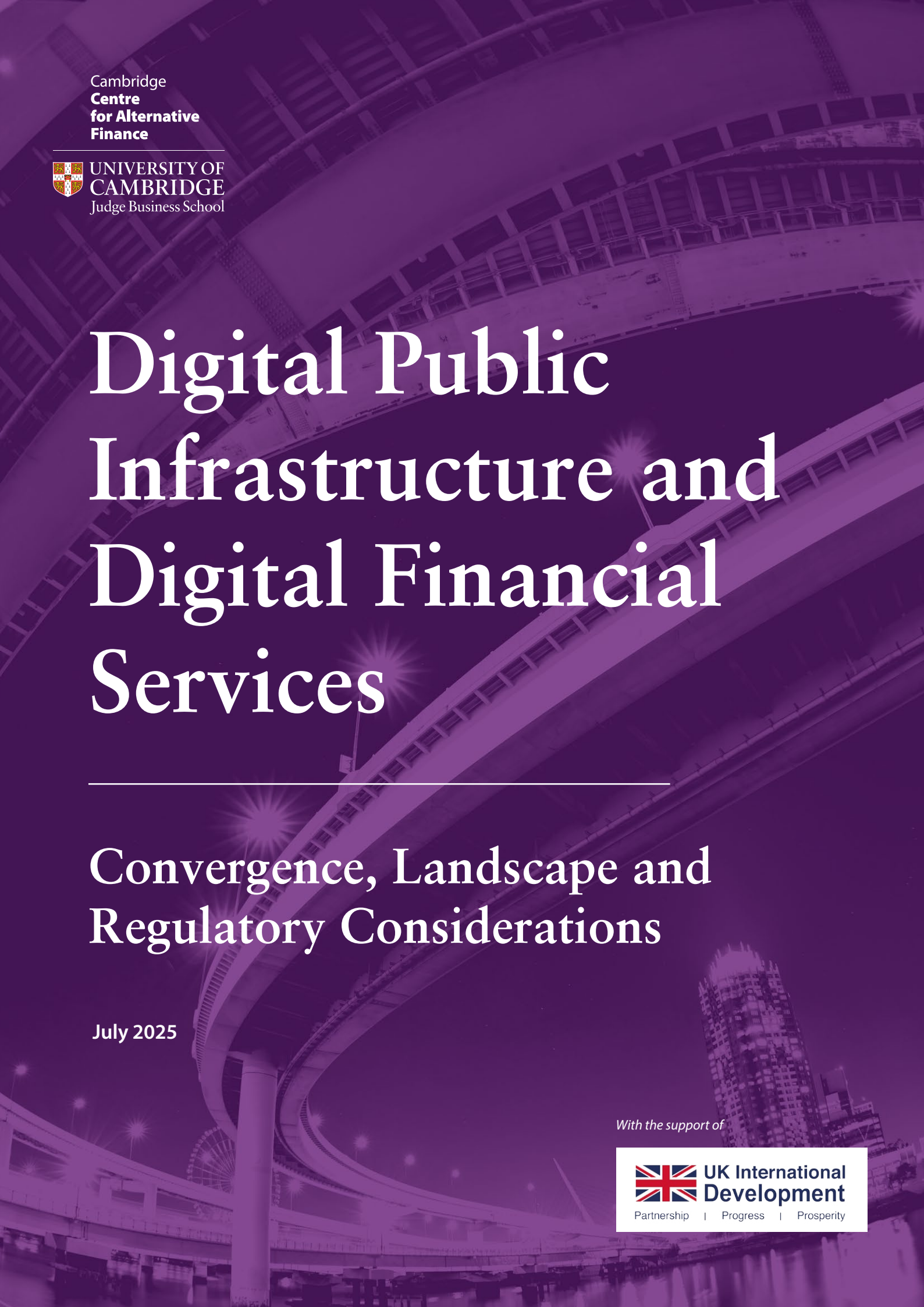

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Judge Business School

Digital Public Infrastructure and Digital Financial Services

Convergence, Landscape and Regulatory Considerations

July 2025

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Contents

Foreword 4
Research Team and Acknowledgements 5
Glossary 6
Executive Summary 8

Introduction 9

Chapter 1: Foundations of Digital Public Infrastructure and Financial Market Systems 12

Chapter 2: An Exploratory Taxonomy of Digital Public Infrastructure for Digital Financial Services 17

Chapter 3: Global Landscape and Case Studies of Digital Public Infrastructure for Digital Financial Services 23

Chapter 4: Emerging Technologies and Regulatory Challenges in Digital Public Infrastructure for Digital Financial Services 36

Chapter 5: Digital Public Infrastructure Principles for Financial Regulatory Authorities 42

Chapter 6: Cross-Regulatory Governance of Digital Public Infrastructure 46

Conclusion 53

Appendix 56
Bibliography 58

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As governments and regulators increasingly invest in Digital Public Infrastructure (DPI), the global financial ecosystem is entering a new phase of transformation. DPI systems – such as digital identity, real-time payments, and consent-based data sharing – are reshaping how financial services are designed, delivered, and regulated. These frameworks have the potential to enhance operational efficiency, reduce costs, and improve the accessibility and scalability of financial services. As the ecosystem evolves, DPI can also play a critical role in improving access to digital financial services, particularly for underserved populations, though its impact will depend on how effectively it is implemented and governed.

However, there is a risk that the deployment of DPI could outpace regulatory understanding, creating a significant knowledge gap regarding the design, users, implementation, and impact of these frameworks. These are complex, multi-dimensional issues that cut across sectors, infrastructure, regulation, and policy. With the broad and often evolving scope of DPI, governance structures remain unclear, with multiple regulators involved and limited clarity around roles, responsibilities, and accountability. Compounding these challenges is the constant need for empirical data to demonstrate the impact of DPI initiatives – making it harder for policymakers to assess effectiveness and make informed, evidence-based decisions.

The Cambridge Centre for Alternative Finance (CCAF), with the support of the UK Foreign, Commonwealth and Development Office (FCDO), has contributed to addressing this gap through a landmark study examining global trends for DPI through a unique policy and regulatory lens. The report provides valuable insights into implementation strategies and market trends, explores emerging technologies and associated risks, and considers how core DPI principles can be embedded into broader regulatory and governance frameworks. It also offers an exploratory taxonomy to help define and structure the rapidly evolving DPI landscape, while drawing on lessons learned from diverse national and regional experiences.

Many jurisdictions are making significant strides in integrating DPI into financial sector strategies and national development plans. Frameworks for digital identity and real-time payments are maturing, and an increasing number of countries are piloting or implementing data-sharing systems. Jurisdictions with more advanced DPI systems tend to report better outcomes across financial inclusion indicators-from account ownership and access to credit, to greater resilience in times of crisis. Yet gaps remain, particularly within governance frameworks. As DPI systems span multiple regulatory domains, fragmented oversight risks undermining both innovation and consumer protection. Early lessons from national coordination mechanisms, data-sharing bodies, and engagement forums highlight the need for stronger cross-regulatory and cross-border collaboration. The rapid pace of innovation, from distributed ledgers and tokenisation to AI and digital wallets, only underscores the urgency for regulators to engage proactively and ensure that oversight mechanisms remain fit for purpose.

This report marks an important milestone, but it is only the beginning. As DPI continues to evolve, further research will be essential to understand its long-term implications for financial inclusion, market structure, regulatory capacity, and financial stability. Which institutional models are best suited for governing DPI? How can policymakers navigate trade-offs between DPI related innovations and risks in fast-changing environments? And what collaborative mechanisms can support alignment on standards and safeguards, particularly across borders?

The CCAF will continue to explore these pressing issues through research, technical engagement, and dialogue with regulators, central banks, and ecosystem actors around the world. We invite regulators, policymakers, industry leaders, and researchers to engage with the findings of this report, contribute their own experiences, and co-create a shared vision for how DPI can support financial systems that are not only innovative, but also equitable, responsive, and future-ready.

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Research team and Acknowledgements

Research Team

The research presented in this report was conducted by the Cambridge Centre for Alternative Finance (CCAF) at the University of Cambridge Judge Business School, with the support of the UK Foreign, Commonwealth and Development Office. The CCAF research team includes the following individuals: **Pavle Avramovic** (Principal Researcher), **Sanya Juneja** (Principal Researcher), **Yue Wu**, **Krishnamurthy Suresh**, and **Bryan Zhang**

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Disclaimer

The data and information contained in this report was accurate at the time of the research. The views and perspectives shared in this report by individuals do not represent the formal positions of their organisations.

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Glossary

Aadhaar	India's biometric-based digital identity system, managed by the Unique Identification Authority of India (UIDAI), enabling authentication for banking, welfare and tax services.[1]
Application Programming Interface (API)	Code that enables software programs to interact by exchanging data and initiating actions, such as making a payment transaction. This includes payment APIs, data APIs, 'ecosystem expansion' APIs and 'consent and identity' APIs.[2]
Artificial Intelligence (AI)	A machine-based system that can make predictions, recommendations or decisions affecting real or virtual environments for a specific set of human-defined goals. [3]
Automated Clearing House (ACH)	A financial network that processes bulk electronic transactions such as direct deposits and bill payments, improving payment efficiency.[4]
Buy Now Pay Later (BNPL)	A payment method that allows for the purchaser to obtain goods or services immediately and pay for them over a period of time.[5]
Central Bank Digital Currencies (CBDCs)	CBDC is a digital form of public money issued by the central bank as a direct liability of the central bank or government. By extension, CBDC is formally part of the national currency system, which means that the law ensures the equivalence at par value with all other forms of money within the regulatory perimeter (i.e. cash, bank reserves, bank deposits and e-money). There are two main CBDC arrangements: retail CBDC, which is available to the general public (like cash); and wholesale CBDCs, where participation is generally restricted to select financial institutions. [6]
Consent-based Data Sharing	A process or mechanism that obtains individuals' or entities' permission before collecting and using their data, for example, by scanning digitally signed QR codes to verify the authenticity of certificates and licenses.[7]
Cross-Regulatory Governance	A collaborative approach involving multiple regulatory authorities to ensure cohesive oversight frameworks for digital financial services and digital public infrastructure.[8]
Cybersecurity	Human and machine actions that seek to preserve the security of software and computer systems, data confidentiality, data integrity and availability of digital information and/or information systems, including measures to ensure information authenticity, accountability, non-repudiation and reliability.[9]
Deferred Net Settlement (DNS)	A settlement model where payments are accumulated and settled at designated intervals, rather than in real time.[10]
Digital Financial Services (DFS)	DFS are financial services that rely on digital technologies for their delivery and utilisation by consumers. These services leverage digital platforms, such as mobile devices and the internet, to provide convenient, accessible, and secure financial solutions. DFS encompass a wide range of financial activities and products, including e-money, digital wallets, and digital payment platforms, loans, savings, insurance, and investment.[11]
Digital Identity	A means of identifying or authenticating the true identity of an entity both online and offline. It can be created from information found on a government-issued legal ID and be used to accurately recognise an individual in order to provide them with their rights or entitlements.[12]
Digital Public Infrastructure (DPI)	DPI is an approach to digitalisation focused on creating "foundational, digital building blocks designed for the public benefit." By providing essential digital functions at society scale that can be reused across sectors, DPIs enable public and private service providers to build on these systems, innovate, and roll out new services more quickly and efficiently.[13]

Digital Wallets	A secure application that stores payment information such as credit and debit cards (also known as an e-wallet) for use on an internet-connected device, including on smartphones and tablets.[14]
Distributed Ledger Technology (DLT)	A permissioned or permissionless synchronised network and protocol (for example, blockchain) enabling the upload, storage and validation of data across multiple locations and digital devices.[15]
Electronic KYC	A digital identity verification process that enables financial institutions and service providers to remotely verify a customer's identity during onboarding and ongoing due diligence. It leverages digital credentials, biometrics, and secure authentication technologies to streamline compliance with Know Your Customer (KYC) and Anti-Money Laundering (AML) regulations while enhancing financial inclusion.[16]
Fast Payment System (FPS)	A financial infrastructure that enables instant electronic transactions, allowing individuals and businesses to conduct real-time payments.
Financial Market Infrastructure (FMI)	Financial market infrastructure refers to systems that facilitate the clearing, settling, and recording of financial transactions among participating entities.[17]
Financial Inclusion	It is generally accepted that financial inclusion, in its entirety, is defined as access to, and use of, quality, affordable, financial products and services that lead to greater financial wellbeing.[18]
Fintech	An abbreviated form of 'financial technology' used in reference to a digital financial services company and, collectively, to the advances in technology that have the potential to transform financial services, stimulating the development of new business models, applications, processes and products.[19]
General Data Protection Regulation (GDPR)	A data privacy law enacted by the European Union effective since 25 May 2018, which regulates the collection, processing and protection of personal data. It grants individuals rights over their data and imposes strict obligations on organisations, with penalties for non-compliance.[20]
Jurisdiction	Authority or power of a judicature (a system of courts) typically within a nation state to determine a dispute between parties; defines the territory over which the judicature has legal authority. [21]
Know-Your-Customer (KYC)	Practices and processes adopted by private and public sector organisations to identify their customer or contractual third party and ensure that client records are maintained, typically according to industry best-practice and in many cases, as required by law.[22]
Open-Source	Software or information, typically source code or programs, that are technology-neutral and made available via the internet without charge to be used, shared or modified without discrimination or restrictions.[23]
Pix	A fast payment system developed in Brazil that enables real-time payments, supporting a wide range of transactions including person-to-person, business, and government transfers. It is mobile-friendly, supports QR code payments, and is used for both retail and public services, such as tax collection and welfare distribution. [24]
Real-Time Gross Settlement (RTGS)	A high-value transaction system where payments are processed and settled between commercial banks in central bank money, using their accounts at the central bank, on a real-time basis with no netting, reducing counter-party risk.[25]
Third Party Application Providers (TPAP)	Third-party application providers are entities that offer additional or enhanced financial services by accessing customers' financial accounts with their consent, typically through APIs. TPAPs facilitate services such as account information aggregation and payment initiation, enabling users to manage multiple accounts or initiate transactions directly.[26]
Tokenisation	In data security, the process of converting sensitive data into a secure yet nonsensitive or anonymised digital identifier that can be mapped back to the original. In blockchain, the process of transforming ownerships and rights over an asset into a digital form on a programmable ledger. Such assets can be fungible or non-fungible and can be representations of real-world assets.[27]
Unified Payments Interface (UPI)	An instant payment system developed in India in 2016 by the National Payments Corporation in 2016 that enables real-time peer-to-peer and merchant payments. UPI implementations include the Aadhaar Payments Bridge (APB) and Aadhaar Enabled Payment System (AePS), which facilitate digital transactions and financial inclusion in underserved areas of India.[28]
Zero-Knowledge Proofs	A cryptographic technique allowing verification of information without revealing underlying data, enhancing privacy in financial transactions.[29]

Executive Summary

The intersection of Digital Financial Services (DFS) and Digital Public Infrastructure (DPI) is reshaping the financial services sector. As core components, such as digital identity, real-time payments, and consent-based data sharing are increasingly integrated into DFS, they are driving efficiency, reducing costs, and expanding access to financial services, creating new opportunities for inclusion and growth. This report identifies 113 jurisdictions that have adopted at least one of these components, with 56 implementing all three. This rapid uptake signals a global shift toward integrated infrastructure for DFS. However, it also presents new governance, security, and interoperability challenges, necessitating regulators and policymakers to evolve and explore innovative ways to balance progress with their regulatory and policy objectives.

For effective implementation of DPI in financial services, a clear taxonomy is essential. As DPIs interpreted and applied differently across jurisdictions, classifying its core components – digital identity, real-time payments, and consent-based data sharing – helps align policymaking and infrastructure development. This report introduces an exploratory taxonomy to support that alignment, offering a common language for regulators, policymakers, and industry actors. A well-defined taxonomy supports interoperability and regulatory understanding, and provides a foundation for scalable, inclusive digital ecosystems.

Early empirical evidence suggests a positive correlation between DPI and improved DFS outcomes. Jurisdictions with all three core components tend to report better outcomes across DFS indicators. Debit or credit card ownership rises from 25% in jurisdictions with one DPI component to 77% in those with all three. Digital payment usage rises from 45% to 83%, and the share of adults citing lack of documentation as a barrier to account ownership falls from 19% to 7%.

Furthermore, DPI is associated with improved access to credit, government support, and financial resilience. In jurisdictions with all three components, greater DPI maturity coincides with higher rates of borrowing from formal financial institutions (rising from 15% to 38%) and a doubling in the proportion of individuals receiving government transfers (from 14% to 28%). Furthermore, increasing DPI maturity coincides with a decline in the share of individuals who find it "very difficult" to raise emergency funds, falling from 34% to 19%.

Global case studies highlight diverse approaches to DPI implementation. India's UPI exemplifies a government and private sector-led approach that accelerated digital payment adoption, while Brazil's Pix demonstrates a regulator-driven but industry-inclusive model. Other jurisdictions have adopted hybrid models, blending public-private partnerships with regulatory oversight. Successful implementations demonstrate that a well-coordinated approach, whether public-led or industry-driven, can influence financial inclusion and efficiency while maintaining regulatory safeguards.

Emerging trends present both opportunities and risks. AI, tokenisation, and digital wallets offer efficiencies like programmable payments and automated decision-making but also pose risks, including data privacy concerns, competition issues and financial instability. Geopolitical fragmentation and shifting governance models may further divide financial ecosystems, making global regulatory coordination essential to prevent market fragmentation and ensure cross-border financial flows.

Foundational DPI principles can guide regulatory evolution. Openness, interoperability, and transparency are built into many DPI systems and could inform the next generation of financial regulation. However, integrating these principles must be done carefully to avoid unintended consequences, particularly in cross-border contexts where mismatched rules can lead to fragmentation.

Effective cross-regulatory governance is essential but challenging. As core components span multiple regulatory domains, fragmented oversight can create inefficiencies. Some jurisdictions have tested national data-sharing bodies and collaboration forums, but balancing privacy, competition, and security remains difficult. Stronger coordination through intergovernmental bodies, cross-border collaborations, and public-private partnerships can enhance regulatory alignment.

Public-private partnerships could play a foundational role in the development of DPI ecosystems. Fintechs and platform providers have already helped scale key DPI components like digital identity and consent-based data sharing, and further innovation could lower barriers by enabling faster, more interoperable service delivery.

As the integration of DPI and DFS begins to show early impact, it is crucial for regulators to explore novel governance structures and develop policies that address the evolving intersection of digital infrastructure and financial systems.

Introduction

The intersection of DPI and DFS carries implications for how DFS is evolving, both from a regulatory and market perspective. This report explores the intersection through a regulatory and government authorities' perspective, focusing on how core DPI components – digital identity, real-time payments, and consent-based data sharing – could impact regulatory and policy objectives such as financial inclusion, market integrity, competition, and financial stability. The goal is to clarify the opportunities and challenges presented by DPI, and to provide insights into how regulatory and governance approaches may need to evolve in response, including the potential overlaps with financial market infrastructure (FMI) developments. This analysis is intended for financial sector authorities, policymakers, regulators, and ecosystem actors seeking to understand the implications of DPI adoption and integration into finance.

