EUROPEAN CENTRAL BANK

EUROSYSTEM

Eurosystem report on the public consultation on a digital euro

April 2021

Contents

Executive summary

The ECB public consultation on a digital euro

On 2 October 2020 the Eurosystem published its “Report on a digital euro”. The report formed the basis for seeking wider views on the benefits and challenges of issuing a digital euro and on its possible design.

The report was followed by the “Public consultation on a digital euro”, which was launched on 12 October 2020 and ran until 12 January 2021.

The consultation included 18 questions aimed at collecting the views of both citizens and professionals. The first part was aimed mainly at citizens in their role as users, while the second targeted primarily financial, payment and technology professionals with specific knowledge of the economics, regulation and technology of (retail) payments. However, respondents were invited to provide feedback on the full set of questions.

This report sets out the results of the analyses of the 8,221 responses submitted by participants in the public consultation.

It will serve as important input for the ECB’s Governing Council when it decides in mid-2021 whether to launch a formal investigation phase in view of a possible launch of a digital euro.

Overview of respondents

94% of the respondents identified themselves as citizens and 6% as professionals. The sample of respondents is biased in terms of gender, industry and country of residence.

Men account for 87% of citizen respondents. A third of the professionals identify themselves as tech companies. Most contributions originate from three countries: 47% from Germany, 15% from Italy and 11% from France. Five other European countries provided 1-5% of replies, with the rest accounting for less than 1% each.

When reading this report, it should be taken into account that these biased demographic characteristics do not represent the euro area population. The replies from both citizens and professionals do, however, provide valuable input to the Eurosystem’s reflections on a digital euro.

Possible features of a digital euro

Privacy is considered the most important feature of a digital euro by both citizens and professionals participating in the consultation, especially merchants and other companies (often self-employed professionals).

When identifying the whole possible package of most preferable options, citizens participating in the consultation consistently opt for privacy, security, usability throughout the euro area, absence of additional costs and usability offline.

When confronted with a specific choice between an offline digital euro focused on privacy, an online one with innovative features and additional services, and a combination of the two, citizen respondents generally opt for an offline solution focused on privacy, while professional respondents consider a hybrid approach more appealing.

Among the main challenges associated with a digital euro, citizen respondents identify those related to privacy and, especially when considering accessibility, simplicity in its use as a means of payment. Professional respondents identify similar challenges, as well as additional ones related to poor internet connectivity in some areas.

Provision of digital euro payment services

Both citizens and professionals in the sample generally agree that the digital euro should be integrated into existing banking and payment solutions. All types of respondent favour licensing and oversight of the intermediaries to ensure that digital euro services include appropriate user protections, especially with regard to possible misuse of data and concerns about the safety of services related to a digital euro.

Notwithstanding the attention to privacy, both citizen and professional respondents support the requirements to avoid illicit activities, and only less than one in ten citizens are in favour of anonymity. Although many suggest that some identification of users should be facilitated, the privacy of payment data is considered the most important feature, ranging from full privacy of transactions to the possibility that only low-risk small transactions are private.

Most citizen and professional respondents believe that digital euro payments should be integrated into existing payment solutions or products and that additional services should be provided on top of basic digital euro payments, with programmability as the most popular choice. They suggest a number of solutions for preventing counterfeiting and technical errors, and to ensure that the amount of digital euro in circulation is equal to that issued by the central bank, including blockchain, cryptography and licensed software or hardware.

Technical solutions

According to a quarter of the citizen respondents, hardware end-user solutions comprising (smart) cards or a secure element in devices such as smartphones are the best technical option to facilitate cash-like features. Of professional respondents, a third consider that end-user solutions (i.e. either software solutions like wallets and apps and/or hardware solutions like cards, a secure element in a device and a dedicated storage or device) are the best way to support cash-like features, while another third prefer a combination of end-user solutions with the back-end infrastructure, many referring to decentralised infrastructures.

Many respondents believe that all available hardware and software solutions for electronic payments could be adapted for a digital euro, provided that their level of protection is sufficient to support trust in safety and security as a key feature of a digital euro.

Tools to avoid macroeconomic consequences

Almost half of citizen respondents mention a need for holding limits, tiered remuneration, or a combination of the two, to manage the amount of digital euro that would be in circulation. A similar share of professional respondents agree. Tiered remuneration is especially popular among the research community, while holding limits are favoured by credit institutions. At the same time, about a third of citizen respondents and professionals classified as merchants reject any tool aiming to avoid the circulation of excessive amounts of digital euro as a risk-free form of investment.

In order to avoid tiered remuneration having a negative effect on the usability of a digital euro, both citizen and professional respondents state that the limit or first tier should be large enough for retail payment needs. Besides delayed settlement of transactions, few respondents suggest any specific solution for making tiering compatible with offline use. Where holding limits are imposed, respondents agree that the best way to allow incoming payments above that limit is by automatically transferring the excess digital euro to an account held with a private institution.

International payments

When questioned about cross-currency payments, citizen respondents value speed of cross-border payments (mentioning that instant payments should be possible), cost and transparency of exchange rates. At least a third of them mention one of these three aspects.

A large majority of citizen respondents consider that the use of digital euro outside the euro area should not be limited, provided that safety and security are ensured, which is also the view of most professional respondents. Nevertheless, one in ten citizens consider that it could be used cross-border but with limits.

Additionally, with regard to cross-border payments professional respondents focus mostly on the issue of interoperability (around a third of respondents) and the role of intermediaries (a fifth of respondents) either as settlement agents or, to a lesser extent, gatekeepers.

Introduction

The ECB launched its “Public consultation on a digital euro” on 12 October 2020. Its purpose was to obtain input from the wider society on the economic and societal implications of issuing a digital euro and, if a digital euro were to be issued, on its design. The public consultation consisted of two multiple-choice and 16 open questions, divided into two parts depending on the main target audience of respondents: (i) the general public, in their role as users (referred to as “citizens” below), and (ii) experts from the financial industry, technology companies and academia (referred to as “professionals” below). However, in order to attract the richest possible set of different views, respondents were invited to share their views on all questions.

The public consultation closed on 12 January 2021. The present document analyses the replies submitted by 8,221 respondents. Both manual assessments and automated tools such as text mining and natural language processing were used to analyse the responses. The methodological details are set out in the Appendix.

The public consultation was open to anyone to participate. The overview of respondents in Section 2 shows that they do not constitute a representative sample of the European population, meaning that their replies cannot be interpreted as the prevailing view of the European population. However, the breadth and depth of responses provide valuable insights for the Eurosystem’s ongoing work on a digital euro. These insights have been divided into six thematic areas: features and challenges of a digital euro; provision of digital euro services; limiting the uptake of a digital euro as an investment; technological solutions; international payments; and external contribution to a digital euro.

The Eurosystem will consider this input when deciding in mid-2021 on the possible launch of a digital euro project, as well as in any potential related work on the design and future launch of a digital euro.

1 Overview of respondents

Overall, the age distribution of citizens who submitted their responses exhibits a skewed bell-shape, with a peak in the 35-54 age range. Nevertheless, more than 34% of respondents younger than 35 and more than 24% of respondents aged 55 and over shared their views (see Chart 1).

Men between the age of 35 and 54 make up the age-gender group of citizens with the largest number of responses, accounting for 37% of total responses. The representation of genders is unbalanced, with 87% of respondents being male (11% female, 1% non-binary).[1]

In line with the European Commission's recommendation and best practices,[2] this overview provides an analysis by socio-demographic group, such as gender, nationality, age and industry, rather than applying a weighting.

Looking at the home countries of respondents, Germany alone accounts for almost half (47%) of the whole sample (see Chart 2). Italy and France follow by some distance with 15% and 11% respectively. Five additional countries each provide 1-5% of replies, while all other countries account for less than 1%.

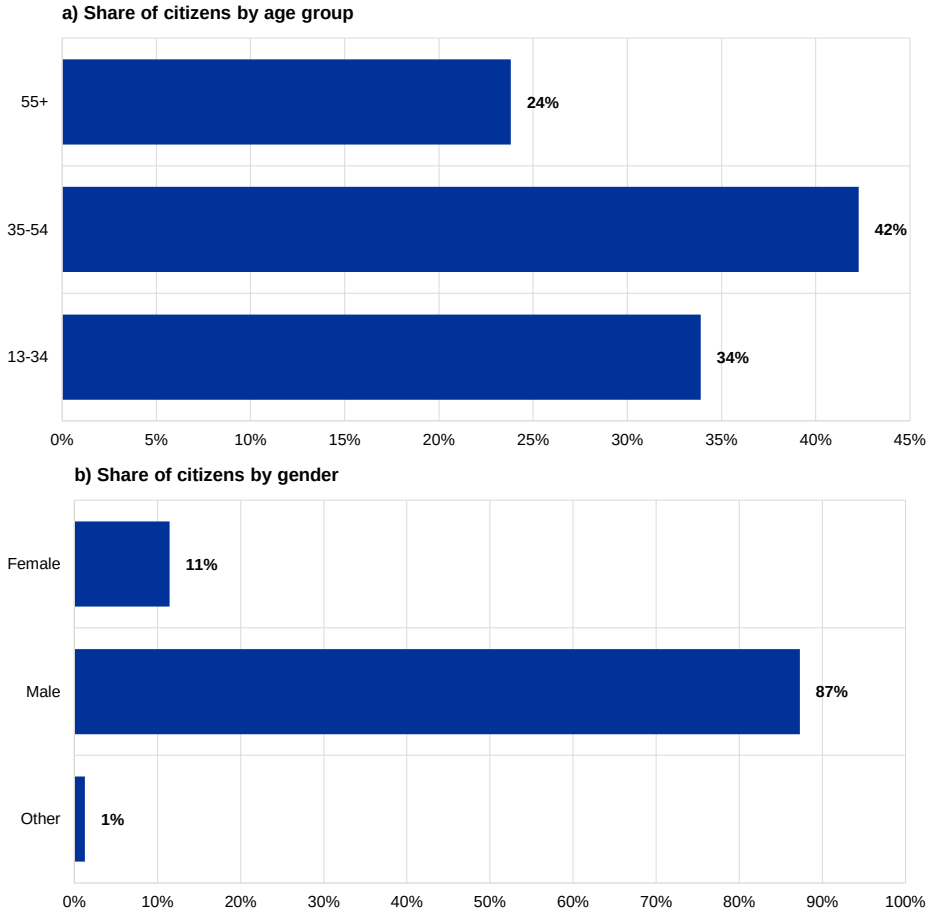
This bias goes beyond population size, with response rate per 100,000 inhabitants varying greatly in the euro area between Germany at one end (4.6) and Spain at the other (0.4) (see Chart A.2 in the Appendix). The broad gap between countries aggravates the issue of non-representativeness and makes it impossible to draw conclusions that are valid for individual jurisdictions, particularly where there are few responses.

