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Digital euro: The future of money

*Marko Pahor**

The evolution of money, from barter to coins, paper money, and digital payments, reflects humanity's drive for efficient and secure transactions. Each innovation, from Lydian coins to modern digital wallets, has simplified and revolutionised trade, paving the way for the digital euro as the future of money. The ECB's 2024 study shows a shift from cash to digital payments in the euro area, with cash use dropping from almost three quarters in 2019 to just above half in 2024. Card payments rose from 25 to 39 percent. Despite this, two thirds of consumers still prefer cash, highlighting the need for a diverse payment landscape. Despite the rise of private money, public money remains crucial. Currently, the EU lacks electronic public money, making the digital euro essential. It promises financial inclusion, payment efficiency, and monetary sovereignty, reducing reliance on foreign providers and fostering innovation. Enhanced security, privacy and accessibility are key benefits, ensuring trust and interoperability. The digital euro project faces challenges such as developing secure infrastructure, building public trust, ensuring privacy, assessing economic impacts and achieving interoperability. Regulatory frameworks and stakeholder engagement are crucial. Financial intermediaries will facilitate transactions, provide support, ensure compliance, promote innovation and foster interoperability - and for that reason will play a vital role in the successful adoption of the digital euro.

JEL E42, E52, E58, G21

A short history of money and payments

If we want to claim that the digital euro is the future of money, we need to start with the history of money, or better with the history of payments. The evolution of money (and payments) is driven by the desire to efficiently store value and create more efficient and secure ways of transacting, i.e. exchanging goods (or services) we have for the ones we want. Initially, the barter system was prevalent, where goods and services were exchanged directly. This system had limitations, particularly the need for a double coincidence of wants – both parties had to want what the other offered. Consequently people started using some standardised goods – commonly a precious metal, but also salt, seashells and others – as intermediary exchange goods. A first real revolution happened around 600 BCE, when the Lydians in modern-day Turkey revolutionised payments by introducing the first coins made of precious metals. These coins were standardised in weight and value, making transactions simpler and more reliable. The use of coins spread rapidly, becoming the dominant form of payment in many civilizations.[1]

The next big revolution was the development of paper money, which first appeared by the 10th century in China. Paper money was lighter and easier to transport than coins, facilitating trade over long distances. This innovation eventually

* Dr. Marko Pahor, Banka Slovenije

[1] BNP Paribas: 18 dates that made the history of payments, 2025

spread to Europe by the 17th century, where banks began issuing banknotes backed by deposits of precious metals. The advent of paper money saw, for the first time, a differentiation between the public and private money. Coins stamped with the portraits of the reigning monarch could be deemed public money, while at least at first, the banknotes, issued by the banks, were the first form of private money.

Public money refers to currency issued by a sovereign, government or central bank, such as coins and banknotes. It is considered legal tender and is backed by the government's authority and the whole economy of the monetary area. Private money, on the other hand, includes forms of currency issued by private entities, such as bank deposits, electronic money, tokenised deposits or stablecoins. Private money is not granted a legal tender status but is widely accepted for transactions. It is managed through private finance, which involves the financial activities of individuals, households, and businesses. The key difference lies in the issuer and the backing authority. Public money is backed by the government, ensuring its stability and acceptance, while private money relies on the trust and credibility of the issuing entity.[2]

After the industrial revolution changed the way we produced and consumed, a need for more efficient payments emerged. The 20th century saw the introduction of cheques, which allowed individuals to transfer money from their bank accounts by writing instructions to their banks. Cheques provided a secure and convenient way to make payments without carrying large amounts of cash. In 1950, Diners Club issued the first credit card, marking the beginning of a new era in payments. Credit cards allowed consumers to borrow money for purchases and pay it back later, often with interest. This innovation transformed consumer behaviour, enabling greater flexibility and convenience in spending.

The 1970s and 1980s brought significant advancements in electronic payment systems. Automated Teller Machines (ATMs) were introduced, allowing customers to withdraw cash and perform banking transactions without visiting a bank branch. Electronic Funds Transfer (EFT) systems enabled the direct transfer of money between bank accounts, further streamlining payments. The advent of the internet in the 1990s revolutionised payments once again. Online payment gateways like PayPal emerged, allowing users to make payments over the internet securely. E-commerce flourished as consumers could shop online and pay with a few clicks, leading to the growth of global marketplaces[3].

The 21st century brought mobile payments including digital wallets, such as Apple Pay and Google Wallet, store payment information securely on mobile devices, enabling contactless payments. The evolution of payments reflects the continuous drive for innovation and efficiency.

