fostering international collaborations. However, balancing data privacy, surveillance concerns, and public trust will be critical to ensuring long-term success.

4.3. Horizon 3 Analysis: Long-Term Vision and Future Trajectories

1. Social Dynamics

- Future Vision: By Horizon 3, Nigeria will have significantly closed the digital divide, with high levels of digital literacy across the country. Rural areas will be fully integrated into the national digital economy, and marginalized groups will have access to a wide array of digital services, improving social equity. Initiatives like the National Digital Literacy Framework can be expanded to rural areas, ensuring targeted training for these communities. Programs such as the Digital Nigeria initiative can be tailored to address the unique needs of marginalized groups, offering them critical digital skills that enhance their ability to participate in economic and social activities. Through these efforts, Nigeria will not only improve overall literacy but also empower its citizens to contribute to and benefit from the digital economy.[18]
- Opportunities: The widespread use of digital platforms will foster a more connected and informed society, empowering citizens to engage in democratic processes and access opportunities across the economy. Expanded efforts like the Digital Nigeria initiative can deliver social programs more

[18] National Digital Literacy Framework, 2023, National Information Technology Development Agency (NITDA), https://nitda.gov.ng/wp-content/uploads/2023/07/Digital-Literacy-Framework.pdf.

effectively, with digital identity systems playing a key role in streamlining public services, particularly in underserved areas. This would enhance transparency and accessibility to education, health services, and financial systems.[19]

- Challenges: There is a risk that even with widespread digital access, certain populations, such as elderly citizens or those resistant to digital adoption, may struggle to adapt to a fully digital society. While initiatives such as the National Digital Literacy Framework offer an avenue for inclusive education, continued support through localized, culturally-sensitive programs will be essential. This includes targeted outreach and specialized programs for populations hesitant to adopt digital technologies to ensure no one is left behind. By integrating these initiatives into a broader strategy, Nigeria can achieve a balanced approach to digital inclusion and sustainable development.

2. Technology

- Future Vision: In the long term, Nigeria's digital infrastructure will be fully interoperable, seamlessly integrating government services, businesses, and individual users. The Nigeria Stack will serve as a foundational platform for innovation, enabling the country to continuously evolve with emerging technologies such as AI, blockchain, and the Internet of Things (IoT). This foundation will further be bolstered by leveraging local tech hubs and innovation centers, fostering a dynamic environment where homegrown talent can collaborate with global players to drive continuous improvements. Partnerships with international tech firms will also accelerate the adoption of cutting-edge technologies, ensuring that Nigeria remains competitive in the global digital economy.[202122]
- Opportunities: Nigeria has the potential to emerge as a global leader in technology, particularly in fintech and e-governance. By setting a benchmark for Digital Public Infrastructure (DPI) across Africa and beyond, the country's DPI could serve as a scalable and flexible backbone for future technological advancements. Local tech ecosystems—including innovation hubs in cities like Lagos, Abuja, and Kano—will play a key role in driving localized solutions and tech innovations that address Nigeria's unique needs. Furthermore, collaborations with global tech giants will introduce state-of-the-art technologies, catalyzing Nigeria's ability to shape the future of digital governance and financial technologies.
- Challenges: The fast-paced evolution of technology will necessitate constant updates to Nigeria's digital infrastructure, policies, and skillsets. Ensuring that the system remains flexible, secure, and accessible in this rapidly changing landscape will require significant investment in upskilling the workforce, revising cybersecurity policies, and maintaining digital equity. While collaborations with international tech firms bring many benefits, they also introduce potential challenges related to data sovereignty, dependency on foreign tech, and the need for robust policy frameworks to manage international partnerships. In summary, Nigeria's Horizon 3 trajectory highlights a

[19] Digital Nigeria Initiative, Federal Ministry of Communications, Innovation and Digital Economy, https://fmcide.gov.ng/initiative/digital-nigeria/.

[20] "FG to Unveil Nigerian Data Stack in Eight Months," The Guardian Nigeria, https://guardian.ng/technology/fg-to-unveil-nigerian-data-stack-in-eight-months/.

[21] Report on Innovation Hubs, Policy Development Facility Nigeria, https://pdfnigeria.org/rc/wp-content/uploads/2020/01/34_PDFII_Report_Innovation-hubs.pdf.

[22] "Tech Industry Collaborations and Partnerships Driving Innovation Through Alliances," Hakia, https://hakia.com/tech-industry-collaborations-and-partnerships-driving-innovation-through-alliances/.

promising future where both local innovation ecosystems and global collaborations drive technological advancement. However, realizing this vision will require strategic foresight, investments, and the flexibility to adapt to the evolving digital landscape.

3. Economics

- Future Vision: Nigeria's digital economy will be a key driver of national growth, characterized by a robust entrepreneurial ecosystem, innovation, and foreign investment. The integration of digital services into key sectors like finance, agriculture, health, and education will enhance productivity and improve economic resilience.
    - Encouraging Local Startups and SMEs: Initiatives like the Nigeria Startup Act play a pivotal role in supporting local startups and small to medium-sized enterprises (SMEs). These policies foster a conducive environment for innovation and business growth by providing regulatory frameworks, access to funding, and tax incentives. The development of a thriving startup ecosystem will further boost Nigeria's digital transformation.[23]
- Opportunities: The expansion of digital financial systems and public services will create new markets and business models. By promoting Nigeria's potential as a digital economy leader in Africa, the country can attract foreign investment and forge global partnerships. This positioning can make Nigeria a hub for digital services, especially in fintech, e-health, and agritech, fostering sustained innovation.[24]
    - Attracting Foreign Investment: By showcasing its digital economy potential, Nigeria can position itself as a leading market in Africa, attracting global tech firms and investors. The integration of smart technologies and the rise of a tech-savvy young population offer numerous opportunities for foreign investors looking to tap into Africa's digital future.
- Challenges: Transitioning from a primarily resource-based economy to a tech-driven economy will require careful economic management. Sustaining high levels of digital investment will depend on factors such as improving infrastructure, developing human capital, and addressing regulatory challenges. Additionally, global economic conditions could impact the country's ability to sustain growth and innovation in the tech sector. By capitalizing on these local and international factors, Nigeria's digital economy can play a transformative role in shaping its long-term economic trajectory. plan-for-building-nigerias-inclusive-digital-future

4. Environment

- Future Vision: Nigeria is expected to emerge as a leader in green technologies within its digital infrastructure. This vision encompasses:
    - Green Data Centers: Powered by renewable energy sources like solar and wind, significantly reducing the carbon footprint of data centers. This transition positions Nigeria as a model for sustainable digital transformation in Africa.
    - Sustainable ICT: The country will adopt energy-efficient hardware and sophisticated e-waste management practices, ensuring a balance between technological growth and environmental sustainability.

[23] Nigeria Startup Act, official portal, https://startup.gov.ng/.

[24] "Nigeria Digital Economy Diagnostic: A Plan for Building Nigeria's Inclusive Digital Future," World Bank, https://www.worldbank.org/en/country/nigeria/publication/nigeria-digital-economy-diagnostic-a-plan-for-building-nigerias-inclusive-digital-future.

- Opportunities: The shift to sustainable infrastructure offers numerous opportunities for Nigeria:
  - Global Leadership: Nigeria can position itself as a pioneer in eco-friendly digital infrastructure, influencing other developing nations.
  - Investment Attraction: By adopting green policies, Nigeria can draw investments from environmentally-conscious organizations and international tech firms. Such policies will enhance its global standing and promote economic growth.
  - Job Creation: The emphasis on renewable energy and sustainable practices will create jobs in green tech industries, including energy installation, management, and recycling.
- Challenges: As Nigeria progresses toward this vision, several challenges need addressing:
  - Energy Consumption: Digital infrastructure, particularly data centers, consume high amounts of energy. The challenge is to innovate continuously in energy-efficient technologies and reduce consumption without hindering digital growth.
  - E-Waste Management: The rapid turnover of digital hardware creates a significant e-waste issue. Nigeria must develop and implement robust e-waste management policies to ensure environmental safety.
  - Balancing Growth with Sustainability: Ensuring sustainable expansion of digital infrastructure while maintaining environmental protection will be critical.

In conclusion, Nigeria's path to a sustainable digital future hinges on two key strategies: enacting policies that encourage the use of renewable energy in digital infrastructure and building partnerships with global organizations. By offering tax incentives to companies that invest in solar- or wind-powered data centers and promoting energy-efficient ICT hardware, Nigeria can ensure that its digital infrastructure aligns with eco-friendly practices. Additionally, collaborating with international organizations like the United Nations Environment Programme (UNEP) and attracting foreign investment from tech firms specializing in green technology will provide the expertise, innovation, and capital necessary for sustainable development. These efforts will enable Nigeria to enhance its Digital Public Infrastructure (DPI) while becoming a global leader in green technology adoption.2526

5. Political Affairs

- Future Vision: By 2040, Nigeria will have established a resilient, transparent, and citizen-centric digital governance framework. This will be characterized by seamless integration of public services through Digital Public Infrastructure (DPI), offering secure and efficient access to government services. The citizen trust in these digital systems will be high, supported by comprehensive data privacy and cybersecurity laws that align with international standards. The government's emphasis on digital inclusion will empower citizens across socio-economic strata, ensuring equitable access to digital services, thereby enhancing public participation in governance.[27]
- Opportunities

[25] Energy Transition Office (Nigeria), https://www.energytransition.gov.ng/.

[26] "Mobilizing Investment for Clean Energy in Nigeria," World Economic Forum, 2023, https://www3.weforum.org/docs/WEF_Mobilizing_Investment_for_Clean_Energy_in_Nigeria_2023.pdf.

[27] "The Nigeria Data Protection Act, 2023," KPMG, https://kpmg.com/ng/en/home/insights/2023/09/the-nigeria-data-protection-act--2023.html.

- Leadership in Africa: Politically, Nigeria will emerge as a leader in digital governance across the African continent, setting a precedent in adopting sustainable ICT policies and fostering regional cooperation on data privacy and cybersecurity.
- International Partnerships: Nigeria's strategic alignment with global digital governance standards and partnerships with international organizations such as the World Bank, ITU, and OECD will strengthen its role in shaping policy dialogues and capacity-building initiatives.
- Technological Diplomacy: With Nigeria's advancements in digital governance, the nation will play a key role in digital diplomacy, influencing policy frameworks across Africa and extending technical expertise to neighboring countries. Nigeria's active participation in multilateral forums such as the AU, UN, and G20 will further elevate its profile on the global stage.