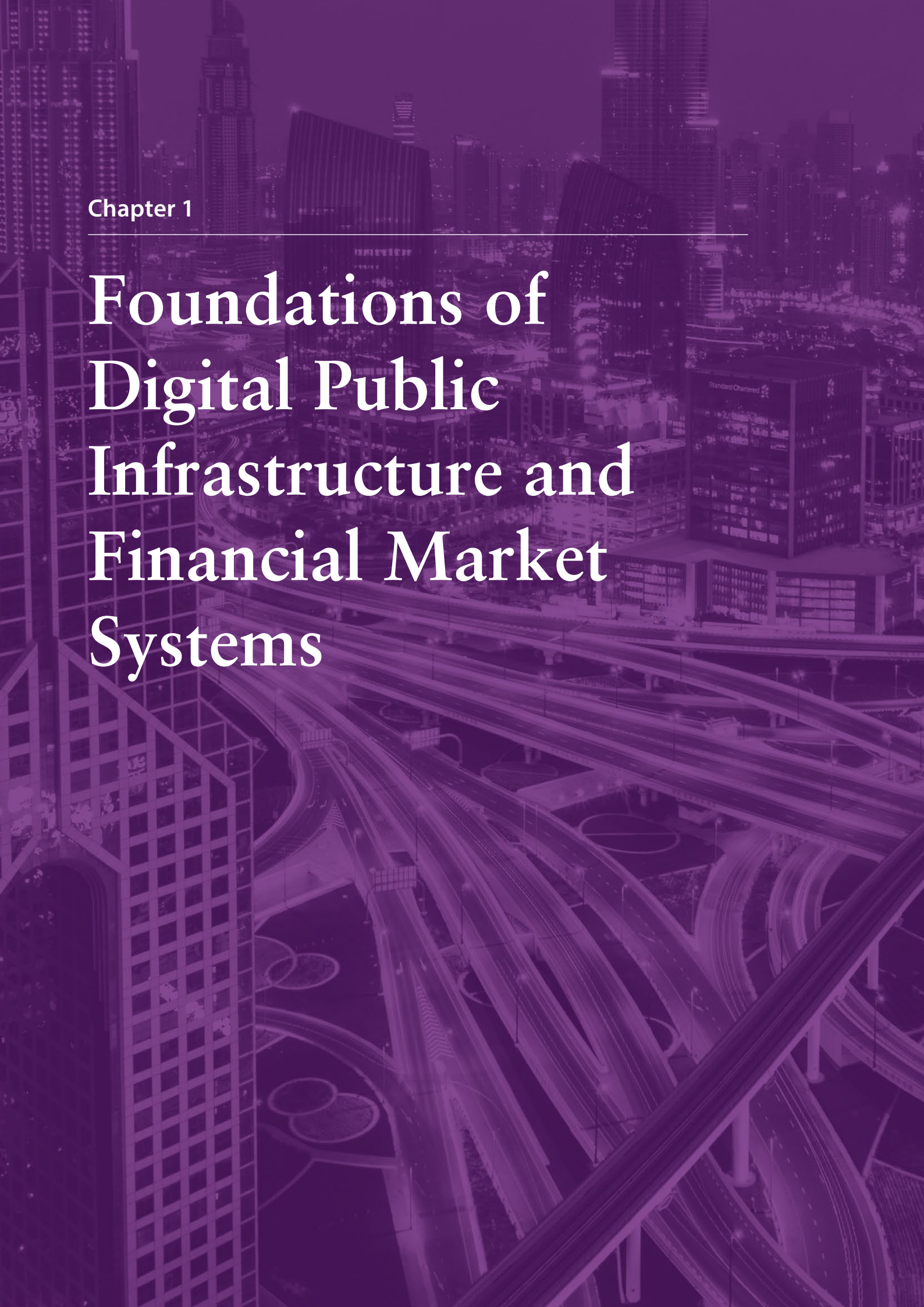
Report Methodology

This study employs a qualitative research approach. In-depth interviews were conducted with 16 stakeholders, including regulators, technology specialists, central bankers, academics, and subject-matter experts, and fintech innovators, to capture a broad spectrum of perspectives on the influence of DPI on DFS. A roundtable discussion was held in February 2025 during the Inclusive Fintech Forum in Kigali, Rwanda, providing further insights from global experts and regulators on the practical challenges and opportunities associated with DPI implementation and governance. These primary data sources are supplemented by an extensive review of the existing literature on DPI, including real-world case studies, particularly those related to India's Unified Payments Interface (UPI) and Brazil's Pix systems, to contextualise the regulatory implications within the broader DFS landscape. In parallel, a quantitative analysis explored potential links between DPI adoption and financial inclusion. For the analysis, DPI scores were assigned to 113 jurisdictions, and Findex 2021 data was used to assess whether higher scores aligned with better outcomes across key financial inclusion indicators.

Report Structure

This report is structured to present a coherent narrative that showcases the interconnection between DPI and DFS while also offering novel insights for policymakers and regulatory authorities. The discussion begins by exploring the interaction between the evolutions of FMI and DPI, demonstrating how advancements in digital infrastructure are redefining financial service delivery. It establishes the foundational context by articulating the potential of DPI for DFS and the consequent need for further regulatory and policy understanding.

Building on this foundation, the analysis then introduces an exploratory taxonomy of DPI, categorising its key components and mapping these elements to the benefits and risks inherent in DFS. This section provides regulators with a nuanced framework to assess and anticipate the potential impacts of DPI on financial service ecosystems. To reinforce this framework with real-world examples, the report incorporates a high-level assessment of the early impact of DPI on financial outcomes, along with case studies from India and Brazil. These examples illustrate the initial empirical evidence of DPI implementations on DFS while underscoring the regulatory challenges faced across different jurisdictions. From the case studies, the discussion transitions to the emerging trends shaping the future of DPI. This section examines the convergence of technological, political, regulatory, and socio-economic themes shaping DPI within DFS. It analyses these developments through the lens of systems design, governance, and regulatory frameworks, highlighting emerging use cases alongside the opportunities and institutional challenges they present. The report then focuses on the core principles underpinning DPI design – such as scalability, interoperability, and transparency – highlighting their role in fostering a robust and inclusive DFS ecosystem and informing future regulatory actions. Finally, the report addresses the critical issue of cross-regulatory governance, examining how the integration of DPI with DFS necessitates coordinated oversight mechanisms and enhanced inter-agency collaboration. Through this comprehensive approach, the report aims to support policymakers and regulators in shaping policies that reflect the deepening integration of digital infrastructure into digital financial systems.



Chapter 1

Foundations of Digital Public Infrastructure and Financial Market Systems

Financial Market Infrastructure: Traditional Foundations

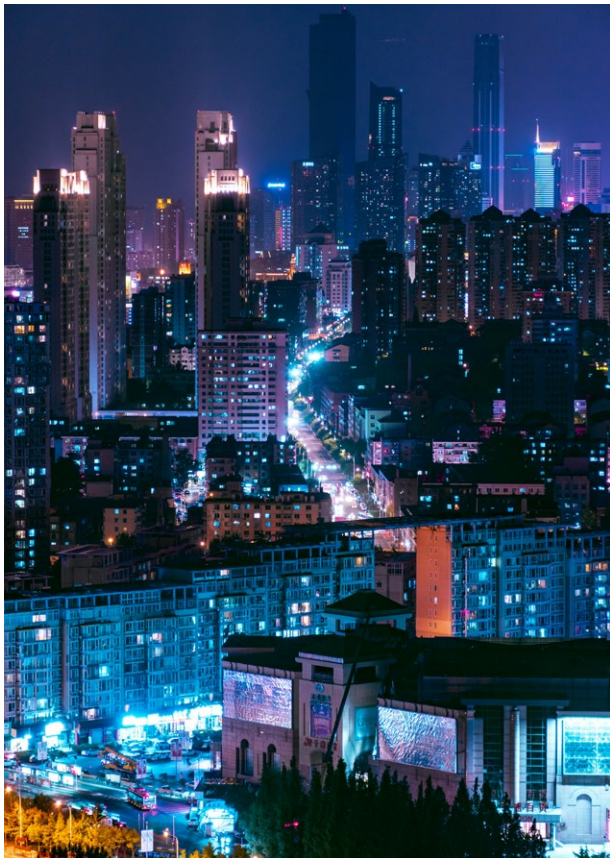
Financial Market Infrastructures (FMI) have a core role in ensuring the stability, security, and efficiency of financial transactions.[30] Over the past five decades, this infrastructure has experienced significant transformations. Advances in technologies, regulatory shifts and geopolitical events have reshaped how financial services are delivered, accessed and governed. A primary factor in this transformation has been the evolution of DFS, fundamentally changing the delivery and use of clearing and settlement services provided by existing and new FMIs.[31]

"Financial Market Infrastructures (FMIs) refers to a multilateral system among participating institutions, including the operator of the system that is used for the purposes of clearing, settling or recording payments, securities, derivatives or other financial transactions"

World Bank, 2018

Historically, FMIs relied on manual and paper-based processes that introduced significant friction, limited reach, and heightened operational risk. The advent of digital systems including electronic documentation, networked databases and cloud computing, marked a paradigm shift, improving efficiency and setting the stage for greater integration. A pivotal moment in this evolution was the implementation of Real-Time Gross Settlement (RTGS) systems in the late 20th and early 21st centuries. By facilitating the immediate settlement of high-value transactions, RTGS significantly reduced settlement risk and improved the reliability of financial transactions. In parallel, the development of automated clearing houses (ACHs) and other electronic payment systems increased speed and scalability, particularly benefiting underbanked and underserved populations. A global payment specialist operating in the Latin America and the Caribbean noted, ***"RTGS and ACHs have not only reduced friction in payments but also laid the groundwork for broader DFS adoption, enabling global financial interoperability."***

Recent developments have added further layers of complexity to the financial system infrastructure, as global markets become increasingly digitised and interconnected. Innovations such as distributed ledger technologies (DLT) and artificial intelligence (AI) are enabling new forms of interaction, automation and access. At the same time, these developments are reshaping existing risk landscapes and introducing new questions around governance, regulatory capacity and resilience. A central bank advisor from Europe noted, ***"The pace of technological change is outstripping our ability to develop coherent frameworks,"*** pointing to a widening gap between innovation and oversight.



Digital Public Infrastructure for Digital Financial Services: Definitions, Scope, and Policy Debates

"DPI refers to systems that serve as foundational, digital building blocks for public benefit. Systems built as DPI can comprise a variety of digital software, platforms, APIs, and services, along with their related legal and regulatory frameworks, standards, policies, and processes. The term "DPI" can refer to this overall approach or to the set of specific systems built as DPIs within a country."

World Bank, 2025

Across sectors, the uneven pace of infrastructure modernisation and the rising costs of maintaining legacy systems are persistent challenges. In some contexts, these pressures have catalysed interest in DPI as part of broader efforts to improve service delivery and resilience. In understanding DPI, it is important to recognise that, DPI and FMI serve distinct yet complementary roles, with significant overlap in payment systems. While DPI aims to provide broadly accessible systems advancing financial inclusion and equitable access, FMIs typically focus on specialised and critical financial sector functions. In payment systems, retail infrastructures often function as both DPI and FMI, serving public accessibility goals while requiring financial oversight. DPI's horizontal design supports multiple sectors, offering potential economies of scale across payments, digital identity, and data-sharing though this creates governance challenges that traditional FMIs, with established regulatory frameworks, address differently. This convergence is particularly evident in initiatives such as Unified Payments Interface (UPI), which exemplify the integration of financial infrastructure with digital public services. Understanding these intersections is crucial for policymakers optimising both approaches for their specific contexts and development priorities.

As a senior regulator from a central bank in Latin America and the Caribbean noted, ***"Regulators have traditionally viewed FMI as distinct from DPI, but we are now seeing an undeniable overlap, particularly in areas like digital identity and cross-border payments."***

According to UCL (2024),[32] DPI is far more prevalent and widespread than initially believed, with 57 digital identity systems in place, 93 jurisdictions with digital payments systems and 103 data exchanges. Emerging markets, in particular, are leveraging DPI to support financial access, digital transformation, economic growth and development. India is frequently cited in this regard, notably for its development of Aadhaar, a biometric digital identity platform covering over 1.3 billion people, and the Unified Payments Interface (UPI), which now processes more than 17 billion transactions monthly.[33] Similarly, Thailand's PromptPay system has illustrated the potential for inclusive, low-cost payments.[34] Estonia's DPI frameworks, built around a digital identity system, interoperable data exchange layers like X-Road, and digital public services have enabled near-universal access to secure e-services, streamlining financial interactions and empowering both individuals and businesses.

Furthermore, DPI has the potential to transform a broader range of DFS activities for individuals as well as businesses. For example, leveraging legal entity identifiers (LEIs), DPI-based digital identity solutions could provide robust mechanisms for managing counterparty risk, ensuring compliance with KYC / AML requirements, and enhance transparency among primary dealers, financial intermediaries, and retail participants.[35] Legacy identifiers, such as Brazil's CPF (Cadastro de Pessoas Físicas) and CNPJ (Cadastro Nacional da Pessoa Jurídica), can be integrated into broader digital identity ecosystems through platforms like Gov.br, which centralises government services and data. Such integration can support cross-border interoperability, enhance regulatory oversight, and improve Micro, Small & Medium Enterprises (MSME) inclusion, highlighting the strategic role of DPI in the wider financial ecosystem.[36]

While these cases offer valuable insights, they are often rooted in specific policy environments and institutional capacities that may not be easily replicated elsewhere. Moreover, digital equity remains a core concern: over 2.7 billion people still lack internet access, and many more have limited access to reliable devices or digital skills.[37] Without addressing these foundational issues, the reach of digital infrastructure may remain uneven. At the same time, the evolution of DPI is prompting broader institutional and regulatory debates, particularly as it intersects with questions of governance, coordination, and public-private partnership.

Some observers have noted that DPI's development may require a rethink of regulatory coordination and governance models, particularly as DPI intersects with private sector services and public interest mandates. According to the UNDP (2023), *"DPI represents a paradigm shift in governance, providing digital rails that enhance both state capacity and private sector participation."*[38] While this perspective reflects growing enthusiasm for the potential of DPI, its real-world implications are still evolving-and remain highly dependent on context, design choices, and institutional readiness.

In parallel, as the definition of DPI continues to be formalised, distinct patterns are emerging in how different stakeholders perceive its role. Within this research, two prominent views are highlighted:

- **DPI perceived as a set of technical components**: This perspective sees DPI as a modular infrastructure: composed of digital identity, real-time payments, and consent-based data sharing. An academic from a European University explained, ***"At a high level, DPI has one definition: payments, data exchange, and digital identity. But DPI can also be understood as a set of building blocks."***
- **DPI perceived as an evolving governance and service paradigm**: Others argue that DPI is less about its technical components and more about its approach, governance model and public policy implications. As DPI becomes more embedded in digital financial ecosystems, it introduces new risks, ranging from data misuse to governance gaps and exclusionary design.[39] These concerns highlight the important role of regulatory authorities. A senior researcher from a think tank in the Asia Pacific region warned: ***"We are heading towards disaster if we do not focus on the governance of DPI."*** Against this backdrop, regulators play a pivotal but often underdeveloped role. Their responsibilities extend beyond ensuring interoperability or consumer protection; they are increasingly expected to help shape the foundational rules and institutional arrangements through which DPI and DFS interact.

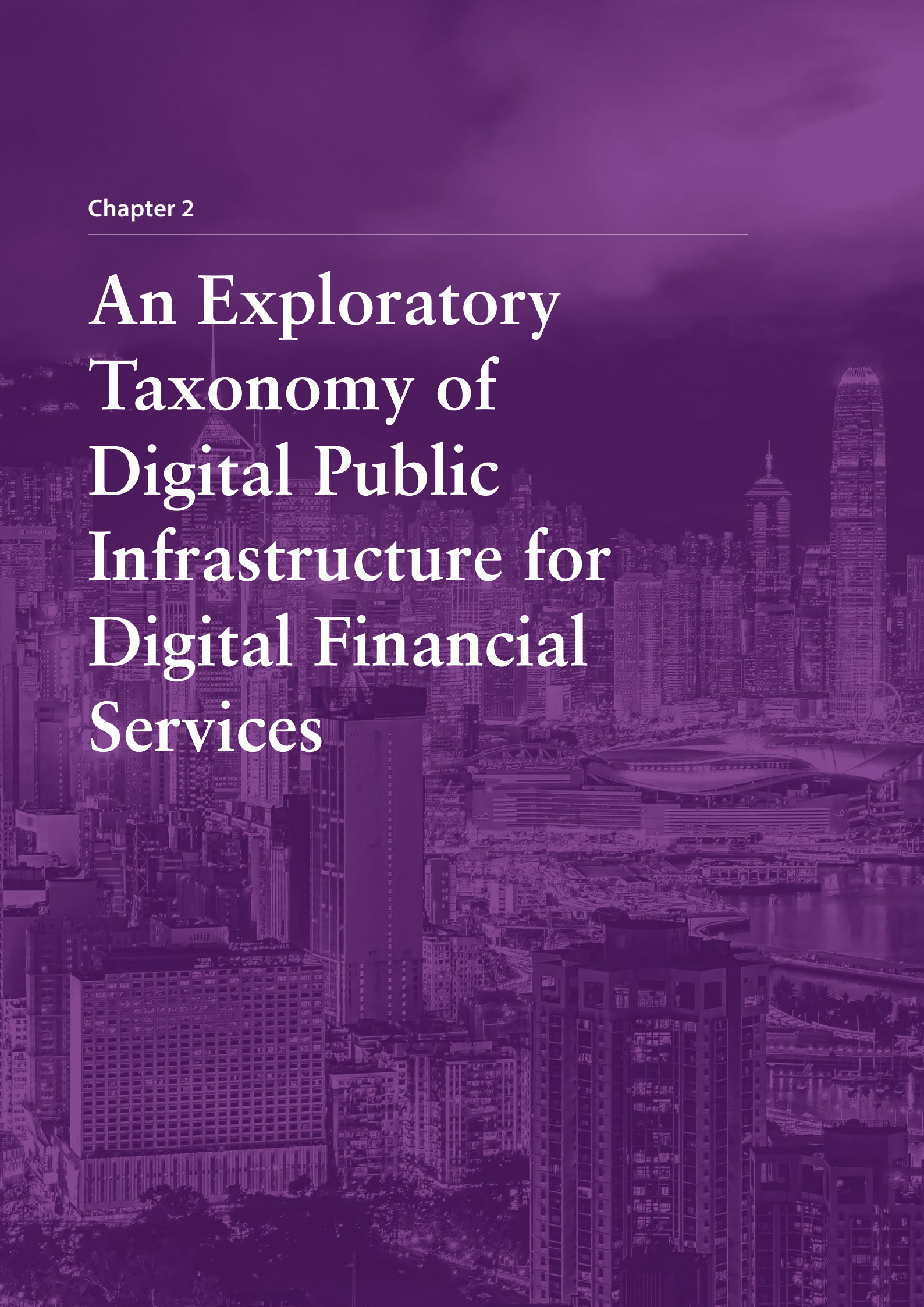
Beyond definitions, a related area of debate concerns the role of the private sector in the design, deployment, and governance of DPI. While there is broad agreement that DPI should be optimised for public benefit, there are differing views on how much of it should be publicly operated versus built or managed in partnership with private entities. A central banker from the Latin America and the Caribbean region noted, ***"We are assuming the role that private agents should be playing because they didn't have the right incentives to build infrastructure."*** Meanwhile, an open-source advisor based in the Asia Pacific region, warned against excessive private sector influence: ***"Private digital infrastructure like Google, Facebook, and Amazon has led to an enormous concentration of power, which is bad for society and the economy."*** DPI offers a counter-model by enabling foundational, open-access systems that facilitate combinatorial innovation. As World Bank (2025) highlights, *"Private companies can contribute to innovation and development of DPIs by building upon foundational rails provided by governments. They can create new applications and services that leverage DPI, leading to a thriving ecosystem."*[40]

As these perspectives and debates illustrate, DPI is not just a technical or institutional construct – it is also an active discussion area on public value, governance, and control. This makes the regulatory role even more critical. DPI presents both opportunities and risks requiring thoughtful and adaptive regulatory oversight. On the one hand, DPI can improve service delivery, expand access and reduce transaction costs. On the other hand, it introduces challenges around regulatory gaps, data security vulnerabilities and the risk of exclusion. This dual potential of enabling progress while introducing new risks, calls for thoughtful, robust, proportionate and adaptive regulation that can effectively mitigate risk without stifling innovation. Elements such as digital identity, real-time payments, and consent-based data sharing frameworks influence how people interact with financial products, yet their impact on access, resilience, and competition vary across jurisdictions.[41]

To keep pace, regulatory authorities should evolve in step with these developments, providing appropriate oversight without stifling innovation. When coordinated and proactive, regulators can enable these benefits by ensuring interoperability, fostering trust, and adapting governance structures to technological change. Without such oversight, DPI risks becoming fragmented, insecure, and inaccessible to the broader population, undermining its potential to serve as an inclusive and resilient infrastructure for the digital age.

