

Luxembourg, 6 January 2021

OPINION OF THE LUXEMBOURG BANKERS' ASSOCIATION ON THE DIGITAL EURO CONSULTATION BY THE EUROPEAN CENTRAL BANK

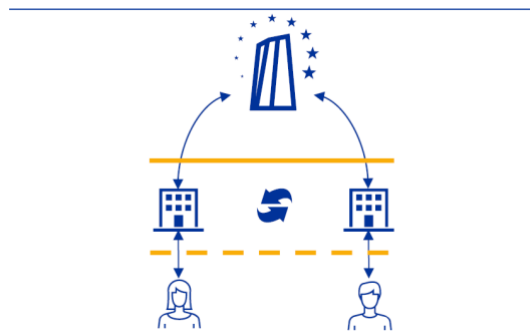
Financial, payment and technology professionals' perspective

5. What role do you see for banks, payment institutions and other commercial entities in providing a digital euro to end users?

We recommend that the distribution of CBDE is ensured by payment service providers (PSPs). PSPs can clearly play a role in the implementation support to CBDE thanks to its competencies in KYC, KYT, AML, CFT, SCA processes and as well as in education, information to large public, and reaching out to the client base

We think that a hybrid decentralized infrastructure (Tier 2) would suit best the banks, payment institutions and other commercial entities as well as mass adoption and rollout of the CBDE.

Account-based and bearer infrastructure



Banks and other financial institutions have always performed state-of-the-art KYC & KYT for their clients following supervisory bodies rules & regulations. This experience in controlling, documenting and archiving proof of evidence can be provided only in the context of an intermediated decentralized infrastructure existing nowadays and represented by financial institutions, payment institutions, fintech firms and etc.

Furthermore, financial institutions are also well positioned to provide Strong Customer Authentication means as well as digital signatures according to eIDAS required levels. This creates high support and mass-adoption by clients. Without the support of the PSPs, the ECB could not reach, equip and support itself its distribution measures directly the end users. Relying on PSPs' networks and workforce is a key success factor for mass adoption of digital euro. The distribution, transfer and exchange of digital euro should not be restricted only to newcomers with innovative technological solutions, Big Tech firms, or geeks in an unsupervised and non-regulated environment like has been recently in the case of speculative crypto-assets.

Given the current PSD2 requirements, which will be again further enforced and of course not

Member of



ABBL a.s.b.l.

R.C.S. Luxembourg: F352

EU Transparency register: 3505006282-58

Office address:

12, rue Erasme
L-1468 Luxembourg

Postal address:

P.O. Box 13,
L-2010 Luxembourg

Tel.: (+352) 46 36 60-1

Fax: (+352) 46 09 21

mail@abbl.lu

www.abbl.lu

lightened anymore, banks and other PSPs will remain cornerstones in the clients' access to financial services whatever the asset is – CBDE or others.

For payment acceptance, many banks are also (or partners to) acquirers which have today millions of payment terminals ready to be upgraded to accept digital payments beside the fact that any secured smartphone could also become a payment terminal. Banks can accelerate the adoption of a digital euro.

On the security side, PSPs can use and provide to the ECB a ready-to-use infrastructure thanks to its e-/m-banking solutions already secured and largely trusted and adopted by the customers in Europe. It can also add a security layer against fraud, intrusion or hacking. This security benefits citizens and businesses as well as the ECB. Banks and other entities can be the trusted link in this regard.

Financial institutions, having established relationships and through knowledge of their clients (all types – retail, HNWI, and corporate) can set up respective access / transactional rights and limits. This right management usually linked to the company status can be provide by banks as well as usage limits, being legal ones or security one per day, week or whatever is required by law.

CBDE should be designed to be interoperable with private payment solutions and would thus represent the “raw material” that supervised intermediaries could use to offer pan-European, front-end payment solutions. Relying on PSPs' security, networks and workforce is a key success factor for mass adoption of digital euro

6. A digital euro may allow banks and other entities to offer additional services, on top of simple payments, which could benefit citizens and businesses.

What services, functionalities or use cases do you think are feasible and should be considered when developing a digital euro?

In general, CBDE could enhance the pace of digitalization in the financial services sector and be an opportunity for banks and other PSPs for developing all its digital solutions: personalized offers, account opening online, sale of new products online, etc.

