

Shaktikanta Das: Digital public infrastructure and emerging technologies

Inaugural address by Mr Shaktikanta Das, Governor of the Reserve Bank of India, at the RBI@90 Global Conference on "Digital Public Infrastructure and Emerging Technologies", Bengaluru, 26 August 2024.

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We are celebrating the 90th year of the Reserve Bank of India in the current financial year. This Global Conference on 'Digital Public Infrastructure and Emerging Technologies' is among the marquee events that we are organising to commemorate this significant milestone. It is my pleasure to extend a warm welcome to each one of you to this conference, held in the beautiful and vibrant city of Bengaluru—a city which, for many years now, has been at the forefront of India's technology revolution. I would also like to extend a special welcome to the esteemed participants who have joined us from across the globe. Thank you all for accepting our invitation. I sincerely hope that you will find the deliberations and interactions during the Global Conference enriching and productive.

The theme of this conference - Digital Public Infrastructure (DPI) and Emerging Technologies – is timely and relevant. It will shape the future journey of almost all economies in the world. Over the last decade, the traditional banking system has undergone an unprecedented technological transformation. By all indications, this process is likely to become even more intense in the coming years. In my address today, I would like to highlight the important role that DPI has played in India's digitalisation process and its contribution to inclusivity in Indian society and economy. India's experience provides an effective digitalisation strategy for public authorities including central banks. I would also touch upon certain key issues underpinning Artificial Intelligence systems and the use of DPI in addressing issues in cross-border payments.

Meaning and Positive Impact of DPI

Digital Public Infrastructure refers to basic technology systems, created mainly in the public sector, that are openly available to users and other developers. DPIs are scalable, and thus can support systems that operate on a population-wide scale; they are interoperable, and therefore spur innovation by being accessible to innovators; and they are also cost efficient by virtue of their economies of scale. These three advantages of scalability, interoperability and cost efficiency hold the potential to accelerate financial inclusion and transform the lives of people by overcoming traditional barriers like physical distance, documentation and transaction costs.

It can be said that DPI has enabled India to achieve, in less than a decade, levels of financial inclusion that would have otherwise taken several decades or more. DPI spurs market innovation by reducing transaction costs, democratising access, maintaining competition through interoperability, and attracting private capital. DPI offers a path to

effectively manage critical national infrastructure. In times of crisis, as during the COVID-19 pandemic, India and a few other countries were able to leverage digital infrastructure for vaccination programmes and targeted transfer payments.

Notable examples of DPIs in other countries include verifiable digital identity systems such as Colombia's Cédula Digital; Nigeria's National ID or Bank Verification Numbers; the Philippines' PhilSys; Rwanda's digital identity system managed by their National Identity Agency (NIDA); Saudi Arabia's Nafath digital identity management platform; Singapore's Singpass; the United Arab Emirates' UAE-Pass; and the like.

The G20 Digital Economy Working Group (DEWG) developed the Global DPI Repository (GDPIR), which is a comprehensive resource hub, pooling essential lessons and expertise from G20 members and other participating countries. Its primary aim is to bridge the knowledge gap in the choices and methodologies required for the design, construction, deployment, and governance of DPIs. The final 'Report of India's G20 Task Force on Digital Public Infrastructure' was released on July 15, 2024 which has, among other things, contributed to acceptance of the definition and framework of DPI. This agenda will be taken forward for implementation during the subsequent G20 Presidencies.

India's Experience with DPI

Let me now turn to India's experience with DPIs. India's DPI journey is a unique model, wherein the base technical infrastructure is built, operated and managed in the public sector, while the private sector accesses the DPI to create innovative customer facing services. The advantage of developing DPI in the public sector is that typically private sector would be averse to capital investment to create infrastructure with uncertain returns. Privately created infrastructure may not also be amenable to democratised access or interoperability. The unique approach of India is conducive for designing services and products which are competitive in the open market.