Chapter 2

An Exploratory Taxonomy of Digital Public Infrastructure for Digital Financial Services



"Regulators and financial institutions don't naturally think in DPI terms – they focus on payment rails, SWIFT, RTGS, clearing houses. There is a need to bridge the language gap between DPI's emphasis on interoperability and modularity and traditional financial infrastructure thinking."

Senior Financial Regulator, Central Bank, Latin America and the Caribbean

The definitional scope of DPI, including within the context of financial services, is an evolving discussion with varying perspectives on its core elements.[42] To bring structure to this ambiguity, this section presents an exploratory taxonomy of DPI, outlining its key components and their relevance to DFS. Given that both DPI and DFS are rapidly evolving fields, with new technologies and use cases emerging, this taxonomy is not intended as a definitive or exhaustive classification. Rather, it offers a flexible framework to guide analysis and to help regulators, policymakers, and industry stakeholders to develop a more holistic approach to digital infrastructure. The taxonomy adopts a user-centric and use case driven methodology, reflecting how individuals and businesses interact with financial services in practice. By mapping observed use cases and current implementations, the taxonomy aims to support a clearer understanding of how foundational digital infrastructure interacts with financial ecosystems, while remaining adaptive as the landscape continues to evolve. Table 1 summarises the key infrastructures within each DPI pillar and their role in enabling selected use cases in DFS.

Table 1: DPI Exploratory Taxonomy

DPI Pillar	Key Infrastructure	Examples of DFS Use cases	Definition
Digital Identity	**Digital ID Network**	Electronic KYC (eKYC)	A digital identity verification process that enables financial institutions and service providers to remotely verify a customer's identity during onboarding. It leverages digital credentials, biometrics, and secure authentication technologies to streamline compliance with Know Your Customer (KYC) and Anti-Money Laundering (AML) regulations while enhancing financial inclusion.[43]
		Electronic Authentication	A digital security process that verifies a user's identity each time they access financial or digital services. It employs biometric authentication, multi-factor authentication (MFA), and cryptographic protocols to prevent fraud, enhance security, and protect sensitive transactions.[44]
		Electronic Signature	A digital mechanism that enables individuals and organisations to sign documents electronically. It uses cryptographic techniques, biometric authentication, or secure digital certificates to ensure the authenticity, integrity, and legal validity of signed agreements while reducing reliance on physical paperwork.[45]
		Entity and Data Registries	Data repositories that store and manage verified identity, business, and financial information. These registries support compliance, risk assessment, and market transparency by providing financial institutions and regulators with access to authenticated entity and customer data for processes such as eKYC, due diligence, and fraud prevention. [46]

Table 1: DPI Exploratory Taxonomy (continued)

DPI Pillar	Key Infrastructure	Examples of DFS Use cases	Definition
Real-Time Payments	**Fast Payment System**	P2P / P2B Payments	Digital transactions initiated by individuals to transfer funds either to other individuals (P2P) or businesses (P2B). These payments typically leverage modern technologies such as fast payment systems, mobile wallets, digital banking platforms, and QR codes, enabling instant, secure, and convenient transactions without relying on cash.[47]
		G2P / G2B Payments	Transfers made by government entities directly to individuals. These payments encompass a variety of disbursements, including social assistance benefits and other forms of government aid.[48]
		P2G / B2G Payments	Digital transactions in which individuals (P2G) or businesses (B2G) transfer funds to the government. These payments typically include taxes, fees, fines, utility bills, and other regulatory or administrative charges.[49]
		B2B Payments	Digital transactions that occur between businesses. Common use cases include payments for invoices, supply chain finance, and trade-related transactions.[50]
		B2P Payments	Digital transfers made by businesses directly to individuals. These typically involve payroll, wages, dividends, refunds, insurance payouts, gig economy payments, or other compensations.[51]
Consent-Based Data Sharing	**Interoperable Data Exchange API Standards**	Open Banking	The practice of sharing and leveraging of customer-permissioned data by banks with third-party providers (TPPs) to build applications and services.[52]
		Open Finance	Open Finance is the extension of Open Banking-like data sharing and third-party access to a wider range of financial sectors and products, such as savings, investments, pensions and insurance.[53]
		Open Credit	The practice of assessing an individual's or an MSME's creditworthiness using non-traditional data sources beyond conventional credit histories, leveraging transactional data, digital payment histories, and alternative financial records.[54]
		Open Insurance	The practice of sharing and leveraging of customer-permissioned data by insurance companies with third-party providers (TPPs) to build applications and services.[55]

Cambridge Centre for Alternative Finance research (CCAF, 2025)

While the above exploratory taxonomy is primarily designed to support the monitoring of DPI developments in DFS, it also offers a foundation for deeper analysis of how these infrastructures interact with existing systems and policy frameworks. The introduction of real-time payments, consent-based data sharing frameworks, and digital identity solutions is not occurring in isolation but within a broader financial ecosystem that includes RTGS systems, clearing houses, card networks, and interbank payment mechanisms.[56] As DPI adoption accelerates, financial authorities and policymakers should assess how these innovations interact with, complement, or challenge existing FMI structures and their regulatory objectives. For example, the introduction of a digital identity carries a cascading effect across data sharing and relevant customer onboarding and KYC processes for a regulatory authority.[57] With the breadth of government and regulatory institutions involved in the development of related identity policies, understanding the interactions is important to manage operational risk, regulatory coherence and system-wide efficiency of such deployments. As one technology executive from a North American financial services provider noted in the interviews for this report, ***"DPI systems are interconnected and should not be developed in isolation."***; similarly, a comprehensive view is essential for mapping both existing and future intersections and identifying the necessary adaptations.

Integration of FPS with traditional FMIs: A DPI Perspective

Another area where this overlap is becoming increasingly apparent is the integration of real-time payments or fast payment systems (FPS) with traditional FMIs. Given the diversity of FPS implementations globally, they differ in supported use cases, access models, and types of participants.[58] One of the most relevant examples of how different FPS implementations affect existing FMIs is through the settlement layer – particularly the distinction between deferred net settlement (DNS) and real-time gross settlement (RTGS). These design choices have direct implications for liquidity, credit exposure, and systemic risk management.[59] For instance, India's UPI, which uses DNS, optimises liquidity through netting but introduces counterparty and settlement risk, requiring robust clearing house functions.[60] In contrast, Brazil's Pix settles transactions in central bank money on a real-time basis, eliminating credit and counterparty risk.

Under Brazil's model, non-banks that meet regulatory requirements can become direct participants in SPI (the RTGS infrastructure behind Pix). This enables non-banks to settle transactions directly in central bank money, without relying on commercial bank intermediaries. However, it also raises liquidity demands, as funds must be available in real time to complete transactions.[61] These variations raise important questions about the evolving relationship between FPS and existing settlement infrastructure: for example, where do responsibilities for liquidity and risk management now lie? How should central banks adapt oversight and regulatory frameworks as new DPI layers become systemically important?

Beyond liquidity and settlement issues, Account-to-Account (A2A) payments facilitated by DPI can bypass traditional card networks, especially in markets where these alternatives are cheaper or more accessible.[62] This shift is compelling card schemes to integrate with FPS to maintain relevance in evolving digital financial ecosystems.[63] Similarly, the rise of FPS and their integration to real-time settlement architectures challenge the centrality of DNS-based clearing houses, whose roles may need to be redefined. These developments surface broader policy questions: to what extent are existing FMIs being reconfigured? How should regulatory authorities manage and monitor overlaps, redundancies, or conflicts between legacy infrastructure and new DPI layers?

As these overlaps between DPI and traditional FMIs become more pronounced, not only national financial authorities and central banks but also global standard-setting bodies will also play an important role in navigating the transitions ahead. Ensuring coherence between new and existing infrastructures will require active, international regulatory engagement – not only to manage operational and systemic risks but also to update standards, licensing frameworks, supervision models, and inter-agency coordination mechanisms.

Regulatory Implications and Strategic Trade-Offs Across DPI Pillars

Policymakers and regulators play an important role in influencing the implementation of DPI while mitigating risks, such as cybersecurity and privacy concerns. This section examines the policy implications and market consequences associated with each of the three pillars. Across these fields, a cohesive regulatory approach is essential, as these pillars are interconnected and alignment within a broader regulatory framework ensures the long-term success and sustainability of DPI systems. Table 2 explores the implications of each pillar, highlighting the specific risks and opportunities regulators should navigate to create an inclusive, secure, and efficient digital financial ecosystem. It analyses the regulatory impact through four cross-cutting policy objectives – financial accessibility, efficiency, security and interoperability – to provide an overview of regulatory trade-offs.

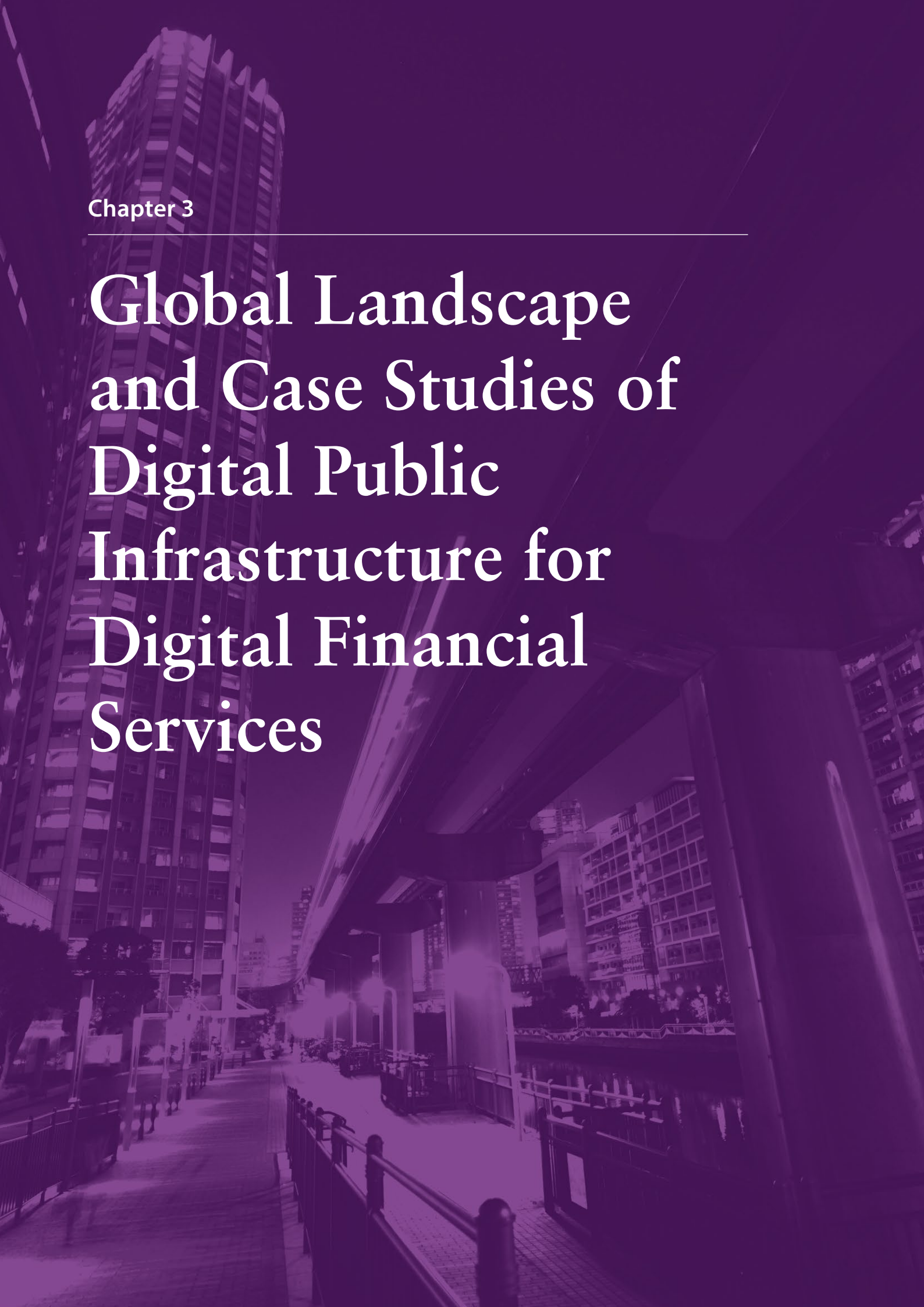
Table 2: Policy Considerations of Digital Identity, Real-Time Payments, and Consent-Based Data Sharing Systems within DFS

Digital Identity	
Key Factor	Implications & Market Consequences
Financial Accessibility	Well-regulated digital identity systems enhance financial accessibility by simplifying onboarding, reducing compliance costs, and enabling financial institutions to serve previously underserved groups. India's Aadhaar-based eKYC illustrates this potential, reducing account verification costs from INR 1,000 (approximately GBP 9, or USD 12) to INR 5, (GBP 0.05, or USD 0.06), per customer.[64] However, these benefits are unevenly distributed due to persistent digital divides related to geography, gender, age and income.[65] To ensure universal financial accessibility, regulatory frameworks should address digital literacy gaps, provide alternative verification methods, and adopt tiered KYC approaches to avoid inadvertently excluding vulnerable populations.
Efficiency	Electronic KYC (eKYC) improves operational efficiency by streamlining identity verification, reducing paperwork, and lowering compliance costs. However, relying heavily on a limited number of digital identity providers can lead to market concentration, potentially undermining competition. In addition, private-sector solutions, such as those from mobile operators, offer immediate benefits but risk fragmentation and interoperability challenges if not integrated into national frameworks. The broader decision between centralised and decentralised digital identity systems is another important design choice that is worth considering trade-offs. Centralised models, such as India's Aadhaar, enhance efficiency and simplify public-service integration but raise privacy and security concerns, whereas decentralised, self-sovereign models empower users and protect privacy yet pose challenges related to accountability and governance complexity.[66]
Security	Technologies such as electronic signatures, biometric verification, cryptographic security, and multi-factor authentication enhance fraud prevention and strengthen identity assurance. Yet, centralised digital identity systems pose persistent risks, as demonstrated by data breaches.[67] Policymakers must carefully navigate trade-offs between centralised and decentralised models, recognising the need for strong security protocols, data governance mechanisms, and clear accountability structures to mitigate risks associated with large-scale identity databases.
Interoperability	Regulatory initiatives, such as the EU's eIDAS regulation, standardise electronic signature protocols, significantly improving interoperability and facilitating cross-border financial transactions.[68] However, regulatory fragmentation remains a concern, and cross-border interoperability remains challenging across jurisdictions.