1 These figures refer to respondents who declared their demographic characteristics. Approximately 2% of the sample did not reveal their gender and 1.7% did not reveal their age category.

2 See the European Commission's better regulation Toolbox, TOOL #54, "Conducting the consultation activities and data analysis".

Chart 1

Share of citizen respondents by gender and age group

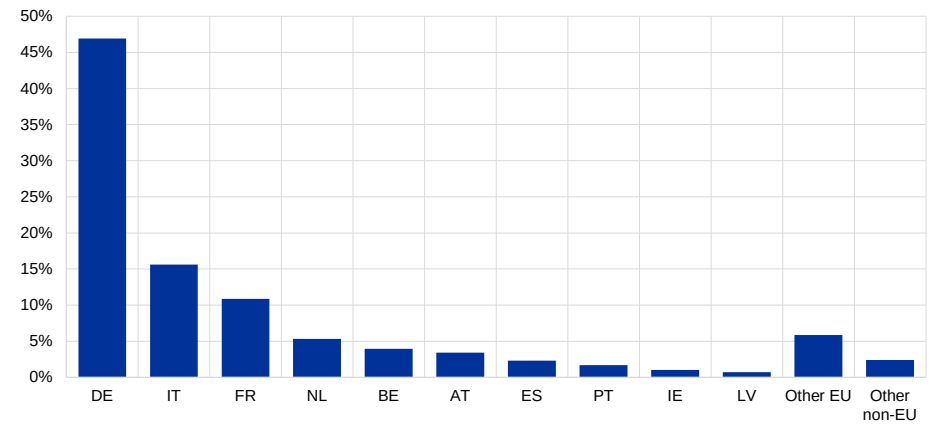


Notes: Details are not included for respondents who did not provide their age and gender. Percentages shown are rounded to the nearest whole number.

Chart 2

Share of respondents

(focus on the ten most heavily represented countries)

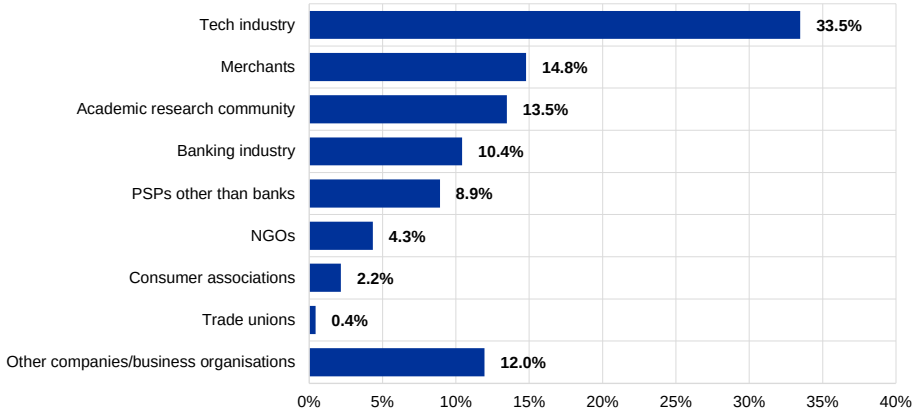


Note: Other non-EU includes any unspecified countries outside the EU.

The 7,761 citizens who participated in the consultation account for 94% of all respondents and provided 57,818 replies (an average of 3,212 per question[3]). The professional clusters comprise 460 respondents;[4] of these, the tech industry is the most heavily represented (one third of all professional respondents), followed by merchants, the academic research community, the banking industry, other payment service providers[5] (PSPs), non-governmental organisations (NGOs), consumer associations and trade unions (less than 1%) (see Chart 3).[6]

Chart 3

Share of professional respondents by sector



Some notes on the analysis

Respondents were allowed to answer all or only some of the questions. The number of blank responses increases further down the questionnaire.[7] In other words, the sample size varies according to the questions for which responses are given. Moreover, some replies were either off-topic or expressed no opinion. For this reason, the percentages indicated in the analysis of each question always refer to the percentage share of the respondents who gave a valid reply to that specific question. Details on response patterns can be found in the Appendix together with the share of "off-topic" answers.

3 Please refer to the Appendix for details of response patterns.

4 Professional respondents also include associations of professionals, whose replies may express the view of a range of respondents. This also affects the share of professionals by sector, in which the share of each category cannot reflect the actual number of professionals behind each association.

5 PSPs other than banks include electronic money institutions, payment institutions, payment initiation service providers and account information service providers.

6 12% of professional respondents could not be allocated to any of these categories.

7 Besides the possibility of respondent fatigue as they proceeded through the consultation, it is also possible that the number of blank responses increases because the second part included more technical questions intended primarily to capture the professionals' perspective.

2 Questions on the user perspective

We want to find out how people in the euro area would use a digital euro. We also want to understand the ways in which a digital euro could complement the existing payment methods you use. Your responses would help us design a digital euro that meets the needs of a broad range of users.

Preferred features of a digital euro

A digital euro should primarily serve the needs of society, providing features and services that ensure its users can benefit from an additional way of improving the current payments landscape. To understand what specific features of a digital euro should be considered more important to fulfil the needs of prospective users, a simple multiple-choice question (followed by a field to add comments) was introduced to gain insights into citizens' preferences in that regard.

How would you rank, in order of importance, the features that a digital euro should offer?

1. **I want to be able to use it throughout the euro area.**
2. **I want my payments to remain a private matter.**
3. **I want to be able to use it with my smartphone and at payment terminals.**
4. **I want to be able to pay even when there is no internet or power connection.**
5. **I want it to be easy to use.**
6. **I want to use a digital euro without having to pay additional costs.**
7. **I want it to take the form of a dedicated physical device.**
8. **I want it to be a secure means of payment.**
9. **I want my transactions to be completed instantaneously.**

Do you have any further comments about the ranking that you have indicated above?

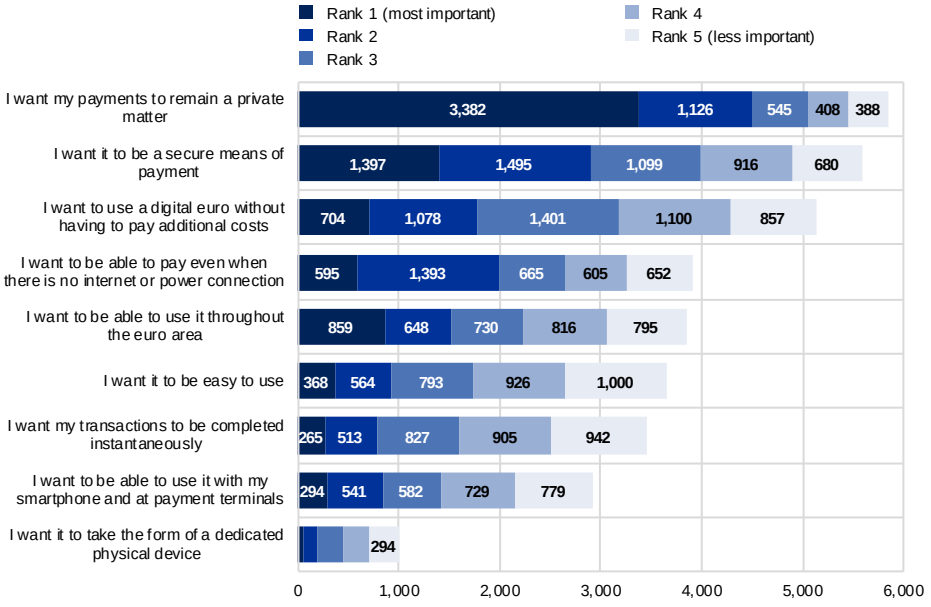
What the respondents want most from a digital euro is privacy (43%), security (18%), usability across the euro area (11%), the absence of additional costs (9%) and offline use (8%).

Looking at the preference for some digital euro features based on top five rankings (see Chart 4), privacy is followed by security, absence of additional costs, offline use and usability across the euro area. Ease of use, speed of settlement, integration with

current devices/terminals and the availability of an ad hoc device appear less frequently among the top five ranked features and sit at the bottom of this ranking.

Chart 4

Preference for some digital euro features based on top five rankings



Note: Number of respondents not shown for the option "I want it to take the form of a dedicated physical device": rank 1 (47), rank 2 (139), rank 3 (254), rank 4 (263).