8. In the area of finance, systems that facilitate digital payments, digital money, digital identity and digital processes are the key components of DPIs. India has carefully crafted its DPI strategy by focusing on three critical dimensions – digital identity, bank accounts and processing infrastructure. Aadhar, India's biometric identity system provides a single and portable proof of identity. Around 1.4 billion¹ Aadhaar numbers have been generated for the residents of India which is near universal for the Indian population. Similarly, access to banking system for the unbanked segments has been enabled through Jan Dhan accounts i.e. Basic Savings Bank Deposit (BSBD)² Accounts. Under the Jan Dhan scheme, more than half a billion³ bank accounts have been opened for the beneficiaries. With regard to processing infrastructure, basic connectivity has been ensured through availability of affordable mobile phones and internet. The number of mobile based internet users in India stands at around 0.9 billion⁴ in May, 2024, with mobile tele-density at 83 percent. Even in rural areas, the mobile tele-density is around 60 percent. The trinity of Jan Dhan Accounts, Aadhar and Mobile Phones, popularly known as the JAM trinity, has provided the base DPI infrastructure which is being leveraged for multiple value added services. Over 67 percent of the

beneficiaries under the JAM trinity initiatives are from rural/semi-urban areas and over 55 percent are women. This clearly demonstrates the role of DPs in promoting inclusion.

9. Another example of DP in India is the Account Aggregator (AA) framework, a regulatory initiative of the Reserve Bank. This framework facilitates consent-based sharing and aggregation of financial information of customers among eligible financial system participants in a secure, transparent, and efficient manner. It enables MSMEs to access cash flow-based financing from lenders with minimal documentation.

10. The Reserve Bank, over the years, has facilitated the development of robust systems in the country for both retail and wholesale payments by supporting the creation of digital infrastructure like INFINET banking network, SFMS messaging system, RTGS and NEFT payment systems.⁵ The current ecosystem of digital payments in India offers a bouquet of simple, safe, and secure options for instant or quick transfer of funds, both large and small value, for businesses and individuals.

11. Unified Payments Interface or UPI, a real-time payment system launched in India in April 2016 by the National Payments Corporation of India (NPCI), has played a significant role in the growth of retail digital payments in India. NPCI itself was promoted by banks under the guidance of the Reserve Bank. While initial participants on the UPI platform were banks, non-bank third party app providers and use of QR codes have all combined in popularising UPI. It has since emerged as a robust, cost effective and portable retail payment system and is attracting active interest across the globe.

12. Continuing on this journey of digitalisation of banking services, last year we launched the pilot of a technology platform which enables frictionless credit. From now on, we propose to call it the Unified Lending Interface (ULI). This platform facilitates seamless and consent based flow of digital information, including even land records of various states, from multiple data service providers to lenders. This cuts down the time taken for credit appraisal, especially for smaller and rural borrowers. The ULI architecture has common and standardised APIs, designed for a 'plug and play' approach to ensure digital access to information from diverse sources. This reduces the complexity of multiple technical integrations. It enables borrowers to get the benefit of seamless delivery of credit, quicker turnaround time without requiring extensive documentation. In sum, by digitising access to customer's financial and non-financial data that otherwise resided in disparate silos, ULI is expected to cater to large unmet demand for credit across various sectors, particularly for agricultural and MSME borrowers. Based on our experience from the pilot project, a nation-wide launch of the ULI will be done in due course. Just like UPI transformed the payments ecosystem, we expect that ULI will play a similar role in transforming the lending space in India. The 'new trinity' of JAM-UPI-ULI will be a revolutionary step forward in India's digital infrastructure journey.