Table 2: Policy Considerations of Digital Identity, Real-Time Payments, and Consent-Based Data Sharing Systems within DFS (continued)

Real-Time Payments	
Key Factor	Implications & Market Consequences
Financial Accessibility	Digital payment solutions, including fast payment systems such as India's UPI, enhance financial inclusion by enabling low-cost, real-time transactions.[69] However, heavy reliance on digital channels may inadvertently widen financial exclusion, particularly among populations with limited internet access, low digital literacy, or infrastructural constraints.[70] Policymakers should therefore, consider a balanced approach that includes the development of offline payment solutions, targeted financial literacy initiatives, and policy measures that promote accessibility and inclusion, ensuring that digital payment systems serve all segments of society.
Efficiency	DPI-enabled digital payment systems can significantly enhance transaction efficiency through real-time payments and reduced transaction costs. The integration of these systems with digital identity infrastructures, exemplified by India's Direct Benefit Transfer (DBT), further improves efficiency by minimising leakages and reducing administrative overhead. While these efficiency gains are substantial, they indirectly influence competitive dynamics through powerful network effects, as users and businesses gravitate toward platforms that achieve early scale or offer superior user experiences, leading to market concentration among a few dominant providers.[71] For instance, India's UPI is largely dominated by a few major technology companies, despite numerous licenses being issued, raising significant concerns about competition and financial stability, including risks associated with single points of failure or disproportionate influence. To proactively address these concerns, the National Payments Corporation of India (NPCI) introduced a market share cap of 30% per player to foster market diversification, however the implementation deadline has been extended to the end of 2026.[72] Regulators should carefully balance the pursuit of operational efficiency with active competition management, considering complementary measures such as interoperability mandates and targeted incentives for smaller or newer entrants, thus ensuring a robust, competitive, and resilient digital payments ecosystem.
Security	Fast Payment Systems (FPS) are increasingly integrating advanced security technologies and digital identity frameworks to enhance transaction integrity and mitigate fraud risks. However, the centralisation of transaction records and the sharing of consumer data among financial institutions and service providers raise concerns regarding data ownership, governance and privacy.[73] Establishing clear regulatory safeguards, well-defined data-sharing frameworks, and user-centric control mechanisms is essential to maintaining consumer trust while supporting innovation in DFS.
Interoperability	Fast Payment Systems (FPS) have effectively utilised open API standards to connect banks, fintechs, MSMEs and consumers within a unified ecosystem. However, divergent regulatory environments can severely limit the scope of FPS interoperability, especially in cross-border contexts. Achieving effective regulatory interoperability necessitates mutual recognition of regulatory oversight, consumer protection frameworks, anti-money laundering (AML) policies, and data privacy laws.[74]
Consent-Based Data Sharing	
Key Factor	Implications & Market Consequences
Financial Accessibility	Open credit frameworks like India's OCEN enhance financial inclusion by leveraging alternative data sources such as transaction histories and mobile payment records, improving credit access for underserved populations and fostering competition in lending markets. Nevertheless, adoption remains constrained by barriers such as limited digital infrastructure, inadequate financial literacy, and gaps in digital connectivity.[75]
Efficiency	Open banking and open finance promote competition and innovation by giving consumers control over their financial data, offering more choices and greater transparency in financial services.[76] Even with these aims, complex liability structures in data-sharing arrangements pose risks in consumer protection, as users may not fully understand agreements, resulting in higher exposure to financial exploitation. Strong regulatory safeguards, including clear liability frameworks and effective dispute resolution, are essential to balancing innovation with consumer protection.[77]
Security	Transparent data sharing enhances security by enabling cross-institutional detection of suspicious patterns that might otherwise remain obscured in siloed systems. Standardised open APIs further strengthen ecosystem resilience by ensuring consistent authentication and authorisation mechanisms. However, increased data sharing introduces privacy and security risks, as multiple third-party providers accessing sensitive financial information create potential vulnerabilities. A financial infrastructure specialist based in Latin America and the Caribbean warned in the interviews for this report that ***"DPI generates vast consumer data. While fintech firms integrate such data for new use cases, this raises concerns about whether private entities should control such data."*** Ambiguities around data ownership and control may expose consumers to opaque data-sharing practices, increasing the risk of misuse.
Interoperability	Initiatives such as the UK's Open Banking Initiative and India's Account Aggregator framework enhance interoperability, expanding consumer access to financial products. However, regulatory fragmentation remains a challenge, as varying data protection laws, such as GDPR and CCPA, create barriers to cross-border financial services. This aligns with insights from interviews conducted by CCAF, where a senior academic based in Africa emphasised that ***"Political and regulatory differences may create silos and inefficiencies in global finance. Diverging standards and regional priorities could hinder global interoperability. Regulatory collaboration is essential to avoid fragmentation in cross-border payments, digital trade, and financial data exchange."*** However, the BIS Innovation Hub's Project Aperta offers a strong example of enabling cross-border data portability. The project is still in early stages of development with its initial use case focussed on trade finance for MSMEs.[78]

Source: Cambridge Centre for Alternative Finance research (CCAF, 2025)



Chapter 3

Global Landscape and Case Studies of Digital Public Infrastructure for Digital Financial Services

"DPI systems are interconnected and, at times, interdependent, benefiting from network effects. The financial sector, for example, links to the healthcare system, facilitating payments and enabling smoother money flows. The right approach is for each jurisdiction to adopt a comprehensive, 360-degree view to effectively govern and integrate these systems."

Senior Academic, Leading Research University, Sub-Saharan Africa

This chapter begins with an overview of the global DPI landscape, mapping the presence of key DPI components across selected jurisdictions along with the enabling regulatory environment that facilitates these components. To further inform the discussion on the overlaps in DPI and DFS, it examines how DPI components, particularly those enabling digital identity, real-time payments, and consent-based data sharing, are starting to influence key financial inclusion outcomes. Drawing on empirical examples from a range of jurisdictions, it examines first-order indicators – such as increases in digital payment usage – to identify emerging patterns in how DPI may support the expansion of DFS. These early signals offer a useful starting point for policymakers and regulators to assess where and how DPI could make a meaningful difference in their own contexts.

Building on this broader perspective, the chapter then examines a comparative case study of two prominent national-level payment systems: India's Unified Payments Interface (UPI) and Brazil's Pix. Payments provide a natural starting point: they are often the first domain to undergo digital transformation and serve as an important entry point for financial inclusion. Although developed within different institutional and market contexts, both UPI and Pix, were introduced by central banks with the shared goal of enabling low-cost, real-time payments at scale. Today, they occupy central roles in their respective digital financial ecosystems. Their comparison provides valuable insights into the ways in which varying governance models and design decisions, when aligned with core DPI principles such as interoperability, modularity, and openness, can yield similar policy outcomes. DPI Principles are discussed in detail in Chapter 5 of the report.

Mapping the Global DPI Landscape

As global adoption of DPI accelerates, jurisdictions are adopting diverse approaches to its implementation, with the aim of striking a balance between fostering innovation and ensuring regulatory oversight. Governance approaches, even within a single pillar such as digital identity, can lie on a spectrum ranging from minimal coordination to private-led models to full government mandates.[79] This diversity underscores the importance of regulatory and government engagement in designing and maintaining secure, interoperable, and inclusive DPI ecosystems. Accordingly, governments and regulatory bodies are actively crafting policies, promoting public-private partnerships, and tackling key challenges such as data privacy, cybersecurity and competition.

To provide a representative snapshot for this report's focus on DPI adoption in the financial sector, Table 3 presents twenty-nine jurisdictions selected based on their varying levels of implementation, regional diversity, and regulatory approaches. The selection was guided by a DFS lens, focusing on jurisdictions where DPI components – such as digital identity, real-time payments, and consent-based data sharing – intersect with DFS use cases. While the primary focus is on financial sector applications, a few jurisdictions with DPI developments in non-financial sectors were also included to reflect a broader range of implementation models. The list includes both early adopters and emerging implementers, offering insights into how different jurisdictions are approaching DPI development, deployment, and oversight to support service delivery within and beyond the financial sector. References to regulatory engagement reflect the key regulators identified during the research, although other agencies may also have played important roles in these developments.

Table 3: DPI Presence and Key Regulatory Engagement in Selected Jurisdictions

Region: **Asia Pacific (APAC)**			
Country	DPI Pillar	Status	Key Regulatory Engagement
Australia	Real-Time Payment	New Payments Platform[80]	Reserve Bank of Australia (RBA)
	Digital Identity	MyGov (for digitised government services), MyID (online ID form) [81]	Department of Finance's Digital ID and Data Policy Division (Digital ID), Services Australia (MyGov)
	Consent-Based Data Sharing	Consumer Data Rights[82]	Australian Treasury, Australian Competition and Consumer Commission (ACCC)
India	Real-Time Payment	UPI[83]	Reserve Bank of India (RBI)
	Digital Identity	Aadhaar[84]	Ministry of Electronics and Information Technology (MeitY)
	Consent-Based Data Sharing	Account Aggregator[85]	Reserve Bank of India (RBI), SEBI, IRDAI or PFRDA (at least one of the authorities to regulate)
Singapore	Real-Time Payment	Paynow[86]	Association of Banks in Singapore (ABS), Monetary Authority of Singapore (MAS)
	Digital Identity	Singpass[87]	Government Technology Agency Singapore
	Consent-Based Data Sharing	APEX Cloud[88]	Monetary Authority of Singapore (MAS)
South Korea	Real-Time Payment	BOK-Wire+[89]	Korea Financial Telecommunications & Clearing Institute (KFTC)
	Digital Identity	Mobile DID[90]	Ministry of Interior and Safety (MOIS)
	Consent-Based Data Sharing	EODES[91]	Personal Information Protection Commission (PIPC)
Thailand	Real-Time Payment	PromptPay (Bank of Thailand)[92]	Bank of Thailand (BoT)
	Digital Identity	National Digital ID (NDID), Thai ID Card[93]	Ministry of Digital Economy and Society (MDES)
	Consent-Based Data Sharing	Your Data[94]	Bank of Thailand (BoT), Securities and Exchange Commission (SEC), Office of Insurance Commission (OIC), other government agencies.
Cambodia	Real-Time Payment	Bakong[95]	National Bank of Cambodia (NBC)
	Digital Identity	Electronic Identification System (eID)[96]	Ministry of Interior
	Consent-Based Data Sharing	CamDX[97]	Ministry of Commerce
Pakistan	Real-Time Payment	Raast[98]	State Bank of Pakistan (SBP)
	Digital ID	Computerised National Identity Card (CNIC)[99]	National Database and Registration Authority (NADRA)
	Consent-Based Data Sharing	Planning	State Bank of Pakistan (SBP)
Philippines	Real-Time Payment	Planning	Central Bank of the Philippines (BSP)
	Digital Identity	Phylsis[100]	Philippines Statistics Authority (PSA)
	Consent-Based Data Sharing	Planning (Open Finance)[101]	Central Bank of the Philippines (BSP)
Indonesia	Real-Time Payment	BI-FAST[102]	Bank Indonesia (BI)
	Digital Identity	e-KTP[103]	Ministry of Home Affairs, Ministry of Communication and Informatics (Kominfo)
	Consent-Based Data Sharing	National Standard Open API Payment (SNAP)[104]	Bank Indonesia (BI), Financial Services Authority (OJK), Indonesian Payment System Association (ASPI)

Table 3: DPI Presence and Key Regulatory Engagement in Selected Jurisdictions (continued)

Region: **Europe**			
Country	DPI Pillar	Status	Key Regulatory Engagement
EU Members	Real-Time Payment	TIPS[105] Digital Euro[106]	of the European Central Bank (ECB), National Central Banks (NCBs)
	Digital Identity	eID[107] EUDI[108]	Department of Finance's Digital ID and Data Policy Division (Digital ID), Services Australia (MyGov)
	Consent-Based Data Sharing	European Data Space[109]	European Commission (EU), European Data Innovation Board (EDIB), and sector-specific initiatives
Switzerland	Real-Time Payment	SIC[110]	SIX Interbank Clearing Ltd (SIC Ltd), Swiss National Bank (SNB)
	Digital Identity	Digital identity e-ID[111]	Federal Office of Justice (FOJ)
	Consent-Based Data Sharing	I14Y Interoperability Platform[112]	Federal Statistical Office
Türkiye	Real-Time Payment	FAST[113]	Central Bank of the Republic of Türkiye (CBRT)
	Digital Identity	T.C. Kimlik Kartı[114]	General Directorate of Civil Registration and Citizenship Affairs, Ministry of Interior of the Republic of Türkiye
	Consent-Based Data Sharing	KAYSIS[115]	Digital Transformation Office of the Presidency of the Republic of Türkiye
Region: **Latin America and the Caribbean (LAC)**			
Country	DPI Pillar	Status	Key Regulatory Engagement
Brazil	Real-Time Payment	Pix[116]	Central Bank of Brazil (BCB)
	Digital Identity	National Identity Card (CIN)/ gov.br[117]	Superior Electoral Court (TSE), Federal Government
	Consent-Based Data Sharing	Conecta.gov.br[118]	Ministry of Management and Innovation (MGI)
Mexico	Real-Time Payment	Sistema de Pagos Electrónicos Interbancarios (SPEI) – DiMo and CoDI[119]	Bank of Thailand (BoT)
	Digital Identity	Unique Population Registration Code (CURP)/ Llave MX[120] / Cédula Única de Identidad Digital[121]	Ministry of the Interior
	Consent-Based Data Sharing	InteroperaMX[122]	Digital Agency for Public Innovation (ADIP)
Colombia	Real-Time Payment	Bre-B Instant payment system, Transfiya[123]	Central Bank of Colombia
	Digital Identity	Cédula de ciudadania/ Cédula digital[124]	National Registry of the Civil Status
	Consent-Based Data Sharing	Data Exchange System[125]	Gov.co
Peru	Real-Time Payment	Mobile Money (Yape/Plin), CBDC[126]	Central Reserve Bank of Peru (BCRP)
	Digital Identity	ID Gov Peru[127]	National Registry of Identification and Civil Status (RENIEC)
	Consent-Based Data Sharing	Plataforma Interoperabilidad del Estado[128]	Government Digital Secretariat (SEGDI)
Chile	Real-Time Payment	Transferencias en Línea (TEF)[129]	Central Bank of Chile
	Digital Identity	ClaveÚnica[130]	Civil Registry and Identification Service
	Consent-Based Data Sharing	PISEE 2.0.[131]	Ministry General Secretariat of the Presidency (SEGPRES)

Table 3: DPI Presence and Key Regulatory Engagement in Selected Jurisdictions (continued)

Region: **Middle East and North Africa (MENA)**			
Country	DPI Pillar	Status	Key Regulatory Engagement
Egypt	Real-Time Payment	Instant Payment Network (IPN)[132]	Central Bank of Egypt (CBE)
	Digital Identity	Planning	Ministry of Interior
	Consent-Based Data Sharing	G2G System[133]	National Telecom Regulatory Authority (NTRA)
Morocco	Real-Time Payment	Virement Instantané, [134] MarocPay.	Central Bank of Morocco
	Digital Identity	CNIE[135]	General Directorate of National Security (DGSN)
	Consent-Based Data Sharing	E-government Interoperability Platform[136]	National Commission for the Protection of Personal Data (CNDP), Agency for Digital Development (ADD)
UAE	Real-Time Payment	Aani[137]	Al Etihad payments (subsidiary of Central Bank of UAE)
	Digital Identity	UAE Pass[138]	Telecommunications And Digital Government Regulatory Authority (TDRA), Department of Government Enablement, Digital Dubai
	Consent-Based Data Sharing	Government Services Bus (GSB)[139]	Telecommunications and Digital Government Regulatory Authority (TDRA)
Region: **North America**			
Country	DPI Pillar	Status	Key Regulatory Engagement
US	Real-Time Payment	FedNow[140]	Federal Reserve
	Digital Identity	mDL.[141] CAT-2[142]	Department of Homeland Security (DHS).
	Consent-Based Data Sharing	Largely market-driven	Consumer Financial Protection Bureau
Canada	Real-Time Payment	Planning	Canadian Digital Service
	Digital Identity	Planning	DCanadian Digital Service
	Consent-Based Data Sharing	Consumer Driver Banking Act[143]	Financial Consumer Agency of Canada (FCAC)
Region: **Sub-Saharan Africa (SSA)**			
Country	DPI Pillar	Status	Key Regulatory Engagement
Tanzania	Real-Time Payment	TIPS (Tanzania Instant Payment System), Jamii Malipo[144]	Bank of Tanzania (BoT)
	Digital Identity	Jamii Namba[145]	National Identification Authority (NIDA)
	Consent-Based Data Sharing	GovESB,[146] Jamii Data Shirikishi[147]	E-Government Authority (e-GA)
Rwanda	Real-Time Payment	eKash[148]	National Bank of Rwanda (BNR)
	Digital Identity	Single Digital ID (SDID).[149]	National Identification Agency (NIDA)
	Consent-Based Data Sharing	Rwanda Government Enterprise Architecture (RGEA)[150]	Rwanda Information Society Authority (RISA)

Table 3: DPI Presence and Key Regulatory Engagement in Selected Jurisdictions (continued)

Region: **Sub-Saharan Africa (SSA)** (continued)			
Country	DPI Pillar	Status	Key Regulatory Engagement
Kenya	Real-Time Payment	Pesalink,[151] Kenya Mobile Money[152]	Central Bank of Kenya
	Digital Identity	Maisha Namba/ National Integrated Identity Management System (NIIMS)[153]	Ministry of Interior and National Administration
	Consent-Based Data Sharing	Kenya Agricultural Data Sharing Platform (KADP)[154]	Office of the Data Protection Commissioner (ODPC)
Uganda	Real-Time Payment	Mobile Money[155]	Bank of Uganda
	Digital Identity	Ndaga Muntu[156]	National Identification and Registration Authority (NIRA)
	Consent-Based Data Sharing	UG Hub Systems Integration Platform[157]	National Information Technology Authority – Uganda (NITA-U)
Zambia	Real-Time Payment	National Financial Switch (NFS)[158]	Zambia Electronic Clearing House Limited (ZECHL), Bank of Zambia (BoZ)
	Digital Identity	Integrated National Registration Information System (INRIS)[159]	Ministry of Home Affairs & Internal Security
	Consent-Based Data Sharing	Data Exchange System[160]	Smart Zambia Institute
South Africa	Real-Time Payment	Real-Time Clearing (RTC), PayShap[161]	South African Reserve Bank (SARB), BankservAfrica
	Digital Identity	Smart Identity Card (Smart ID)[162]	Department of Home Affairs (DHA)
	Consent-Based Data Sharing	State Information Technology Agency (SITA)[163]	Department of Communications and Digital Technologies (DCDT)
Mauritius	Real-Time Payment	Mauritius Central Automated Switch (MauCAS)[164]	Bank of Mauritius (BoM)
	Digital Identity	MNIC 3.0.[165]	Prime Minister's Office
	Consent-Based Data Sharing	Infohighway[166]	Ministry of Information Technology, Communication, and Innovation (MITCI)

Source: Cambridge Centre for Alternative Finance research (CCAF, 2025)

The global adoption of DPI reflects diverse regulatory approaches and implementation strategies. However, the key question remains: what impact do these infrastructures have on the financial ecosystem? The next section examines first-level indicators to assess their influence, particularly on DFS, offering a view of their initial impact.

Early Signals of DPI's Impact on Financial Access

At the time of writing this report, 113 jurisdictions were assessed as each had at least one of the three core components of DPI in place – namely, a digital identity, real-time payment,[167] or a consent-based data sharing[168] framework.[169] To assess DPI maturity, each jurisdiction received a composite score ranging from 1 (lowest) to 3 (highest), based on how many of the three core DPI components were established. This scoring system helped to differentiate levels of development in a clear, quantifiable manner. Of these, 26 (23%) jurisdictions scored 1, 30 (26.5%) scored 2, and 56 (49.5%) scored 3, highlighting varying levels of DPI adoption. Average scores for these indicators were calculated across groups with DPI scores of 1, 2, and 3.

To explore the relationship between DPI maturity and financial inclusion, DPI scores were used as a proxy for maturity, and a correlation analysis was conducted using selected indicators from the World Bank's 2021 Global Findex database.[170] These indicators covered access to personal financial products (e.g., debit/credit cards, checking/savings accounts, mobile money), use of payment services (e.g., digital payments, domestic remittances, government transfers), and broader measures of financial access (e.g., ability to cover emergency expenses, possession of ID documentation).

These indicators were chosen because they reflect key dimensions of financial inclusion that are likely to be influenced by the presence and effectiveness of DPI components, such as ease of identification, access to digital payments, and the ability to receive or send funds.

The scored jurisdictions were grouped into three categories: Group 1 (DPI score 1), Group 2 (DPI score 2), and Group 3 (DPI score 3). For each group, the average percentage of the population for each financial indicator was calculated.

This exploratory analysis then examined whether jurisdictions with more DPI components demonstrated stronger financial inclusion outcomes – for example, whether increases in DPI maturity were accompanied by corresponding increases in the share of the population owning a debit or credit card. It is important to note, however, that these results reflect data collected up to 2021; since then, policy reforms, technological changes, and economic shifts may have influenced both DPI implementation and financial inclusion outcomes. Moreover, the maturity and readiness of these DPI components are dependent on reporting and available data from the specific jurisdictions.