- Challenges
  - Governance Balance: Maintaining a balance between the centralized control of digital services (for efficiency) and decentralized governance (for inclusiveness) will present ongoing challenges. While centralization might streamline digital governance, it could also lead to bottlenecks and inefficiencies, particularly in ensuring that regional governments are equipped to manage localized digital services.
  - Surveillance Concerns: Ensuring DPI does not evolve into a tool for state surveillance or the exploitation of citizen data will be critical. Establishing independent oversight bodies and ensuring public accountability will be essential to mitigate risks of data misuse and safeguard democratic principles.
  - Cybersecurity: The dynamic threat landscape will require Nigeria to continually strengthen its cybersecurity frameworks. Building a resilient cyber defense infrastructure, combating emerging threats like ransomware and nation-state cyber-attacks, and securing critical infrastructure will remain priorities.

Transparency and accountability in governance can be further enhanced through continuous engagement with civil society organizations (CSOs)3, ensuring the governance process remains inclusive and people-centered. Public consultations, along with initiatives to boost digital literacy, will ensure that citizens actively participate in shaping a transparent digital landscape. Additionally, Nigeria's commitment to adopting global best practices in sustainable ICT will support the reduction of the digital infrastructure's carbon footprint, while fostering innovation in green technologies. Through these steps, Nigeria is well-positioned to become a leading force in digital governance, balancing control and transparency while prioritizing security, inclusivity, and sustainability as it navigates the challenges of a rapidly digitalizing world.28

Summary: Horizon Three Scenario

In conclusion, Nigeria stands at the brink of a transformative digital future, driven by a multifaceted approach addressing social, technological, economic, environmental, and political dynamics. By significantly narrowing the digital divide and enhancing digital literacy across the nation, Nigeria will empower marginalized communities, ensuring all citizens can participate in the digital economy. Initiatives like the National Digital Literacy Framework and Digital Nigeria will be pivotal in equipping individuals with essential skills. The establishment of a robust, interoperable digital infrastructure will enable seamless integration of services and foster innovation through local tech ecosystems and international collaborations. As Nigeria positions itself as a leader in the digital economy, emphasizing

[28] RAND Corporation, Perspectives, PE-253, https://www.rand.org/content/dam/rand/pubs/perspectives/PE200/PE253/RAND_PE253.pdf.

sustainable practices and green technologies will enhance its global standing and attract foreign investment. However, realizing this vision requires addressing challenges such as technological adaptation, cybersecurity, and equitable access to digital services. Implementing policies that promote transparency, accountability, and inclusivity while safeguarding citizens' rights in an evolving landscape is crucial. With strategic foresight and collaboration, Nigeria can navigate these challenges, becoming a model for digital governance and sustainable development on the global stage.

Synthesis: Nigeria's Three-Horizon Trajectory

In conclusion, Nigeria's journey towards fully deploying Digital Public Infrastructure (DPI) reveals a dynamic process with opportunities and challenges across the Three Horizons. In Horizon 1, the country is laying the groundwork for its digital transformation, with growing political will, incremental improvements in digital infrastructure, and rising adoption of digital services. However, significant barriers, such as the digital divide, low digital literacy, and uneven infrastructure deployment, particularly in rural areas, pose challenges to inclusive growth. Regulatory uncertainties and cybersecurity risks also threaten to slow progress if not addressed effectively. Moving into Horizon 2, we see the emergence of significant technological and social shifts. Increased digital literacy, improved interoperability between systems, and enhanced public service delivery will reshape Nigeria's socio-economic landscape. However, this transitional phase will still face hurdles, including managing the technological and environmental impact of DPI expansion and ensuring that economic benefits are distributed equitably between urban and rural populations. Success in this horizon depends on addressing disparities and ensuring that digital public services are accessible to all Nigerians, regardless of geographic or economic status. By Horizon 3, Nigeria will be well-positioned as a digital leader within Africa and globally, with a fully interoperable DPI supporting various sectors such as finance, education, health, and agriculture. A strong digital economy, high levels of digital literacy, and an integrated governance model will characterize this future. Yet, continued attention will be needed to balance innovation with privacy, environmental sustainability, and decentralized governance. Ensuring that digital public services remain open, secure, and flexible will be critical to maintaining public trust and adapting to global technological trends. Overall, Nigeria's DPI deployment, if carefully managed, holds immense potential to drive social inclusion, economic growth, and governance reform. However, success requires deliberate efforts to close the digital divide, foster sustainable digital infrastructure, and implement robust regulatory frameworks to protect citizens' rights and ensure the long-term viability of its digital ecosystem.

5. Deployment of Systems Thinking & Design Thinking Tools

In addressing the complex challenges of Digital Public Infrastructure (DPI) adoption in Nigeria, systems thinking and design thinking emerge as essential tools for crafting inclusive and sustainable solutions. These approaches enable stakeholders to navigate the interconnected nature of DPI challenges and design adaptive frameworks that cater to the country's unique socio-economic and infrastructural realities. Systems thinking provides a holistic lens to understand the broader ecosystem in which DPI operates. It identifies key stakeholders such as the government, private sector, civil society, and citizens, highlighting their interdependencies and roles. By focusing on leverage points like Nigeria's youthful population, digital policies, and public trust, systems thinking reveals opportunities for systemic change. For instance, expanding digital literacy among young people can create a ripple effect, increasing DPI adoption while simultaneously boosting

employability and innovation. Moreover, it emphasizes the importance of feedback loops, ensuring that interventions in areas like connectivity, regulatory frameworks, and public engagement continuously inform and improve one another. Design thinking, on the other hand, offers a human-centered approach to tackling DPI challenges, emphasizing iterative problem-solving. It begins with problem framing, helping stakeholders define and understand the multifaceted issues hindering DPI adoption—such as regional disparities in infrastructure or digital literacy gaps. The ideation phase generates innovative solutions, such as piloting modular DPI systems tailored to specific local contexts. Prototyping and testing these solutions in real-world scenarios allow for adjustments based on user feedback and regional conditions, ensuring that implementations are both practical and impactful. For example, testing cybersecurity frameworks in pilot programs helps refine data protection mechanisms before broader rollout, reducing risks of misuse and enhancing public trust. Together, these methodologies provide a dynamic framework for navigating the "wicked problems" of DPI adoption in Nigeria. Systems thinking ensures that efforts are aligned and interdependent, addressing root causes rather than surface symptoms, while design thinking fosters creativity and adaptability in solution development. By leveraging both approaches, Nigeria can create a resilient and inclusive digital infrastructure that evolves in response to emerging challenges and opportunities, driving equitable socio-economic growth.[29]

5.1. The Wicked Problem Aspects of DPI Adoption in Nigeria

1. No Definitive Formulation In Nigeria, Digital Public Infrastructure (DPI) is often seen as a panacea for addressing digital inclusion and economic formalization, especially given the large informal sector and the significant rural-urban divide. However, Nigeria's infrastructural limitations pose a considerable challenge to implementing DPI effectively. Many rural areas still lack reliable electricity and Internet access, making it difficult for digital identity programs like the National Identity Number (NIN) to reach remote populations. Additionally, disparities in digital literacy across regions mean that even with digital infrastructure, certain groups may remain excluded due to a lack of skills to engage with DPI systems. Without a clear strategy that addresses these local realities, DPI risks becoming an oversimplified solution that fails to bridge these systemic divides.

2. No Stopping The Nigerian government and private sector are investing heavily in digital infrastructure, from expanding broadband networks to introducing digital literacy programs. However, Nigeria's fast-growing population and rapid urbanization create a scenario where the demand for digital infrastructure outpaces development. The country's reliance on oil revenues, which are subject to fluctuations, adds economic volatility to DPI funding. Consequently, there is no clear endpoint in sight for investments in infrastructure, regulatory frameworks, and digital skills programs, as each advancement requires further updates and maintenance. This "no stopping" reality means that Nigeria will need to continuously adapt and fund DPI-related initiatives to keep pace with technological changes and population growth.

3. Improvements Rather Than Final Solutions While DPI could potentially streamline service delivery and improve access to financial services in Nigeria, it also exposes users to risks such as identity theft, privacy infringements, and government surveillance. Nigeria's data protection framework is still evolving, with the Nigeria Data Protection Regulation (NDPR) providing some safeguards but lacking enforcement strength and comprehensive coverage. As Nigeria scales up DPI initiatives, the increase

[29] Horst W. J. Rittel and Melvin M. Webber, "Dilemmas in a General Theory of Planning," Policy Sciences 4, no. 2 (1973): 155–169.

in digital transactions and identity verifications could open doors to misuse of personal information, especially if cybersecurity measures remain underdeveloped. For instance, reports of fraud and unauthorized data access have raised public concerns over digital identities and financial transactions. These issues underscore the need for continuous improvement rather than assuming that DPI alone can provide a final, risk-free solution.

4. No Way to Measure/Evaluate the Outcome In Nigeria, there are limited standardized metrics or frameworks to measure the impact of DPI systems on social inclusion, economic growth, and public welfare. For example, while the government tracks the registration numbers for the NIN, there is little clarity on how to measure its effectiveness in improving service access across different demographics. Without robust evaluation metrics, the potential positive outcomes of DPI—such as increased financial inclusion or streamlined government services—may not be fully understood or achieved equitably. Additionally, regional inequalities, such as the higher levels of digital access in cities like Lagos versus more remote areas in the North, highlight how DPI's benefits are experienced unevenly. This lack of measurement tools makes it challenging to assess the overall success of DPI in achieving inclusive development.

5. One-Shot Solution & Consequences for the Larger System The decisions Nigeria makes now regarding DPI technology choices, partnerships, and regulatory frameworks will set a trajectory for its digital ecosystem for years to come. For instance, Nigeria's collaboration with international technology companies for digital infrastructure development introduces risks of dependency on proprietary technologies, which could limit local innovation and increase costs in the long run. Furthermore, Nigeria's data sovereignty could be compromised if data storage and processing are managed by foreign companies without adequate local controls. Regulatory choices made today will shape data privacy norms, cybersecurity standards, and even digital governance for decades. For example, a focus on surveillance in DPI implementation, without sufficient checks and balances, could lead to public distrust in digital systems. Each of these choices has long-lasting implications for Nigeria's digital future and its capacity to participate in the global digital economy on equitable terms.

6. No Final End to the Solution DPI implementation in Nigeria faces a constantly shifting landscape due to technological advancements, fluctuating public adoption, political shifts, economic variability, and influences from digital geopolitics. This means that DPI, by its very nature, lacks a fixed endpoint. The rapid pace of technological change can make existing infrastructure and policies quickly outdated, creating an endless cycle of updates and modifications that complicates both strategic planning and resource allocation. The unpredictability of public adoption patterns and political and economic changes further exacerbates the complexity of crafting a long-term DPI framework.