Privacy emerges as the key feature that a digital euro should offer, according to respondents to the public consultation. This is confirmed both indirectly – by the presence of comments on the importance of privacy in the responses to most questions – and directly – by the choice of two in five citizen respondents to rank privacy first among the nine features proposed in this question.[8] Of the citizens who replied to this question, respondents who did not identify themselves as either male or female give the highest prominence to privacy, followed by female and male respondents. The preference for privacy is also high among citizens of all ages, but increases mildly with age: 39% of respondents under 35 years, 45% between 35 and 55 years and 46% of respondents aged 55 and over give the highest prominence to privacy. Chart 5 shows that, of the countries most heavily represented in the sample, Italy and Portugal are the only ones where less than a quarter of citizen respondents cite privacy as the most important feature.

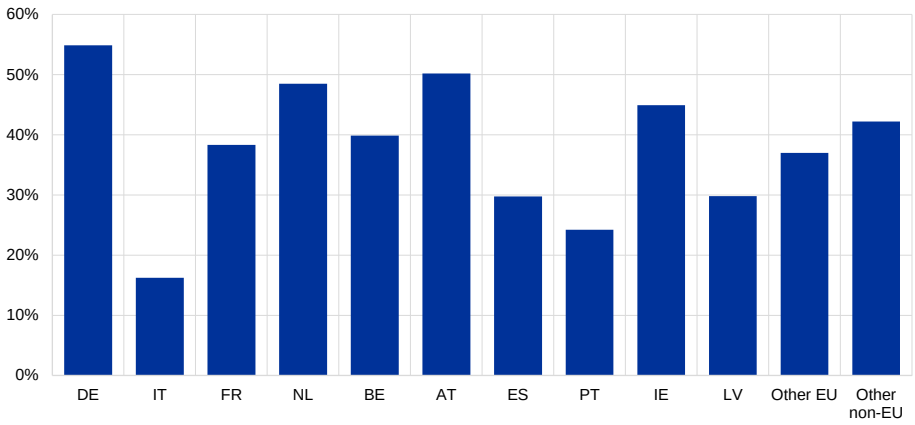
Most citizen respondents took the opportunity to elaborate further on their choice of features. About a third of them talk about the levels of confidentiality and privacy (see further details in the dedicated question on page 14). When commenting on fees and services, one in ten citizen respondents say that digital euro services should be free of charge for the end user, and roughly one in five state that a digital euro should support instant payments.

8 All percentages refer to the total number of respondents who assigned a ranking to at least one of the features.

Citizen respondents mostly mention safety, security, usability and the Eurosystem's commitment to maintain the availability of cash as key ingredients to foster trust in a digital euro and its support and adoption.

Chart 5

Share of citizens per country who ranked privacy as most important feature



A third of professional respondents rank privacy first. However, the shares of merchants and those who could only be classified as "other companies/business organisations" who favour privacy are even higher than for citizens. Chart 6 shows the complete picture of what would be the five most popular features of a digital euro for citizens and diverse types of professionals.

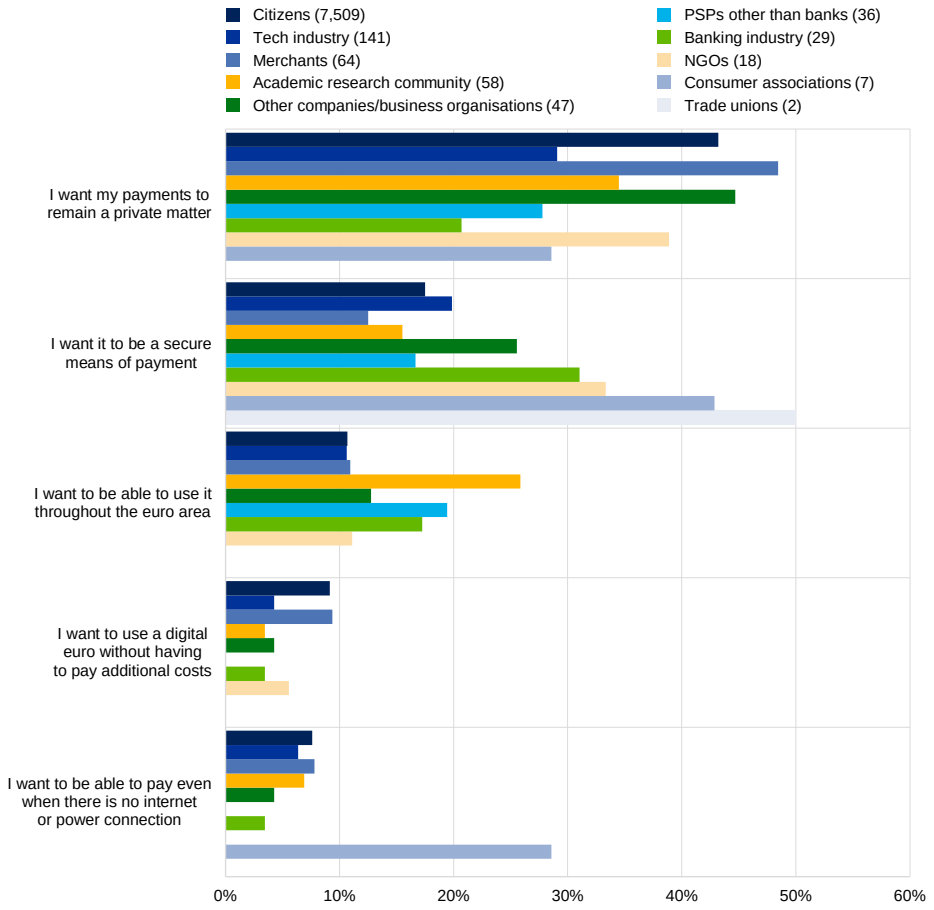
Besides privacy, around one in five citizen respondents in the sample show a consistent preference for security, whereas one in ten favour the usability of a digital euro throughout the euro area, closely followed by the absence of additional costs and usability offline. Again, this result is consistent across geographies and genders, except for Italy and Portugal where respondents rank security first and give lesser importance to privacy, additional costs and usability throughout the euro area. Less than 1% of respondents rank the possibility to use digital euro through a dedicated physical device as first choice.

Security is especially important among some professional clusters, especially consumer associations and trade unions, followed by NGOs and the banking industry. Integration throughout the euro area is notably favoured by the research community and PSPs. Usability offline is most popular among consumer associations.

Chart 6

Most important feature of a digital euro per type of respondent

(focus on the five most popular features; number of respondents in brackets)



Professional respondents highlight security and usability as features that would foster trust in a digital euro.

Before approaching the following question, participants in the survey were made aware that there are two approaches we can take to make a digital euro work: one that requires intermediaries to process the payment and one that does not. If the Eurosystem designs a digital euro that has no need for the central bank or an intermediary to be involved in the processing of every single payment, this means that using a digital euro would feel closer to cash payments, but in digital form – users would be able to make payments even when not connected to the internet, and their privacy and personal data would be better protected. The second approach is to design a digital euro with intermediaries recording the transaction. This would work online and allow broader potential for additional services to be provided to citizens and businesses, creating innovation opportunities and synergies with existing services. For example, it could make it easier to integrate a digital euro into currently available electronic banking services and applications. They were then asked to select which of the following they find most appealing:

1. **a digital euro focused on privacy and the protection of personal data, which can be used offline;**

2. **a digital euro with broader potential for additional services, allowing innovative features and other benefits for citizens and businesses;**

3. **a combination of both.**

Do you have any further comments regarding your answer to the question above?

Once again, most citizens in the sample opt for privacy, even if that would restrict usability to offline transactions and limit the alternative of receiving additional innovative services (see Chart 7) or even with a combination of both offline and online functionalities. It is worth noting that even a combination of the two options proves far less popular. Italy and Portugal (as well as Latvia) are once again an exception, since around half of respondents prefer having the option of a combination and only a third opt for an offline solution. The overall preference for an offline privacy-enhancing solution is consistent across age bands, and it increases with age at the expense of the hybrid option.