Table 4: Average Percentage of Financial Indicators by DPI Score

Financial Indicators (Average % / Population)	DPI Scores		
	1 (n.26)	2 (n.31)	3 (n.56)
Owns a debit or credit card	25%	39%	77%
Used a debit or credit card	20%	31%	67%
Has an inactive account	4%	4%	2%
No account because financial services are too expensive	21%	22%	11%
No account because of a lack of necessary documentation	19%	17%	7%
Mobile money account	23%	28%	22%
Saved money using a mobile money account	8%	10%	5%
Borrowed any money from a formal financial institution or using a mobile money account	15%	23%	38%
Made or received a digital payment	45%	56%	83%
Made a utility payment: using a mobile phone	26%	28%	31%
Received government transfer	14%	17%	28%
Sent or received domestic remittances	39%	36%	38%
Very difficult to come up with emergency funds in 30 days	34%	30%	19%

Source: Cambridge Centre for Alternative Finance research (CCAF, 2025) and 2021 Global Findex Database (World Bank, 2022), https://www.worldbank.org/en/publication/globalfindex

The data showed that jurisdictions with only one DPI element have 25% of their population owning a debit or credit card, whereas this figure rises to 77% in jurisdictions with all three DPI elements. Similarly, the share of people making or receiving digital payments increases from 45% to 83% as the number of DPI elements grows. Barriers to financial access also decline. In jurisdictions with only one DPI component, 19% of the population cites a lack of necessary documentation as a reason for not having an account, compared to just 7% in jurisdictions with all three DPI elements.

Access to credit and government support is also higher in jurisdictions with more DPI elements. The percentage of people who have borrowed from a financial institution or mobile money provider increases from 15% in jurisdictions with one DPI element, to 38% in those with all three. The share of individuals receiving government transfers is 14% in jurisdictions with one DPI element but doubles to 28% among those with full DPI. This trend aligns with existing research on digital infrastructure's role during the COVID-19 pandemic. Among 85 jurisdictions, those that leveraged digital databases and trusted data-sharing mechanisms were able to reach, on average, three times more beneficiaries than jurisdictions without such systems, which had to rely on manual data collection.[171] Furthermore, jurisdictions with all three DPI elements show a lower share of individuals who find it "very difficult" to come up with emergency funds within 30 days. This percentage declines from 34% in jurisdictions with one DPI element to 19% in those with all three elements.

Table 5: Average Percentage of Financial Indicators by DPI Score in Emerging Market and Developing Economies (EMDE)

Financial Indicators (Average %)	DPI Scores (EMDEs)		
	1 (n.24)	2 (n.28)	3 (n.17)
Owns a debit or credit card	23%	34%	50%
Used a debit or credit card	18%	24%	31%
Has an inactive account	4%	4%	6%
No account because financial services are too expensive	21%	22%	15%
No account because of a lack of necessary documentation	19%	17%	9%
Mobile money account	23%	28%	22%
Saved money using a mobile money account	8%	10%	5%
Borrowed any money from a formal financial institution or using a mobile money account	14%	18%	21%
Made or received a digital payment	44%	52%	60%
Made a utility payment: using a mobile phone	26%	27%	22%
Received government transfer	14%	16%	24%
Sent or received domestic remittances	40%	36%	37%
Very difficult to come up with emergency funds in 30 days	19%	19%	23%

Source: Cambridge Centre for Alternative Finance research (CCAF, 2025) and 2021 Global Findex Database (World Bank, 2022), https://www.worldbank.org/en/publication/globalfindex

Narrowing the analysis to Emerging Market and Developing Economies (EMDE) (Table 5), the observed trend of higher DPI scores correlating with better financial inclusion indicators persists, although some discrepancies are noted. While access to debit or credit card ownership, account opening, digital payment transactions, and borrowing money improve with higher DPI scores, factors related to digital accessibility, such as mobile money account ownership, mobile phone payment rates, remittances, and financial health aspects like access to emergency money and mobile money savings, yield mixed results. This suggests that, while these trends present a potential link between DPI and financial inclusion, other factors, such as regulatory environments, economic conditions, and financial sector development, likely also influence these outcomes.

However, the DPI scores do not necessarily indicate that more DPI components will directly result in greater financial inclusion, as the analysis is exploratory and does not establish causality but rather identifies patterns of co-occurrence between DPI components and key financial inclusion indicators. A well-developed DPI ecosystem may help reduce barriers by simplifying identity verification, expanding access to digital payments, and enabling secure data-driven financial services. However, further research is needed to further understand the specific drivers behind these relationships, and how other critical factors, such as government involvement, political and socio-economic developments, culture and values, would contribute to positive financial outcomes.

Comparative Snapshot: India's UPI and Brazil's Pix

India's UPI and Brazil's Pix reflect two distinct approaches to public digital payments infrastructure. UPI was developed as part of a broader DPI strategy, integrating payments with digital identity and consent-based data sharing frameworks. In contrast, Pix is more rooted in traditional FMI but incorporates key DPI-aligned principles such as interoperability, openness, and real-time functionality. This comparison highlights how different starting points can still lead to scalable, inclusive payment systems when foundational principles are in place.

Table 6: Comparative Framework: A Case Study of India's UPI and Brazil's Pix

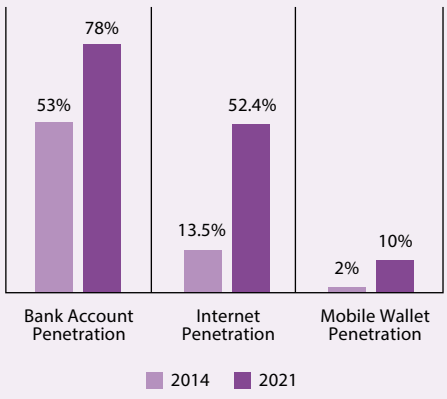
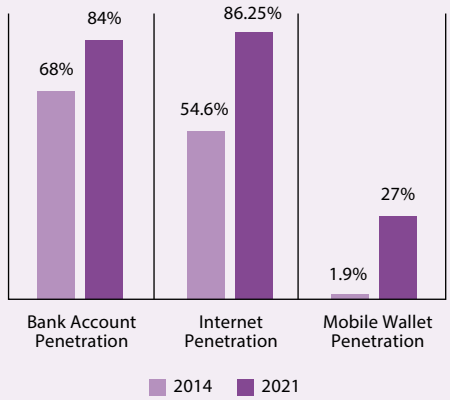
Category	Sub-Category	India	Brazil
Real-Time Payment System	Name	United Payments Interface (UPI)	Pix
	Year of Launch	2016	2020
	Regulatory Body	National Payments Corporation of India (NPCI)	Banco Central do Basil (BCB)
	Features Lead	The UPI enables real-time peer-to-peer (P2P) and merchant payments, while the Aadhaar Payments Bridge (APB)[172] and Aadhaar Enabled Payment System (AePS)[173] facilitate digital transactions and financial inclusion in underserved areas.	Pix in Brazil, supporting payment types like P2P, P2B, B2B, P2G, G2P, and G2B. Currently, offline payments are unavailable. In February 2025, contactless payments with NFC were introduced.
	Use Cases	UPI supports bank accounts, wallets, prepaid cards, credit lines, and credit cards. It enables P2P, P2B, B2B, P2G, G2P, and G2B payments. UPI Lite allows offline payments, while UPI AutoPay handles recurring payments. UPI Tap & Pay uses NFC for contactless transactions.	Pix in Brazil, supporting payment types like P2P, P2B, B2B, P2G, G2P, and G2B. Currently, offline payments are unavailable. In February 2025, contactless payments with NFC were introduced.[174]
	Penetration Levels[175]		
Financial Market Infrastructure	FMI Regulatory Body	Reserve Bank of India (RBI), Securities and Exchange Board of India (SEBI)	Brazilian Payments System (SPB), Banco Central do Brasil (BCB), Securities and Exchange Commission of Brazil (CVM)
	Principles for FMI	CPSS-IOSCO Principles for Financial Market Infrastructures (PFMI), 2012.[176]	CPSS-IOSCO Principles for Financial Market Infrastructures (PFMI), 2012.[177]

Table 6: Comparative Framework: A Case Study of India's UPI and Brazil's Pix (continued)

Category	Sub-Category	India	Brazil
Key DPI Developments	Payments Status	UPI processes over 17 billion transactions monthly.[178] Its growth is supported by services such as UPI Lite and UPI 123PAY, which enhance accessibility in rural areas. UPI also integrates with RuPay and is expanding to cross-border use.	Pix processes over 6 billion transactions monthly.[179] High smartphone usage supports digital wallets such as Mercado Pago and PicPay, while e-commerce and Buy Now, Pay Later (BNPL) services boost adoption.[180]
	Open Banking and Open Finance Status[181]	Passed regulations for both Open Banking and Open Finance (2019); Open Banking and Open Finance began live Implementation in 2021.	Passed regulations for both Open Banking and Open Finance in 2021, with live Implementation after 2022.
	Digital Identity Status	India's digital identity system is built on Aadhaar, a biometric-based ID managed by the Unique Identification Authority of India (UIDAI), covering over 1.3 billion citizens. Aadhaar enables authentication for banking, welfare, and tax services and is a core component of the India Stack, supporting e-KYC, digital signatures, and payments.[182]	Brazil's digital ID system, the Documento Nacional de Identidade (DNI), links identity data to the national civil registry and CPF. Introduced in 2018, it enables secure access to services via the gov.br platform and supports digital authentication through encryption and biometrics, advancing e-governance and fraud prevention.[183]
	Ongoing Government Initiatives	Government of India is extending UPI via partnerships such as NIPL–Lyra in France[184] and advancing international adoption of India Stack and innovation by enabling startups to build digital services through open APIs, particularly in financial inclusion and service delivery.	Government of Brazil is expanding Pix with new features such as Pix Automático for recurring payments. This feature goes live on June 16, allowing users to authorise recurring charges with a single consent.[185] Pix is also being integrated into Brazil's Open Finance framework, with payment initiation regulations anticipated by 2025 to enhance interoperability. Efforts are underway to enable Pix for international transfers.[186]
DPI Principles	Interoper-ability	NPCI approves Issuer Banks, PSP Banks, Third Party Application Providers (TPAP), and Prepaid Payment Instrument issuers (PPIs) for participation. UPI 2.0 framework brought enhanced features like linking multiple bank accounts within one app, allowing users to access funds and make payments without switching apps. It supports QR-code interoperability and recurring payments also enabled on the QR.	Pix enable seamless payments among financial institutions, being central to Brazil's payment system. Utilising open technologies like HTTPS, it lowers technological barriers, allowing increased participation and collaboration. Pix integrate directly into financial services applications, promoting access and innovation. The participation of large banks and non-banks (over 500,000 transaction accounts) is mandatory.[187] It supports QR code interoperability.
	Secure and Private by Design	UPI, built on the Immediate Payment Service (IMPS) infrastructure, assigns each user a unique Virtual Payment Address (VPA) for easy transactions without detailed bank information. It uses two-factor authentication (2FA) and data encryption for security. Users can perform up to 20 transactions per day, with daily transaction value limits to prevent fraud, including an initial transaction limit for new users.	Pix was built with strong security features, including advanced fraud detection, two-factor authentication, and immediate settlement dispute mechanisms. It uses secure identification protocols (Pix Keys) to link individuals and businesses with their bank accounts, ensuring correct recipient transactions. Pix set transaction limits to reduce large-scale fraud, especially for new accounts or first-time transactions. A dedicated security subgroup within the Pix Forum monitors the system to mitigate threats and maintain user trust.

Table 6: Comparative Framework: A Case Study of India's UPI and Brazil's Pix (continued)

Category	Sub-Category	India	Brazil
DPI Principles (continued)	Reusable and Scalable	A single UPI ID can link multiple bank accounts, simplifying adoption and enhancing convenience. The Virtual Payment Address (VPA) is the only required information for transactions, eliminating redundant data entry. UPI supports various transaction types, making it versatile across industries like financial services, e-commerce, education and healthcare.	Pix is designed to evolve continuously, adding features like cash withdrawals, recurring payments, offline transactions, and integration with Brazil's Open Finance initiative. Initially handling 2,000 transactions per second, it now scales to 6,000 transactions per second,[188] showcasing its scalability. Tokenization in Pix allows reuse of unique payment identifiers, reducing repetitive data entry for merchants, businesses and consumers.
	Inclusivity	Banks/Wallets Live: 632, Payment Service Providers: 86, TPAPs: 38 + 10 (banking apps).[189] Around 350 million Indian citizens are actively using UPI (Unified Payments Interface), making it the most widely used digital payment method in the jurisdiction. By March 2024, UPI represented 81.8% of India's digital payment volumes.	905 Financial Institutions (banks and neo-banks).[190] The architecture of Pix prioritises financial inclusion by allowing small institutions to participate alongside larger banks and fintech companies. Around 153 million Brazilian citizens are currently using Pix, which represents around 75% of the population.[191]
Impact	Financial Inclusion	India's financial inclusion has improved, with account ownership rising from 53% in 2014 to 80% today through government initiatives like Aadhaar and UPI.[192] Over 330 million individuals and 70 million merchants in India used UPI by 2024.[193]	Pix has integrated millions into the formal financial system, opening new opportunities. Around 70 million[194] people made their first digital payment through Pix, providing an alternative for unbanked individuals who had previously relied on cash. Over three-quarters of Brazil's population now prefer Pix over credit cards. The number of active users of financial services increased from 77.2 million in 2018 to 152 million in 2023, raising the proportion of adults with active accounts from 46.8% to 87.7%. During the same period, the number of business clients rose from 3.4 million to 11.6 million.[195]
	Cost Reduction /Efficiency	UPI transfers between bank accounts are subject to no fees. Alternative payment methods such as wallets, credit cards, and credit lines offer varying MDRs for merchants and users. For example, Merchants incur a 1.1% fee for UPI transactions over INR 2,000 (approximately GBP 18, or USD 24), applicable to payments via prepaid instruments like mobile wallets or credit cards.[196] UPI has zero fees for end-users. Further, the Aadhaar ID system has reduced the onboarding cost for firms from approximately USD 23 to less than USD 0.15.[197]	Pix offer an average transaction fee of 0.22%,[198] much lower than debit (over 1%) and credit card fees (2.2%) in Brazil. This reduces costs and streamlines financial processes, including government payments like tax refunds, benefiting both consumers and institutions. Pix has zero transaction fees for end-users.
Regulatory Insights	Lessons/ Challenges	***"India's success with DPI like UPI and India Stack stems from a mature tech ecosystem and strong public-private collaboration-conditions that may not exist elsewhere. Other countries must decide whether to adapt India's model or develop their own paths."*** Expert, International Development Organisation ***"Rapid scaling of DPI in India brings risks. While speed drives adoption, it must be balanced with safeguards for fraud, consumer protection, and inclusion. UPI during demonetisation showed the dangers of prioritising scale over sustainable growth."*** Expert, International Development Organisation	***"Though cost-effective, maintaining public infrastructure demands steady federal funding-challenging amid budget cuts. Staffing shortages further hinder operations, unlike private entities that avoid such constraints."*** Public Sector Representative ***"Public payment systems face serious security risks, often targeted by fraudsters. Without in-house expertise, central banks must work with financial specialists to develop regulations and coordinate effectively with institutions."*** Public Sector Representative

Source: Cambridge Centre for Alternative Finance research (CCAF, 2025)
*DPI Principles are discussed in detail in Chapter 5 of the report.

In conclusion, while early empirical evidence suggest that jurisdictions with more advanced DPI ecosystems often report higher levels of digital payment adoption, account ownership, and financial resilience. These relationships remain indicative rather than definitive. The observed correlations point to potential enablers rather than guaranteed outcomes, with broader contextual factors, such as, regulatory frameworks, market dynamics, and institutional capacity also playing important roles. The comparative case studies of UPI and Pix illustrate that while institutional and market contexts differ, alignment with core DPI principles – such as interoperability, openness, and public oversight – can help deliver inclusive and scalable digital payment systems.

Public-private partnerships play a significant role in establishing and promoting such initiatives. The NPCI, which operates UPI, is led by a consortium of banks, initiated by the Reserve Bank of India (RBI) and the Indian Banks Association (IBA). Similarly, the Central Bank of Brazil (BCB) created the 'Pix Forum'[199] in 2019 to maintain ongoing engagement with market participants and potential users, bringing together around 200 participating institutions.

For policymakers and regulators, these early signals highlight the value of taking a holistic approach to DPI development: one that recognises interdependencies across systems and balances innovation with responsible oversight. As countries continue to experiment with and expand their DPI ecosystems, further research and evidence will be essential to better understand not only what works, but why it works and for whom.

Chapter 4

Emerging Technologies and Regulatory Challenges in Digital Public Infrastructure for Digital Financial Services

"The next generation of DPI will be shaped as much by technological breakthroughs – such as tokenisation, programmable money, and AI-driven systems, as by our ability to govern their risks, reimagine regulatory boundaries, and ensure these tools serve the public interest."

Senior Financial Regulator, Central Bank, Latin America and the Caribbean

As DPI evolves globally, particularly within DFS, it is being shaped by rapid advances in technology and emerging models of governance. Innovations such as DLT, AI, and digital wallets are opening new pathways to efficiency, cost reduction, and broader financial inclusion. These tools have the potential to reimagine service delivery, automate oversight, and support tailored user experiences while also modernising regulatory compliance mechanisms.[200]

However, technologies like DLT, AI, and digital wallets are not neutral tools as they embed trade-offs that directly affect system design, regulatory strategy, and user outcomes. While DLT may improve transparency and traceability, it can also increase energy consumption or create new risks of decentralised accountability.[201] AI can automate compliance and personalise services, but it also raises concerns about bias, opacity, and control over decision-making.[202] Digital wallets have enabled real gains in payment inclusion, yet they often come bundled with surveillance risks and limited data protection.[203] These examples demonstrate that the effects of technological adoption not only depend on technical readiness, but also on regulatory foresight, institutional maturity, and socio-political priorities.

This complexity underscores why a static view of DPI trends is insufficient. As technology advances, regulatory systems often lag behind, while geopolitical agendas, such as data sovereignty or cross-border digital integration, create friction or accelerate change.[204] At the same time, persistent inequalities in digital access, literacy, and trust shape the uptake and impact of these infrastructures.[205] What emerges is a dynamic and interdependent ecosystem in which technological innovations, political choices, and socio-economic realities interact continuously.

This section examines key trends shaping the future of DPI, categorised across technological, political-regulatory, and socio-economic domains. It explores both the promise, and the risks associated with each development, supported by global case studies and expert insights. The goal is to inform a more holistic and anticipatory approach to DPI policy, helping decision-makers design infrastructure that is not only innovative but also inclusive, resilient, and fit for purpose.