The payments landscape in the euro area in 2025

The European Central Bank's (ECB) "Study on the Payment Attitudes of Consumers in the Euro Area (SPACE) 2024" based on the results of the survey questionnarie provides a comprehensive analysis of how payment behaviours and preferences have evolved across the euro area in the recent years. In 2019, cash was the dominant payment method at points of sale (POS) in the euro area, accounting for 72 percent of all transactions. However, by 2024, this figure dropped to 52 percent, reflecting a significant shift towards digital payments. The use of cards and other electronic payment methods increased, with card payments rising from 25 percent in 2019 to 39 percent in 2024. This shift was driven by the growing acceptance of contactless payments and the increased use of mobile payment apps. The European Central Bank's report on card schemes and processors[4] highlights the dominance of card payments in the EU, accounting for 70 billion transactions in 2023, which is 54 percent of all non-cash transactions. International card schemes made up 61 percent of euro area card payments in 2022, while national schemes accounted for 39 percent. The number of national card schemes has decreased, with only nine remaining active in the EU. Thirteen-euro area countries rely entirely on international card schemes. There is a high concentration in the card-processing market, with four major cross-border companies among 80 providers.

Visa and Mastercard had varying market shares across European countries in 2024, sometimes significantly higher than domestic payment cards. Visa was the largest card scheme in Ireland, with a market share of 90 percent. Mastercard, on the other hand, held market share of 87 percent in the Netherlands. On the other hand, some countries see a dominance of domestic schemes. In Germany, for example, the domestic card brand Girocard had a market share of 75 percent, whereas Visa and MasterCard each made up around 13 and 11 percent of the market. Italy, on the other hand, was more divided. Bancomat (Italian ATM) cards made up 45 percent of transactions, whereas MasterCard and Visa each held a market share of approximately 20 and 34 percent respectively. It is worth noting, however, that most Bancomat cards in Italy

[2] Tobias Adrian, Tommaso Mancini-Griffoli: Public and Private Money. IMF, 2021

[3] BNP Paribas: 18 dates that made the history of payments, 2025

[4] ECB: Report on card schemes and processors, 2024

are co-branded with one of the international schemes.[5] The decline in national schemes and the presence of foreign shareholders in major processors highlight dependencies that could affect Europe's payment sovereignty. The drawback of national schemes is that they don't work across borders, a severe impediment for the common market. While interlinking the national payment schemes is part of the Eurosystem's strategy of retail payments[6], this remains in the hands of private initiatives and doesn't address all market deficiencies.

While digital payments are on the rise, cash remains an important payment method, especially for small-value transactions and in rural areas. Despite the decline in cash usage, 62 percent of euro area consumers in 2024 still expressed a preference for keeping cash as a payment option, up from 60 percent in 2019.[7] This underscores the importance of maintaining a diverse payment landscape that includes both digital and traditional methods. Access to cash remains good throughout the euro area, though some countries report a slight increase in the difficulty to access cash.

In Slovenia, the trends mirror those of the broader euro area but with some notable differences. Slovenia was and remains above average in the preference for cash; in 2019, cash was used for 73 percent of POS transactions in Slovenia, same as the euro area average. By 2024, this had decreased to 64 percent, a much slower decline than seen in the euro area at large (52 percent). Card payments in Slovenia increased from 24 percent in 2019 to 29 percent in 2024, reflecting growing acceptance of electronic payment methods. The preference for cash in Slovenia remains strong, with 57 percent of consumers in 2024 indicating they want to keep cash as an option, compared to 44 percent in 2019.[8]

The Covid-19 pandemic accelerated the adoption of digital payments as consumers sought contactless and online payment options to reduce physical contact. This trend is evident in the increased use of mobile payment apps and online banking services across the euro area. Another key finding is the growing importance of instant payments. In 2024, 20 percent of the euro area consumers reported using instant payments, up from 10 percent in 2019. This increase is attributed to the enhanced convenience and speed of instant payments, which are becoming more widely available and accepted. Instant payment schemes suffer from the same problem as the national card schemes, i.e. they are mostly confined to national borders. Some private initiatives emerged and made significant progress[9], for example the EPI/Wero and more recently the EuroPA[10], which interlinked instant payment schemes in three countries. The ECB's "Study on the Payment Attitudes of Consumers in the Euro Area" also highlights the challenges associated with the digitalisation of payments. Nearly 10 percent of respondents in 2024 reported needing assistance with digital payments, indicating a need for greater support and education to ensure inclusivity. This is particularly relevant for older adults and those with lower digital literacy.