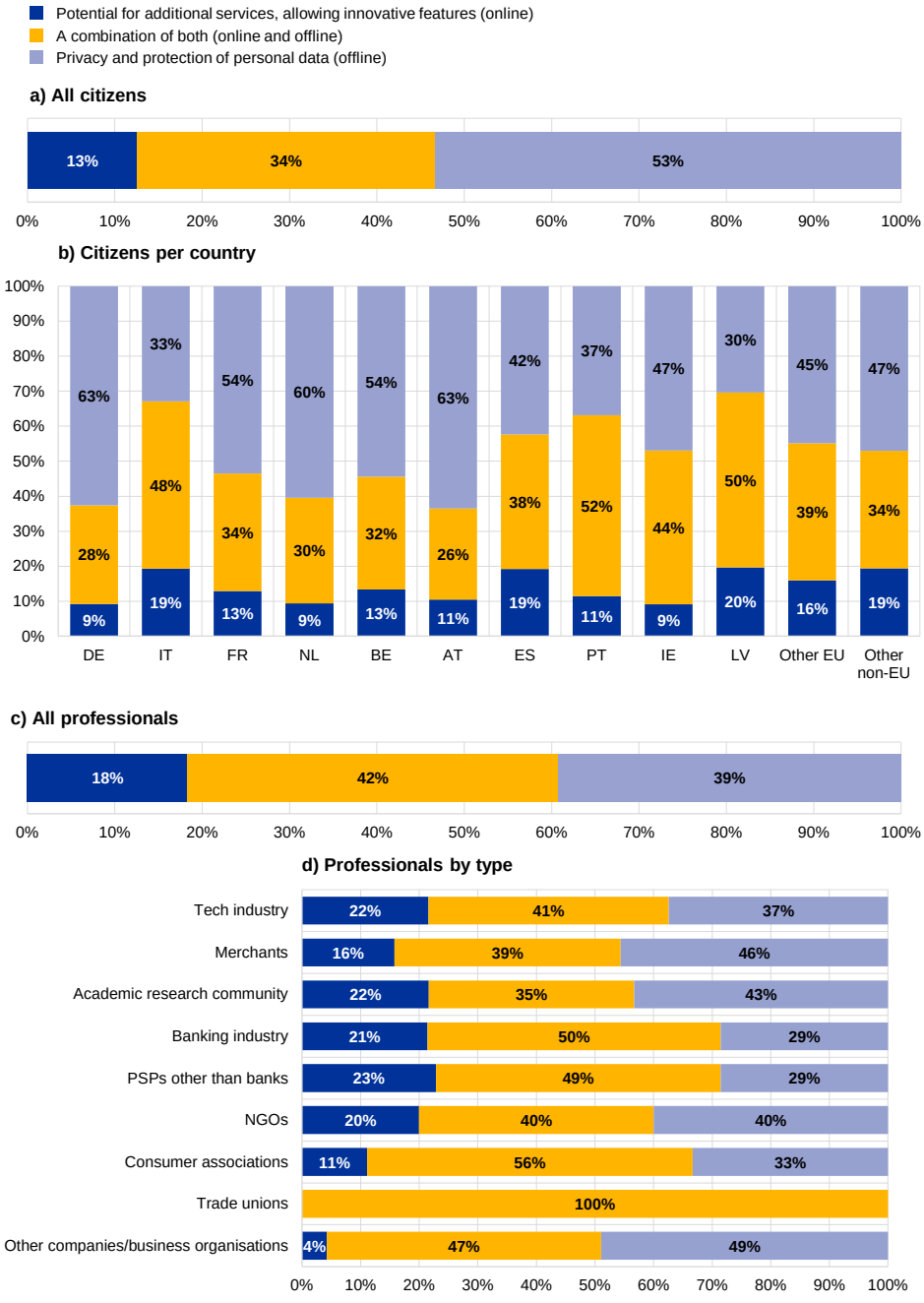
Many citizen respondents have taken the opportunity to elaborate further on their choice of model. A fifth of those citizens who elaborate on their preference for offline usability and a high level of privacy are against the involvement of intermediaries in the transactions, since they are afraid that their involvement could jeopardise end-user privacy and increase costs. At the same time, many citizens who prefer a digital euro with additional services and innovative features indicate that a strong focus on privacy could increase the risk of misuse.

Two out of five citizen respondents who elaborate on their preference for a combination of online and offline functionalities ask for privacy, while one in ten would like to choose the service level as well as the degree of privacy of their transactions. An even larger share raise security concerns related mostly to the devices used to store digital euro locally, as these could be damaged or stolen and for which a hybrid model with the need to connect periodically to an online service could mitigate the risks.

By contrast, two out of five professional respondents favour a hybrid model. Privacy is also popular among the sample of professional respondents, irrespective of their industry, while only around one fifth of them opt for additional innovative online services and functionalities.

Chart 7

Preference for privacy/offline, innovative solutions/online and hybrid solution



Notes: Percentages shown are rounded to the nearest whole number. Panel (b): focus on the ten most represented countries.

Of those taking the opportunity to elaborate further on their choice, almost half of professionals (especially merchants) are also of the opinion that a degree of privacy would be necessary for a digital euro to be adopted widely, irrespective of their preference for any of the three models. Among professional respondents that comment on their preference for a digital euro focus on privacy, more than a quarter indicate a preference for an offline digital euro with cash-like features. One in ten mention that a digital euro should follow a basic privacy-focused design, on top of

which intermediaries could then offer optional innovative services in line with what is described in the Eurosystem report, while one out of seven do not consider financial intermediaries well positioned to foster innovation.

Among professionals who provide further comments on their choice of innovative features, almost one in five think that a digital euro ecosystem composed of intermediaries could minimise the technological hurdles associated with distribution of a digital euro and on-boarding processes. Nevertheless, an almost equal share are of the view that innovation can be provided without relying on intermediaries, as is the case with a decentralised model backed by blockchain technology.

Finally, professionals providing additional information on their choice of a combination of privacy and innovative features mainly state that it is ideal for end users to choose their service level depending on their needs and that privacy and simplicity should be provided as a basic design, while advanced services provided on top by private entities would foster innovation.

It is worth noting that, in their replies, citizen respondents often refer to the characteristics of crypto-assets such as bitcoin, although a digital euro would be very different in terms of stability of value, data protection, transaction costs and public protection. Professional respondents instead refer to the innovation that a digital euro would potentially bring to the payment market (see also panel (a) of Chart A.3 in the Appendix).

Simplicity of use is especially important to ensure that all segments of the population can use a retail payment solution such as the digital euro, with the aim of fostering the participation of all citizens and businesses in the increasingly digital economy. The Eurosystem finds this aspect of the design of a digital euro to be especially important, and participants in the public consultation were therefore asked to provide their input on this.

What user features should be considered to ensure a digital euro is accessible for people of all ages, including those who do not have a bank account or have disabilities?

Almost half of citizen respondents confirm that the simplicity of the end-user solutions for a digital euro is the most relevant feature to assure broad accessibility. The most frequently cited solutions are simple payment cards, smartphones featuring inclusive payment applications and the possibility to use QR codes, NFC, digital wallets (not necessarily linked to any bank for the unbanked) and even dedicated payment devices.

This view is shared by a similar proportion of professional respondents pointing to simplicity as the most important feature to be considered, while not specifying what hardware or software solutions could be used to this end. Professional respondents are mindful of the possibility that the need for internet connectivity and the associated costs could make a digital euro less inclusive.

Only a few respondents include privacy among the features to be ensured to support the inclusiveness of a digital euro solution. A higher share of professional respondents

than citizen respondents mention security and safety as prominent features to broaden the range of citizens who would be able to use a digital euro.

Do you envisage any challenges associated with a digital euro that would prevent you or others from using it? If so, what are they?

Among citizen respondents, the key challenges are related to privacy (especially for respondents under the age of 55), simplicity and safety issues such as cyber threats. One in ten citizen respondents are particularly concerned about lack of knowledge for using digital means of payment. Similarly, it is suggested that the public may not trust, accept and have confidence in a digital euro unless data protection rights are ensured, technological barriers are kept to a minimum and the fear of losing money in wallets is minimised.

A fifth of professional respondents identify challenges in the poor internet coverage in some locations, and an equal share flag possible reluctance to use a digital euro out of fear of concentration of power. Many mention difficulties that some people might have in distinguishing central bank money from commercial bank money. Others stress the two-sided nature of the payments market, in which consumers and retailers rely on each other's adoption of a payment instrument to be able to use it to the extent they would like. Almost one in five of professional responses point to challenges of achieving satisfactory levels of safety and security and the possibility that users will not be inclined to use a digital euro unless those worries are addressed. Many professional respondents express concerns about privacy. Almost a tenth of professionals perceive no specific challenges.

3 Questions on financial, payment and technology professionals' perspective

We want to hear from experts working in the financial and technology industries so that we can assess how a digital euro could be provided safely and efficiently. We want to make sure that its design would not inadvertently constrain industry-led solutions aimed at providing additional features or services which might also benefit citizens. We would also like to understand what role you or your organisation could play in facilitating or encouraging the use of a digital euro as an effective complement to cash.

Provision of digital euro payment services

From the Eurosystem's perspective, the concern for privacy expressed by respondents to the consultation does not come as a surprise. Privacy in its different forms, from sheer confidentiality of data to anonymity, was covered in the Eurosystem's "Report on a digital euro". The inclusion of a specific question on this topic was motivated by the need to balance the individual right to privacy with the need to prevent illicit activities that could harm broader society, in ways that will ultimately be mandated by the applicable legislation.

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?

Faced with the issue of money laundering and the financing of terrorism, the sample of citizen respondents is able to more precisely qualify the preferred level of privacy indicated in the analysis so far.[9] Two in five suggest that digital euro transactions should be visible to either intermediaries or the central bank, which would effectively allow the application of anti-money laundering and combating the financing of terrorism (AML/CFT) requirements. Almost one in ten citizen respondents support selective privacy, where lower-risk small payments under a threshold would remain fully private. About the same share suggest that, following the initial identification of a given user, all transactions should then be private, often referring to offline use and similarities with cash. Only less than one in ten ask for anonymity, thereby making the application of AML/CFT requirements impossible. Blockchain is considered by one in ten respondents as the most obvious solution to ensure compliance with know your customer (KYC) and AML/CFT rules while still providing a certain level of privacy.

9 The terminology used in this report is in line with that used in the Eurosystem's "Report on a digital euro", and responses have been categorised accordingly whenever different terminology was used to reflect the same concepts: anonymity is defined as where the legal identity of users is not verified when they access a service; selective privacy describes solutions whereby a user is identified but data contained in certain transactions (e.g. low-value payments) are not shared with all actors in the payment value chain; full privacy indicates that such actors do not receive payments data independent of the type of transaction; full transparency is defined as where all payments data are shared with actors in the payments value chain.