7. Every Problem is Unique Nigeria's vast population, diverse socio-economic landscape, and varied levels of infrastructure development demand a DPI framework that is adaptable across regions and demographics. What works for one community or region may not apply or may even prove detrimental in another, leading to significant disparities in access and efficacy. The challenges posed by this diversity make it difficult to develop universal solutions, as the infrastructural gaps between urban and rural areas, as well as differences in digital literacy, require distinct, nuanced approaches for effective DPI deployment.

8. Every Problem is a Symptom of Another Issues like limited internet access and low digital literacy in Nigeria are not isolated challenges; they stem from deeper, entrenched problems such as deficiencies in the education system, infrastructural disparities, and economic inequality. These fundamental issues not only hinder DPI adoption but also reveal underlying socio-economic divides

that a DPI framework alone cannot resolve. DPI implementation, in this context, risks addressing only surface-level symptoms without tackling the root causes, creating a fragile foundation that may fail to achieve true inclusivity.

9. Variation in Explanation Determined by Experience DPI is understood and prioritized differently depending on the stakeholders involved, such as government agencies (e.g., ICT, tax authorities, and data protection authorities), private sector entities, development partners, civil society organizations, and end-users. Each group's unique experience shapes their view on what DPI should achieve, which can lead to conflicts in goals and priorities. For instance, while government bodies may focus on regulatory control and security, private sector players might prioritize innovation and scalability. This diversity in perspectives creates friction, misalignment, and a lack of cohesion that can delay DPI progress and complicate its governance.

10. No Right to Be Wrong The high stakes associated with data security, privacy, and inclusivity in DPI implementation mean that any failures—whether in data protection, privacy rights, or equitable access—carry severe repercussions. A single breach of security, lapse in privacy, or misstep in policy can result in significant harm to the public, eroding trust in digital systems and creating barriers to DPI adoption. In an environment where trust is fragile, the risk of making even minor errors compounds the difficulty of DPI deployment, as any missteps have the potential to impact public confidence and the broader digital landscape in Nigeria.

5.2. Systems Thinking: Leveraging DPI Adoption in Nigeria

Figure 2. Systems map: how leverage points connect to levers and system outcomes

LEVERAGE POINT	→	LEVER	→	SYSTEM OUTCOME
People — a youthful population receptive to digital services	→	Digital literacy and skills programmes targeting rural and underserved regions	→	A digitally capable population able to use DPI services independently
Policies — digital identity and financial inclusion mandates	→	Refined data privacy and security regulatory frameworks	→	Enforceable rules that de-risk adoption for citizens and investors
Organizational processes — NIN and BVN service delivery	→	Broadband investment, particularly in rural areas	→	Public services that are reliably reachable nationwide
Social norms — trust in digital services	→	Targeted public awareness campaigns	→	Public confidence that converts access into uptake

To ensure the successful and inclusive adoption of Digital Public Infrastructure (DPI) in Nigeria, a systems-thinking approach can help identify stakeholders, leverage points, and systemic initiatives that align with the local context. Below is an expanded view of each element, applying it to the unique challenges and opportunities in Nigeria.[30]

Stakeholders

1. Government of Nigeria (Policymaker, Regulator): The government plays a central role in DPI adoption, setting policies, regulations, and standards for digital identity (e.g., NIN) and financial inclusion initiatives. Policymakers need to consider issues like privacy protection, data security, and equitable access, particularly for underserved communities in rural areas.

[30] Donella H. Meadows, "Leverage Points: Places to Intervene in a System" (Hartland, VT: The Sustainability Institute, 1999).

2. Private Sector (Telecom Providers, Fintech): Telecom companies and financial technology providers are essential in expanding DPI by delivering the required digital services and connectivity infrastructure. Partnerships with the private sector can accelerate digital literacy, improve accessibility, and introduce innovative digital financial services.

3. Civil Society (NGOs, Advocacy Groups): Civil society groups serve as watchdogs and advocates for inclusivity, transparency, and privacy in DPI. They play a key role in ensuring that DPI systems address issues like data privacy, user rights, and digital equity, especially for vulnerable and underserved populations.

4. International Organizations (Funding, Technical Assistance): Organizations such as the World Bank, UNDP, and others provide critical funding and technical support for DPI projects. These stakeholders offer best practices, frameworks, and resources to guide Nigeria's DPI initiatives, ensuring alignment with global standards and sustainability.

5. Citizens of Nigeria (End Users, Digital Identity & Payments): The ultimate beneficiaries of DPI, Nigerian citizens need access to secure, efficient, and inclusive digital services. Understanding and addressing user needs and concerns, particularly around data privacy and trust, are crucial for driving adoption among Nigeria's diverse population.

6. Technical and Academic Community: These communities play a pivotal role in driving the adoption of Digital Public Infrastructure (DPI) in Nigeria, they serve as catalysts for innovation, capacity building, and evidence-based policymaking, contributing to the systemic change needed for inclusive and sustainable digital development.

Leverage Points (Key Areas for Systemic Change)

1. People: Nigeria's youthful population is a major asset for DPI adoption. Young people are generally more receptive to digital services and can drive the demand for DPI-related services. Investing in digital skills development for this demographic can enhance their readiness for the digital economy and support the adoption of DPI across sectors.

2. Policies: Government-led policies on digital identity and financial inclusion act as enabling levers for DPI expansion. Policies encouraging widespread adoption of digital identities (like NIN), particularly in rural areas, along with initiatives promoting financial access (such as cashless policies), can enhance public service delivery and foster greater digital inclusion, especially in urban and semi-urban regions.

3. Organizational Processes: Streamlining public service delivery through DPI initiatives like NIN and BVN (Bank Verification Number) can foster trust and encourage citizens to adopt digital services. Clear and transparent organizational processes in DPI implementation are essential to building public confidence in government-managed digital systems.

4. Social Norms: Digital adoption requires a shift in societal attitudes, particularly concerning trust in digital services. Promoting trusted digital platforms and addressing concerns about data privacy and inclusivity can help normalize digital interactions. By addressing these social concerns, Nigeria can accelerate DPI adoption and enhance public trust.

Levers (Initiatives to Shift the System)

1. Digital Literacy and Skills Programs: To bridge the digital literacy gap, especially in rural and underserved regions, programs that target education and training are essential. Digital literacy

initiatives can empower citizens with the skills to use DPI services confidently, thereby enhancing inclusivity and driving the effective use of digital infrastructure.

2. Improving Connectivity: Nigeria's DPI adoption depends heavily on reliable Internet access. Investing in broadband infrastructure, especially in rural and semi-urban areas, will increase connectivity and reduce the digital divide. Enhanced connectivity will enable DPI services like digital identity verification and financial inclusion to reach a broader population base.

3. Policy and Regulatory Frameworks: Refining Nigeria's data privacy regulations and security frameworks is critical for DPI adoption. Clear policies that ensure data privacy, foster trust, and encourage private-sector collaboration can create an enabling environment for DPI initiatives. Regulatory frameworks should also address cybersecurity to protect citizens' data and maintain public trust.

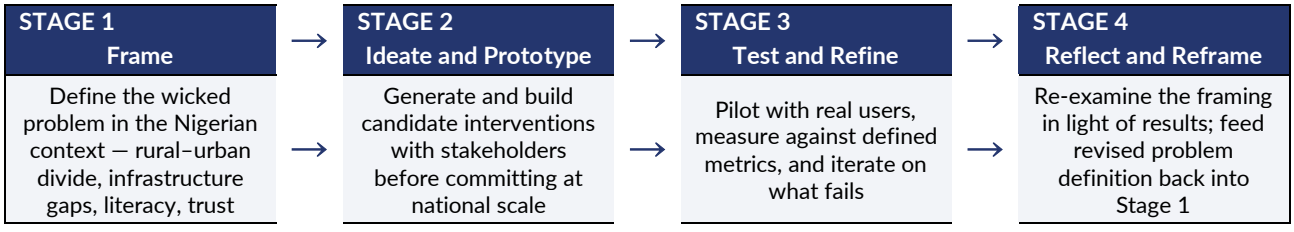
4. Public Awareness Campaigns: Building trust in DPI initiatives requires engaging citizens and addressing their concerns through targeted public awareness campaigns. Outreach programs that emphasize the security, benefits, and inclusivity of DPI can help overcome mistrust and encourage widespread adoption. Educating the public about the advantages of DPI, particularly in remote regions, will strengthen acceptance.

Application of Systems Thinking

Nigeria can build an inclusive and effective Digital Public Infrastructure (DPI) system by leveraging its youthful population, strengthening digital policies, and fostering public trust. Key actions, such as improving connectivity and enacting thoughtful regulatory reforms, play a vital role in this effort. A systems-thinking approach ties these elements together, recognizing the interconnections among stakeholders, leverage points, and initiatives. This creates a feedback loop where progress in one area supports advancements in others, driving sustainable and equitable DPI adoption. By prioritizing accessibility, security, and digital literacy, Nigeria can establish a robust DPI framework that promotes socio-economic growth and improves the overall well-being of its citizens.

5.3. Design Thinking

Figure 3. The four-stage design thinking cycle applied to DPI adoption



Design thinking offers a practical framework for addressing the 10 wicked problems of Digital Public Infrastructure (DPI) adoption in Nigeria. It unfolds across four interconnected stages. The first stage, Problem/Opportunity Framing, emphasizes understanding the unique challenges of DPI adoption in Nigeria and identifying potential opportunities. This involves framing DPI as a tool to address systemic issues such as digital inequality and infrastructure gaps while considering the diverse needs and perspectives of stakeholders. The second stage, Ideate and Prototype, focuses on generating innovative ideas and developing prototypes that provide tangible solutions. For example, designing modular DPI solutions tailored to both urban and rural settings or embedding robust security

measures to foster trust in digital systems are crucial activities in this stage. Next, the Test and Refine stage involves piloting these prototypes in real-world settings, such as underserved communities, to gather feedback from users and stakeholders. Insights gained from these pilot projects are used to identify gaps, refine the designs, and enhance their effectiveness. Finally, the Reflect and Reframe stage ensures continuous improvement by evaluating outcomes and revising strategies based on lessons learned. This reflective process allows DPI initiatives to evolve in response to changing needs, ensuring they remain scalable, inclusive, and resilient in supporting Nigeria's digital transformation.[31]

Stage 1: Problem/Opportunity Framing

This stage involves understanding the complex nature of the problems, and framing them within the context of DPI adoption in Nigeria. Key Wicked Problems:

1. No definitive formulation: DPI is often presented as a catch-all solution, but how it addresses systemic issues like rural-urban divides and infrastructure gaps is unclear. However, presenting DPI as part of a broader, multifaceted effort that addresses long-standing infrastructural and socio-economic disparities will help ensure that it doesn't overpromise.