Moreover, digitalisation of information exchange in payments (e-invoices, e-receipts, e-identity and e-signature) should enable value-added services benefitting end users.

CBDE should allow PSPs to add smart functionalities to payments and security features. Here are some smart features we thought about. We did not look at the costs of implementation, neither at the complexity of such features.

Smart transactions & transparency

One feature is programmability: allowing the amount of CBDE to be used exclusively for specific types of spending or prevent from being used in some context. It could provide full transparency on how and where the money has been spent or received.

Examples: a payment to charity could be monitored and end clients could have a view on how the amount given has effectively been spent. Some social supporting allowance could be used for essentials goods and not for alcohol, tobacco, gambling, and etc.

Allowing the development by the market of programmable CBDE features would definitely stimulate innovation in payments. Also, PSPs and end clients should be in control of some programmable functions in accordance with their needs (e.g. payment limits, merchant category for specific fund transfers).

Enriched transactional data leading to personalised client advice

Another feature is enriched data usage for personalised services: full transparency on spending behavior could enable more personalised services to clients (if s/he gives consent to it).

Example: based on payments behaviour, the PSP could provide advice on how the client could optimize his regular spending (utilities duplicated consumed services, insurance duplicated covers, and etc).

Easy settlement & price comparison

Another feature is faster and cheaper FX service: Digital euro, provided it is connected to other CBDCs, would no longer rest on FX Brokers, but automated decentralized ledgers. FX, in that respect would become more and more a commodity.

In the context of CBDC, it is expected that there will be a sort of registry of assets held by consumers, which could impact the concept of bank account. If this proves true, this will facilitate the switch from one bank to another (model close to Nordic model for securities holdings, not held by the bank but by the CSD and monitored in real time by tax authorities). Thanks also to Open Finance, this could be beneficial for the citizens and clients, being able to switch easily if the service offered by the Financial Institution is not the one expected.

CBDC will also accelerate the securities settlement processes (for P/S or Corp Actions) and avoid mismatch on settlement instructions. It could also lead to a close to real-time settlement for securities quoted in CBDC.

Bridge to Open Finance

Another feature is linked to Open Finance: PSPs can provide a wealth report to the citizen/business by applying the Open Finance approach bringing into one view all his/her assets from other financial institutions but also his/her CBDE.

Following PSD2, some banks and financial institutions are moving away from depositary role to a much broader Open Banking role offering a one-stop service model gathering and processing information from their own systems but also from others in accordance with client's consent. Moving further to Open Finance is just a step away thanks to the opening of APIs not only for payment accounts but also for any asset. Digital euro could pave this road.

Besides all this, existing financial institutions can add all the features they already use to increase customer protection and business ease of transacting, i.e. purchase protection, insurance or assistance linked to payments made by CBDE or lost coverage in case of CBDE hacking of the client personal security keys.

Besides features, it is clear that CBDE could also facilitate the fight against money laundering, as the trace of all exchanges will be fully transparent.

7. What requirements (licensing or other) should intermediaries fulfil in order to provide digital euro services to households and businesses? Please base your answer on the current regulatory regime in the European Union.

We think it is very important that ECB states that CBDE will work closely with the EU Digital Strategy Package and will of course follow existing EU regulation such as PSD2.

With the introduction of CDBE some existing actors in financial value chain may become obsolete while new roles and actors are to be created. The EU should build upon the diverse financial

services ecosystem it has developed and promote both banks and non-banks to participate in this distribution, under the appropriate regulatory framework.

An overarching principle “same business, same risks, same rules” should be duly applied for all market actors. Equally, FinTech companies could issue CBDCs such as a digital euro through accounts which are fully backed by central bank reserves. Users would recognize the electronic payment and transfer solutions they already use today.

One has to be clear that a full deployment of CBDE will open the market and allow a higher degree of penetration by new entrants to the existing financial services marketplace, which has to be closely monitored. Incumbents, especially of mid- and small size, have to prepare themselves to withstand and compete with newcomers who are likely to be more technologically advanced in the underlying technologies like DLT. Existing PSPs may resort to a variety of tools and ways of improving their absorptive capacity with regard to the new technology by investing in human capital, interorganisational cooperation, technology transfer, and inhouse digital transformation.