Only one in ten professionals (mostly in the banking industry) consider data transparency to be of upmost importance. A quarter support selective privacy under which transactions below a given amount would stay private (mostly credit institutions and PSPs). Spending limits on the value or the number of transactions over a certain timeframe are suggested by one in ten of the respondents to complement or substitute for selective privacy. Transactions above the given limits or of a given type could be automatically denied or could trigger an authentication procedure. One in ten are supportive of full privacy of transactions, while only a few are in favour of full anonymity.

Respondents of all types refer to technological precautions (e.g. distributed ledger technology (DLT), encryption using various techniques such as zero-knowledge proof or hashing) or authentication measures (e.g. strong authentication, one-time codes, passwords, e-signature, ID or physical recognition) as a way of protecting data.

The Eurosystem believes that supervised intermediaries should, alongside their role as obliged entities, play a significant role in the provision of digital euro services and sought views on how that could best be done.

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

The vast majority of citizen respondents (73%) see a role for intermediaries, with a clear preference for their role in introducing innovative services and efficiency-seeking solutions in general, as well ensuring appropriate interfacing with current payments and providing information about the use of digital euro. Less pronounced views are almost equally split among those who see their involvement as gatekeepers, interface providers or mere distributors of digital euro. Less than one in ten respondents expect intermediaries to act as settlement agents.[10] Respondents who do not envisage a role for intermediaries are mainly concerned about costs and privacy.

The view that intermediaries have a role to play in the provision of digital euro services is equally supported by professional respondents (80%). Around two out of five suggest that intermediaries should be responsible for introducing innovative solutions, ensuring service efficiency and promoting or providing information about the use of digital euro. Some professional respondents mention specific roles for intermediaries, in providing personalised, convenient and frictionless value-added services for end users, in educating users, in helping to minimise overall costs and the carbon footprint, and in incentivising the adoption and use of a digital euro.

A quarter of professional respondents see intermediaries as gatekeepers (suggested by most banks), while a fifth of them (again mainly among banks) see a key role for them as the guardians of AML/CFT regulation compliance. Many professional respondents argue that intermediaries' involvement in user on-boarding, including identification, authentication and authorisation, would ensure resilience across the

[10] As described on page 37 of the Eurosystem's Report on a digital euro, "[t]he basic functions of gatekeepers are […] similar to those of commercial banks in the primary provision of cash to the economy. Settlement agents, conversely, would in addition execute digital euro transactions on behalf of their customers and may provide storage facilities (akin to digital vaults) for digital euro holdings. These holdings shall, however, remain available to end users as a Eurosystem liability at any time."

entire ecosystem, give greater security to the safekeeping of a digital euro and mitigate operational risks.

A quarter of professional respondents are of the opinion that intermediaries should provide the interface (app, wallet, etc.) required to interact with the digital euro system and to maximise the ease of use and accessibility of a digital euro. Unlike citizens, more than one in ten professional respondents imagine intermediaries being involved as settlement agents.

A fifth of professional respondents (mostly NGOs) see no role for intermediaries in the provision of a digital euro. These participants highlight the importance of a digital euro as an independent means of payment that should be totally under the control of the user. Some professional respondents reiterate the concern that the involvement of intermediaries might bring higher costs, privacy concerns and social exclusion.

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?

When asked about the specific services that intermediaries could provide, around one in ten citizens suggest programmability, followed by functionalities normally offered by current payment solutions such as instant payments and custody services.

The services suggested by professional respondents are in line with those mentioned by citizen respondents, albeit with even greater support for innovative functionalities (especially programmability features such as delivery versus payment with assets recorded via distributed technologies, e-commerce escrow services in retail payments and machine-to-machine payments). Moreover, existing financial services such as savings, loans and other payment and custody services for a digital euro or interconnecting services with private money through wallet functionalities provided by private entities are often mentioned. More than one in ten professional respondents emphasise that additional services should be driven by market forces in a competitive environment and suggest that the Eurosystem could design a digital euro as a platform on which the private sector can develop innovative solutions.

On the other hand, though, one in five citizen respondents warn that additional services would increase the complexity of a digital euro and that the features highlighted in relation to inclusiveness, such as simplicity and usability, safety and security and low or no cost, should be prioritised over additional services. These words of caution are echoed by more than one in ten professional respondents (especially merchants), who say that additional features might increase the probability of undetected weaknesses and, undermine the security and robustness of a digital euro, and should therefore be avoided. One respondent suggests: “The main feature of a medium-of-exchange offered by the ECB is to be trustworthy which requires safety, robustness and predictability in operation”.

Citizens who replied to this question often refer to the issue of tax evasion (see panel (c) of Chart A.3 in the Appendix), generally keeping a negative tone/sentiment and

suggesting a digital euro should be used to counter this, while at the same time stressing that payments are part of their private life.

The provision of services related to a digital euro by intermediaries would require a certain level of reassurance that users are duly protected. This might already be captured in current legislation or might need different requirements, which could be specific to the digital euro ecosystem.

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.

The sample of citizens who participated in the consultation seem to find reassurance in the possibility of intermediaries being subject to some form of regulatory requirement to provide digital euro services. The most important reasons relate to privacy concerns, misuse of data and security issues. Whereas two in five explicitly ask for some form of supervision or oversight, only a few oppose such requirements.

This view is shared among professional respondents, where the vast majority support the application of standard licensing and related prudential requirements (mostly credit institutions and PSPs). Those who are against such requirements (mostly the tech industry) share concerns such as higher costs, less competition and limits to innovation, and highlight that requirements should be commensurate with the type of service provided (e.g. non-financial services such as technical providers, lower risks associated with the digital euro depending on the back-end infrastructure).

More than one in ten (especially among credit institutions) ask for a level playing field between all intermediaries offering the same type of service, upon the “same risk, same activity, same treatment” principle. Some mention the need to ensure harmonised rules across the euro area. One respondent mentions “If at all non-banks or non-licensed PSPs are to play a role in the intermediation of the Digital Currency, this must be done subject to strict supervision, particularly in respect of Anti-Money Laundering and Counter Terrorism Financing rules”.

Professional respondents also cite the need to enforce AML/CTF rules (mostly credit institutions) and GDPR. Some mention possible requirements for IT infrastructures. Several respondents (mostly credit institutions and other PSPs) consider that supervision is essential to ensure that rules are properly implemented by intermediaries.

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?

Half of citizen respondents reply that using blockchain would be a solution. Technical solutions in general were cited often, especially in the form of cryptography (almost a fifth of the sample) and the provision of duly licensed software or hardware solutions to supervised intermediaries and end users (e.g. mobile applications or cards). Some citizen respondents mention that all systems used by intermediaries and users should

be provided by the central bank, while half also specifically call for a limited or no role for intermediaries. One in ten citizens suggest that regulation and supervision would be the right tools.

The answers from professionals differ between the tech industry and other professionals. Tech professionals mainly refer to technical solutions based on blockchain, cryptography and licensed software and hardware. Credit institutions, academic research institutions and PSPs also mainly cite blockchain, but also support regulation and supervision. Moreover, one out of five of these three types of professional mention that the central bank should provide the system used by intermediaries and users, meaning that the central bank would be responsible for any technical faults and/or counterfeiting. Lastly, almost one in ten of all professionals favour the introduction of technical audit checks in real time.

It is worth noting that citizens refer to blockchain (see panel (b) of Chart A.3 in the Appendix) much more often than professionals, even those from the tech industry.

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?

Around a third of citizen respondents suggest that a digital euro should be integrated into the existing payments infrastructure, with many proposing integration through banking and payment services where the digital euro would be stored in a separate account from private money. One in ten also see value in integrating a digital euro through open source technologies or DLT/blockchain, mostly due to the perceived greater likelihood of fostering innovation. Among the concerns related to technology and standards, the most important issue is safety, followed by rate of adoption, scalability, compliance and pace of innovation.

Around half of the professional respondents agree that the digital euro should be integrated into existing banking and payment solutions. Of the integration solutions mentioned, the most prominent are mobile and online payments and banking solutions, API, wallets, QR codes and/or smart devices (cards, phones). Almost one in ten mention that integration should also encompass POS and ATM terminals. The main challenges to such integration identified include (cyber) security, interoperability, scalability, standardisation and the cost of integration, and compliance with regulation.

PSPs other than credit institutions and the tech industry believe that the integration of a digital euro could benefit from DLT/blockchain technology since it would be more likely to foster innovation, while credit institutions and merchants do not make any reference to this technology. All agree that mobile and online banking and existing payment solutions are best positioned to allow for integration. Credit institutions are the most concerned about integration costs, while merchants point to compliance and reporting obligations as the most challenging issues. On the other hand, PSPs and the tech industry see scalability, security and interoperability as the main challenges of integration, according to professional respondents.

Technical solutions

Besides the features to be provided with a digital euro, the Eurosystem needs to identify the right set of tools to ensure that these can be provided in the most effective way, delivering what users would require while ensuring the appropriate level of safety and efficiency.

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)?

Almost half of citizens in the sample of respondents consider that the best way to facilitate cash-like features in the use of digital euro is to provide adequate end-user solutions. In particular, a quarter of the respondents prefer hardware, primarily (smart)cards or a secure element in devices such as smartphones. Nearly one in ten citizens prefer to have a software solution like a wallet or a mobile application that would allow for cash-like use of a digital euro. Only few of them consider that a combination of software and hardware solutions should be provided.

Around a third of citizen respondents believe that cash-like features should be supported by the back-end infrastructure, especially if a decentralised infrastructure (including DLT/blockchain) is considered.