2. No stopping: Investments in DPI-related infrastructure, digital literacy, and evolving policy might never reach a final endpoint. However, describing DPI as a continual process of improvement, where it can evolve incrementally with regular iterations based on feedback, highlights its potential for ongoing development and adaptation.

3. Improvements rather than final solutions: Increasing access to the internet can exacerbate vulnerabilities, such as exposure to online risks like identity theft and surveillance. However, using DPI to enhance not just access but also security by employing technologies like encryption, authentication, and digital literacy programs can help mitigate these risks.

4. No way to measure/evaluate the outcome: The lack of defined metrics for DPI impact makes it difficult to assess its effectiveness and determine equitable benefits. However, defining success metrics based on accessibility, literacy improvement, and security measures, and ensuring that outcomes are monitored and evaluated over time, can address this challenge.

5. One-shot solution & consequences for larger system: The choice of DPI technologies, regulatory frameworks, and partnerships will set the long-term trajectory for Nigeria's digital future. However, leveraging this opportunity to implement forward-thinking policies and strategic partnerships that consider the adaptability and long-term sustainability of DPI technologies can ensure a more resilient and inclusive digital landscape.

6. No final end to solution: Unpredictable factors like evolving technology, shifting political dynamics, and economic fluctuations could affect DPI outcomes. However, promoting DPI adoption as a dynamic, flexible initiative that adapts to evolving trends in technology and governance can help ensure its resilience and effectiveness.

7. Every problem is unique: The vast diversity of Nigeria's population, infrastructure, and socio-economic conditions makes the implementation of DPI complex and context-specific. However, promoting DPI adoption as a locally tailored approach that adapts to diverse regional contexts,

[31] Hasso Plattner Institute of Design at Stanford (d.school), An Introduction to Design Thinking: Process Guide; see also Tim Brown, "Design Thinking," Harvard Business Review, June 2008.

incorporating community involvement and input at each stage of the process, can address these unique challenges effectively.

8. Every problem is a symptom of another: Issues like limited access and literacy are symptoms of deeper, systemic problems, including education gaps, economic inequality, and infrastructure deficiencies. However, positioning DPI as a systemic solution that addresses root causes like inadequate infrastructure, educational shortcomings, and socio-economic inequality can effectively tackle these underlying challenges.

9. Variation in explanation determined by experience: Different stakeholders (government, private sector, civil society, and end-users) may have varying perspectives on the problems and solutions. However, presenting DPI adoption as a collaborative effort that actively includes diverse viewpoints and interests from all stakeholders can ensure buy-in and shared ownership.

10. No right to be wrong: Data security, privacy, and inclusivity are high-stakes issues; failures such as data breaches or insufficient coverage can have severe public consequences. However, prioritizing DPI as a high-priority initiative that emphasizes security, transparency, and inclusivity at every stage, with clear accountability and remedial mechanisms, can mitigate these risks effectively.

Stage 2: Ideate and Prototype

This stage involves generating ideas to address the wicked problems and creating prototypes to test potential solutions. Ideas to Address Wicked Problems:

1. Technology-Neutral Infrastructure: Design DPI that is open-source and flexible, allowing for integration of multiple technologies. Ensure it doesn't favor specific vendors to maintain neutrality.

2. Incremental Expansion: Prototype pilot programs in rural areas that combine DPI infrastructure with targeted digital literacy programs. These pilots can be scaled once they show success.

3. Security and Education Focus: Develop a DPI framework with built-in security protocols (e.g., end-to-end encryption, secure data storage) and integrate these with public awareness campaigns on digital security and privacy.

4. Impact Metrics Dashboard: Create a real-time dashboard that tracks DPI adoption, usage, and security breaches. Include metrics on digital literacy, data protection compliance, and user feedback.

5. Policy Sandbox for DPI Regulations: Develop a policy sandbox to test and iterate on DPI regulations, partnerships, and governance models. This can provide insight into the long-term impacts of certain decisions.

6. Modular, Scalable Solutions: Prototype flexible, modular DPI solutions that allow for local customization while ensuring interoperability at a national level. These can be tested in both urban and rural areas.

7. Localized DPI Models: Prototype various models of DPI for different Nigerian states, accounting for local infrastructure and socio-economic realities, and encourage community involvement in their design.

8. Integrated Education and DPI Platforms: Build prototypes that combine DPI with educational platforms, ensuring that digital literacy is embedded within the wider social infrastructure, especially in underserved regions.

9. Stakeholder Engagement Platforms: Develop a platform to facilitate ongoing dialogue among all DPI stakeholders (government, businesses, civil society) to ensure transparent decision-making and ongoing feedback loops.

10. Fail-Safe Mechanisms: Create and test data protection frameworks that include public reporting mechanisms, breach-response protocols, and clear governance structures to minimize data misuse.

Stage 3: Test and Refine

In this stage, prototypes are tested in real-world scenarios to gather feedback and make improvements. Testing and Refining DPI Solutions:

1. Pilot Projects: Run pilot projects in different regions, particularly rural areas, to test infrastructure and digital literacy initiatives. Use feedback to identify gaps and challenges early on.

2. Security Audits: Conduct regular security audits to test the robustness of DPI systems against potential breaches and threats. Use findings to improve security protocols and public awareness programs.

3. Feedback Loops for Impact Metrics: Use the metrics dashboard to collect feedback from users, developers, and government officials. Refine the dashboard to capture more relevant data and provide actionable insights.

4. Policy Iteration: Test different regulatory models through the policy sandbox and refine them based on their effectiveness in encouraging innovation while protecting citizens' rights.

5. Local Adaptations: Use local models to refine DPI systems for different Nigerian states, adjusting to regional needs and challenges. Collaborate with local governments to ensure that solutions are context-specific.

6. Education Programs: Test digital literacy programs in different educational settings to refine content and delivery methods, ensuring maximum reach and engagement, especially in underserved communities.

7. Stakeholder Platforms: Use feedback from diverse stakeholders to refine collaborative governance models, improving inclusivity and transparency in decision-making processes.

8. Data Privacy Mechanisms: Test privacy-enhancing technologies like India's Account Aggregator model to ensure that DPI systems protect user data effectively and give users control over their information.

Stage 4: Reflect and Reframe

This final stage involves evaluating what worked, what didn't, and reframing the approach based on insights gathered during testing. Reflections and Reframing:

1. Continuous Iteration: Recognize that DPI is a long-term, evolving process. Reframe the expectation of a "final solution" to acknowledge that improvement will continue, especially in infrastructure and digital literacy.

2. Broader Integration: Reflect on the need to integrate DPI with broader social programs addressing infrastructure, education, and economic inequalities to avoid DPI becoming a patchwork solution for digital inclusion.

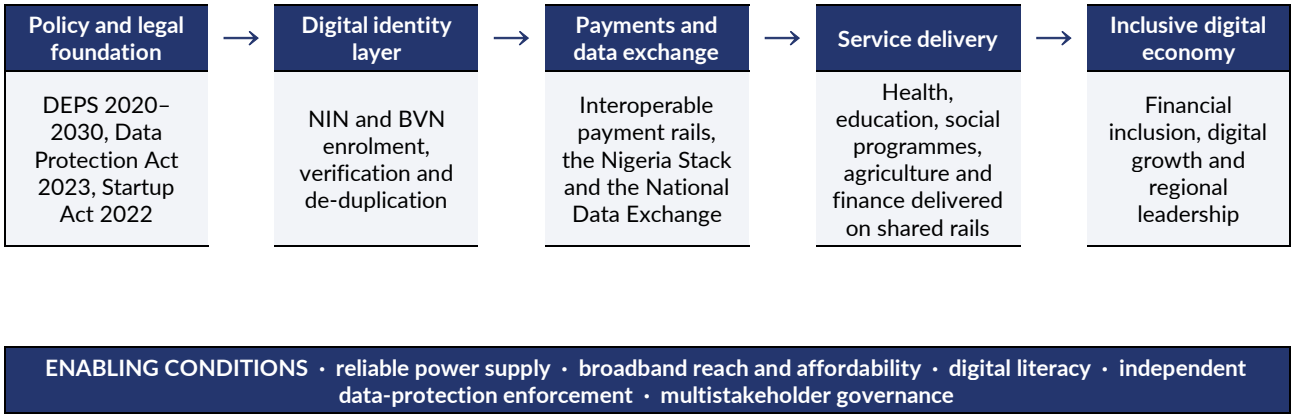
3. Scalability and Flexibility: Reframe DPI as a scalable initiative that can adapt to changes in technology, policy, and governance over time, ensuring it remains relevant in the face of unpredictable global trends.

4. Monitoring and Accountability: Refine monitoring mechanisms to ensure that DPI initiatives are evaluated in terms of actual impact on citizens, not just broad access metrics. Make sure that all evaluation tools are transparent and participatory.

5. Sustained Collaboration: Foster continuous collaboration among stakeholders, recognizing that the political, economic, and technological landscape will continue to evolve. By applying the design thinking process to the wicked problems associated with DPI adoption in Nigeria, we can create a flexible, responsive approach that tackles the complexities while ensuring that the system evolves based on real-world feedback and outcomes.

6. Adoption Approach (Solutions)

Figure 4. The DPI adoption pathway for Nigeria, and the enabling conditions it rests on



The successful implementation of Digital Public Infrastructure (DPI) in Nigeria depends on the active involvement and alignment of diverse stakeholders, each playing a critical role. By leveraging leadership and management skills, we can ensure that all stakeholders are engaged, motivated, and aligned with the overarching goals of digital transformation and inclusion. These include government bodies like the Federal Ministry of Communications and Digital Economy, private sector innovators such as MTN and Flutterwave, civil society organizations advocating for transparency, and international entities like the World Bank and UNDP providing funding and technical expertise. Together, they must address challenges such as digital literacy gaps, infrastructure deficits, and data privacy concerns while fostering inclusivity and innovation. The government holds the responsibility for creating policies, allocating resources, and overseeing DPI projects. Policymakers can be engaged through regular consultations, workshops, and data-driven discussions to ensure alignment with national goals. For the private sector, partnerships, co-investments, and innovation hubs present avenues to expand DPI infrastructure and services while unlocking revenue and market opportunities. Civil society organizations are vital for advocacy and community outreach, ensuring transparency and accountability. Meanwhile, international organizations provide essential funding, global standards, and technical insights, emphasizing DPI's alignment with Sustainable Development Goals (SDGs). Equally important are the citizens, the ultimate beneficiaries of DPI. Public awareness campaigns, community workshops, and accessible feedback channels can empower them to adopt DPI systems for services like digital payments and government resources. Academic institutions and tech hubs also play a crucial role by fostering innovation and building technical capacities. A robust stakeholder

engagement strategy ensures collaboration, inclusivity, and accountability, addressing Nigeria's digital challenges effectively. By aligning stakeholder interests, the initiative not only facilitates a sustainable DPI framework but also positions Nigeria as a leader in Africa's digital transformation, paving the way for improved governance, economic growth, and financial inclusion. This document outlines a detailed plan to drive, gain support for, and motivate a team to deliver and achieve the long-term impact of DPI solutions in Nigeria.