The case for digital euro

The short history of money and payments shows us that throughout the history payments relied on sovereign money. Even as the emergence of private money dethroned sovereign money as the only payment solution, people still relied on public money for a large chunk of their everyday needs and a fall-back solution should the private money fail. At the moment, there is simply no electronic public, sovereign money available for payments in the European Union, which is, given the inevitable rise of e-commerce, for which physical cash is unsuitable, simply unacceptable. Not only we rely for our electronic payments on private money but this reliance is in almost two thirds of cases on providers outside the EU. The card schemes, which account for the vast majority of non-cash payments, are dominated by the global giants Visa and Mastercard. The fast-growing field of e-payments also relies on global players' solutions, including ApplePay, GooglePay, AliPay and others. The digital euro is the solution, since it's the first time a cash-like electronic payment option in public, sovereign money would be offered to European citizens.

Just as the introduction of Euro coins and banknotes in 2002 offered the EU citizens to pay throughout the monetary union in the same money, the introduction of the digital euro some decades later would mean the same for electronic payments. The fragmentation of the payments markets is a market failure and an important hurdle for the development of the European economy. The ECB identified this issue and addressed it in the retail payments strategy[11], the execution of the strategy is in the hands of private initiatives. Despite public incentives. the need for large investments and general lack of incentives (as a logical

[5] Raynor de Best: Visa, Mastercard share against domestic solutions in 14 countries in Europe 2024. Statista, 2024

[6] Our retail payments strategy, https://www.ecb.europa.eu/paym/integration/retail/retail_payments_strategy/html/index.en.html

[7] Study on the Payment Attitudes of Consumers in the Euro Area. ECB, 2025

[8] Share of respondents replying having cash as an option at POS with »very important« and »important« in the SPACE studies

[9] ECB welcomes the EPI's progress on building a European payment solution

[10] EuroPA launch cross-border instant payments in Southern Europe

[11] Our retail payments strategy, https://www.ecb.europa.eu/paym/integration/retail/retail_payments_strategy/html/index.en.html

consequence of payments market`s features) pushes these solutions further into the future. Digital euro is a public solution to the requirements for a unique solution for payments in the European Union, which would truly be European, would be the right answer to this market failure.

One of the primary objectives of the digital euro is financial inclusion. It aims to provide a secure and accessible form of money for all citizens, including those who may not have access to traditional banking services. This is particularly important for individuals in remote areas or those who are unbanked. By ensuring that everyone has access to central bank money, the digital euro promotes financial equality and reduces the gap between different socio-economic groups.[12]

Another key objective is payment efficiency. Digital transactions are faster than traditional methods, reducing the time required for payments and transfers. The digital euro aims to lower transaction costs, making payments more affordable for both consumers and businesses. In terms of monetary sovereignty, by issuing a digital currency, the ECB maintains control over the monetary system, reducing reliance on foreign digital payment solutions and protecting the strategic autonomy of European payments. The digital euro serves as a monetary anchor, ensuring that private money can always be converted into central bank money, thus maintaining trust in the euro.

Innovation is also a significant objective. The introduction of the digital euro is expected to foster innovation in the financial sector, encouraging the development of new payment technologies and services. By embracing digital currency, Europe can stay competitive in the global financial landscape, particularly as other large economies introduce their own central bank digital currencies.[13]

The benefits of the digital euro are manifold. It will be an electronic means of payments in retail payments, which will be made in public money, without any credit risk. Security is a top priority, with robust measures designed to protect against fraud and cyber threats. Enhanced security features will ensure the resilience of the digital currency against potential attacks. Privacy is another critical benefit, with mechanisms in place to protect personal data while complying with regulatory requirements. The digital euro will offer varying levels of privacy, balancing privacy with the need for regulatory oversight.

Accessibility is a key benefit, as the digital euro will be user-friendly and accessible to all citizens, regardless of their technological proficiency or access to banking services. It aims to be inclusive, providing a reliable payment option for everyone, including those who are currently underserved by traditional banking. Interoperability is also a significant benefit, as the digital euro will be compatible with existing payment systems and technologies, facilitating seamless integration. It will work alongside other forms of money, such as cash and commercial bank deposits, ensuring a smooth transition to digital payments.

The strategic impact of the digital euro includes economic efficiency, as streamlined payments will enhance the overall efficiency of the payment system. It will reduce the risk of market-abusive behaviour by ensuring a diverse and competitive payment ecosystem. Geopolitical stability is another impact, as the digital euro will protect the strategic autonomy of European payments, providing a fall-back solution in case of further geopolitical tensions. By maintaining a strong monetary anchor, the digital euro will support the international role of the euro.