Table 7: Trends Shaping the Future of DPI

Technological Trends	
Trend	Rationale
DLT and Tokenisation	Stakeholders have differing views on the role of DLT and tokenisation in impacting DPI. Some argue that DLT models could change the roles and functions of financial intermediaries and have the potential to streamline cross-border transactions, improve settlement efficiency, and support initiatives such as Central Bank Digital Currencies (CBDCs).[206] On the other hand, as these token-based and distributed infrastructures mature, their integration with broader financial infrastructure, and other DPI, raises important questions regarding scalability, governance frameworks, regulatory oversight, stability and interoperability with existing systems. An instructive case is of Singapore where the MAS used a regulatory sandbox to launch Project Ubin. This collaborative project between the regulator and the industry explored several ways in which blockchain could be used for interbank payment and settlement.[207] It is now further exploring how its use can be expanded to foreign currency exchange settlement using wholesale digital currencies.[208]
AI	AI is increasingly intersecting with DPI, offering new avenues for financial inclusion and automation.[209] AI-powered language translation tools could improve accessibility to financial services across diverse linguistic regions, while AI-driven credit assessments[210] based on transaction data may enable better risk evaluation for underserved populations. At the same time, concerns about algorithmic bias,[211] transparency and regulatory oversight remain unresolved. Poorly implemented AI models risk entrenching financial exclusion rather than mitigating it, underscoring the need for clear governance frameworks that ensure responsible AI use in DFS.[212] A global example of AI-powered DPI can be seen through the Bhashini initiative in India which leverages AI powered translation capabilities to make public and financial services more inclusive and accessible in local languages.[213] This demonstrates how AI can help a DPI ecosystem scale in a diverse population, as long as governance and inclusion are prioritised.
Digital Wallet Expansion and Security Enhancements	The role of digital wallets in DFS is expanding, with some jurisdictions exploring their integration with digital identity frameworks to enhance security and accessibility.[214] Proponents argue that linking digital identity to financial transactions could improve KYC and AML compliance while reducing fraud.[215] For example, India is exploring digital ID-linked wallets as a way to strengthen transaction security. However, concerns remain about potential overreach, including risks of excessive surveillance and reduced user control over financial identities. Striking a balance between security and privacy will be crucial as digital wallets continue to evolve. Additionally, regulatory clarity on the interoperability of digital wallets across different financial systems remains a pressing issue.[216] A leading example of the rising security concerns can be seen through the rise in mobile wallet phishing incidents which prompted a coordinated response from banks, regulators, and law enforcement.[217] Recently, DBS Bank introduced a new security feature requiring users to verify their intention before adding a card on their digital wallets, a move supported by the Singapore Police Force and the MAS.[218] The above example demonstrates that effective security enhancements, combined with regulatory oversight and collaborative efforts, are critical to realising the full potential of digital wallets.
Political and Regulatory Trends	
Trend	Rationale
Governance Shifts and New Regulatory Models	DPI could also influence regulatory and governance structures. Some jurisdictions are moving toward more participatory, consumer-driven models, where users have greater control over their financial data and service choices.[219] In regions such as Africa, there is growing interest in DPI as a foundation for integrated digital marketplaces, potentially enabling more seamless cross-border financial services.[220] A senior digital policy researcher based in North America noted: ***"African policymakers see DPI as impactful and are eager to implement it. The idea of a single digital marketplace in Africa is a lofty but exciting goal."*** There are multiple regulatory models in existence. For instance, the UK's shift toward outcome-based regulation and investment in digital skills illustrates the importance of aligning governance with evolving public needs and technological capabilities. The NHS Marketplace is an example of a collaborative, platform-agnostic ecosystem that enables sharing of secure interoperable digital solutions while balancing the need for robust standards for security.[221]
Geopolitical and Economic Fragmentation Risks	The expansion of DPI is occurring in parallel with increasing geopolitical fragmentation in global finance.[222] Some stakeholders warn that alternative DPI ecosystems developed by major economies could lead to competing financial infrastructures, potentially reducing the dominance of existing international payment networks.[223] While this diversification may increase financial resilience, it also raises concerns about interoperability, economic cooperation, and the potential for diverging regulatory approaches that could create inefficiencies in global DFS systems.[224] This fragmentation is particularly evident in the way countries are prioritising digital sovereignty. The prime example has been the EU's push for a Eurostack approach to building its DPI.[225] The EU has launched a wave of reforms including key initiatives in digital wallets, a data exchange layer built on its own standards and security protocols.[226]
Data Privacy, Cyber Security, and Consumer Protection	As DPI adoption grows, concerns about data privacy and cyber security remain central, particularly in jurisdictions without strong data protection laws.[227] Some implementations have prioritised scale over consumer protection, leading to increased financial fraud and data security vulnerabilities. Privacy-enhancing technologies, such as federated learning and zero-knowledge proofs, have been proposed as potential solutions, but their adoption remains limited. Ensuring robust consumer protection frameworks and following security-by-design approaches will be essential in maintaining trust in DFS ecosystems built on DPI.[228] Proactive legislation can prove key in mandating more secure standards. The EU has been recently rolling out multiple pieces of key legislation in this respect. The Digital Operational Resilience Act (DORA) standardises digital resilience requirements for financial institutions, mandating strict ICT risk management, third-party oversight, and incident reporting.[229] Further, the NIS2 Directive creates a unified legal framework to uphold cybersecurity in 18 critical sectors including finance, digital infrastructure, public electronic communications and public administration.[230]

Table 7: Trends Shaping the Future of DPI (continued)

Political and Regulatory Trends (continued)	
Trend	Rationale
Fraud Risks in Expanding DFS Ecosystems	As DFS scales rapidly, fraud prevention remains a significant challenge. In some regions, DPI-driven financial ecosystems have experienced spikes in digital fraud due to gaps in consumer protection and regulatory enforcement.[231] A digital financial inclusion expert from Asia Pacific warned on the trade-offs in DPI adoption: ***"The trade-offs between rapid technological adoption and consumer protection haven't been balanced. We see spikes in financial fraud in all regions where digital payments have scaled quickly."*** Addressing these risks will require stronger safeguards, including more adaptive fraud detection mechanisms and clear accountability frameworks to protect consumers.[232] In Nigeria, as the DFS ecosystem has grown, financial losses due to fraud have surged by over 350% between 2020 and 2024, prompting greater regulatory intervention. The Central Bank of Nigeria has mandated that commercial banks receiving fraudulent transactions must refund affected customers if they cannot demonstrate that due diligence was exercised. In parallel, banks are increasingly deploying AI-based fraud detection tools to monitor and mitigate suspicious activity in real time.[233] In India, the rapid adoption of UPI has been accompanied by a sharp rise in fraud, with reported incidents of domestic UPI-related fraud increasing by 85% in FY 2023–24 compared to the previous financial year.[234] In response, the Reserve Bank of India (RBI) has issued a framework for digital payment fraud reporting and established a centralised fraud registry to enable faster detection of fraud patterns. Further, National Payments Corporation of India (NPCI) offers a fraud monitoring solution for banks, enabling them to alert and decline transactions using AI/ML models.[235] These examples highlight the importance of regulatory clarity, institutional accountability, and proactive technological adaptation. As DPI scales, consumer trust and system resilience will depend not only on innovation, but also on effective governance and intervention mechanisms that can evolve with emerging risks.
Regulatory Uncertainty and Financial Stability Considerations	The evolution of DPI has raised questions about its impact on financial stability and monetary policy.[236] In a 2022 speech, the European Central Bank cautioned that if market participants adopt DLT for securities settlement but encounter obstacles in accessing TARGET[237] Services, they may shift toward alternatives such as commercial bank money or stablecoins. This shift could pose several risks, including a diminished role for central bank money in settlement processes and increased fragmentation in trading and liquidity.[238] At the same time, balancing innovation with oversight remains a challenge, as regulatory frameworks struggle to keep pace with technological advancements in DFS. Ensuring that DPI-driven financial systems remain resilient and do not introduce systemic risks will be a key priority for policymakers.
Impact Tracking	As DPI ecosystems expand, it is essential to implement robust mechanisms to track and assess their immediate and long-term social and economic impacts. This includes measuring financial inclusion outcomes, consumer protection efficacy, and the broader economic effects of DPI implementation. Regular monitoring and impact assessments can provide valuable data to inform ongoing policy decisions, ensuring that DPI continues to meet its intended objectives while adapting to new challenges. Recent global initiatives have focused on developing standardised frameworks and indicators to measure DPI's effectiveness. In India, for example, the regulators regularly publish granular data in relation to UPI including transaction volumes, ecosystem statistics and other performance metrics.[239] Such kind of impact tracking can help inform timely regulatory interventions demonstrating the value of data and impact driven policy making. The global lesson is that impact tracking can strengthen a DPI system's accountability and transparency while enabling adaptive regulation. Countries with embedded monitoring and impact tracking will usually be best positioned to maximise positive outcomes while addressing emerging risks and unintended negative feedback.
Socio-Economic Trends	
Trend	Rationale
Digital Divide and Unequal Access to DFS	While DPI is often positioned as an enabler of financial inclusion, there is a risk that it could exacerbate existing digital divides.[240] Around 2.6 billion people (32% of the global population) remained offline in 2024 – mostly in low-income countries and rural areas (83% of urban versus 48% of rural dwellers are online). Globally, only 65% of women use the Internet, compared to 70% of men, with digital divides as wide as 32% in South Asia.[241] Without targeted interventions, digitalisation efforts may primarily benefit those with access to technology while leaving marginalised populations behind. India's Internet Saathi has trained 17 million rural women on digital skills across 170,000 villages,[242] while UNESCO-led programs in Ghana and Tanzania are aiming to build information and computer technology literacy among teachers and female students.[243] Some stakeholders advocate for hybrid models that integrate physical financial infrastructure and human-assisted services alongside digital solutions to ensure broader access. A key challenge is ensuring that DPI is inclusive, which not only requires innovative technology but also strong public policy and sustained investment to improve digital access and literacy. By combining digital and physical channels (e.g. kiosks, agents) and prioritising the consumer experience in design, countries can ensure that the benefits of DPI reach marginalised groups and truly further financial inclusion.
Digital and Financial Literacy	The successful adoption of DPI relies heavily on users' understanding of DFS. Improving digital and financial literacy is essential, particularly in underserved populations who may lack the skills to navigate new digital tools safely and effectively. Educational initiatives and community-based training programs could help bridge the knowledge gap and empower users to make informed decisions regarding their financial well-being. For example, in Rwanda, the Digital Transformation Center with the support of One Acre Fund, has been able to train 20,000 farmers, including women and people with disabilities, to use mobile money and USSD tools for saving and financial management.[244] Widespread campaigns using multi-media formats, in-person workshops in rural areas and tailored digital learning modules could also be developed by regulators in collaboration with civil society institutions to educate citizens on using digital payments securely, recognising fraud, and managing personal finances. The global lesson is that digital and financial literacy campaigns must be an integral part of any DPI strategy to ensure that the positive effects and benefits of DPI reach all users, especially those who are most vulnerable.

Table 7: Trends Shaping the Future of DPI (continued)

Socio-Economic Trends (continued)	
Trend	Rationale
Competition & Competitiveness Dynamics	Effective design and deployment of DPI has the potential to lower market-entry barriers, foster competition and enhance economic growth. A UNDP-Dalberg (2023) study covering 70 low- and middle-income countries estimates that DPI adoption across finance, justice, and climate sectors could accelerate GDP growth by compressing years of economic progress into a shorter timeframe.[245] In Brazil, the PIX instant payment system led households to open more accounts with smaller banks, boosting competition in the deposit market and reducing the dominance of traditional banks.[246] In India, the implementation of UPI's open-stack architecture triggered a surge of fintech players with a fintech market value of 111.14 billion as of 2024 and expected to grow to USD 421.48 billion by 2029.[247] However, this broader transformation is not only about enabling new players, but also about reshaping the behaviour of existing ones – driving incumbents and tech giants alike to improve quality, lower costs, and embrace transparency. Incumbent banks in India have been forced to compete on service quality rather than proprietary barriers and closed-network advantages.[248] This shift has further augmented the use of innovative technologies and adoption of AI in traditional services.[249] At the same time, UPI disrupted wallet-based ecosystems and large tech companies, weakening their platform lock-in advantages. Players like Google Pay and PhonePe, which entered the Indian market as UPI-first apps rather than traditional closed wallets, became part of a shared, interoperable infrastructure. As basic payment services were commoditised, these firms have been compelled to differentiate themselves through superior user experience and by expanding into AI-driven offerings.[250]

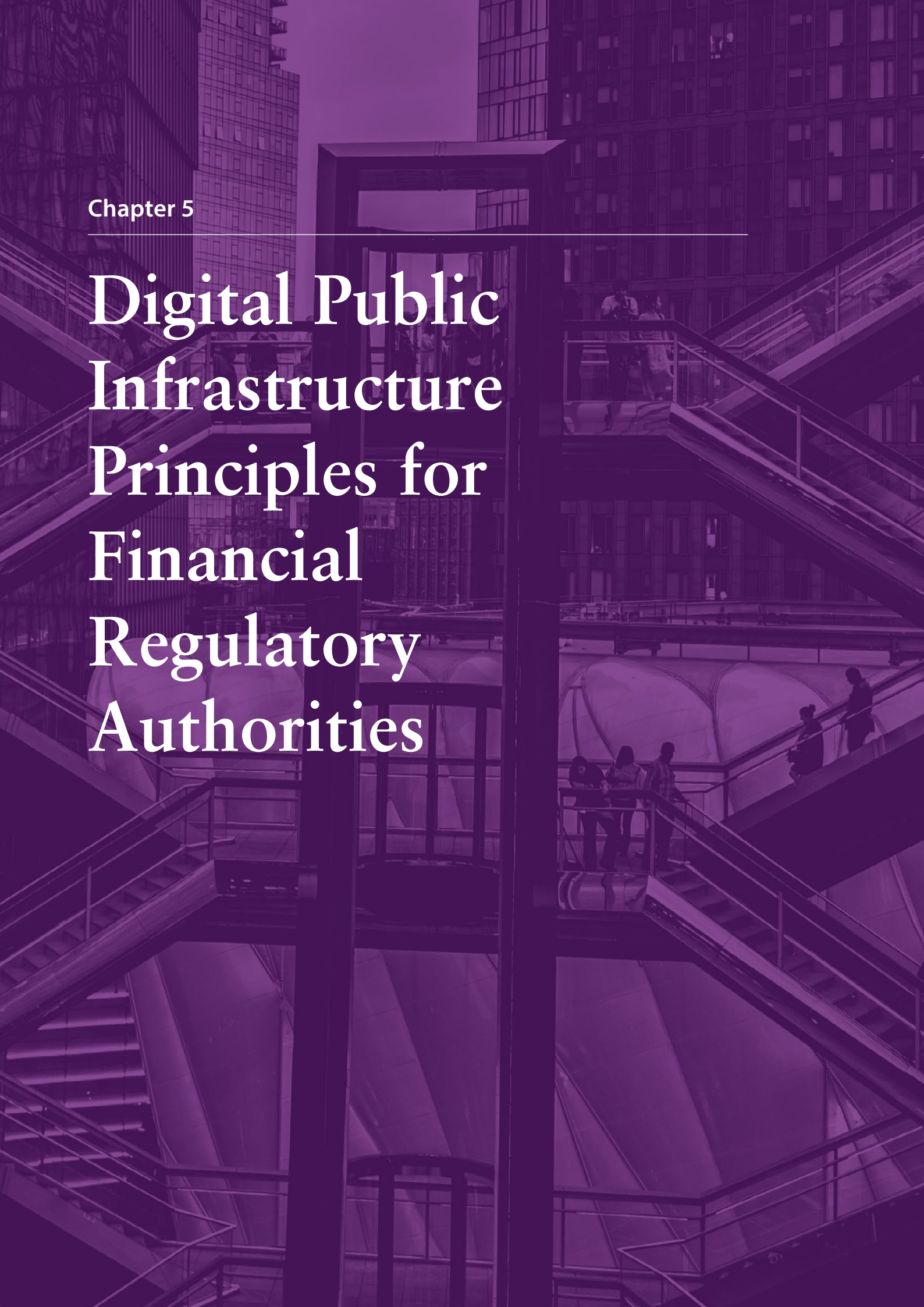
Source: Cambridge Centre for Alternative Finance research (CCAF, 2025)

The trends shaping DPI, whether technological, socio-economic, or political, are deeply intertwined and their impact depends heavily on user access, trust, and institutional preparedness. Regulatory shifts and geopolitical developments are altering the global DPI landscape, creating both momentum and fragmentation. For instance, national efforts to assert digital sovereignty or build domestic stacks can promote local innovation but may also reduce global interoperability unless actively coordinated.

Many of these trends also amplify one another. Digital wallets depend not only on secure technologies but also on robust digital identity systems, regulatory clarity, and public trust. Similarly, efforts to close the digital divide require investments not just in broadband or mobile infrastructure but also in education, literacy, and local content. Regulatory frameworks must therefore be agile and interconnected, able to respond to cumulative effects across domains and over time. A stepwise approach risks introducing bottlenecks, exclusions, or even systemic vulnerabilities.

This makes the case for a more integrated approach to DPI governance and regulation. Monitoring mechanisms should be cross-cutting, incorporating insights from financial regulators, data protection authorities, cybersecurity agencies, and civil society. Scenario planning and anticipatory policymaking[251] can help identify emerging risks and inform adaptive strategies. Governments must also invest in frameworks that measure DPI's social and economic impacts, tracking not only transaction volumes but also inclusion metrics, user satisfaction, and unintended consequences such as fraud or exclusion.

Ultimately, the future of DPI lies in the ability of regulators and policymakers to understand and act on the intersections between trends. The most effective DPI ecosystems will be those that combine technological excellence with inclusive design, participatory governance, and continuous evaluation. Such ecosystems will be better placed to deliver trusted, equitable, and sustainable digital public goods that advance financial well-being and economic transformation.



Chapter 5

Digital Public Infrastructure Principles for Financial Regulatory Authorities

"There is an ongoing debate about whether regulators should evolve their approach and embrace new principles. While some argue for maintaining a strict, compliance-focused role, others call for institutional transformation to meet the demands of a rapidly changing landscape."

Senior Academic, Leading Research University, Europe

This chapter explores the foundational principles that underpin effective DPI and their relevance for regulatory design, particularly in the context of DFS. It outlines core DPI principles such as interoperability, modularity, inclusivity and openness, which define the cross-cutting functionality and societal-scale reach nature of DPI and examines whether these can be meaningfully applied within regulatory frameworks. Given the growing integration of DPI within financial systems, two key questions emerge: can the same principles that guide infrastructure development also inform regulatory approaches? Could this approach be compatible and improve the regulatory process without disrupting existing regulatory ways of working?

While some policymakers argue that these principles provide a strong foundation for adaptive regulation in DFS, others caution that infrastructure design and regulatory oversight require distinct considerations. This chapter offers a thought experiment: can DPI principles serve as a meaningful foundation for governance or whether their role should remain limited to the design of DPI?