6.1. Stakeholder Identification for Nigeria's DPI Implementation

Table 4. Stakeholder engagement matrix for Nigeria's DPI implementation

Stakeholder Group	Role and Interest	Engagement Strategy	Value Proposition
Government of Nigeria (policymakers and regulators) Federal Ministry of Communications and Digital Economy; local government authorities	Formulate policy, allocate resources, and oversee DPI implementation.	Bi-monthly ministry consultations; region-specific policy workshops; multi-sectoral advisory committees spanning federal, state and local tiers; evidence-based briefings on governance impact.	Streamlined services through digital IDs, e-payments and interoperable data; cost savings from removing manual and duplicated processes; economic growth from new digital markets and foreign investment.
Private sector (telecoms, fintech, technology firms) MTN, Airtel, Flutterwave, Paystack	Build and deploy DPI infrastructure, provide digital services, drive innovation.	Formal partnership agreements with major operators; DPI innovation hubs in Lagos, Abuja and Kano; co-investment vehicles for rural connectivity.	Revenue generation on the UPI precedent; lower operating costs and easier market entry through interoperability; market expansion into underserved regions.
Civil society (NGOs and advocacy groups) Paradigm Initiative and digital inclusion advocates	Ensure transparency, inclusivity and accountability; advocate user-centric policy.	Collaborative digital-rights projects; joint transparency campaigns on data privacy and security; a DPI grievance portal channelling community feedback.	Inclusivity gains that narrow the rural–urban divide, particularly for women and the unbanked; DPI positioned as an accountability tool for public spending.
International organizations (funding bodies and technical experts) World Bank, IMF, African Development Bank, UNDP	Provide financing, global standards and technical expertise for scalable implementation.	Detailed funding proposals; knowledge partnerships with UNDP and OECD on standards; transparent performance reporting to donors; joint programmes co-financing green ICT.	Direct alignment with the SDGs across health, financial inclusion and education; Nigeria positioned as a regional leader in Africa's digital transformation.
Citizens of Nigeria (end users) Rural and urban populations; women, smallholder farmers, the unbanked	Adopt and use DPI to reach payments, social programmes and government services.	Nationwide awareness campaigns across radio, television and digital platforms; hands-on community workshops with local government; hotlines, mobile apps and public kiosks for feedback.	Faster access to health insurance, pensions and education services; financial empowerment through mobile banking and digital payments.
Technical and academic communities University of Lagos, Ahmadu Bello University, Co-Creation Hub	Conduct research, build technical capacity, foster innovation.	Research grants to partner universities; skill-building workshops; open public datasets; sponsored open innovation challenges.	Opportunities for original research on scalable, interoperable DPI; universities and hubs shaping national direction; a sustained pipeline of skilled professionals.

The success of Digital Public Infrastructure (DPI) in Nigeria hinges on the active involvement and alignment of diverse stakeholders across sectors. Each stakeholder group brings unique perspectives,

resources, and challenges to the table, making their identification and engagement critical for the initiative's success. The key stakeholders in Nigeria's DPI implementation include:

1. Government of Nigeria (Policymakers and Regulators)

- Ministries such as the Federal Ministry of Communications and Digital Economy and local government authorities.
- Role: Formulate policies, allocate resources, and oversee DPI implementation.

2. Private Sector (Telecom Providers, Fintech Companies, and Technology Firms)

- Major companies like MTN, Airtel, Flutterwave, and Paystack.
- Role: Develop and deploy DPI infrastructure, provide digital services, and drive innovation.

3. Civil Society (NGOs and Advocacy Groups)

- Organizations such as Paradigm Initiative and other digital inclusion advocates.
- Role: Ensure transparency, inclusivity, and accountability in DPI systems while advocating for user-centric policies.

4. International Organizations (Funding Bodies and Technical Experts)

- Entities like the World Bank, IMF, African Development Bank, and UNDP.
- Role: Provide financial support, global standards, and technical expertise for scalable and sustainable DPI implementation.

5. Citizens of Nigeria (End Users)

- Rural and urban populations, particularly underserved groups such as women, smallholder farmers, and the unbanked.
- Role: Adopt and utilize DPI systems to access services like digital payments, social programs, and government resources.

6. Technical and Academic Communities

- Institutions like the University of Lagos, Ahmadu Bello University, and tech hubs such as Co-Creation Hub (CcHub).
- Role: Conduct research, build technical capacity, and foster innovation for DPI systems.

6.2. Stakeholder Engagement and Management Plan for Nigeria's DPI Implementation

Nigeria's journey toward implementing Digital Public Infrastructure (DPI) holds the potential to revolutionize governance, enhance financial inclusion, and bridge the socio-economic divide. However, achieving these outcomes requires the active engagement of a diverse set of stakeholders, each playing a unique role in the DPI ecosystem. From government policymakers and private sector innovators to civil society organizations and citizens, effective stakeholder engagement is essential for addressing Nigeria's complex digital challenges. This Stakeholder Engagement and Management Plan outlines tailored strategies for key groups, highlighting their roles, proposed engagement methods, and mutual value propositions. By aligning stakeholder interests and fostering collaboration, Nigeria can create a sustainable, inclusive, and secure DPI framework, setting a precedent for digital transformation across Africa.

1. Government of Nigeria (Policymakers and Regulators)

Engagement Strategy

- Regular Consultations: Establish bi-monthly meetings with relevant ministries, including the Federal Ministry of Communications and Digital Economy, to address ongoing challenges and policy alignment.
- Policy Workshops: Host region-specific workshops to train policymakers, local government authorities, and community leaders on DPI implementation and its socioeconomic benefits.
- Advisory Committees: Create multi-sectoral advisory committees involving federal, state, and local government representatives to maintain a cohesive strategy.
- Data-driven Discussions: Present evidence-based research on DPI's role in improving governance efficiency and transparency to support policy decisions.

Value Proposition

- Streamlined Services: Showcase how digital IDs, e-payments, and interoperable data systems will reduce bureaucracy and improve service delivery efficiency.
- Cost Savings: Emphasize cost reductions in manual processes and duplication of government programs by leveraging DPI.
- Economic Growth: Highlight DPI's role in unlocking new digital markets and attracting foreign investment into Nigeria's technology sector.

2. Private Sector (Telecom Providers, Fintech Companies, and Technology Firms)

Engagement Strategy

- Partnership Agreements: Formalize partnerships with key players like MTN, Airtel, and leading fintech startups such as Flutterwave and Paystack to expand DPI infrastructure and services.
- Innovation Hubs: Establish DPI-focused innovation hubs in Lagos, Abuja, and Kano to encourage collaboration on technical solutions, such as payment gateways or digital literacy tools.
- Co-investment Opportunities: Promote joint ventures where telecom providers can co-invest in rural connectivity and fintech firms can integrate DPI solutions into their platforms.

Value Proposition

- Revenue Generation: Present case studies from India (e.g., UPI) where DPI has created massive opportunities in fintech, expanding user bases and revenue streams.
- Reduced Barriers: Demonstrate how interoperable systems can lower operational costs and enable seamless market entry for startups and SMEs.
- Market Expansion: Offer incentives for private sector partners to provide connectivity solutions in underserved regions, unlocking untapped customer bases.

3. Civil Society (NGOs and Advocacy Groups)

Engagement Strategy

- Collaborative Projects: Partner with civil society organizations such as Paradigm Initiative and NGOs advocating for digital inclusion to run DPI awareness campaigns and training programs in marginalized communities.
- Transparency Campaigns: Work with advocacy groups to ensure DPI systems meet data privacy and security expectations, fostering public trust.
- Feedback Mechanisms: Develop platforms, such as a DPI-focused grievance portal, for NGOs to relay community feedback to policymakers.

Value Proposition

- Inclusivity: Collaborate to reduce the rural-urban divide by leveraging DPI for financial inclusion, especially for women and smallholder farmers.
- Accountability: Position DPI as a tool to improve government transparency in resource allocation and public service delivery.

4. International Organizations (Funding Bodies and Technical Experts)

Engagement Strategy

- Funding Proposals: Submit detailed proposals to entities like the World Bank, IMF, and African Development Bank, emphasizing DPI's alignment with Nigeria's Sustainable Development Goals (SDGs).
- Knowledge Partnerships: Partner with the United Nations Development Programme (UNDP) and OECD to establish global standards and best practices for Nigeria's DPI frameworks.
- Performance Reporting: Create transparent mechanisms to regularly report progress on DPI adoption to donors and technical partners.
- Joint Investment Programs: Partner with organizations like the UNDP to co-finance green ICT initiatives, such as renewable energy-powered data centers.

Value Proposition

- Alignment with SDGs: Show how DPI will improve healthcare access, financial inclusion, and education outcomes, directly supporting SDGs 1 (No Poverty), 4 (Quality Education), and 8 (Decent Work and Economic Growth).
- Regional Leadership: Position Nigeria as a leader in Africa's digital transformation, attracting funding for scaling DPI projects across the continent.

5. Citizens of Nigeria (End Users)

Engagement Strategy

- Public Awareness Campaigns: Use nationwide campaigns through radio, television, and digital platforms to explain DPI services like NIN and BVN.
- Community Workshops: Partner with local governments to organize hands-on workshops that teach citizens how to use DPI systems for accessing social programs.
- User Feedback Channels: Establish citizen hotlines, mobile apps, and public kiosks for feedback and issue resolution. Develop DPI service centers in every local government area, allowing citizens to report challenges or suggest improvements.

Value Proposition

- Improved Access: Highlight how DPI enables quicker access to critical services like health insurance, pensions, and education scholarships.
- Financial Empowerment: Stress how mobile banking and digital payment solutions lower barriers to accessing credit and saving mechanisms.

6. Technical and Academic Communities

Engagement Strategy

- Research Grants: Collaborate with academic institutions like the University of Lagos and Ahmadu Bello University to fund DPI-focused research.

- Skill-building Programs: Organize workshops to equip students and professionals with the skills to design, deploy, and manage DPI systems.
- Open Data Access: Encourage the creation of public datasets for academic research and innovation in DPI technologies.
- Open Innovation Challenges: Sponsor competitions to encourage students and researchers to propose innovative solutions for DPI-related challenges, such as rural connectivity.