The majority of the professional respondents are of the opinion that end-user access solutions are best suited to facilitate cash-like features, either alone or in combination with appropriate back-end infrastructure. A third of professionals propose a combination of software (e.g. wallet, app) and hardware solutions (e.g. card, secure element in a device, dedicated storage or device), while about one in five specify that (smart)cards would be the preferable access channel; a similar share support wallets and some indicate smartphones.

Almost half of professional respondents consider the back-end infrastructure to be a promising solution for this purpose, with one in five referring to decentralised infrastructure which could be built on DLT/blockchain, while only a few respondents refer to ATM and/or card networks, mostly in combination with the use of cards.

For offline use, both (smart)cards and wallets with offline functionalities are suggested by around one in ten professionals, while recognising emerging challenges such as the prevention of double spending and payments flow management until online validation, for which almost a tenth of respondents suggest setting limits on the number and/or value of offline transactions. Another tenth of professional respondents mention that cryptographic solutions (e.g. zero knowledge proof in combination with the DLT/blockchain) could be used to enhance privacy.

Of the cash-like features mentioned by the professional respondents, the most prominent are offline connectivity, privacy and confidentiality and accessibility.

Overall, both citizens and professional respondents agree that specific end-user access solutions would be the best way to facilitate cash-like features in the digital

euro, while also recognising the potential of back-end infrastructure to support similar solutions.

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

Around a third of citizen respondents suggest that all available software and hardware solutions should be used for a digital euro. About half of them would prefer specific hardware solutions, mostly adaptations of mobile phones or smartcards and wearables (e.g. smartwatches). A fifth express a preference for software solutions on existing hardware, such as wallets and mobile applications. A small share of respondents highlight the safety and security of a digital euro, especially with regard to possible software and hardware solutions.

Half of professional respondent believe that hardware solutions could be adapted for a digital euro, with a relative majority viewing mobile phones as better positioned, followed by computers and chip systems in physical devices, but also smart devices, including smartphones, smartcards and wearables. Another quarter of the professional respondents are of the opinion that software solutions are more likely to be adapted for a digital euro, especially wallets and mobile applications. Some of them referred to NFC/Bluetooth and QR code technology.

Safety and security are also considered important aspects for any software and hardware solution by the professionals and were highlighted accordingly. Additionally, the solutions should be simple in order to promote accessibility. Finally, almost one in ten also mention that end-user access solutions must ensure privacy and confidentiality, while complying with regulation, and allow the market to innovate and propose solutions.

Citizen respondents show a strong preference for being able to use a digital euro on their mobile phones (see panel (d) of Chart A.3 in the Appendix), whereas professional respondents point out a broader range of hardware and software solutions.

Limiting the uptake of a digital euro as an investment

As the digital euro should be designed to be an attractive means of payment, the Eurosystem needs to identify the appropriate tools that could be used to avoid its excessive use as a form of investment and the associated risk of large shifts from private money to digital euro.

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?

Most citizen respondents specifically mention the need for either holding limits or tiered remuneration, or a combination of both, to control the amount of digital euro in circulation, while one in ten refer to spending limits. About a third of citizen respondents are against the introduction of any tools to restrict the amount of digital euro in circulation.

Most professional respondents agree that the amount of digital euro in circulation should be limited, with an almost even split among those suggesting holding limits, tiered remuneration or a combination of both. In particular, tiered remuneration is popular among the research community, whereas holding limits are especially favoured by credit institutions. Nearly half of merchants (online and physical merchants and merchant associations) are against any tool restricting the amount of digital euro in circulation.

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?

When referring to the specific topic of applying tiered remuneration to digital euro used offline, most respondents suggest that an offline digital euro should simply not be subject to this. A tenth of citizen respondents suggest that tier-1 holdings should be large enough to cater for standard retail payment needs. A third of them suggest having delayed online settlement of small amounts transferred offline.

The possibility of delayed settlement is also mentioned by one in five of professional respondents, who often point out that the risk of delayed settlement has to be borne by someone (merchant, intermediary or central bank). Indeed, a fifth of professionals do see challenges for remuneration on an offline digital euro. For this reason, one in ten professionals suggest that tiered remuneration should only apply to online holdings but not offline holdings of digital euro. Technology companies seem to be more optimistic about the trade-off between remuneration and offline use: two in five say there are possibilities depending on design (nearly three in ten for other professional respondents).

A fifth of the professional respondents who assumed remuneration would apply mention the possibility of a first tier for retail payments and a second tier with penalty rates to disincentivise large holdings (mostly credit institutions). One in seven (especially credit institutions) suggest that the way interest rates are set should be easily understandable and linked to monetary policy, or even be enshrined in law. A similar share of respondents suggest that the thresholds and remuneration should be differentiated by category of users. For example, merchants would have a higher threshold than consumers in order to receive incoming payments.

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?

The majority of citizen respondents who assumed holding limits would apply mention that automatic transfer to a private money account could be implemented to ensure that digital euro payments are received, although they would breach the limit if they

were simply added to previous digital euro holdings. Whereas about one in six ask for thorough integration within the systems of their banks, a nearly equal proportion highlight the need for user consent, mainly requesting that incoming transactions can be put on hold if the payee does not want to link digital euro payment to a bank account.

An overwhelming majority of professional respondents who support holding limits mention that the excess amount could be automatically transferred to an account in private money. When specifying how this should be achieved, integration of digital euro services within commercial bank money system is indicated by nearly one in five respondents, the majority of which refer to the need for an application aggregating information and offering custody and payment services in both digital euro and private money. A few suggest that the waterfall from digital euro to commercial bank money holdings should also work in the opposite direction, giving users the opportunity to replenish their digital euro account or wallet automatically when they make a payment.

One in ten professional respondents are sceptical of automatic transfers, mainly due to privacy and accessibility concerns relating to the need to provide a private money account, to competition considerations and the implied dependency on banks, and to the effect of this complicating balance sheet management at financial institutions. Like citizen respondents, professionals also highlight the need to ensure appropriate notification of users and to seek their consent for money transfers between their digital euro and private money holdings.

International payments

A digital euro could help to address current inefficiencies in cross-currency and cross-border payments through improved interoperability across countries and their respective currencies. The Eurosystem would need to identify the appropriate way to achieve enhanced efficiency in international payments while addressing unwanted consequences for local and international economies.

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

Citizen respondents show great interest in the speed of cross-border payments (more than a quarter of respondents highlight the importance of instantaneous settlement), cost (a quarter of respondents mention that costs should be low) and exchange rate transparency. One citizen mentions that a digital euro should feature “A real time currency converter” and another suggests it should be “Connected to other cbdc’s across the world”.

Professional respondents focus mostly on the issue of interoperability and the role of intermediaries, either as settlement agents or to a lesser extent as gatekeepers. For a fifth of them (particularly half of consumer organisations and a quarter of merchants), cross-currency transactions involving digital euro should take place at low or no cost. Compliance with regulation, including most notably the trade-off between privacy and AML requirements, is also flagged as particularly relevant (and notably half of banks).

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

A large majority of citizen respondents state that the use of digital euro outside the euro area should not be limited provided that safety and security are ensured, while one in ten consider that it could be used cross-border but with limits (when the digital euro is first introduced, and then to be lifted gradually thereafter). Finally, almost one in ten come out against the use of digital euro outside the euro area as they could not foresee any relevant benefits.

The majority of respondents among professionals are also of the opinion that use of a digital euro should not be limited abroad and they see several benefits from its cross-border use, also strengthening the role of the euro as an international means of payment. Although international use of a digital euro is desirable, professional respondents recognise that some challenges and risks may emerge (especially two out of five from the tech industry and one in ten PSPs other than credit institutions).

One out of five professional respondents state that the use of digital euro outside the euro area should be subject to limits (two in five of tech industry respondents and nearly one in four in the banking industry). Their concern is to prevent potential macro-financial risks and criminal use, by means of caps on foreign holdings, transactions, or both, and by requiring mandatory registration of digital euro outflow from the euro area. Nevertheless, a small share of the professional respondents consider that it will be difficult to limit digital euro use.

Finally, one in ten of the professional respondents do not agree with the digital euro being used outside the euro area (including nearly a quarter of tech industry respondents and merchants).

Contribution to the future development and launch of a digital euro

Gauging support from prospective end users and the market players who could be involved in the provision of digital euro services is crucial to assess the actual business case for issuance. The Eurosystem takes great interest in hearing the views of the public to ensure that any change to the form of money and payments that the Eurosystem provides remains firmly rooted in citizens' trust.

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?

Most citizen respondents say they will be ready to support a digital euro, for instance by simply adopting it, testing it or contributing to its design. A quarter of them (especially respondents aged 55 and over) say they would not support it, because they are either unwilling or unable to do so. Finally, only a minority would actively oppose the issuance of a digital euro, mainly because they do not believe in the Eurosystem's commitment not to use a digital euro as a tool to enforce deeply negative interest rates and to maintain the availability of cash.

A substantial share of professionals responding to this question mention their role in supporting the digital euro through its usage, promotion or research. A quarter of the professionals are willing to provide technical support for the design and uptake of a digital euro, through either end-user access solutions (especially software but also hardware) or design and infrastructure development. Only a minority of professionals (mainly merchants) state that they would not support a digital euro because they are against its issuance.

4 Conclusion

The Eurosystem welcomes the high level of participation in the public consultation and notes with great interest the views of the respondents. Any form of central bank money should accommodate the evolving needs of the general public and the economy at large. At the same time, considerations on the benefits and challenges of issuing a digital euro, and its possible design, are open questions that are best answered taking into account the input of all stakeholders. To this end, reaching out to the public at an early stage in the digital euro assessment phase enables us to benefit from such insights from the outset.