Commercial entities involved in the distribution of digital euros ought to be formally regulated for the provision of that service: any intermediary should be licensed and registered as a financial services player in the EU and comply with all related obligations, in order to safeguard both end-users and the overall integrity of the ecosystem for a digital euro.

For efficiency's sake, the regulatory model should build as much as possible upon existing frameworks, recognizing the investments in compliance already performed by existing players while allowing in new entrants wishing to join that market. The distribution of CBDE should therefore broadly fit under the following EU legislative architecture:

- EU Directive 2013/36 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms (CRD IV) that ensures strict prudential and reporting requirements for licensed credit institutions.
- Directive 2009/110/EC of the European Parliament and of the Council of 16 September 2009 on the taking up, pursuit and prudential supervision of the business of electronic money institutions (EMD2)
- Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market (PSD2)
- Directive (EU) 2018/843 of the European Parliament and of the Council of 30 May 2018 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing

Licensing and other requirements related to should be developed taking into account the new set of legislative proposals emerging nowadays, notably – the proposal for a regulation on markets in crypto-assets¹ and the regulation on a pilot regime for market infrastructures based on distributed ledger technology².

However, we believe that the principle of technology neutrality and proportionality should continue to prevail. The framework should also leverage existing infrastructures and rules, for instance around customer identification and authentication. Any evolution of such frameworks for the digital euro should be an opportunity to consider how they also ought to evolve for euro services.

8. Which solutions are best suited to avoiding counterfeiting and technical mistakes, including by possible intermediaries, to ensure that the amount of digital euro held by users in their digital wallets matches the amount that has been issued by the central bank?

First and foremost, we believe that technological neutrality and interoperability are key points in respect to architecture. Any form of innovation in this field to avoid counterfeiting and technical

¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020PC0593>

² <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020PC0594>

mistakes with regard to digital euro wallets should be open to both incumbents and newcomers, and the role of the ECB could be in driving the call for proof of concepts, evaluation and testing to make sure market actors and end users are satisfied with the product.

The report does not precise whether all CBDE wallets are to be mirrored at the level of ECB or at the level of national central banks. Further clarity is welcome in this respect.

9. What technical solutions (back-end infrastructure and/or at device level) could best facilitate cash-like features (e.g. privacy, offline use and usability for vulnerable groups)?

Seamless, transparent, secure, fast and interoperable payments are keys to facilitate cash-like payments. Underlying payment services and technologies as proxy lookup services (including phone number, e-mail, ...), proximity technologies (QR code, NFC, Near Sound Data Transfer,...) and mobile payments could be some options for offline use and usability for vulnerable groups. (Behavior) payment monitoring systems (on back-end infrastructure) and offline payment controls (on devices) are essentials to prevent fraud, misuse and malicious use of payment instruments. Programmable CBDE features could enable such offline payment controls.

CBDE should guarantee the same facility of euro disbursing and usage as it is currently with conventional euro:

- 24/7/365;
- Real time transfer;
- Offline usage options similar to existing euro. For this purpose, there is a paramount requirement to make sure that CBDE can be circulated offline and here technological advances and further exploration are needed to ensure synchronisation of the balances between the digital euro wallet and the data stored and registered at the level of issuing institution (i.e. the central bank).

As already mentioned, CBDE accounts and normal EUR accounts should be shown on any banking app, allowing the client to instantly move from one to another seamless and frictionless.

10. What should be done to ensure an appropriate degree of privacy and protection of personal data in the use of a digital euro, taking into account anti-money laundering requirements, and combating the financing of terrorism and tax evasion?

We do agree with the ECB that Users' privacy should be protected by considering an appropriate balance between individual rights and public interest. While issuing the digital euro it is of outmost importance that the Eurosystem complies with the regulatory standards for digital payments in order not to disrupt the digital payments ecosystem in the Eurosystem.

Anonymity has to be ruled out in order to avoid the use of CBDE for money laundering and terrorist financing. We do agree with the ECB that users have to be identified when they first access digital euro services. Afterwards different degrees of privacy should be granted either by the issuer (the Eurosystem) and the providers of intermediary services.

In order to have an equivalent to cash offline digital euro payments should be allowed under full privacy while accounting for the transparency nature of CBDE. A selective approach to privacy may be a solution i.e. in the same way we do allow nowadays occasional transactions or transactions under a certain threshold to be executed without applying full KYC rules a similar system could be put in place for the digital euro e.g. by putting in place a or several threshold(s) according to wish different level of privacy would be applicable.