Value Proposition

- Innovative Opportunities: Promote the potential for groundbreaking research on scalable, interoperable DPI solutions.
- Collaboration Platforms: Emphasize how universities and tech hubs can shape the future of DPI by fostering partnerships with global institutions.
- Skills Development: Build a pipeline of skilled professionals who can sustain DPI's implementation and growth over the long term.

A comprehensive stakeholder engagement strategy is the cornerstone of Nigeria's successful DPI implementation. Each stakeholder group, from policymakers to end-users, contributes critical insights, resources, and innovations necessary to overcome Nigeria's digital challenges. By fostering collaboration, promoting inclusivity, and ensuring accountability, the proposed strategies address key barriers such as infrastructure deficits, data privacy concerns, and limited digital literacy. The value propositions tailored for each stakeholder emphasize mutual benefits, such as improved governance efficiency, market expansion, increased financial inclusion, and strengthened public trust. As Nigeria embarks on its DPI journey, these engagement strategies will ensure that the initiative is not only inclusive and adaptive but also positions the nation as a leader in Africa's digital transformation.

6.3. Developing High-Stakes Leadership Capability in a VUCA World

We localize leadership strategies to Nigeria's unique landscape, DPI initiatives can navigate the complexities of a VUCA world. These approaches ensure that all stakeholders, from policymakers to citizens, are aligned and actively engaged in building a sustainable and inclusive digital future for Nigeria. Using the leadership framework model by the US Army: Be, Know, Do[32]

Be: Visible, Caring, Empathetic, Calm, and Assertive

1. Visibility

- Action: Regularly update stakeholders, including federal and state government agencies, citizens, and international partners, on the progress of DPI projects such as the Nigeria Stack and NIN. Use public broadcasts, national newspapers, and social media platforms (e.g., NITDA's Twitter) to share milestones like broadband expansions or DPI integration efforts.
- Outcome: Builds public trust and confidence in DPI's transformative potential.

2. Empathy and Care

- Action: Conduct town hall meetings in rural areas to understand local connectivity challenges, ensuring no community is left behind. Engage underserved populations, particularly women and smallholder farmers, by addressing their digital literacy gaps through workshops.

[32] U.S. Department of the Army, Field Manual 22-100, Army Leadership: Be, Know, Do (Washington, DC: Headquarters, Department of the Army, August 1999).

- Outcome: Strengthens stakeholder relationships and fosters inclusivity.

3. Calm and Assertive

- Action: During crises (e.g., cybersecurity threats or data breaches), maintain public confidence by quickly addressing issues with clarity and actionable plans. Example, when concerns about NIN data breaches arose, decisive responses emphasizing Nigeria's ISO-certified data protection systems reassured citizens.
- Outcome: Demonstrates leadership resilience and builds credibility.

Know: Vision, Values, Guiding Principles

1. Vision

- Action: Clearly articulate how DPI will drive Nigeria's digital transformation, boost financial inclusion, and reduce inequality.
- Outcome: Inspires alignment across government, private sectors, and citizens.

2. Values:

- Action: Promote transparency by publishing DPI progress reports, inclusivity by prioritizing rural connectivity, and security by upholding Nigeria's Data Protection Act. Commit to transparent oversight via public audits of DPI projects like the National Broadband Plan.
- Outcome: Builds a culture of trust and accountability.

3. Guiding Principles:

- Action: Align DPI efforts with goals of digital inclusion, rural development, and economic growth outlined in Nigeria's Digital Economy Policy and Strategy. Use DPI to empower women through mobile financial services and e-learning platforms tailored for rural communities.
- Outcome: Keeps projects focused and outcome-driven.

Do: Communicate, Make Decisions, Take Responsibility, and Engage Stakeholders

1. Communication

- Action: Triple communication efforts during periods of uncertainty, using media to clarify DPI's purpose and address misinformation. Deploy SMS campaigns and local radio programs to explain DPI benefits like streamlined public services and digital payments.
- Outcome: Sustains stakeholder confidence and dispels doubts.

2. Decision-Making with Limited Information:

- Action: Use pilot programs to test initiatives (e.g., deploying NIN in specific states) and adapt strategies based on early results. Launch DPI pilots in urban centers like Lagos while iterating solutions for rural scalability.
- Outcome: Enables agility and data-driven scaling.

3. Responsibility:

- Action: Publicly take ownership of DPI outcomes and communicate lessons learned from setbacks (e.g., delays in infrastructure rollouts). Address connectivity delays in rural Nigeria by revising the National Broadband Plan timelines and committing resources for faster implementation.

- Outcome: Enhances credibility and resilience.

4. Engagement:

- Action: Actively involve key stakeholders, including telecom providers, civil society, and local communities, in shaping DPI policies and initiatives. Collaborate with NGOs like Paradigm Initiative to ensure DPI meets local needs, especially for vulnerable groups.
- Outcome: Builds grassroots support and enhances policy relevance.

6.4. Building Resilience and Adaptability for Nigeria's DPI Adoption

Crisis Preparation and Management

Preparation

- Contingency Plans:
  - Develop contingency plans addressing potential DPI challenges specific to Nigeria, such as:
    - Technical Failures: Intermittent power supply affecting the uptime of data centers or connectivity in rural areas.
    - Regulatory Changes: Adaptability to shifts in data protection regulations like the Nigerian Data Protection Act (NDPA).
    - Stakeholder Resistance: Opposition from groups concerned about privacy or lack of digital literacy.
  - Example: Create backup solutions, such as offline verification tools, for rural areas with unreliable connectivity.
- Training Programs:
  - Conduct simulations and scenario-based training for teams in ministries like the Federal Ministry of Communications and Digital Economy.
  - Topics to cover: handling cybersecurity incidents, public backlash on data privacy issues, and managing project delays.

Adaptability

- Flexible Strategies:
  - Use pilot programs (e.g., rolling out Nigeria Stack in urban hubs first) to gather feedback and refine implementation before scaling nationwide.
  - Incorporate insights from rural communities to adapt DPI services to their unique needs, such as voice-enabled interfaces for low-literacy populations.
- Continuous Learning:
  - Establish a National DPI Learning Hub where government teams, telecom operators, and fintech companies can share lessons learned during implementation.
  - Partner with international organizations like the World Bank for access to global best practices in DPI deployment.

Resilience

- Innovation:
  - Foster partnerships with Nigerian tech hubs like Co-Creation Hub (CcHub) to co-develop creative solutions to implementation barriers, such as localized apps for financial services.

    - Leverage generative AI for tasks like providing real-time feedback in multiple Nigerian languages to ensure inclusivity.
- Support Systems:
    - Set up a DPI Crisis Management Unit with resources like rapid response teams to address critical challenges (e.g., data breaches or public distrust).
    - Provide funding for third-party support to bolster cybersecurity and data protection systems.

Motivating the Team

Empowerment

- Decision-Making Authority:
    - Empower local teams to make location-specific decisions for DPI rollout, such as customizing training programs for rural areas in Northern Nigeria.
    - Example: Grant state-level authorities autonomy to address their unique connectivity challenges.
- Autonomy:
    - Allow DPI implementation teams at ministries and telecom companies to propose innovative, low-cost solutions tailored to underserved communities.

Support

- Resources:
    - Provide essential tools, like portable digital literacy kits, and ensure remote teams have uninterrupted access to power and internet during operations.
    - Example: Deploy solar-powered connectivity solutions in regions with unreliable electricity.
- Mentorship:
    - Pair younger team members with seasoned professionals from leading Nigerian tech companies to foster knowledge transfer and career growth.

Recognition

- Celebrate Milestones:
    - Announce and celebrate key achievements (e.g., completing NIN registration for a state or launching DPI infrastructure in a rural region) through government channels and media.
- Public Recognition:
    - Recognize outstanding contributors through public accolades during events like Nigeria's Digital Economy Summit.
    - Example: Highlight innovative DPI implementations by state governments in the annual DPI Progress Report.

Rewards

- Incentives:
    - Offer performance-based rewards, such as financial bonuses or professional certifications, to team members who develop innovative solutions or exceed project targets.
- Career Development:
    - Provide opportunities for team members to attend international workshops and conferences on DPI and digital governance.

- Example: Sponsor participation in programs like the African Union's Digital Transformation Conference.

6.5. Managing Stakeholder Reactions During Crises in Nigeria's DPI Adoption

Predicting Stakeholder Reactions

1. Appreciate Stakeholder Reactions

- Understand Concerns:
  - Take time to identify stakeholder-specific concerns. For example:
    - Government Officials: Worry about reputational risks or delays in policy execution.
    - Private Sector: Fear potential financial losses or operational disruptions.
    - Citizens: Concern about service outages, data privacy breaches, or misinformation.
  - Action: Conduct rapid surveys or engage in dialogue forums to gauge reactions.
- Empathy:
  - Acknowledge stakeholder challenges, such as rural citizens' reliance on DPI for accessing subsidies or private companies' investment risks.
  - Example: Reassure telecom providers by acknowledging infrastructure repair delays and offering clear timelines for restoration.

2. Frame Communications

- Address Reactions:
  - Customize crisis communications for each stakeholder:
    - Government: Emphasize accountability and the steps being taken to prevent future crises.
    - Private Sector: Offer immediate support, such as policy adjustments or co-investments, to mitigate losses.
    - Citizens: Simplify messaging to provide reassurance and actionable steps.
  - Example: Use local radio stations and SMS alerts to inform rural citizens about temporary disruptions in DPI services like digital payments.
- Clear Messaging:
  - Use clear, non-technical language when addressing the public.
  - Example: During a NIN data breach, release a statement outlining the breach's scope, steps to mitigate risks, and contact information for assistance.

3. Own It

- Take Responsibility:
  - Publicly accept accountability for DPI failures or disruptions.
  - Example: Acknowledge power-related outages affecting data centers and outline steps to prevent recurrence.
- Provide Solutions:
  - Offer immediate, practical solutions to stakeholders:
    - Launch a 24/7 DPI support hotline.
    - Roll out temporary offline verification systems in areas with connectivity issues.

The Nature of the Crisis Environment

1. Understanding the Crisis Environment

Complex Systems

- Identify Threats:
  - Map potential DPI implementation challenges in Nigeria, such as:
    - Inconsistent power supply.
    - Cybersecurity vulnerabilities due to limited data protection infrastructure.
    - Stakeholder resistance from groups skeptical about data privacy.
- Holistic View:
  - Analyze interdependencies in DPI systems. For instance, delays in expanding fiber optics can directly impact e-payment platforms used for subsidies.

