

Some reflections on the digital euro infrastructure and technology

The current Digital Euro definition is as a **retail means of payments** and a **digital currency**. The combination of both these goals increases the complexity and potential impact on banks, and do not achieve the full innovation potential because it leaves the commercial euro outside the model, creating confusion and misunderstanding in citizens.

With the aim to simplify that complexity, a different approach could be:

1. Create a complete European payment scheme, not only for the CBDC but for both digital and commercial Euro, to strengthen the European hegemony in a holistic way.
2. In parallel, reinforce the Digital Euro model (as an example, like Real Digital in Brazil is doing), enabling the tokenization of commercial bank deposits and investing in a new, effective, and innovative infrastructure to really bring innovative services to the citizens.

But if we want to maintain the current definition of the Euro Digital, it would be mandatory to **reuse the current rails and allow for interoperability**, to make the model as efficient as possible and respond to ECB's current goals in a faster and more certain time frame. The digital euro should also leverage on well-known existing domestic payment solutions, to facilitate its implementation and boost its adoption by individuals and businesses.

The infrastructure and the underlying technology are two essential design elements of the design of the digital euro. The infrastructure will determine the degree of innovation that the digital euro could facilitate with new use cases that could be developed in the future by the private sector, e.g. in the area of tokenised finance. They will be also crucial in terms of the cost and the effort required by intermediaries to provide basic services, e.g. by reusing existing payment processes and components.

We are aware that it has been decided not to discuss yet this issues till the other key design elements are designed. Technical decisions should respond to the strategic definition aimed for the digital euro, and not the other way round. However, at this stage this discussion becomes necessary to **understand holistically the potential impacts and benefits of the digital euro**.

The following note aims at supporting the discussion by providing some reflections on these topics. It is crucial that banks participate in this discussion, to assess potential impacts and opportunities of the different design options. **In our view, this decision should be based on three guiding principles:**

1. The digital euro infrastructure should respond to the use cases aimed for the digital euro in an efficient way, taking into consideration the costs for the Eurosystem, intermediaries and end-users.

- The digital euro must be integrated into existing banking apps and payment rails that consumer already use to manage their finances. Banks and other payment service providers will play a key role can help distributing the digital euro by integrating it in its solutions. This will involve **reviewing many existing processes such as the end user onboarding, sanction screening, access to central bank accounts through existing Target circuit to enable funding and defunding...** Many of these processes rely for example on existing communication protocols based on widely accepted standards (such as ISO 20022 standards). Impact on intermediaries would be much higher if a new infrastructure or a new underlying technology is used which is not compatible with these existing infrastructure and processes¹.

2. The digital euro should also become an opportunity to enable interoperability among domestic solutions across Europe, providing European cross-border payments for both the digital and the commercial euro.

- Although at domestic level there are already very successful payment initiatives which are growing strongly (as an example, Bizum in Spain), we lack common standards and rules that enable cross-border payments across Europe. The Digital Euro scheme could provide this interoperability to private payment solutions.
- This would complement the digital euro in reinforcing European payments sovereignty, creating an integrated and innovative European payments market.

3. Finally, the digital euro should become an opportunity to foster innovation in payments.

- The digital euro should enhance the **development of programmable payments by the private sector both for Digital Euro and commercial bank money**. Technologies such as DLT and particularly *smart* contracts have the potential to automate processes making payments more efficient, as well as to enable the development of new business models².
- At the same time we are seeing promising developments in the field of **tokenised finance**. There would be merit in exploring also the **opportunities for the digital euro and commercial bank money** to meet emerging needs of the digital economy and the **digital asset ecosystem** (such as e.g., enabling machine-to-machine payments or DLT payments).

¹ As an example, the ECB presented in the prototyping exercise an UTXO data model for the back-end prototype for online payments. We are concerned that this model is not compatible with the ISO 20022 standards. The SCT Inst scheme is based on the use of ISO20022, which is the (very extensive and standardised) format that regulates the financial messaging (payments, cash reporting, cash management, etc) of the main market infrastructures (SWIFT, Target, EBA, CHAPS UK soon, Fedwire US in 2025...). One of the objectives of this format is precisely that the main infrastructures speak the same 'language', facilitating interoperability between them.