Digital euro transactions should be fully transparent. Transparency could be guaranteed by a dedicated authority which could as the case may be decrypt private digital euro transactions guaranteeing data protection, as it is currently the case with electronic payments. A technology like the distributed ledger technology (DLT) for example would allow to execute transactions with

a high degree of privacy without nevertheless being anonymous. In the DLT pseudonymous accounts and balances could be stored in the core ledger and each account in the core ledger could be linked to a Payment Service Provider who knows the identity of each user. Existing PSPs would be responsible for applying AML checks to users, and for reporting suspicious transactions to the authorities. Granular personal data on any user would not be held by the ECB reducing the privacy concerns that could arise in connection with holding personal user data, but AML requirements could still be met by the system as a whole. New business models could be created with dedicated firms verifying users' identity and use new techniques to identify suspicious activity.

The Digital Euro needs to be compliant with privacy regulations, such as the 2018 General Data Protection Regulation (GDPR). Users should have control over how their data is used and who it is shared with. Third-parties processing data have to comply with applicable data protection legislation.

11. The central bank could use several instruments to manage the quantity of digital euro in circulation (such as quantity limits or tiered remuneration), ensuring that the transmission of monetary policy would not be affected by shifts of large amounts of commercial bank money to holdings of digital euro.

What is your assessment of these and other alternatives from an economic perspective?

(Tiered remuneration is when a central bank sets a certain remuneration holding balances of digital euro up to a predefined amount and a lower remuneration for digital euro holding balances above that amount.)

It is vital that a CBDE does not undermine the robustness of the financial system, if banks' deposit base becomes less stable because of a CBDE, this will impair the funding management and make liquidity planning less predictable.

CBDE should be a means of **payment (ECB would not aim to acquire deposits)**.

We think that in order to limit the risk of shifts from commercial bank accounts to CBDE, ECB should fix a balance limit threshold. The threshold has to be thoroughly thought to avoid refuge of savings into CBDE in case of financial crisis. Such concept of "limit" already exists in most EU countries for cash payments. Defining a limit would ensure that CBDE is only used as a medium of payment similar to cash. It would give an additional protection to the banking industry by preventing important amounts of liquidity stored out of the "traditional" system, limiting liquidity risks for the financial sector.

For balance limit become meaningful, it is important to impose the rule of one-account per individual.

We are in favour of instant and recurrent automatic rebalancing, CBDE wallet being linked to a respective current account which can be opened at any PSPs.

We favour an approach where no penalties are imposed if a threshold is reached and no remuneration like cash. Nevertheless, given the ongoing negative interest rates context for individuals, a balance limit threshold for CBDE becomes unavoidable.

The ECB report does not precise how CBDE pooled accounts and CBDE segregated accounts will be managed and operated. Further clarity from ECB in that respect is needed.

12. What is the best way to ensure that tiered remuneration does not negatively affect the usability of a digital euro, including the possibility of using it offline?

We are in favour of instant and recurrent automatic rebalancing, CBDE wallet being linked to a respective current account which can be opened at any PSPs. Once threshold is reached, special AML due diligence measures are triggered.

Therefore, we are in favour of the approach where no penalties are imposed if a threshold is reached and no remuneration like cash. Nevertheless, given the ongoing negative interest rates context for individuals, a balance limit threshold for CBDE becomes unavoidable.

13. If a digital euro were subject to holding balance limits, what would be the best way to allow incoming payments above that limit to be shifted automatically into the user's private money account (for example, a commercial bank account) without affecting the ease of making and receiving payments?

As mentioned previously, to ease the making and receiving of payments, we believe that each Digital Euro account holder could link its Digital Euro wallet to an existing bank account. Creating this link between a wallet and a bank account held at one of the EU PSPs would have the following advantages:

- It would allow the ECB to rely on the AML/KYC performed by the bank to open Digital Euro wallets
- It would give a role to existing PSPs into the Digital Euro value chain
- It would allow a Digital Euro wallet to automatically shift incoming payments above a certain limit to another bank account without any friction from the account holder who could easily transfer the excess amount later.