13. Central Bank Digital Currency (CBDC) has dominated recent policy discourse across the world. In India, the Reserve Bank launched CBDC pilots in both retail and wholesale segments in late 2022. The retail pilot currently has over 5 million users and 16 participating banks. While the retail pilot started with initial use case of payments, currently both the offline and programmability functionalities are also being tested. The programmability feature of CBDC could serve as a key enabler for financial inclusion by

ensuring delivery of funds to the targeted user. Let me illustrate this by an actual pilot that was launched recently⁶. Tenant farmers often find it difficult to access agricultural credit for inputs and raw materials as they do not have the land title to submit to the banks. However, programming the end use for purchase of agricultural inputs can give the required comfort to banks and thus establish the identity of a farmer not through his land holding but through the end use of funds being disbursed. Yet another path breaking use case⁷ is farmers getting purpose bound money through programmable CBDC for generation of carbon credits. Other new use cases aimed at testing features such as anonymity and offline availability are proposed to be rolled out gradually.

14. It is important to emphasise that there should not be in any rush to roll out system-wide CBDC before one acquires a comprehensive understanding of its impact on users, on monetary policy, on the financial system and on the economy. Such understanding would emerge from generation of user data in pilots. Actual introduction of CBDC can be phased in gradually. Undoubtedly, CBDC has the potential to underpin the payment systems of future, both for domestic payments and also cross-border payments.

Artificial intelligence and DPI

15. Today, as Artificial Intelligence (AI) is making forays in the financial sector in the form of services like chatbots, internal data processing for intelligent alerts, fraud risk management, credit modelling and other processes. Integrating this cutting-edge technology into a robust and responsible DPI presents an opportunity to amplify the capabilities and efficiency of DPI even further. As the Report of India's G20 Task Force on DPI states, the seamless fusion of DPI with AI would propel us into a new world of "Digital Public Intelligence". Integration of AI into financial services brings significant opportunities for all stakeholders. For customers, AI enables hyper-personalised products and faster, more relevant services. Financial institutions like lenders benefit from advanced tools for risk and fraud management, streamlined operations, and reduced compliance costs. Regulators gain enhanced oversight and real-time monitoring capabilities, which would improve regulatory enforcement and market stability.

16. Such advancements, however, come with serious challenges. Data privacy concerns arise from handling vast volumes of personal information. Ethical AI governance is essential to ensure fairness and prevention of bias. Financial institutions must ensure that AI models are explainable, i.e., ability to explain why certain results are produced. AI technology can also be misused to spread misinformation, potentially causing severe damage and disruption to DPIs as well as other digital systems. They can also damage the reputation and operations of financial institutions. Recognising the same, international bodies such as the Organisation for Economic Cooperation and Development (OECD) have outlined core principles governing AI, which include inclusive growth, respect for the rule of law and human rights, transparency and explainability, robustness and safety, and accountability. In December 2023, the Hiroshima AI Process Comprehensive Policy Framework was established. It includes a set of guiding principles and a code of conduct, marking a significant step towards a coordinated global approach for responsible development of AI.

17. India is the lead chair of the Global Partnership on AI (GPAI) for 2024. This multi-stakeholder initiative, with 29 countries, aims to bridge the gap between AI theory and

practice by supporting cutting-edge research and advancing applied activities. The Ministry of Electronics and Information Technology (MeitY) of Government of India has been taking important initiatives in this area, such as setting up AI Research Analytics and Knowledge Dissemination Platform which will focus on developing indigenous AI-enabled products and solutions to tackle India-specific challenges and complex real-life problems. These initiatives underscore India's commitment to not only capitalise on the potentialities of AI technology, but also ensure robust governance.

18. I am pleased to know that in this conference a panel discussion will focus on emerging technologies. I am sure they will look into various issues associated with technologies like AI. It is important to be pro-active to leverage the capabilities of new technologies, but at the same time it is essential to be abundantly mindful of the associated risks and challenges. It would be prudent to keep in mind the following aspects:

(i) AI is a data driven science. The authenticity of data being used in training the models, possibility of biases, concerns of data privacy need to be carefully examined.

(ii) AI promises to make processes simpler and efficient. It can also emulate decision making to a great extent. However, when it comes to the regulated financial institutions, there should be careful adoption of AI in critical decision-making segments, for example in loan sanctioning. While AI can definitely assist the process, the institutions using them should have proper understanding of the models and ensure accountability of the outcomes.