² On this matter, it is interesting the exercise being developed in Brazil to explore potential use cases based on the *digital real* and banks tokenised deposits. <https://www.bcb.gov.br/site/liftchallenge/en>

- If a new technology is chosen, we must be careful **not to select a technology that accidentally breaks some core principles** (e.g. fungibility) of today's financial system³.

Based on these three principles **we would suggest the following approach:**

1. Leveraging as much as possible on current instant payment infrastructure as well as on existing payment processes and components. This approach would provide many advantages:

- **Fit for the use cases prioritized by the ECB:** The existing infrastructure would allow the deployment P2P, P2M and P2eM payments, as demonstrated in the Spanish PoC.
- **Lower costs:** There would be high costs to create a completely new infrastructure. Costs for intermediaries can be also considerable (e.g. in the adaptation of POS terminals, etc.). Building on the current instant payment's infrastructure would be the most **efficient way to deliver to consumers** across Europe the benefits of the digital euro.

According to the assessment done in the proof of concept developed by Bizum, Redsys and Iberpay in Spain (The Spanish PoC), **existing infrastructure could be adapted** for the distribution and processing of the digital euro and its coexistence with current payment instruments and processes. And more important, **the reuse of the existing infrastructure would reduce investment and costs by more than 70%.**

- **Lower complexity:** Existing payments infrastructure based on **well-know technology would also reduce the complexity** of the project, responding to ECB's goals in a **faster and more certain time frame.**

2. Leverage as much as possible on domestic payment solutions⁴ as a strategy to **facilitate its implementation and boost its adoption** by individuals and business.

- From the user's point of view, these services would facilitate the acceptance and use of the digital euro by end users and businesses that already know the payment solution.
- From the point of view of the intermediaries, it would make it possible to optimize the efforts necessary for its distribution, leveraging once again on already existing infrastructures and services.

³ For example, the technology that was chosen for the ECB's prototyping exercise breaks fungibility in a fundamental way because Unspent Transaction Outputs (UTXOs), have an individual history that can be tainted and can have impaired title.

⁴ For instance, the ECB includes as "supporting services" introducing an "*alias lookup to minimize use of data in settlement component. Not to be operated by Eurosystem*". We propose 1) **Reusing existing national Proxy Lookup systems (such as Bizum)**. Instead of developing a new centralized directory, we propose to interconnect national solutions, which would reduce adaptation costs and provide huge synergies in terms of development and maintenance. 2) **Reuse the figure of the Instructing Party (IP)** that serves for the instruction of the TIPS messages of the Spanish banking community.

- **This would also facilitate interoperability** among existing domestic solutions for payments in commercial bank money.

3. Explore with the private sector how to enhance programmability capabilities and enable new innovative use cases, both for the digital euro and for commercial bank money payments

- The ECB should be ambitious and **explore how to enable innovative capabilities from new technologies such as DLT.**
- We think that programmability capabilities could be implemented in an **additional layer on top of the digital euro that would provide the private sector with the platform to program and execute programmable payments.** This programmability layer should enable payments in both central and commercial bank money, which would add more value to customers and the payment ecosystem.
- At the same time, as the BIS has already mentioned, there is great potential in **combining public and private money into a “unified ledger” with a common programming environment.** There are already private initiatives such as the Regulated Liability Network proposal, that would offer a potential solution for this aim. We should think of how to **enable interoperability of the digital euro with other forms of private money through these initiatives.**
- If, in order to exploit these opportunities a new infrastructure or a different technology becomes necessary which does not allow the above-mentioned synergies to be realized (see 1 and 2), then **a detailed analysis is needed to assess the costs and benefits for the system** (citizens, intermediaries, traders, Eurosystem), and to ensure that the **compensation model** will be able to compensate the different agents for these additional costs.
- Initiatives such as the Digital Real in Brazil that would enable the development of programmable payments based on **commercial bank money through tokenised deposits** are in our view an interesting proposal that could be assessed.