For example, by taking the hypothesis that each digital wallet would not be able to have a holding balance above an amount of "Y" EUR:

1. each payment in a Digital Euro form should also be limited to the same maximum amount "Y EUR" (such concept of "limit" already exists in most EU countries for cash payments).
2. If the initial balance of the wallet of the payee is 0, the wallet can then be credited of the full Y EUR amount.
3. If the initial balance of the wallet of the payee is >0 (which should be the case in most situations), any "X" EUR amount between $0 < X \leq Y$ should be allowed to be transferred. In case the transfer results in a wallet having an excess holding balance (> Y EUR) then the alternative approach detailed hereafter may be considered.

In the situation of 3. two possible solutions may be considered:

- i. either the excess amount ($\geq Y$) is blocked by the "system" and the Digital Euro wallet is configured to be able to initiate an automatic credit transfer to a predefined bank account based on "ceiling" rules (e.g. maximum holding balance limits) as soon as there is an online connection available.
- ii. or the wallet is allowed to hold an excess holding balance for a limited period of time (e.g. 1h, 2h, 24h) without limitation of use. At the end of this "excess" period, the amount can be automatically transferred to an existing bank account.

In both cases, as payments are limited to Y EUR (item 1. Above), the risk of misuse of the Digital Euro should be limited.

14. What would be the best way to integrate a digital euro into existing banking and payment solutions/products (e.g. online and mobile banking, merchant systems)? What potential challenges need to be considered in the design of the technology and standards for the digital euro?

Real-time, 24/7, on- & offline

CBDE should be as fast and easy as instant payment today, i.e. always available 24/7 and ready for offline use for payments (on consumer side at least).

By using banks as intermediaries, the CBDE account would be real-time updated and shown besides traditional bank accounts in any e-/m-banking. Providing this to its clients, any EU citizen thanks to the PAD could therefore use and benefit from the CBDE. Banks should use the CBDE account as any other account to source payments/transfers or to accept transfers. By doing so, they would give the CBDE the largest and fastest adoption possibilities to any citizen or business.

Challenges will be the security and fraud management as we're used to on the client side. Also, the banks would need a secured real-time link to the ECB monitoring live the CBDE in circulation. This secured real-time link is also a challenge as no downtime can occur. If the will is also to provide offline use of CBDE, the reconciliation process when back online will be key.

Any use, up to the client's choice

Also, when paying in shop or online, a client could back it with a traditional account or a digital euro account. S/he should be able to choose anytime from/to which account a transfer is made. Questions may raise also as settlement might be done by the banks about netting operations at their level, would it still be possible? Clarification is recommended on whether segregated accounts and omnibus accounts for B2B solutions will still be available.

New opportunities to seize

CBDE should leverage on the opportunity of collaborating with a pan-European Payment Initiative (EPI) to ensure rapid and wider usage of the CBDE.

If EPI comes to life and delivers what is expected in terms of access, it is most likely one of the best technological Pan-European solutions to allow payments to be executed in a secured and controlled framework and to ensure the wider usage of the CBDE. The usage of EPI could also help to create a comprehensive set of additional services, shared between financial actors and could also allow PSPs to remain the client financial partner.

The delivery of the CBDE through EPI would strengthen the incentive to use a competitive pan-European payment solution and encourage the market to start and/or keep investing in a such digital initiative.

Leverage trusted accesses by the clients & known user experience

CBDE accounts and normal EUR accounts should be shown on any banking app, allowing the client to instantly move from one to another seamless and frictionless. This will allow to reduce to the maximum the payment process in a consumption act.

Infrastructure

When it comes to payment for services dealt with distributed ledger technology for instance, standards must be created to allow payments to be handled in a secured and controlled way. These standards must be managed by a neutral central counterparty. This counterparty should have a wide enough network of European payment stakeholders and proven knowledge and experience in the development and maintenance of standard supporting seamless, transparent, secure, fast and interoperable European payments.

As previously said, the CBDE solution should be techno agnostic and interoperable. We recommend that the ECB organises evaluation sessions of technological tools.

In terms of technological challenges, security remains on the top of the list, both at Central bank and at end client levels and Europe must have clear guidelines in that respect.

One key aspect to keep which is also a technical challenge is to have a mechanism that prevents soft and hard “forks” from happening on the CBDE, as this could lead to a loss of trust, which could have a massive impact on the economy. This would be under the responsibility of the governance bodies of the CBDE.