Core DPI Principles

Many global organisations have articulated a shared set of principles to guide their DPI development. The World Bank (2025) emphasises the importance of inclusion, openness, modularity, user-centricity, privacy-by-design, and strong governance as core to delivering DPI functionality.[252] Complementing this, the Centre for Digital Public Infrastructure (CDPI, 2024) underscores open interoperability, modular reuse, inclusive innovation, decentralised design, and embedded security and privacy.[253] The UNDP (2023) similarly highlights interoperability, modularity, scalability, and security and privacy[254] as essential to DPI development,[255] particularly in the context of digital identity and real-time payment systems. As DFS become more tightly integrated with DPI, a clearer regulatory understanding of how these principles manifest within financial ecosystems will be value-adding to ensure an innovative and systemically stable ecosystem. Table 8 outlines the most relevant DPI principles for DFS. It distinguishes between core principles, which directly support system functionality, integrity, and innovation, and supplementary principles, which enhance user trust, accessibility, and systemic resilience.

Table 8: DPI Principles and their Relevance for DFS

Core Principles	Relevance for DFS
Interoperability	Interoperability is central to the implementation of DPI within DFS, enabling integration between financial institutions, payment networks, and service providers. By leveraging open standards, data can connect efficiently across banks, fintech companies and government platforms, expanding financial inclusion and enabling competition.[256] For regulators, interoperability fosters competition by preventing market monopolies, encouraging innovation, and ensuring a level playing field where new entrants can compete with established players[257] Interoperability also promotes competition by allowing different systems to communicate with one another. It simplifies multi-homing, enabling consumers to access various competing or complementary services through a single access point and making markets more contestable. This could help maintain network effects while also addressing barriers to entry and improving market competition.[258]
Security and Privacy by Design	Given the sensitive nature of financial transactions, DPI should embed strong security and privacy measures to protect consumer data and prevent fraud. Features such as end-to-end encryption and real-time fraud detection are critical for maintaining trust in DFS.[259] The UNDP (2024) DPI Safeguards Framework[260] demonstrates how there are ongoing efforts to agree on universal protection standards. However, further work may be required which ensures a holistic approach, balancing consumer protection and industry innovation. In addition to technical safeguards, users must have the agency over their personal data through informed consent, the ability to opt out and access to redress, ensuring that DFS empowers rather than exploits. Regulatory frameworks play a key role in enforcing these protections while balancing innovation with consumer safeguards.
Reusable and Scalable	DPI for DFS should be designed to support continuous evolution, adapting to shifting regulatory requirements, market needs and new innovations. Scalability ensures that as financial ecosystems grow – whether through an increase in transactions, new use cases like cross-border payments,[261] or embedded finance – DPI for DFS can accommodate expansion without compromising performance and security.
Modularity	A modular approach allows DPI for DFS to support a wide range of financial applications, from instant payments to digital lending, without requiring system overhauls. By enabling financial service providers to plug into different components – such as KYC, credit scoring, or account authentication – modular design fosters innovation while ensuring regulatory compliance.[262]
Supplementary Principles	**Relevance for DFS**
Inclusivity	It must be accessible to all, particularly underserved populations. Systems should be designed to remove barriers to financial access, supporting multiple languages, low-cost transactions and offline capabilities for those without consistent internet access.[263]
Transparency	Clear policies on data sharing, transaction processing, and dispute resolution enhance trust in DFS. Transparent governance structures help ensure that financial data is handled responsibly, reducing risks of misuse and promoting fair competition.
Resilience	The reliability of DFS depends on the resilience of its underlying systems. Platforms must be designed to withstand cyber threats, payment disruptions and operational failures, ensuring that financial transactions remain stable even during crises.[264]
Accountability	Regulatory oversight, monitoring, and consumer redress mechanisms are critical to maintaining trust.[265] Governance should enforce accountability standards, providing mechanisms for dispute resolution, fraud prevention and compliance with financial regulations.

Source: Cambridge Centre for Alternative Finance research (CCAF, 2025)

Integrating DPI Principles into Regulatory Activities

The rapid evolution of DFS and technological innovation presents adaptation challenges for established regulatory frameworks, which are often constrained by rigid, document-heavy processes and lengthy oversight processes. This raises the question of whether DPI principles could offer regulatory authorities new ways of 'thinking' to enhance oversight, promote financial inclusion and foster innovation while maintaining stability and security. For example, regulators can apply principles like interoperability in areas such as firm authorisation processes.[266] In regions where similar regulations exist, regulators can design systems that allow for more efficient cross-border licensing, where firms can be authorised in one jurisdiction and seamlessly operate in another. This may generate a more interconnected regulatory landscape that is both efficient and future-proof.[267] As a thought experiment, Table 9 illustrates the potential for DPI principles to inform new ways of approaching traditional regulatory functions.

Table 9: Comparative Analysis: Traditional vs DPI-Inspired Regulatory Approaches

Regulatory Function	Traditional Approach	DPI-Inspired Approach	Success Metric
Licensing/Certification	Licensing is jurisdiction-specific, requiring firms to apply separately in each region.[268] Approvals are often slow, relying on manual processes.	**Interoperability**: Regulators use shared infrastructure for firm authorisation across regions, reducing duplication and enabling cross-border compliance.	Faster market entry, lower regulatory burden, greater financial inclusion across jurisdictions.
Consumer Protection	Consumer complaints are handled reactively on a case-by-case basis. Regulators rely on post-event enforcement.	**Transparency**: Regulators have access to real-time financial data dashboards, enabling early fraud detection and proactive interventions before disputes escalate.	Faster dispute resolution, increased consumer trust, and reduced financial harm.
Anti-Money Laundering (AML)	Reliance on batch reporting and retrospective transaction monitoring, leading to delayed action against financial crime.[269]	**Interoperability & Transparency**: Regulators and financial institutions share data on a standardised platform, allowing anomaly detection and real-time reporting.[270]	Faster identification of illicit transactions, improved regulatory coordination and reduced financial crime.
Prudential Regulation and Risk Assessment	Capital adequacy and stress tests occur at fixed intervals, with the risk of missing emerging systemic risks.	**Scalability**: DPI-driven risk assessments use real-time data,[271] allowing regulators to detect vulnerabilities as they arise and implement early warning mechanisms.	Stronger financial stability, better crisis prevention and reduced systemic risks.
Enforcement Actions	Enforcement is sometimes siloed and fragmented across agencies, with delayed information exchange leading to slow activities and mixed approaches.	**Interoperability & Transparency**: Cross-agency enforcement platform uses standardised templates for information sharing with built-in compliance checks. The system provides clear guidance on what can be shared, with whom, and under what circumstances, reducing uncertainty. Automated audit trails document the legitimacy of information exchanges while streamlining bureaucracy.[272]	Increased information sharing between agencies (measured by volume and speed of exchanges), reduction in "perception barriers" to sharing, fewer missed intelligence opportunities, consistent application of data protection rules, and improved clarity for frontline staff without increasing data breaches.
Market Conduct Regulation	Regulatory action is largely reactive, based on consumer complaints and periodic inspections.	**Interoperability &Transparency**: Open financial ecosystems enable regulators to track real-time market behaviours, ensuring proactive enforcement.[273]	Faster detection of misconduct, improved market integrity, and enhanced consumer confidence.

Source: Cambridge Centre for Alternative Finance research (CCAF, 2025)

Additionally, DPI principles could complement existing regulatory and policymaking approaches by offering new tools for regulators to consider, particularly in moving towards more agile, risk-based, and open-source approach. Traditional regulatory structures tend to follow rigid, compliance-driven processes that evolve linearly. As a central banker in Southeast Asia acknowledged, ***"Regulators are bound by structured processes designed for stability, not agility."*** However, this is beginning to shift. Some regulators are embracing software-driven, iterative models, particularly in payments infrastructure.[274] As one technology executive from a North American financial services provider noted, ***"We are seeing more innovative and agile approaches emerging, with regulators becoming increasingly flexible in response to technological advancements."*** These frameworks can adapt more precisely to emerging technologies and different DFS actors, such as fintech companies, mobile money operators, and microfinance institutions.

Open-Source

The open-source movement provides powerful tools for DPI deployment that align with core DPI principles. While some regulatory authorities have begun exploring open-source approaches – exemplified by MAS's open-source AI toolkit[275] – questions persist about formal regulatory recognition. Traditional concerns around security, accountability, and data sovereignty continue to affect regulatory trust. When properly implemented with robust safeguards and continuous monitoring, open-source approaches could advance DPI objectives by enhancing transparency, preventing vendor lock-in, and accelerating innovation.[276] For regulators specifically, open-source tools offer potential mechanisms to foster competition and effectiveness in DFS while enabling more collaborative approaches to oversight. However, adoption should be guided by thorough risk assessment, evaluation of ecosystem maturity, and consideration of long-term sustainability.

Furthermore, privacy-by-design and security-by-design can be embedded into DPI-aligned regulatory models. An academic from a leading European university emphasised, ***"Innovation is important, but stability cannot be compromised – we must strike a careful balance."*** This is especially important in jurisdictions where legal or political frameworks lag, even as technical capacity within regulatory agencies grows. These principles ensure that protections are built into systems from the outset, rather than retrofitted in response to failures. For example, the General Data Protection Regulation (GDPR) in Europe enshrines privacy-by-design, making data minimisation and user consent central requirements.[277] Similarly, India's Data Empowerment and Protection Architecture (DEPA)[278] demonstrates how DPI can enable consent-based data sharing for DFS users while maintaining strong privacy safeguards.

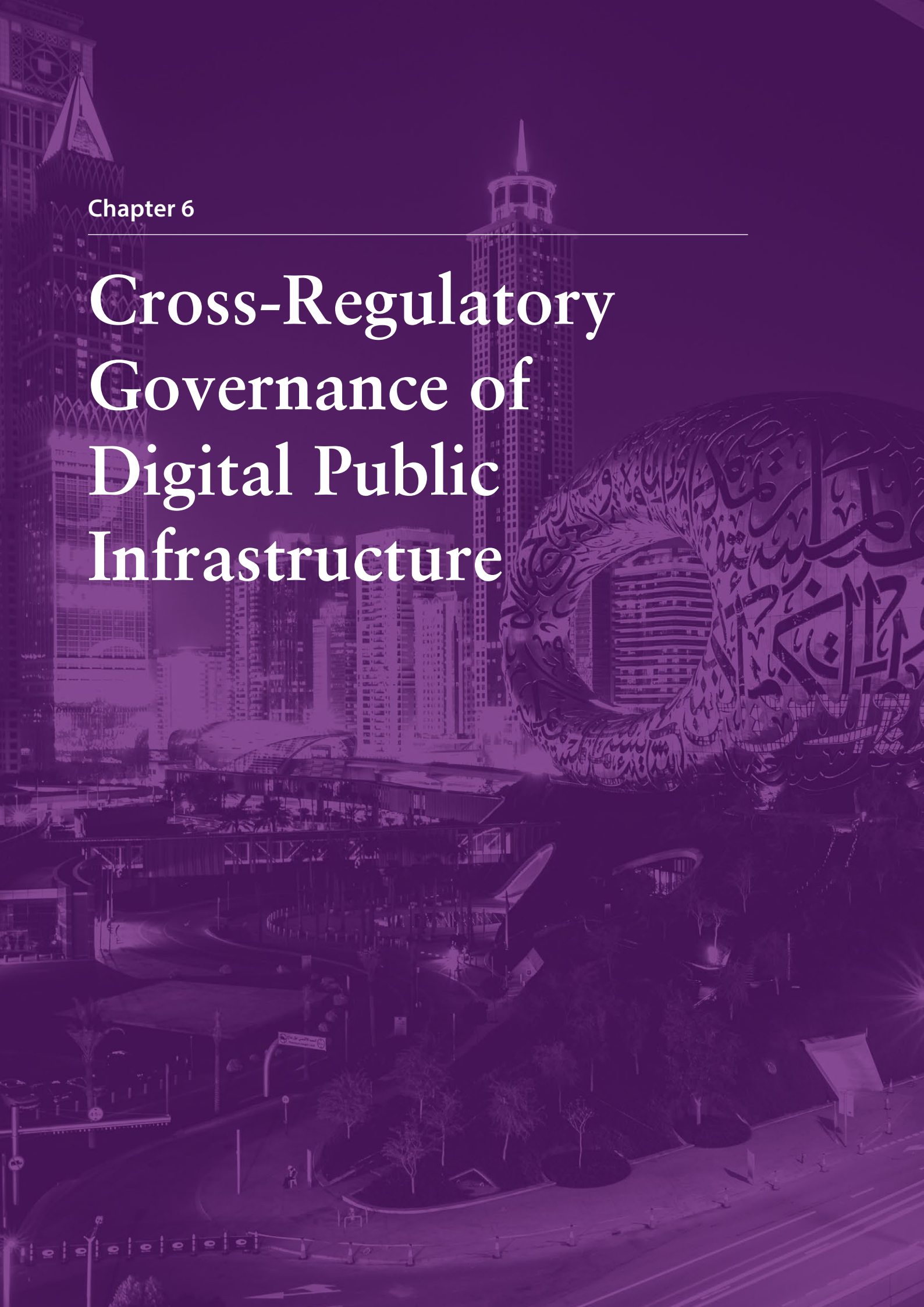
Nevertheless, the integration of DPI principles must be approached with care. One risk is regulatory overreach: implementing DPI reforms too quickly can overwhelm supervisory structures, particularly in markets with lower digital maturity.[279] In many cases, DPI principles are being adopted organically, as regulators consider new approaches and initiatives to advance innovation. Brazil's Pix system,[280] for example, first emerged as a solution to a payments problem. Yet, the design of Pix reflects core principles like interoperability and inclusivity. As the market matured and adoption of Pix increased, it evolved into a key DPI. This underscores the point that DPI can emerge bottom-up, through practice and necessity, rather than only through top-down design.

For DPI-driven regulatory models to complement existing frameworks, foundational elements such as a common taxonomy, shared data standards and interoperable infrastructure are essential. The Central Bank of Kenya's real-time clearinghouse is a case in point: its operating principles, inadvertently or not, align closely with DPI principles, fostering a more inclusive and responsive financial market infrastructure.[281] Similarly, digital identity systems, while often outside central bank mandates, are critical enablers of both financial inclusion and AML/CFT compliance.[282] This highlights the need for inter-agency coordination, as many core components of DPI – such as identity, authentication and consent – sit across ministries, regulators and private actors. Data privacy concerns also become more pronounced as real-time monitoring expands; if safeguards are weak, it could erode public trust. Lastly, implementation complexity, including infrastructure gaps, digital literacy and coordination between agencies can delay or derail adoption.

To mitigate these risks, DPI principles could be introduced incrementally, allowing space for testing and adaptation to local contexts. Reforms that are rushed or not grounded in a clear understanding of DFS market dynamics may lead to unintended consequences, potentially undermining institutional credibility and consumer trust. A gradual and considered approach can help promote equity and sustainability across varied financial ecosystems. Continued research, collaboration and capacity-building can support a balanced path forward-encouraging innovation while ensuring financial stability.[283]

Chapter 6

Cross-Regulatory Governance of Digital Public Infrastructure



"A key aspect of DPI is its potential to reshape the balance of power, granting individuals greater rights and capabilities over their data. While a top-down regulatory approach is a natural posture for governments, an exciting shift occurs when regulation not only ensures oversight and accountability but also fosters an enabling environment. This interplay between regulatory control and individual data empowerment is crucial in designing DPI that is both secure and user-centric."

Senior Researcher, International Think Tank

Throughout the research and interviews for this report, a recurring theme was the importance of effective cross-regulatory coordination in the successful development, implementation and governance of DPI in DFS. Given that components of DPI often span traditional institutional boundaries, including financial regulation, data governance, and competition, interagency alignment is becoming increasingly important. However, navigating the interplay of multiple regulatory bodies is likely to present challenges. Overlapping mandates, fragmented oversight and limited coordination among financial regulators, data protection authorities, ministries of finance and digital infrastructure agencies can create inefficiencies and regulatory uncertainty.[284] These challenges are further compounded by the rapid evolution of digital technologies, which often outpace existing regulatory frameworks and necessitate adaptive implementation and governance approaches. Addressing these challenges requires a clear understanding of the institutional dynamics and the factors that contribute to regulatory misalignment. In this context, the broader whole-of-society approach, which emphasises coordination not just across agencies but also with private sector actors and civil society, offers a valuable framework for building inclusive and resilient DPI ecosystems.[285]

Frictions in Cross-Regulatory Coordination

Responsibilities for the three core pillars of DPI – digital identity, real-time payments, and consent-based data sharing – often fall under separate regulatory authorities, including central banks, data protection agencies, sector regulators, and digital infrastructure bodies.[286] This fragmented structure creates challenges around coherence and coordination, particularly as DFS depends on alignment across all three domains. As noted by a legal expert specialising in technology policy from the Asia Pacific region, ***"There are issues of turf wars between regulators."*** Particularly, designing and implementing governance frameworks that promote innovation while managing risks – such as exclusion, data misuse, or systemic vulnerabilities – is not straightforward.

Regulatory mandates can overlap or conflict, and gaps in accountability or operational responsibility can introduce inefficiencies and trust deficits.[287] These frictions are often exacerbated by divergent regulatory priorities and weak mechanisms for coordination. Additionally, regulators with limited capacity are often stretched thin by existing priorities and may lack the resources to coordinate effectively with other regulators. Additionally, achieving optimum governance also requires political support to ensure legitimacy and long-term sustainability.[288]

Without it, oversight may become overly concentrated in a single agency or misaligned with broader economic and social objectives. Some jurisdictions have responded by establishing new institutions, such as national data-sharing bodies or payment councils, but many still face gaps in areas like privacy, competition and inclusion.[289] Table 10 summarises common challenges arising from cross-regulatory fragmentation.