Multiple Contributing Factors

- Analyze Factors:
  - Examine crises caused by combinations of:
    - Infrastructure gaps (e.g., electricity shortages in rural areas).
    - Regulatory inconsistencies (e.g., confusion over NDPA compliance).
    - Economic instability impacting private sector investments.
- Proactive Measures:
  - Establish pre-crisis protocols, such as:
    - Emergency funds for infrastructure repairs.
    - Annual cybersecurity drills to test DPI systems' resilience.

2. Uncertainty

Embrace Uncertainty

- Real-time Monitoring:
  - Use technology like IoT sensors to monitor DPI infrastructure (e.g., detecting fiber optic damage early).
  - Partner with tech hubs for innovative predictive tools to mitigate emerging threats.

Flexible Strategies

- Dynamic Adjustments:
  - Update strategies based on crises' evolving nature.
  - Example: If a rural community is impacted by a cyberattack, prioritize deploying mobile-based DPI services with enhanced security.

7. Policy Update: Developments Since December 2024

This report was originally completed in December 2024. In the eighteen months since, Nigeria has moved from the policy-commitment stage described in Parts I–VI toward active implementation, while India has continued to export its Digital Public Infrastructure model abroad — including, notably, to Nigeria itself. This section updates the study's empirical base with developments through mid-

2026 and assesses which of the original recommendations have gained traction, which remain unmet, and what has changed in the underlying international policy environment.

Table 5. Developments since December 2024 and their bearing on this study's findings

Date	Development	Bearing on this study
Baseline (Apr 2024)	12,948 startups registered for labelling under the Nigeria Startup Act (2022).	Confirms the Act as a live lever for private-sector collaboration, though delivery against it remains mixed (§7.5).
2025	UN Universal DPI Safeguards Framework updated following ecosystem-wide consultation.	The safeguards architecture referenced throughout §3 has matured into a usable reference standard (§7.7).
20 Mar 2025	Nigeria Data Protection Commission moves from framework-setting to active enforcement.	§3.4.4 treated the NDPC as a nascent regulator of untested bite; credible penalties are now a live deterrent (§7.2).
Jun 2025	NIN enrolment reaches approximately 121 million.	Identity-layer coverage tracks ahead of the Horizon 1 baseline (§4.1).
Nov 2025	Broadband penetration crosses 50% for the first time — 50.58%, 109.7 million subscriptions.	Materially ahead of the 43.53% figure underpinning the original Horizon analysis (§4, §7.3).
2025	Electricity Act Amendment Bill passes its second reading.	Begins to address the power constraint this study identified as structural to data-centre growth and DPI resilience (§4, §7.4).
Jan 2026	Broadband reaches 53.07%. India's UPI processes 21.70 billion transactions worth ₹28.33 trillion in the month.	Reinforces the comparative premise: India's stack continues to scale as Nigeria's reaches critical mass (§7.3, §7.6).
Early 2026	NITDA begins rolling out the DPI and Nigerian Data Exchange (NGDX) platforms across key economic sectors.	The interoperability layer this report treated as a Horizon 2 milestone is now in delivery (§4.2, §7.3).
Feb 2026	Decentralized ward-level NIN enrolment drive launched.	Directly targets the rural exclusion risk flagged in §3.3.4 and §3.4.1 (§7.1).
26 Jun 2026	President Tinubu signs the NIMC Act 2026, replacing the Commission's founding 2007 Act.	The single largest legal development since drafting; recasts the governance of the identity layer analysed in §3.3.4 (§7.1).
Mid-2026	NIN enrolment reaches 136 million. India–Nigeria MeitY agreement signed on e-governance, digital identity and public-service delivery.	Formalizes the Nigeria–India corridor this study proposed as a knowledge-transfer channel (§7.1, §7.6).

7.1. Digital Identity: The NIMC Act 2026

The single largest legal development since this study's original drafting is the National Identity Management Commission (NIMC) Act 2026. President Bola Tinubu signed the NIMC Act 2026 into law on 26 June 2026, replacing the Commission's founding 2007 Act and establishing the National Identification Number (NIN) as Nigeria's sole recognized means of identification under a "One Person, One Identity" policy. The Act expands legal recognition of the NIN across taxation, banking, pensions, healthcare, voting, and business registration, and — significantly for this study's Internet-impact analysis in Part 3 — designates NIMC as the Root Certification Authority for Nigeria's National Public

Key Infrastructure and for Digital Public Infrastructure generally, while placing the Commission's data handling under the Nigeria Data Protection Act.[33][34]

Enrollment has accelerated accordingly. NIN enrollment stood at approximately 121 million in June 2025 and had reached 136 million Nigerians and legal residents by mid-2026, with a decentralized ward-level enrollment drive underway since February 2026 to close the remaining gap. NIMC must now enroll 3.3 million citizens a month to hit its 180 million target by December 2026 — a pace that will test the "last-mile" assumptions this report raised in Section 3.4.1 about rural and low-connectivity populations being harder to reach than urban ones.[35][36]

7.2. Data Protection Enforcement Comes of Age

Where this report's original analysis (Section 3.4.4) treated the Nigeria Data Protection Commission (NDPC) as a nascent regulator whose bite was still untested, the record since March 2025 shows a body actively enforcing its mandate. On 20 March 2025, the NDPC issued the NDPA General Application and Implementation Directive to guide interpretation and enforcement of the Act. It followed with two of the largest penalties issued by a Global South data protection authority to date: a fine of ₦766.2 million on MultiChoice Nigeria in July 2025 for data privacy violations and illegal cross-border data transfers, and a $220 million fine against Meta Platforms — the largest penalty imposed by a Global South data protection authority. In August 2025 the NDPC issued a compliance notice to 1,368 organizations across the banking, insurance, pension, and gaming sectors, giving them 21 days to demonstrate compliance.[37][38][39][40]

This shift from framework to enforcement substantially changes the risk calculus this report described for DPI-adjacent institutions (Section 3.4.4): the deterrent effect of credible penalties is now a live factor, not a hypothetical one, and Nigeria's regulatory posture is closer to peer economies than it was at the time of the original study.

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[33] "Tinubu Signs New NIMC Law, Gives Nigeria Single Digital Identity Framework," ThisDay, June 27, 2026, https://www.thisdaylive.com/2026/06/27/tinubu-signs-new-nimc-law-gives-nigeria-single-digital-identity-framework/.

[34] "Five Key Things You Should Know About the NIMC Act 2026," Tribune Online, https://tribuneonlineng.com/five-key-things-you-should-know-about-the-nimc-act-2026/.

[35] "NIMC Says NIN Enrolment Crosses 136m as New Identity Law Takes Effect," The Cable, https://www.thecable.ng/nimc-says-nin-enrolment-crosses-136m-as-new-identity-law-takes-effect/.

[36] "NIMC Must Enroll 3.3 Million Nigerians Monthly to Hit 2026 Target," TechCabal, August 22, 2025, https://techcabal.com/2025/08/22/nimc-nigeria-digital-identity-2026-deadline/.

[37] S.P.A. Ajibade & Co., "Updates on the Recent Activities and Other Developments in the Data Privacy Sector," https://spaajibade.com/updates-on-the-recent-activities-and-other-developments-in-the-data-privacy-sector/.

[38] "Businesses Face Up to N10m Fine as NDPC Tightens Data Protection Audit Enforcement," The Economic Times (Nigeria), January 21, 2026, https://theeconomictimes.com.ng/2026/01/21/businesses-face-up-to-n10m-fine-as-ndpc-tightens-data-protection-audit-enforcement/.

[39] Nigeria Data Protection Commission, cited in "Data Protection Laws and Regulations 2026: Nigeria," ICLG, https://iclg.com/practice-areas/data-protection-laws-and-regulations/nigeria.

[40] "NDPC Compliance Notice: What You Need to Do," Hamu Legal, https://hamulegal.com/ndpc-compliance-notice-nigeria-2025/.

7.3. Broadband, the Nigeria Stack, and the National Data Exchange

Broadband penetration — 43.53 percent when this study was first drafted — crossed 50 percent for the first time in November 2025 (50.58 percent, 109.7 million subscriptions), and continued climbing to 53.07 percent in January 2026 and reaching 55.67 percent by April 2026. This is meaningful progress, but it falls short of the 70 percent target set by the National Broadband Plan (NBP) 2020–2025, which expired at the end of December 2025. A successor plan is in development, oriented around a 120,000 km fibre backbone and 5G spectrum auctions; in October 2025 the World Bank Group approved the BRIDGE Project to expand broadband into historically underserved regions, and in December 2025 the government approved 4,000 additional telecom towers prioritizing northern Nigeria — a direct response to the rural-urban divide this study identified as the central obstacle to inclusive DPI adoption.[41][42][43]

On the DPI stack itself, the National Information Technology Development Agency (NITDA) now plans to roll out the Digital Public Infrastructure and Nigerian Data Exchange (NGDX) platforms across key economic sectors starting in early 2026, building on its Extents platform. In a milestone for the "paperless governance" ambitions described in this report, all 38 federal ministries and extra-ministerial departments met a December 2025 deadline to digitalize their operations. New international backing has followed: a €45 million EU–Nigeria Digital Economy Package supports the rollout.[44][45][46]

7.4. Power Sector Reform and the Constraint on Data Infrastructure

This study's Horizon analyses (Section 4) flagged Nigeria's electricity shortfall as a structural constraint on data-center growth and DPI resilience. Reform has since progressed on two fronts. First, the Electricity Act Amendment Bill 2025 has passed its second reading in the National Assembly, proposing stronger consumer protection and stiffer penalties for infrastructure vandalism. Second, the sector is decentralizing: the Nigerian Electricity Regulatory Commission (NERC) has transferred regulatory oversight to Nasarawa, Bayelsa, and Anambra States, and in September 2025 published Draft Net Billing Regulations for grid-connected solar and small wind systems between 50 kWp and 5 MWp — the regulatory foundation this report's Section 4 (Environment) called for to enable

[41] "Nigeria Hits 50.58% Broadband Penetration Milestone in November 2025, But Misses 70% National Target," Tekedia, https://www.tekedia.com/nigeria-hits-50-58-broadband-penetration-milestone-in-november-2025-but-misses-70-national-target/.

[42] "With 55.67% Broadband Penetration, Nigeria Still Far From Achieving 70% Target," ThisDay, July 16, 2026, https://www.thisdaylive.com/2026/07/16/with-55-67-broadband-penetration-nigeria-still-far-from-achieving-70-target/.

[43] "Nigeria to Hold Minority Stake in 90,000km National Fibre Project," TechCabal, https://techcabal.com/2026/01/30/nigeria-to-hold-a-minority-share-in-2-billion-nationwide-fibre-rollout/.