15. What features should the digital euro have to facilitate cross-currency payments?

The CBDE should offer the basis for providing functionalities that are at least as attractive as those of the payment solutions available in foreign currencies.

With the CBDE we should aim and focus to have interoperable payment systems in place – allowing for fast instant payments. In order to promote and facilitate cross-currency payments, developers of the digital euro will have to promote a cooperative approach between member states. A cooperative approach to interoperable designs across currencies would contribute to strengthening the international role of the euro and to improving cross-currency payments. Any frictions in the payment process should be removed.

Clear synergies between private money and CBDE should be put in place and CBDE should be integrated in pan European payment solutions. Central banks will have to complement the existing players and have to team-up with front end solutions in order to facilitate cross-currency payments.

The development of CBDE should be incorporated/considered in the development of the European standards to foster instant retail payments and digital payments within the EU in general. The objective here should be to reach a high level of complementarity between the payment solutions developed by the private sector and the necessary intervention of public authorities.

With regards to the technologies, the use of a technology allowing for easy booking transfer and storage of the digital euro would be appropriate.

16. Should the use of the digital euro outside the euro area be limited and, if so, how?

In order to respond to this question, we need first to understand what does the outside eurozone limitation mean. Would this encompass the interchangeability to other currencies or the possibility for the CBDE to be held by non-eurozone residents (and does that mean non euro EU countries or third countries as well)? Also, is the exchange towards only other digital currencies or would it be exchangeable to foreign cash as well?

Benefits and risks: we have performed a cost and benefit analysis to identify the potential level of openness or limitation to the CBDE that should be put in place. In this analysis, cross-border payments must be understood as payments coming in/out of the Eurozone.

1) View on the benefits:

- **Macroeconomic risk implications** - for the Eurozone, one of the main benefits in opening the CBDE lies in the strengthening of the presence of the euro. It also ensures that euro will be a frontrunner in the digital innovation, along with the private sector.

- **Placing EUR as an internal transaction currency for the benefit of the real economy:** the limitation of amounts on CBDE account and the limitation of accounts to one per person (legal or physical), also limits actions from institutional investors that would invest in digital euro. Offering such accounts to non-EU residents may also make it easier for the users to acquire goods issued in EU Member States.
- **Liquidity and credit risk implications** – as Instant Payments processed in TIPS, cross-border payments using CBDE would be instant with those risks limited or eliminated (not reliant on opening hours, regulatory requirements and cooperation mechanisms between two banks, reducing time-zone lags).
- **FX risk implications** - limited thanks to real-time transactions, however the scope of such benefit is predetermined by the potential availability of cross-border payments and cross-border transactions.
- **Interest rate implications** - limited or eliminated given speed (real time) of the execution of payments. This is because lack of lag reduces the exposure to rapid changes to interest rates due to market events (financial panic) or market manipulation. Taking away time zone impediments and speeding up transactions while reducing costs and scope for error
- **Operational risk implications** – currently, there are multiple actors involved in one cross-border payment (Central Bank, Bank A and Bank B). A cross-border Digital Euro will reduce the number of intermediaries involved and accelerate the time to pay. It could also grant the certainty of the costs of the transaction beforehand, what is not certain in the current structure for cross-border payments (due to the risks mentioned above).

2) View on the risks:

- **Macroeconomic risk implications** – it might cause substantial shifts of global portfolios into the Digital Euro and could strengthen the euro exchange rate by materially increasing the ECB balance sheet while having a negative impact on euro area firms. This risk can be mitigated if a maximum holding balance limit of each wallet is decided.
- **Liquidity and Credit risk implications** – while Digital Euro will materially reduce both, due to real time transaction execution, other means such as “atomic settlements” would achieve the same goal, without a potential new exposure to transition risk (see below).
- **FX risk implications** - while, in principle, should be reduced because of the real time execution of payments, and additional risk would be created in ensuring that Digital Euro would always be equal in value with the cash euro. It would also depend on the conditions for exchange to other currencies.
- **Interest rate implications** – there are two things to consider: 1) in current state the additional cost of interest rate risk is reduced or non-existent due to low or zero interest rate, 2) lies with credit, liquidity risk and time lag that can be eliminated via other real time transactions and real time payments without the need to create a Digital Euro.
- **Operational and transition risk implications** – in order to ensure that the ECB has a full control of who is holding the Digital Euro, it would need a strong CDD/KYC and a reliable IT system with a constantly updated database. This would be additionally complicated by adding foreign investors/retail payers and their data. Another consideration should be given to the administration of foreign participants in the system and to the responsibility towards the conduct of CDD/KYC. The control over the cross-border circulation of Digital Euro needs to have strong controls not to facilitate international criminal activities.