Although not representative of the European population as a whole, the input received from citizens and professionals signals that privacy, security, usability, low cost and accessibility are among the most popular features that respondents expect from a possible digital euro. Most respondents stress the value of privacy, often acknowledging requirements to avoid illicit activities while protecting the confidentiality of payments data.

The vast majority of respondents see intermediaries playing a role in the digital euro ecosystem, mainly as a way of enabling the introduction of innovative and efficient services and facilitating integration with existing offerings.

Mixed views are expressed on the use of tools to avoid unwanted macroeconomic consequences, which is a technical topic but with a substantial amount of public interest. Generally, respondents expect cross-border and cross-currency payments to be supported in a fast, interoperable and low-cost manner.

Overall, most of the respondents are willing to support a digital euro, especially given the Eurosystem's commitment ever since its public engagement on the topic began that it would not use a digital euro to either discontinue cash or lower interest rates in the economy.[11]

The responses from the public consultation provide valuable input to the Eurosystem's ongoing assessments and upcoming decisions on a possible digital euro, even though it is accepted that the sample of respondents is not representative of the European population. At the same time, experiments to assess the strengths and weaknesses of different design options and further analysis of the policy implications of a digital euro are necessary to obtain a comprehensive assessment of the technical input received.

This analysis does not pre-empt decisions, reach conclusions or commit the Eurosystem to provide a digital euro of any kind. Nor does it prevent the Eurosystem from further investigating and engaging with the general public and relevant stakeholders on the topic of a digital euro.

---

11 See for instance the Eurosystem's Report on a digital euro (specifically the Foreword and Requirement 12); A digital euro for the digital era (introductory statement by Fabio Panetta, Member of the Executive Board of the ECB, at the ECON Committee of the European Parliament); and Evolution or revolution? The impact of a digital euro on the financial system (speech by Fabio Panetta, Member of the Executive Board of the ECB, at a Bruegel online seminar).

Appendix

Methodological note

Response languages were identified on the basis of the language indicated by respondents and adjusted whenever such indication was identified as erroneous. Next, text answers in each language were fed into a machine translation tool. It was necessary in some instances to correct wrongly translated words.

The unstructured nature of the core data of this analysis – i.e. open questions – necessitated a text analysis approach. A quantitative analysis was conducted on the English-language texts (both translated and original), and a qualitative analysis was run in parallel to validate the results.

Each question required a different type of analysis and, to a lesser extent, different standard pre-processing operations, such as transforming all words to lower case, removing punctuation marks, numbers, separators and stop words (“the”, “and”, “of”, “for”, etc.) and stemming (the process of reducing inflected words to their root form). For ease of readability, the inflected word root forms are represented in the word clouds in the form of the most common inflection.

Dictionary approaches, frequency analysis, structural topic models and support-machine classifiers were used to complement and validate the classification involving human coding. The results obtained were usually displayed in the charts using a dictionary approach for an easier interpretation.

After responses were classified, a regression analysis (logit or multinomial logit) was run on the original contributions to understand the link between socio-demographic characteristics and the probability of being in one category or another. All regressions include gender, age category (under 35, between 35 and 54, 55 and above), country group (northern EU Member States, southern EU Member States, eastern EU Member States and non-EU countries) and sector (academia and education, public sector and civil society, finance industry, private sector, and other).

After the responses were classified, the demographic categories (age category, country group and sector) were analysed as percentage shares.

Response patterns

The consultation was made available to the public on the ECB’s public consultation website, as shown in the Appendix. Eighteen questions were presented on six pages, divided into two sections: (i) user perspective (questions 1-4 on pages 2 and 3), and (ii) financial, payment and technology professionals’ perspective (questions 5-18 on pages 4-6) (see panel (a) of Chart A.1). While the first section included two multiple-choice questions (question 1 and question 4), the second section only offered open questions. All participants were given the opportunity to answer all the questions,

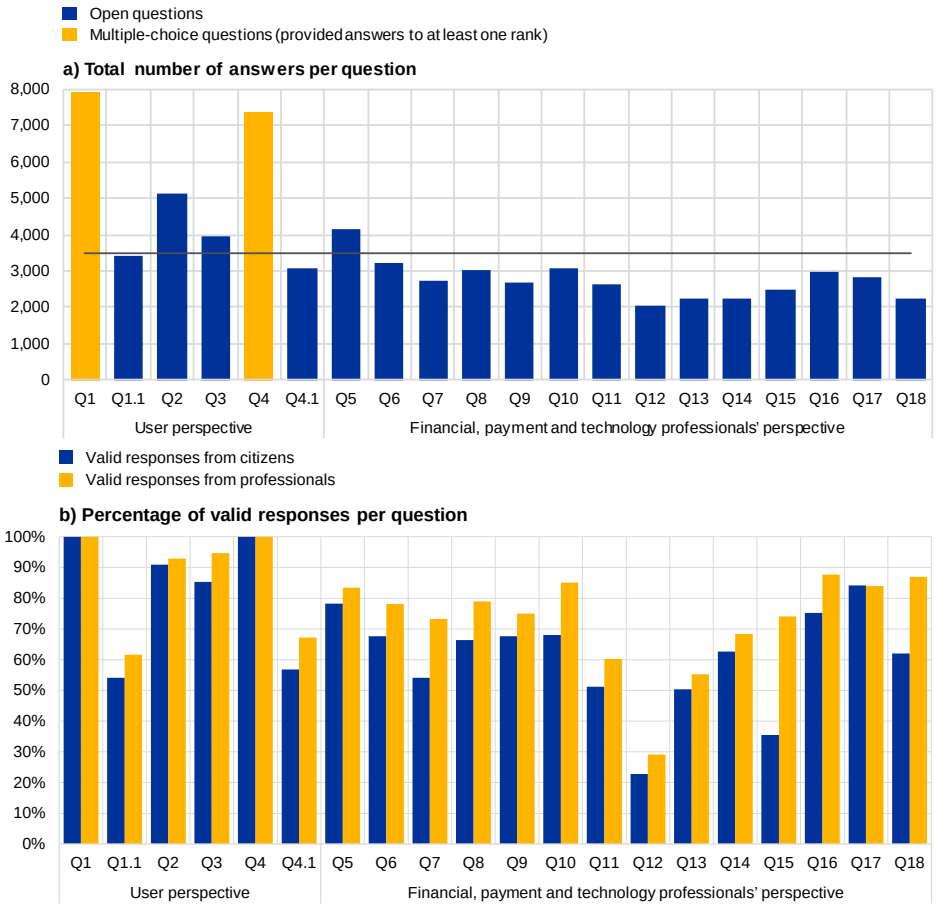
regardless of the socio-demographic information they provided, which led to a relatively equal distribution of citizens and professionals across both sections. However, this also means that the bias of citizens representation has a strong impact on the replies to all questions.

On average, more than a third of all participants answered all questions, with a specific focus on the multiple-choice questions (question 1: 96%, question 4: 90%). No significant preference among age groups, gender or country of residence is identifiable.

Answers were considered valid unless out of scope (including when due to clear miscomprehension) or reflecting no opinion. Based on the sample of citizens and the complete analysis of professionals' responses, professionals provided slightly more valid answers than citizens (see panel (b) of Chart A.1). While on average two out of three answers provided by citizens were valid, three out of four answers from professionals were valid.

Chart A.1

Total number of answers (top panel) and percentage of valid responses (bottom panel) per question]



Additional graphs

Chart A.2

Number of respondents per 100,000 inhabitants

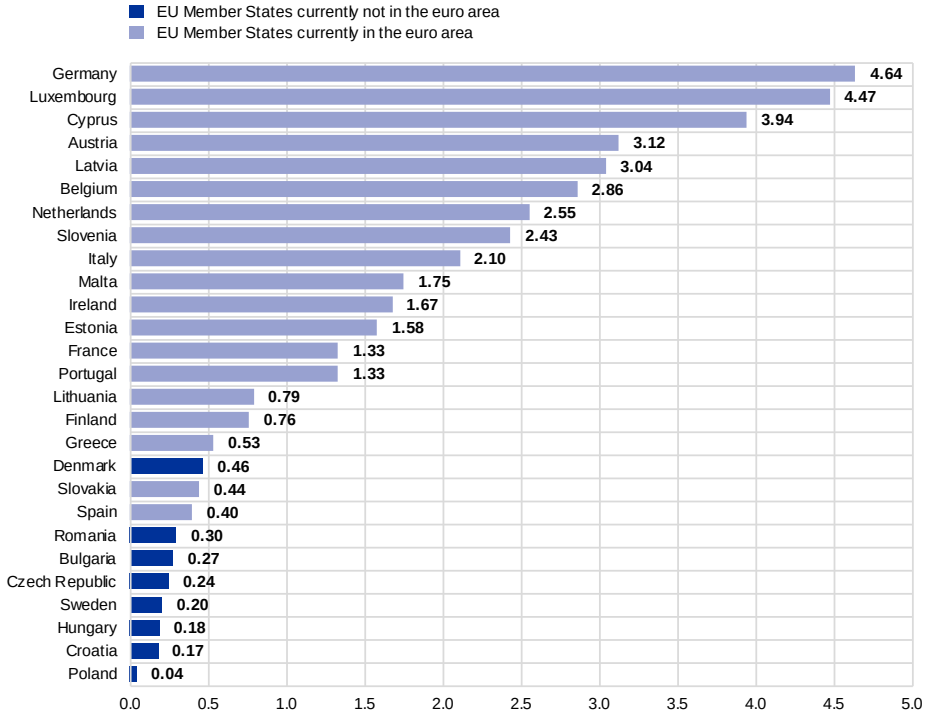
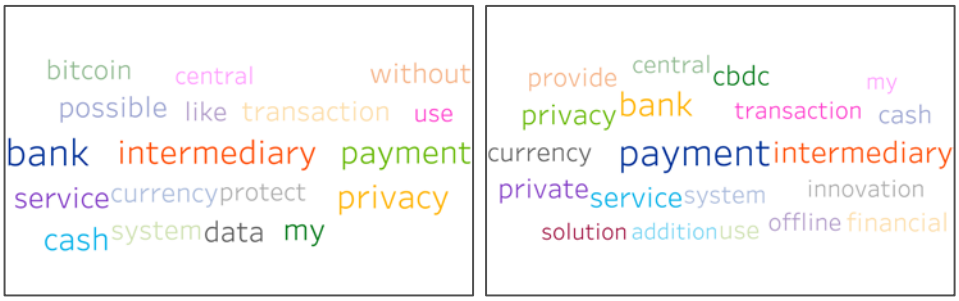


