



Global Conference on "Digital Public Infrastructure (DPI) and Emerging Technologies", Reserve Bank of India

August 26, 2024

**Emerging Technologies in Financial Services:
Opportunities and Challenges**

**Speech by Denis Beau
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Good afternoon Ladies and Gentlemen,

I am very pleased to speak today, at this event celebrating the 90th anniversary of the Reserve Bank of India. I would like to thank the organizers for providing me with the opportunity to speak about a major topic for Central Banks and Supervisors today, that is: emerging technologies, their opportunities for the financial sector and the challenges they represent for us all. I would like to focus my remarks on two emerging technologies, which I believe may transform deeply financial services: tokenisation (i) and artificial intelligence (ii).

1. Tokenisation of assets and payment services

In the financial sector, the emergence of crypto-assets has paved the way for the tokenisation of finance. It allows the issuing, recording and exchange of financial assets in the form of digital tokens on DLT such as blockchain. Such tokenisation has the potential to drive deep changes in the way our financial system works.

These potential changes present opportunities for market participants and the general public, as they could bring greater simplicity, transparency, effectiveness and speed while also lowering transaction costs of financial transactions.

But they also raise challenges, especially for institutions such as the Banque de France and RBI, whose mandate includes preserving financial stability. In this respect, we are, at the Banque de France, guided by two convictions:

1. Confidence requires a regulatory framework that is suitable, clear, sufficiently demanding and fair;
2. Central bank money (CeBM) must remain at the heart of settlements between financial intermediaries, which are the most sensitive from a systemic perspective.

As regards regulation, France blazed a trail in crypto-assets with the adoption in 2019 of the PACTE Act, which created the classification of digital asset services provider. Europe's lawmakers have drawn heavily on the French framework. In 2023, the European Union adopted its Markets in Crypto-Assets (MiCA) Regulation, a specific regulatory framework covering the issuance of crypto-assets and stablecoins and the provision of related services. MiCA's goal is to address the major risks to market integrity and provide greater protection to users.

While MiCA represents a vital regulatory step forward, it will need to be built on in the coming years. For example, it only partially tackles the concentration of crypto-asset service activities within crypto-conglomerates. By virtue of its decentralised nature, the so-called DeFi ecosystem likewise raises regulatory challenges that will need to be addressed.

With this in mind, the ACPR, the French supervisor backed by the Banque de France, has begun identifying potential avenues of regulation. They include: (1) preserving the resilience of public and private DLT infrastructure via security standards; (2) certifying smart contracts and (3) regulating DeFi entry points to protect investors against the risks of abuse.

Our second conviction is that, in order to have a framework that inspires trust in the development of the tokenisation of finance, CeBM needs to be maintained as the primary settlement asset for financial intermediaries, which are the most sensitive in terms of systemic consequences in the event of problems. It ensures confidence between financial intermediaries and so decisively contributes to the stability of the financial system. In a DLT environment, the use of stablecoins is growing, even though these private settlement assets are riskier. It is therefore important that financial intermediaries have access to a trusted settlement asset when operating in a DLT environment. To achieve this goal, central banks need to adapt the form and provision of CeBM to reflect the characteristics of transactions in tokenised assets to ensure that CeBM can be issued, recorded and used for settlement of DLT transactions.

This conviction spurred the Banque de France to become the first central bank to launch an ambitious experimental programme on wholesale central bank digital currency (CBDC) for large-value payments in 2020. This work is continuing at the Eurosystem level and includes several dozen on going PoC and live experiments. The Banque de France is directly involved in these Eurosystem further exploratory work to determine the best way of making CeBM available to private players. At the same time, the Banque de France is also involved in international works such as the Agorá project, which is exploring the concept of unified ledger that could bring together all types of tokenised assets and allow the system to operate more efficiently on a DLT.

2. Artificial intelligence in the financial sector

I now turn to the second **innovation**, artificial intelligence (AI), which could lead to real economic disruption, especially in the financial sector. AI has been an important driver of transformation in recent years. Today, AI is used in all segments of the value chain in

finance: to improve the “user experience”, to automate and optimize a number of internal processes and to monitor or mitigate risk, as illustrated by its success in use cases relating to anti-money laundering. **The advent of generative AI is expected to further accelerate this trend**, not only by increasing users’ adoption of AI tools, but also by structurally accelerating the pace of innovation.

However, **these significant developments raise a number of questions, including for us central bankers and supervisors**: I would like to share some of these with you, before expressing my views about how we should tackle them.

A first issue is that, despite recent progress, **the underlying AI technology does not yet appear to be fully mature**, particularly as regards generative AI (GenAI). There are still a number of unanswered questions on this subject.

For example, the question of **general-purpose AI (GPAI) models**: how will they perform in a whole range of tasks relevant to the financial sector? If large GPAI models be introduced in all areas, we run a high **risk of ending up in a natural monopoly** or oligopoly, adding to the already largely oligopolistic nature of the cloud market.

A second issue I would like to mention is **the vulnerabilities of AI systems**, with new risks adding to existing cyber risks, such as the dangers of so-called “indirect prompt injection” and the possibility to use AI to develop new attack techniques. Our ability **to adequately secure AI systems** will have a major influence on the ability of different actors to make extensive use of this technology.

Even though AI technologies are not yet fully mature, it seems to me that **central banks and financial supervisors should embrace them without delay**, for at least three reasons.

First, to continue **to carry out our missions effectively**, by doing more and doing it better and offering new capabilities to employees. AI can of course help us become more efficient, by increasing the level of automation.

Second, **to develop critical expertise in AI**. Using AI for our own purposes allows us to gradually acquire a good command of the technology, and is a very effective way of properly understanding its benefits and risks.

Finally, **to drive the financial ecosystem**, by sending a signal to the market that it too can – or must – take the plunge, but in a controlled way.

So, while it is clear to me that central banks and supervisors must seize the opportunities offered by AI, the question is: How do we do that?

It seems to me that we must first lay down **a fundamental principle of governance: AI must be at the service of humanity and society**, and not the other way around. This calls for the adoption of a minimum set of safeguards which central banks could support, to channel the development of AI use cases. From this perspective, even if it does not solve all the problems, the recent adoption of the European AI Act, the world's first binding text laying down the principles of "trustworthy AI", is from my perspective a welcome step.

This governance principle should be supplemented by three operational principles as far as our own usage of AI is concerned.

First, **using AI proportionately** and progressively. With a simple rule: the more critical the use case for our activity, the more we have to do it ourselves.

Second, experimenting without delay, even with simple use cases, to **find the right way of integrating AI into our activity**, the tasks performed by our staffs. In my view, it should be done so as to mostly support them, leading to an "augmented agent" rather than a "substituted agent" vision of its impact on staff contribution. Indeed, we can expect AI to significantly reshape the patterns of human-machine interactions. Finding the right combinations will encourage the adoption of the new tools, by winning the buy-in of users, which is a crucial issue.

Third, **collaborate** with others, to share best operational practices and to build a coherent AI supervision framework. In this field, cooperation should be cross-sectoral: we need to **cooperate with authorities in other sectors**, especially competition, cyber security, fundamental rights and even the green transition, as AI-related concerns are largely **interconnected**. Cooperation should also be, of course, international, because AI-related issues are by their very nature global. In this area, while there may be nuances in terms of how to proceed, I note above all that many jurisdictions are expressing similar concerns, which should enable international **cooperation to move forward**.

In my view, these different forms of cooperation are an **essential condition** if we are to contribute to the emergence of the most relevant and resilient technologies in the financial sector, **in the direction of the general interest**.