(iii) Going beyond understanding the risks posed by AI, financial institutions should clearly outline the liabilities and ensure a calibrated and responsible adoption. Central banks and governments, on their part, should foster the development of trustworthy AI, keeping data privacy, explainability, accountability and transparency at its core.

DPI and Cross-border Payments

19. A recurring agenda of importance across all multilateral settings including the G20 and international standard setting bodies like the Committee on Payments and Market Infrastructures (CPMI) has been to bring efficiency to cross-border payments. A lot of initiatives and experimentation in bi-lateral and multi-lateral arrangements among various countries are already underway. While much efficiency has been achieved in case of wholesale markets, the retail cross-border space is still fraught with multiple layers that add to the cost and delays in cross-border remittances. Needless to say that modern technology offers solutions which can smoothen these frictions. With the emergence of Fast Payment Systems across countries and experimentation around CBDC, new possibilities are opening up to bring in greater efficiency to cross-border payments. Maximum efficiency gains in such initiatives would come from ensuring interoperability as a key design element.

20. Ideally, while the legacy payment systems should be able to connect to each other and so should the CBDC systems, one country's legacy system should also be interoperable with another country's CBDC. Actual implementation of interoperability would pose challenges and may involve certain trade-offs. Technical barriers may be surmounted by using common (international) technical standards. Further, the

governance structure or management framework for long-term sustainability would also need to be finalised.

21. In this journey of attaining harmonisation and interoperability among countries, a key challenge could be the fact that countries may prefer to design their own systems as per their domestic considerations. We can overcome this challenge by developing a plug and play system which allows replicability while also maintaining the sovereignty of respective countries. India has made some progress in this direction and would be happy to develop a plug and play system for the benefit of the community of nations.

22. The UPI system has the potential to evolve into a cheaper and quicker alternative to the available channels of cross-border remittances. A beginning can be made with small value personal remittances as it can be quickly implemented.

Conclusion

23. India is a vast country with great diversity. A solution that works well in India has the potential to be customised to the unique requirements of any other country. Accordingly, the conference planners have organised a deep dive session on Day-2 on India's UPI, especially for the international delegates. I would request all delegates to participate and derive benefit from the various sessions and also share their experiences which could provide learnings for all. I also invite you to the Conference Exhibition, showcasing some of India's innovations relevant to this conference.

24. As you may recall, the theme of India's G20 presidency in 2023 was "One Earth, One Family, One Future". It underlies India's thought process in how it sees the world and itself as being part of one family with a common future. At the Reserve Bank of India, we look forward to the journey towards RBI@100 with considerable optimism. We are constantly working on devising policies, approaches, systems and platforms that will make our financial sector stronger, nimble and customer centric. With these words, I wish you all a pleasant stay and productive discussions. I wish this conference all success.

Thank you and Namaskar.

¹ https://uidai.gov.in/aadhaar_dashboard/

² In such savings bank accounts, there is no requirement of maintaining any minimum balance. Such accounts also offer certain minimum facilities, free of charge.

³ <https://pmjdy.gov.in/>

⁴ <https://www.trai.gov.in/release-publication/reports/telecom-subscriptions-reports>

⁵ INFINET (Indian Financial Network): A closed user group network comprising of RBI and financial institutions. This provides the communication backbone for the Indian banking and financial sector.

SFMS (Structured Financial Messaging System) is a secured financial messaging

system which is used for both inter-bank and intra-bank communications in India. RTGS (Real Time Gross Settlement) is a 24x7x365 electronic fund transfer system for large value transactions (2 lakh and above) in which transactions are processed continuously on a gross basis (i.e. transaction by transaction basis). NEFT (National Electronics Fund Transfer) is a 24x7x365 retail electronic fund transfer system in which the transactions are processed in batches.

⁶ The pilot was launched by SBI on August 16, 2024 in the states of Odisha and Andhra Pradesh.

⁷ IndusInd Bank piloted the same in Maharashtra