Table 10: Key Challenges for DPI Cross-Regulatory Coordination

Issue	Rationale
Regulatory fragmentation	While the modular nature of DPI allows adaptability, excessive regulatory fragmentation can create inconsistencies across different regulatory functions.[290] For example, the delicate balance between anti-money laundering regulation and data protection showcases the evolving complexities amongst different regulatory actors.[291] Without a harmonised approach, DPI implementation and governance risks becoming inefficient, hindering innovation and market participation. Balancing regulatory flexibility with standardisation is essential to maintain coherence across jurisdictions.
Lack of coordination	DPI governance spans multiple policy domains, but in many cases, institutional roles and responsibilities remain unclear or are not legally defined. Effective DPI implementation demands structured collaboration between cross-regulatory authorities, yet many jurisdictions struggle with fragmented oversight. Cross-regulatory challenges arise when different institutions govern separate aspects of DPI, such as payments, identity systems, and data frameworks, without mechanisms to ensure consistency.[292] For instance, while central banks often take the lead on real-time payments, oversight responsibilities for data exchange or digital identity systems are frequently unresolved. Without an established lead agency with a legal mandate to set policy objectives and oversight goals, coordination efforts risk becoming ad hoc, fragmented, and ultimately ineffective. This misalignment can lead to conflicting policies, gaps in regulatory coverage, and inefficiencies that slow down DPI adoption.[293] A lack of coordination also undermines interoperability, making it difficult for different systems to function smoothly at both national and cross-border levels.
Platform competition	Competition authorities need to adapt to new DPI ecosystems through a closer understanding of platforms' behaviours, data flows and novel business models.[294] Coordination, such as the UK's Digital Regulation Cooperation Forum, provides valuable mechanisms of learning about firms' activitises.[295] Through a layered governance approach, combining competition monitoring, information exchange and cross-regulatory cooperation, it is possible to achieve target outcomes and guard against infrastructural monopolies.
Limited regulatory capacity	Jurisdictions with limited regulatory capacity may struggle to establish new oversight bodies or implement comprehensive regulations for DPI. Instead, a spectrum of regulatory approaches, ranging from voluntary standards and licensing to full legislative and institutional frameworks, can offer scalable solutions. Without clear pathways for progressive regulation, some regulators may default to either excessive restrictions that stifle innovation or weak governance that creates risks. Establishing a structured regulatory approach enables jurisdictions to align oversight with their institutional capacities while ensuring effective DPI implementation.
Public-private governance imbalances	DPI often involves collaboration between governments and private sector players, but misalignment in their priorities can introduce governance risks.[296] While public institutions focus on inclusivity and security, private firms prioritise commercial viability and profitability. This divergence can lead to vendor lock-in, conflicts of interest and a lack of transparency in decision-making processes. A DPI provider based in the Latin American and the Caribbean region noted, ***"We have interests as providers that are completely different from our interests as overseers."*** Effective governance structures must ensure private sector participation aligns with public policy objectives without compromising competition, accountability, or long-term sustainability. Creating transparent governance, open communication, and public oversight builds trust in DPI by balancing private sector interests with that of the wider public and ensuring equitable access. Strengthening internal governance through robust decision-making, adaptive risk management, and inclusive multi-stakeholder engagement further enhances transparency and accountability.[297]
Data security and privacy oversight	As DPI relies on extensive data-sharing frameworks, robust governance mechanisms are necessary to protect privacy and prevent misuse. However, many jurisdictions lack comprehensive data protection regulations or struggle with enforcement, leaving DPI vulnerable to cybersecurity threats, unauthorised data access and regulatory blind spots. Without strong data governance frameworks, DPI risks eroding public trust, weakening its ability to drive financial and digital inclusion.[298]
Political and institutional buy-in and awareness	DPI implementation and governance requires strong political commitment[299] and institutional support to be effective as noted by a Europe-based public policy advisor, ***"DPI initiative requires buy-in at the political level. I don't feel comfortable with it being pioneered just from the central banking world."*** However, many initiatives struggle due to competing policy priorities, resistance from legacy institutions, lack of awareness or regulatory uncertainty. Without high-level buy-in and alignment with broader digital transformation strategies, DPI risks stagnation, limiting its potential to enhance financial access, economic efficiency and innovation.
Cross-jurisdictional governance challenges	As DPI systems become more interconnected across borders, harmonising cross-jurisdictional frameworks presents a significant challenge.[300] Differing regulatory standards, legacy systems, legal interpretations and technological infrastructures can complicate interoperability and data-sharing between jurisdictions. Additionally, the absence of clear international coordination mechanisms can lead to fragmentation, limiting the scalability and efficiency of regional DPI initiatives. Addressing these issues requires strengthened international collaboration, standardisation efforts and mechanisms for resolving regulatory conflicts.

Source: Cambridge Centre for Alternative Finance research (CCAF, 2025)

Mechanisms for Cross-Regulatory Coordination

Effective coordination models can help manage overlapping mandates while fostering cooperation across sectors. Strong intergovernmental coordination can support alignment, ensuring entities operate within a shared framework. As one global payments professional working in the Latin American and the Caribbean markets explained, ***"DPI really requires strong intergovernmental coordination. If there is one entity which is working at cross purposes, you must have a supervisory infrastructure to bring it back in alignment."*** While collaboration is often beneficial, there are instances where a centralised approach may be more efficient, used in combination. The independently led rollout of Pix in Brazil shows that placing a single authority in charge can enable faster execution, supported by a collaborative model in the Pix Forum.[301]

Additionally, implementation and governance structures that include diverse institutional perspectives can help reduce blind spots. Cross-sector committees can ensure financial inclusion and consumer protection are not sidelined. ***"Regulators cannot afford to remain in silos as DPI increasingly spans multiple domains,"*** a public sector consultant based in Europe noted, underscoring the value of cross-sector engagement for DFS and beyond. Without coordination, duplication of efforts becomes more likely, making it useful to establish mechanisms that bring together regulators, innovators and technical agencies early in the process.

Public-private partnerships can also help ensure DPI systems remain grounded and adaptable. While the public sector typically provides core infrastructure like RTGS, private actors are often central to DFS ecosystems – such as India's UPI – which interact with but do not rely solely on traditional settlement systems.[302] As one technology expert from a North American financial services provider put it, ***"It's not just about who's in the room-it's about what they bring to the table,"*** highlighting the importance of including those with operational and technical expertise. Beyond participation, some stakeholders suggest that DPI governance could also be embedded directly into the infrastructure itself, through features such as automated rule enforcement, auditability, and machine-readable compliance standards.[303] While this concept points to a future where technical systems drive governance, a more immediate priority may lie in enhancing regulatory coordination. Fostering strong coordination across regulators is key to addressing enforcement challenges, building trust, and maintaining transparency in complex domains like data sharing and digital identity.

In exploring a DPI cross-regulatory coordination model, it is worthwhile to analyse existing coordination models in the wider financial sector domains. While DFS governance approaches vary by jurisdiction and sector, several national and international mechanisms have emerged globally as instrumental in enabling collaboration across regulatory agencies in the financial sector domain. In the United States, the Financial Stability Oversight Council (FSOC) brings together multiple financial regulators – including the Federal Reserve, Securities and Exchange Commission (SEC), and the Office of the Comptroller of the Currency (OCC) – through structured deliberations, regular meetings, and voting mechanisms designed to manage systemic risks.

Similarly, the European Data Protection Board (EDPB) ensures cross-border regulatory alignment within the EU through joint opinions, binding decisions, and formal documentation of its proceedings. At the global level, SWIFT's financial messaging infrastructure demonstrates how advisory structures can maintain regulatory consensus across central banks and jurisdictions. Other examples include the Basel Committee on Banking Supervision (BCBS), which leverages global working groups and standardised consultation processes, and the UK's Financial Policy Committee (FPC), which publishes risk assessments, policy recommendations, and detailed meeting minutes to promote accountability. Table 11 provides a brief overview of these coordination efforts

Table 11: Selected Cross-Regulatory Governance Models and Lessons for DPI Coordination in Financial Sector

Governance Body	Jurisdiction	Coordination Mechanism	Number of Regulators Involved	Key Strengths	Potential Weaknesses
CDR (Consumer Data Right)	Australia	Multi-agency governance (ACCC, OAIC, Treasury), joint policymaking	3	Clear role division; strong consumer data protection	Potential regulatory overlap; slower decision cycles
FSOC	USA	Regular meetings, structured deliberation, formal voting	10+	Strong for identifying systemic risk; legal authority for macroprudential oversight	Risk of gridlock; focus may be reactive
EDPB	EU	Binding decisions, joint opinions, formalised proceedings	27 national DPAs + EDPS	Ensures EU-wide data protection consistency; legal clarity	Consensus-based approach may affect agility
SWIFT Advisory Structures	Global	Industry-led with central bank oversight	200+ institutions	Global reach; neutral messaging infrastructure	Consensus-based approach prioritises inclusivity, which may affect agility
BCBS	Global	Standardised consultations, iterative working groups	45+ member jurisdictions	Broad legitimacy; deep technical collaboration	Implementation is non-binding
FPC (Financial Policy Committee)	UK	Publishes risk reports, structured voting, public minutes	Bank of England, FCA, HMT	Strong transparency; integrates monetary and financial oversight	Focuses on financial stability-not always proactive
DCRF (Digital Cooperation Regulatory Forum)	UK	Voluntary collaboration on digital and data regulation	4+ (Ofcom, CMA, ICO, FCA)	Future-oriented; cross-sector dialogue	No binding authority; early-stage structure
FSF (Financial Sector Forum)	Philippines	Regular meetings, voluntary collaboration on information sharing, cooperative oversight framework	Bangko Sentral ng Pilipinas (BSP), Securities and Exchange Commission, Insurance Commission, Philippine Deposit Insurance Corporation	Regular meetings; cross-sector dialogue; information sharing; issues joint public advisories; focused collaborative working groups	Consensus-building approach; slow decision cycles; risk of gridlock

Source: Cambridge Centre for Alternative Finance research (CCAF, 2025)

A review of coordination models in selected jurisdictions for other areas of financial policy and digital economy highlights several common mechanisms that can support cross-regulator coordination:

- **Structured meeting protocols**: Coordination can benefit from formalised meetings with clear agendas, documented minutes and follow-up processes. Meeting records may help promote transparency and continuity in decision-making. Consensus-building approaches, including negotiation frameworks and impact assessments, can assist in aligning divergent regulatory perspectives. Groups such as financial stability boards often use meeting notes to capture action points and identify responsible parties.[304]
- **Decision-making mechanisms**: Some regulatory coalitions use weighted or consensus-based voting to resolve disagreements and shape policy. Structured voting mechanisms allow for broader participation in decision-making processes. In some cases, voting rights are distributed based on an agency's scope of responsibility or contribution.[305] However, the implementation of such mechanisms may raise challenges around efficiency, clarity, or coordination.
- **Dedicated coordination bodies**: Certain jurisdictions have established independent oversight committees to support regulatory alignment. These bodies can act as intermediaries, helping regulators coordinate policies while preserving institutional independence. In addition, co-governance structures, such as steering committees, multi-stakeholder boards, or advisory councils, can institutionalise participation from industry, civil society, and technical experts, offering complementary input into system design and governance.
- **Technical working groups**: Formal working groups and advisory committees also offer platforms for dialogue and may help reduce jurisdictional tensions.[306] Further, a domain-specific technical working group can help develop interoperable and adaptable standards, while offering operational feedback loops between public authorities and service providers. The Pix Forum in Brazil, for instance, complemented central bank leadership by fostering regular dialogue with market participants during rollout.[307] The UK's Financial Conduct Authority established the Synthetic Data Expert Group (SDEG), which brings together experts from financial services, the public sector, technology vendors, and consumer groups to explore synthetic data use in financial markets.[308]
- **Technology-enabled collaboration**: Digital platforms for document sharing, real-time discussions, and tracking progress can support transparency and reduce administrative delays. Some regulators, particularly in fintech and cybersecurity, have used these tools to improve coordination. One interviewee noted that embedding governance mechanisms into digital infrastructure, such as requiring informed consent within transactions can help automate compliance functions.

When designed with attention to context, such mechanisms may help reduce fragmentation and improve coordination within complex DPI ecosystems. However, governance approaches vary based on institutional and historical factors. In some jurisdictions, central banks play a leading role, while in others, finance ministries or treasuries may take the lead. Institutional roles and structures are often shaped by the nature of the infrastructure and a jurisdiction's broader policy objectives. As one senior regulator from a central bank in the Latin America and the Caribbean region observed, ***"There is no one-size-fits-all model for DPI governance."***

Political dynamics may further complicate coordination. A senior policy advisor at a financial regulatory body in Europe observed, ***"Even strong regulators may face institutional resistance,"*** pointing to challenges when pursuing governance reforms. In some cases, efforts to regulate components of digital financial infrastructure have had to be delayed, reflecting the complexities of institutional and policy coordination.[309]

Adopting a phased and pragmatic approach to coordination may help avoid governance bottlenecks and support more sustainable implementation. Rather than rushing broad reforms, starting with targeted initiatives and scaling gradually may allow space for learning and adjustment. Regulator review on the regulatory landscape and institutional self-assessments can clarify roles and expectations before formal coordination begins. Within this context, prioritising domestic collaboration first helps establish stronger national foundations for regulatory coherence before expanding internationally. These efforts can be captured within national, sector-agnostic strategy that provides a neutral framework for alignment and accountability, helping to mitigate fragmentation and enhance coordinated oversight. Ultimately, building effective DPI governance ultimately requires flexibility and a clear understanding of institutional capacities and constraints.

Conclusion

The growth of DPI influence within DFS is creating opportunities for greater efficiency and improved financial access while also introducing new challenges in governance and regulation. Early evidence shows that well-developed DPI ecosystems are linked to improved DFS outcomes, with jurisdictions experiencing higher account ownership, increased digital payments, and greater access to credit and government support. However, as the core pillars of DPI – digital identity, real-time payments, and consent-based data sharing – become increasingly interconnected, traditional distinctions are blurring. This shift requires regulatory approaches that are more integrated and adaptive.

In this evolving landscape, global case studies provide valuable insights into the diverse approaches by different jurisdictions as they begin to implement DPI. For example, India's UPI exemplifies a government and private sector-led model that has rapidly accelerated digital payments adoption, whereas Brazil's Pix system demonstrates how a regulator-driven but industry-inclusive approach can achieve similar impact. Meanwhile, other jurisdictions have adopted hybrid models that balance public-private partnerships with regulatory oversight. What becomes clear from these experiences is that there is no single way to develop DPI. Instead, each jurisdiction should navigate its unique context, balancing trade-offs between innovation, control, protection, and market inclusivity. Since there is no single way to implement DPI, there is also no single way to govern DPI. Instead, governance models must be context-specific, evolving in response to each jurisdiction's regulatory landscape, institutional capacities and market dynamics.

One of the key challenges in developing these context-specific governance models is ensuring effective cross-regulatory coordination, as different authorities may have overlapping mandates, priorities and institutional capabilities. Some jurisdictions have attempted to address this by establishing inter-agency councils or dedicated innovation offices. Others are exploring potential solutions such as regulatory harmonisation, sandbox environments and flexible oversight frameworks to enhance coordination. However, ensuring that these oversight mechanisms remain adaptive and responsive to emerging risks remains an ongoing challenge, particularly as the role of regulators is often underutilised. Early evidence suggests that their proactive engagement can be instrumental in addressing these complexities, highlighting the need for more structured and coordinated regulatory involvement.

To further compound these challenges, the rapid pace of technological innovation is outpacing the ability of regulatory frameworks to adapt effectively. As DLT and AI reshape financial services, they bring not only efficiency gains, but also new risks in information and systems security, competition, data privacy, and financial stability. The increasing uptake of digital wallets and the growth of cross-border payment networks further highlight the urgent need for clear regulatory guidance, particularly in areas such as consumer protection and fraud prevention. Geopolitical shifts influencing financial infrastructure development may lead to diverging global standards, intensifying the need for international coordination to prevent market fragmentation and ensure seamless cross-border financial flows.

Given these developments, the DPI principles of openness, interoperability and modularity present new opportunities for regulators to explore adapting their traditional approaches to oversight and potentially other regulatory functions. Integrating these principles into regulatory frameworks could encourage the cultivation of a more dynamic and responsive environment, enabling regulators to better manage emerging risks and innovate their ways of working. These principles not only promote system stability but also reinforce the critical importance of transparent and accountable governance, ensuring that regulatory processes remain effective and credible in addressing both technological advancements and cross-regulatory governance challenges.

As DPI continues to evolve, several critical areas demand deeper research and sustained policy engagement. One priority is understanding the long-term impact of DPI on financial inclusion and consumer protection, especially in jurisdictions with limited regulatory capacity. Emerging economies, in particular, may benefit from structured coordination mechanisms, including legislative frameworks that support joint oversight and shared responsibilities across regulators. As regulators adapt to new governance models, there is a pressing need to examine how DPI intersects with specific regulatory remits, such as data protection, competition, and cyber resilience. Strengthening regulatory cooperation, both within and across borders, can help avoid duplication, promote interoperability, and facilitate the exchange of best practices. At the same time, as private actors increasingly deliver core identity, payment, and data infrastructure, there is a growing need to clarify their incentives, capabilities, and accountability. Hence, continued exploration of public-private partnership models will be vital to shaping regulatory frameworks that both enable innovation and uphold public interest goals. The CCAF team is committed to advancing research and engagement in these areas, supporting regulators, policymakers, and stakeholders as they navigate the evolving landscape of DPI and DFS.

Appendix

Interview Question Guide

Part 1: DPI & DFS Fundamentals

1. Core DPI Concepts

- How would you define DPI in the context of financial services?
- What do you consider of the definition of DPI including the three fields of open data exchange, digital identity, and payments? Are there additional elements to include?
- What do you think are the key principles (considerations) of DPI that are relevant for financial services (such as interoperable, private innovation, inclusive etc.)?
- From your perspective, what makes DPI particularly relevant for financial services?
- Could you elaborate on the key stakeholders involved in DPI implementation and governance? What do you see as the role of regulators, central banks?

2. DPI Taxonomy in Financial Services

- In your experience, which areas of financial services are most impacted by DPI?
- Could you discuss the relationship between DPI and existing financial markets infrastructure?
- What are the primary benefits and challenges of DPI implementation in financial services?
- In your opinion, what should be the regulators' action points in facing the development of DPI in financial services?

3. Regulatory Perspective

- From a regulatory standpoint, what makes DPI particularly important?
- How does DPI contribute to financial stability and consumer protection, often the key regulatory objectives?
- What opportunities does DPI create for interoperability and innovation? What about regional and international collaboration in DPI development?
- What are the key risks that regulators should consider when implementing DPI? What about opportunities?

Part 2: Empirical Evidence

4. Case Studies

- Could you share your insights on DPI implementation in [specific country]?
- What are the key country-specific factors that need to be considered for effective implementation of DPI? (e.g., level of digitalisation, existing laws & regulations, level of coordination among regulators etc.)
- How did different stakeholders (regulators, government agencies, private sector) collaborate?
- How do you see the impact of this DPI transformation on the financial services sector?
- What lessons can other countries learn from this experience?

5. Regulatory Role

- How was the regulatory framework impacted by the DPI implementation?
- What is the role of a regulator in collaborating with various industry stakeholders in the successful implementation (and adoption) of DPI?
- What was the nature of collaboration between different government agencies?
- How were cross-border considerations addressed?
- What mechanisms were put in place for oversight and governance?

Part 3: DPI as a Regulatory Tool

6. Implementation Strategy

- How can regulators effectively use DPI principles to enable innovation?
- What prerequisites should be in place to help regulators to adapt to DPI principles?
- What emerging DPIs do you see (in addition to the existing elements) that could help achieve regulatory goals and enable beneficial outcomes?
- How can regulators balance innovation with stability and security in the world of DPI?

7. Practical Application

- What specific regulatory outcomes can be achieved through DPI?
- What specific applications and services are the most suited for DPI-focused implementations?
- What role does SupTech play in DPI implementation?

Part 4: Future Developments

8. Emerging Technologies

- How do you see DPI evolving with the impact of emerging infrastructures? What do you see as the impact of DLT-developments such as tokenisation?
- What do you see the impact of stablecoin regulation?
- What are the impacts of CBDCs?
- What about the impact of AI?

9. Broader Implications

- How might geopolitical factors influence DPI development?
- What are your thoughts on addressing the digital divide through DPI?
- How can fragmentation risks be mitigated?

Part 5: Closing Questions

- Are there any other aspects of DPI in financial services that we have not discussed?
- What research gaps need to be addressed regarding DPI in financial services?
- Who else would you recommend we speak with about these topics?

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