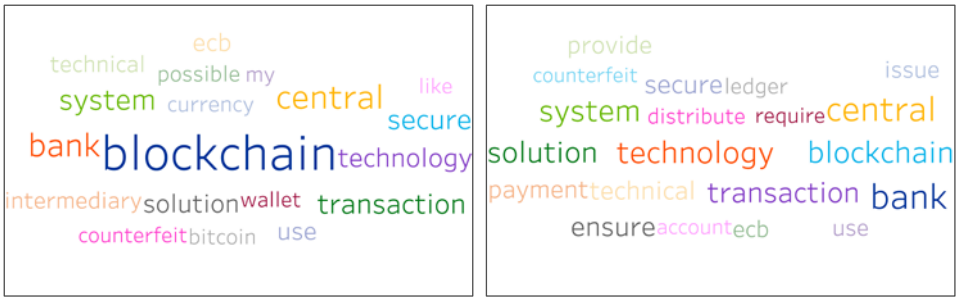
Chart A.3

Words most frequently used in replies to selected questions

a) Question 4: citizens (left) and professionals (right)

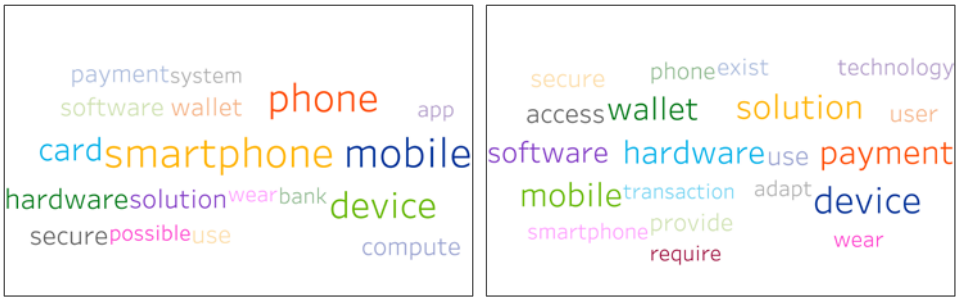


b) Question 8: citizens (left) and professionals (right)

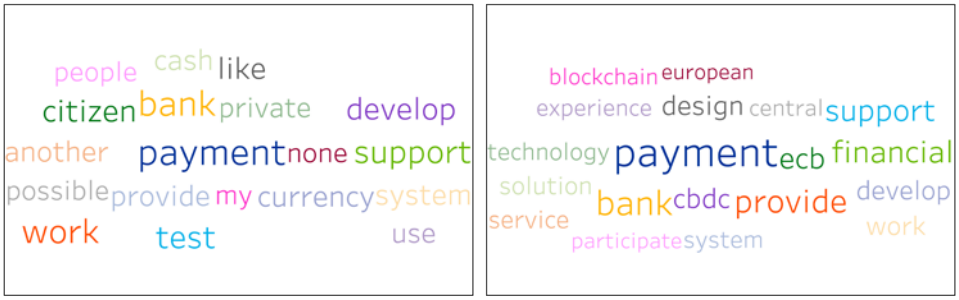


c) Question 10: citizens (left) and professionals (right)

d) Question 17: citizens (left) and professionals (right)



e) Question 18: citizens (left) and professionals (right)



Note: Size of words indicates their frequency.

Text of the public consultation

Your views on a digital euro

The European Central Bank (ECB) and the national central banks of the euro area are together assessing whether to introduce a digital euro.

A digital euro would be an electronic form of central bank money accessible to all citizens and firms – like banknotes, but in a digital form – to make their daily payments in a fast, easy, costless and secure way. A digital euro would be introduced alongside cash; it would not replace it.

As part of the ongoing assessment, we want to hear the views of the public and of all interested stakeholders on the benefits and challenges of issuing a digital euro and on its possible design.

The following questionnaire is divided into two parts. The first part is aimed at the general public, while the second is targeted primarily at experts from the financial industry, technology companies and academia. However, respondents are welcome to provide feedback on any of the questions. The questions include references to the pertinent sections of the Eurosystem Report on a digital euro, which include additional details for the interested reader.

After the consultation period closes, all comments will be published on the ECB's website. For details on how personal data and contributions will be handled, please see the privacy statement below.

User perspective

We want to find out how people in the euro area would use a digital euro. We also want to understand the ways in which a digital euro could complement the existing payment methods you use. Your responses would help us design a digital euro that meets the needs of a broad range of users.

No	Question
1	How would you rank, in order of importance, the features that a digital euro should offer? (a) I want to be able to use it throughout the euro area. (b) I want my payments to remain a private matter. (c) I want to be able to use it with my smartphone and at payment terminals. (d) I want to be able to pay even when there is no internet or power connection. (e) I want it to be easy to use. (f) I want to use a digital euro without having to pay additional costs. (g) I want it to take the form of a dedicated physical device. (h) I want it to be a secure means of payment. (i) I want my transactions to be completed instantaneously.
1 sub-question	Do you have any further comments about the ranking that you have indicated above?
2	Do you envisage any challenges associated with a digital euro that would prevent you or others from using it? If so, what are they?
3	What user features should be considered to ensure a digital euro is accessible for people of all ages, including those who do not have a bank account or have disabilities? For more information, please refer to Requirements 2 and 12 in the Eurosystem Report on a digital euro.
4	There are two approaches we can take to make a digital euro work, one that requires intermediaries to process the payment and one that doesn't. If we design a digital euro that has no need for the central bank or an intermediary to be involved in the processing of every single payment, this means that using a digital euro would feel closer to cash payments, but in digital form – you would be able to use the digital euro even when not connected to the internet, and your privacy and personal data would be better protected. The other approach is to design a digital euro with intermediaries recording the transaction. This would work online and allow broader potential for additional services to be provided to citizens and businesses, creating innovation opportunities and possible synergies with existing services. For example, it could make it easier to integrate a digital euro into currently available electronic banking services and applications. From your perspective, which of the following do you find most appealing? (select one): (a) a digital euro focused on privacy and the protection of personal data, which can be used offline; (b) a digital euro with broader potential for additional services, allowing innovative features and other benefits for citizens and businesses; (c) a combination of both. For more information, please refer to Sections 5.1.5 and 6.1 of the Eurosystem Report on a digital euro.
4 sub-question	Do you have any further comments regarding your answer to the question above?

Financial, payment and technology professionals' perspective

We want to hear from experts working in the financial and technology industries so that we can assess how a digital euro could be provided safely and efficiently. We want to make sure that its design would not inadvertently constrain industry-led solutions aimed at providing additional features or services which might also benefit citizens. We would also like to understand what role you or your organisation could play in facilitating or encouraging the use of a digital euro as an effective complement to cash.

No	Question
5	What role do you see for banks, payment institutions and other commercial entities in providing a digital euro to end users? For more information, please refer to Sections 5.1.1 and 6 of the Eurosystem Report on a 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? For more information, please refer to Section 6 of the Eurosystem Report on a digital euro.
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.
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? For more information, please refer to Section 6.3 of the Eurosystem Report on a digital euro.
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)? For more information, please refer to Requirement 2 in the Eurosystem Report on a digital euro.
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? For more information, please refer to Section 5.1.2 of the Eurosystem Report on a digital euro.
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 on holding balances of digital euro up to a predefined amount and a lower remuneration for digital euro holding balances above that amount.) For more information, please refer to Sections 3, 5.1.3 and 5.1.8 of the Eurosystem Report on a digital euro.
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? For more information, please refer to Section 5.1.8 of the Eurosystem Report on a digital euro.
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? For more information, please refer to Section 5.1.3 of the Eurosystem Report on a digital euro.
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? For more information, please refer to Section 6.2 of the Eurosystem Report on a digital euro.
15	What features should the digital euro have to facilitate cross-currency payments? For more information, please refer to Scenario 6 in Section 2.2 of the Eurosystem Report on a digital euro.
16	Should the use of the digital euro outside the euro area be limited and, if so, how? For more information, please refer to Requirement 13 in Section 3 of the Eurosystem Report on a digital euro.
17	Which software and hardware solutions (e.g. mobile phones, computers, smartcards, wearables) could be adapted for a digital euro? For more information, please refer to Section 6.2 of the Eurosystem Report on a digital euro.
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?

Postal address 60640 Frankfurt am Main, Germany
Telephone +49 69 1344 0
Website www.ecb.europa.eu

For specific terminology please refer to the ECB glossary (available in English only).