[44] "Nigeria to Roll Out Digital Public Infrastructure, Data Exchange in 2026," Nairametrics, September 20, 2025, https://nairametrics.com/2025/09/20/nigeria-to-roll-out-digital-public-infrastructure-data-exchange-in-2026/.

[45] "Nigeria Advances Digital Economy Agenda in 2025, Sets Stage for Large-Scale Deployment in 2026," Tech Review Africa, https://techreviewafrica.com/news/3600/nigeria-advances-digital-economy-agenda-in-2025-sets-stage-for-large-scale-deployment-in-2026.

[46] "Nigeria Targets Early 2026 for Digital Public Infrastructure Rollout," The Guardian (Nigeria), https://guardian.ng/news/nigeria-targets-early-2026-for-digital-public-infrastructure-rollout/.

renewable-powered data centers. A ₦4 trillion government bond is intended to address liquidity shortfalls owed to generation companies, though whether this translates into reliable power for DPI infrastructure in the near term remains to be seen.[47][48][49]

7.5. The Startup Act at Three Years: A Mixed Record

This report's recommendations leaned on the Nigeria Startup Act (2022) as a lever for private-sector DPI collaboration. Three years on, the record is mixed. On the positive side, 12,948 startups had registered for labelling under the Act as of April 2024, alongside more than 900 onboarded venture capitalists, angel investors, and accelerators. On the negative side, the Act's flagship financing vehicle, the Startup Investment Seed Fund, remains uncapitalized, with no public evidence of disbursement to any labelled startup, and Nigeria slipped to 66th position in the 2025 Global Startup Ecosystem Index, down from 64th the previous year, even as at least fifteen Nigerian startups that had collectively raised more than $100 million shut down between 2023 and 2025. The Act has changed the legal environment for DPI-adjacent private-sector partners; it has not yet resolved the financing gap this report identified as a barrier to scaling pilot DPI solutions.[50][51][52]

7.6. India's DPI Diplomacy and the Nigeria–India Corridor

India's own DPI stack has continued to scale domestically and expand internationally, reinforcing the comparative premise of this study. The Unified Payments Interface (UPI) processed 21.70 billion transactions worth ₹28.33 trillion in January 2026 alone, and the IMF's June 2025 report named UPI the world's largest fast-payment system by volume. Beyond India's borders, the Government of India has signed memoranda of understanding with 24 countries for cooperation on India Stack components — digital identity, digital payments, data exchange, and service delivery — with UPI now

[47] "Power Sector Updates No. 1: January 2026," Mondaq, https://www.mondaq.com/nigeria/renewables/1783184/power-sector-updates-no-1-january-2026.

[48] "The Conduit Annual Electricity & Renewables 2025 Review | 2026 Outlook," Mondaq, https://www.mondaq.com/nigeria/renewables/1769548/the-conduit-annual-electricity-renewables-2025-review-%7C-2026-outlook.

[49] Nigerian Electricity Regulatory Commission, Draft Net Billing Regulations, September 2025, cited in "Nigeria Energy Sector Review: H2 2025 & 2026 Strategic Outlook," Aluko & Oyebode, https://www.aluko-oyebode.com/insights/nigeria-energy-sector-review-2026-outlook/.

[50] "3 Years On, How Well Has Nigeria's Startup Act Shaped the Tech Ecosystem?," TechNext24, October 3, 2025, https://technext24.com/2025/10/03/nigeria-startup-act-tech-hubs-policy/.

[51] "Nigeria Startup Act 2022 Review: A Two-Year Reality Check," The Mediterranean Practice, June 18, 2025, https://www.themediterraneanpractice.com/2025/06/18/nigeria-startup-act-2022-review/.

[52] "Nigeria Slips to 66th Position in 2025 Global Startup Ecosystem Index," Nairametrics, May 31, 2025, https://nairametrics.com/2025/05/31/nigeria-slips-to-66th-position-in-2025-global-startup-ecosystem-index/.

live for merchant payments in Bhutan, France, Mauritius, Nepal, Qatar, Singapore, Sri Lanka, the UAE, and Cambodia.[535455]

Most directly relevant to this study, Nigeria is now one of those partners. India and Nigeria have signed a MeitY agreement focused on sharing digital solutions in e-governance, digital identity, and public-service delivery, alongside a companion pact targeting technology-enabled education and digital-learning infrastructure. This development substantially validates this report's original central recommendation — that Nigeria pursue structured, government-to-government learning from India's DPI experience — and shifts the relevant policy question from whether such cooperation should happen to how effectively it will be implemented and adapted to Nigeria's infrastructural and regulatory realities.[56]

7.7. The UN Universal DPI Safeguards Framework

The international safeguards architecture referenced throughout Section 3 of this report has also matured. The Universal DPI Safeguards Framework, first released in 2024, was updated in 2025 following consultation with the wider DPI ecosystem, and is now organized around 18 Foundational and Operational Principles addressing safety, inclusion, and structural vulnerability. In September 2025, during the 80th UN General Assembly, the DPI Safeguards initiative and the 50-in-5 campaign launched the DPI Safeguards Accelerator, a technical-assistance platform intended to move countries from safeguards commitments to full implementation. Nigeria's NDPC enforcement activity and the NIMC Act's data-protection provisions position the country to draw directly on this Accelerator as it operationalizes DPI at scale.[5758]

7.8. Digital Literacy: Progress Against a Persistent Gap

The 3 Million Technical Talent (3MTT) program — the initiative this study identified as central to closing Nigeria's digital-skills gap — reports a 99.6 percent completion rate in its skills assessments across three cohorts covering all 36 states and the FCT, and NITDA has set revised targets to raise Nigeria's digital literacy rate to 70 percent by 2027 and 95 percent by 2030. However, independent

[53] "India's Digital Public Infrastructure Goes Global: 24 Countries Adopt India Stack, UPI and DigiLocker," Current Affairs Adda247, https://currentaffairs.adda247.com/indias-digital-public-infrastructure-goes-global-24-countries-adopt-india-stack-upi-and-digilocker/.

[54] "India's DPI Model Continues Global Expansion with 23 Country Partnerships," Biometric Update, https://www.biometricupdate.com/202602/indias-dpi-model-continues-global-expansion-with-23-country-partnerships.

[55] "Ten Years of UPI: Implications of India's Digital Public Infrastructure for Data Protection," CSIS Strategic Technologies Blog, https://www.csis.org/blogs/strategic-technologies-blog/ten-years-upi-implications-indias-digital-public-infrastructure.

[56] "India's Digital Partnership Opens Way Ahead for Nigeria: Report," The Hans India, https://www.thehansindia.com/amp/news/national/indias-digital-partnership-opens-way-ahead-for-nigeria-report-1058642.

[57] "How the DPG Standard and the Universal DPI Safeguards Framework Are Charting a Safe and Inclusive Digital Future," UNDP, https://www.undp.org/digital/blog/how-dpg-standard-and-universal-dpi-safeguards-framework-are-charting-safe-and-inclusive-digital-future.

[58] "UN Releases Universal DPI Safeguards Framework to Promote Safe and Inclusive Digital Public Infrastructure," UNDP, https://www.undp.org/press-releases/un-releases-universal-dpi-safeguards-framework-promote-safe-and-inclusive-digital-public-infrastructure.

research on the program's reach finds that barriers this study flagged in 2024 persist: in rural states such as Ebonyi, over half of respondents cited poor connectivity as a major obstacle, with cost and low baseline literacy cited by roughly four in ten and three in ten respondents respectively. High completion rates among enrolled participants coexist, in other words, with continued difficulty reaching the rural and low-income populations this study identified as most at risk of exclusion from DPI's benefits.[59][60][61]

7.9. Implications for This Study's Findings

Measured against the five recommendations in this report's Executive Summary, the record through mid-2026 is uneven but broadly consistent with the trajectory this study anticipated. Infrastructure investment has advanced (broadband past 50 percent, new fibre and tower approvals, the BRIDGE Project) but remains short of the 70 percent target. Regulatory enforcement has moved decisively from framework to active penalty, arguably faster than this report anticipated. Digital literacy programming has scaled impressively on paper while continuing to struggle with the same rural connectivity and affordability barriers this study identified. Stakeholder collaboration has produced its clearest result yet in the form of direct Nigeria–India government-to-government cooperation. Iterative piloting remains the least evidenced of the five recommendations, with the DPI/NGDX rollout still pending as of this update. Taken together, the developments reviewed in this section suggest that Nigeria's DPI trajectory continues to track the "Horizon 2" scenario modeled in Section 4.2 of this report — meaningful modularity and stakeholder alignment underway, with the fully integrated, inclusive Horizon 3 outcome still dependent on closing the rural-urban divide this study identified as the central risk to inclusive adoption.

[59] "Nigeria Records 99.6% Completion Rate in 3MTT Assessments, Expands AI Talent Drive," Technology Times, https://technologytimes.ng/ai-nigeria-records-99-6-completion-rate-in-3mtt/.

[60] "Nigeria: Federal Government Targets 95 Percent Digital Literacy by 2030," AllAfrica, https://allafrica.com/stories/202601070239.html.

[61] "Evaluating the Viability of Nigeria's 3MTT Program as a Long-Term Investment in Tech Talent Development," AInvest, https://www.ainvest.com/news/evaluating-viability-nigeria-3mtt-program-long-term-investment-tech-talent-development-2512/.

Conclusion

The successful implementation of Digital Public Infrastructure (DPI) in Nigeria demands a multifaceted, inclusive, and adaptive approach that addresses the country's unique challenges while leveraging its opportunities. The stakeholder engagement and management plan presented in this report highlights the critical roles of government, private sector, civil society, international organizations, technical communities, and citizens in driving the nation's digital transformation. By fostering collaboration and aligning these diverse interests, Nigeria can create a resilient, secure, and inclusive DPI framework. Moreover, integrating leadership frameworks such as "Be, Know, Do" with systems and design thinking ensures that Nigeria can navigate the complexities of a volatile, uncertain, complex, and ambiguous (VUCA) environment. Proactive crisis management, coupled with continuous learning and innovation, will enable Nigeria to address emerging challenges and maintain stakeholder trust. By adopting tailored solutions such as enhanced regulatory frameworks, targeted digital literacy programs, rural connectivity investments, and collaborative innovation hubs, Nigeria can achieve the twin goals of digital equity and economic growth. As this plan demonstrates, the journey toward DPI implementation is not merely a technological challenge but an opportunity to empower communities, drive sustainable development, and position Nigeria as a leader in Africa's digital transformation. Through commitment, collaboration, and innovation, DPI can truly become the foundation for an inclusive and prosperous future.

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