We believe that CBDE could be offered to non-EU participants to strengthen the “brand” and the position of the euro as an international mean of payment. It would allow the euro to remain relevant on the international scene while demonstrating innovation in the EU. However, there are clear items with regards to CDD/KYC that will need to be taken into consideration in this context. Terrorist Financing is most of the time performed using small amounts and a limit of holding balances on Digital Euro wallets will not be enough to prevent such risk.

17. Which software and hardware solutions (e.g. mobile phones, computers, smartcards, wearables) could be adapted for a digital euro?

A software-based solution would be more cost-effective and environmentally friendly on the long-term for the development and the adoption of the CBDE. However, this question is fully dependent on the decision on whether the payments would be made available both offline and online.

1) View on hardware solutions:

The main advantage of offline hardware wallet is the possibility to keep an access to funds when there is a black swan event, that restricts the access to online banking (as demonstrated by Japanese tsunami crises) or in situation when there is no network available (e.g. plane, underground parking, specific building, etc.). Those circumstances are however rare.

In addition, in Europe, a cheap or free access to high-speed internet and the development of the 5G network raises the question of commerciality for sophisticated offline hardware working solutions.

Items to be considered for hardware solutions:

- Production of hardware is expensive (things to consider include, but are not limited to development, patent, security, maintenance and update, production, transport, storage, staff, recycling, environment impact etc.).
- An entire distribution model would need to be put in place to ensure that all EU citizens can have access to this hardware without discrimination of unnecessary additional costs.
- Hardware is still susceptible to access risk (lost or forgotten device)
- While hardware-based wallets can be lost or stolen, they are more resilient to cybersecurity risk (i.e. installation of malware or a breach).
- There is additional risk of creating unsupervised and non-monitored circulation of the Digital Euro in a 100% offline world. Thus, strong KYC procedures, transactional monitoring and additional requirements (like periodic requirement of switching online or ad hoc testing or cap on the available amount of Digital Euro that can be stored on a digital wallet needs to be considered.
- While for offline solutions, we could leverage existing solutions (Bluetooth or NFC) more secure and newer solutions (like Visa's execution environments (TEE) would require a dedicated and more sophisticated device than a phone.

2) View on software solutions:

Developing a software-based solution compatible with most existing operating systems (e.g. windows, android, MacOS, Linux etc.) would be cheaper and easier to implement. Adopting this approach would allow the ECB to remain as technology neutral as possible while allowing EU citizens to access Digital Euro wallets in an easy and cost-effective way.

Items to be considered for software solutions:

- Software on a smartphone or any other wearables having the necessary communication features (e.g. Bluetooth, NFC, WIFI) would be probably the most cost effective. The penetration rate of these devices in Europe is very high and most EU users are already equipped with such devices and used to use them.
- Should data plan be necessary to operate such wallet (only if a 100% online model is chosen), since 2017 and the end of the extra fees for data roaming in Europe is already ensuring a fair and even use of the wallet for travellers.
- The use and selection of software would also depend on whether the Digital Euro will be based on the DLT.
- A software can more easily be updated, patched or suspended (in case of cyberattack) than a hardware solution.

However, even if it can be observed that more and more cheaper alternatives are offered to EU citizens (in terms of available hardware and access to network), we should remain conscious that

not all EU citizens have access to such technology and that a special care will need to be taken to ensure a fair access to Digital Euro wallet.

18. What role can you or your organisation play in facilitating the appropriate design and uptake of a digital euro as an effective means of payment?

As already mentioned, we believe that both existing ecosystem with its various stakeholders including both PSPs and newcomers have a lot to propose for the design and uptake of CBDE as an effective means of payment. PSPs have direct contacts with their clients and developed extensive experience of relations with them be it onboarding and identification including those means conducted with remote technologies, KYC/AML checks, safeguarding and distribution of assets, acquisition, monitoring and validation of transactions, and etc.

* * *
*