Building public trust in the digital euro is critical, necessitating transparent communication and education about its benefits and security measures. The guaranteed convertibility of private money to public money will maintain trust in both private and public money. These objectives and benefits highlight the transformative potential of the digital euro in enhancing financial inclusion, payment efficiency, monetary sovereignty, and innovation, while ensuring security, privacy, accessibility, and interoperability.

Challenges and considerations

The introduction of the digital euro presents several challenges and considerations that need to be addressed to ensure its successful implementation and adoption. One of the primary challenges is the development of the necessary technical infrastructure. Creating a robust and secure digital currency requires significant investment in technology and cybersecurity. The infrastructure must be capable of handling large volumes of transactions efficiently and securely, while also being resilient to potential cyber-attacks. [14]

Another major consideration is public trust. Building trust in the digital euro is crucial for its widespread adoption. This involves transparent communication and education about its benefits and security measures. The ECB must ensure that citizens understand how the digital euro works, its advantages over traditional payment methods, and the measures in place to protect their personal data and financial information. Public trust is also linked to the perceived reliability of the digital euro. The guaranteed convertibility of

[12] ECB: The case for a digital euro: key objectives and design considerations. ECB, 2022

[13] Christine Lagarde and Fabio Panetta: Key objectives of the digital euro. ECB, 2022

[14] ECB: The case for a digital euro: key objectives and design considerations. ECB, 2022

private money to public money will play a key role in maintaining trust in both private and public money.[15]

Privacy is a significant concern when it comes to digital payments and it tops the list of the desired features in surveys on digital euro. Thus the digital euro will balance between ensuring user privacy and complying with regulatory requirements. This involves implementing mechanisms to protect personal data while also allowing for necessary oversight to prevent illegal activities such as money laundering and fraud. The challenge lies in designing a system that offers a cash-like level of privacy without compromising security and regulatory compliance.[16]

Its economic impact is another important consideration. The introduction of the digital euro could have various effects on monetary policy implementation and financial stability. It is essential to assess these potential impacts and develop strategies to mitigate any negative consequences. For instance, the digital euro could affect the traditional banking system by reducing the demand for bank deposits, which could in turn impact banks' ability to lend. To address this issue the regulation proposal[17]envisage a system of holding limits for digital euro in the electronic wallets. The methodology for calibration of the holding limits is being finalised at the time of writing this paper; the actual size of the limits will be however determined at the time of the launch. The holding limits will balance between covering the needs of users and financial stability; the studies show that there is a wide enough range of limits that would ensure both.

Interoperability is also a key challenge. The digital euro will be compatible with existing payment infrastructure and technologies to facilitate seamless integration and to minimise the need for investments into systems and equipment. This requires collaboration with financial institutions, technology providers, and other stakeholders to develop standards and protocols that ensure interoperability. The goal is to create a digital currency that works alongside other forms of money, such as cash and commercial bank deposits, supporting a smooth transition to digital payments already taking place due to shifting preferences.

Regulatory framework is another critical consideration. Establishing a clear and comprehensive regulatory framework to govern the issuance and use of the digital euro is essential to ensure its stability and security. This involves defining the legal status of the digital euro, setting standards for its use, and developing mechanisms for oversight and enforcement.

The role of financial intermediaries

The role of banks and other intermediaries in the digital euro ecosystem is crucial for its successful implementation and operation. Intermediaries, banks and other payment service providers, will play a key role in distributing the digital euro to end users, just as they do today with the distribution of cash and ensuring them to keep the relationships with the end-users. They will be responsible for opening and managing digital euro accounts or wallets for users, ensuring that individuals and businesses can easily access and use the digital currency.[18]

One of the primary functions of intermediaries is the funding and defunding of users' holdings in digital euro. This means that users can either fund their digital euro accounts with cash or convert commercial bank money, such as bank deposits, into the digital euro. Intermediaries will facilitate these transactions, ensuring a seamless process for users. This role is essential for maintaining the liquidity and usability of the Digital euro, as it allows users to move funds between different forms of money easily.

Intermediaries will also be responsible for providing customer support and services related to the digital euro. This includes helping users with account setup, troubleshooting issues, and providing information about the features and benefits of the digital euro. By offering these services, intermediaries will help build trust and confidence in the new digital currency, encouraging its adoption among the general public. Another important role of intermediaries is ensuring compliance with regulatory requirements. They will need to implement measures to prevent money laundering, fraud, and other illegal activities. This involves conducting due diligence on users, monitoring transactions, and reporting suspicious activities to relevant authorities. By ensuring compliance, intermediaries will help maintain the integrity and security of the Digital euro system.

Intermediaries will also play an important role in promoting innovation and competition within the digital euro ecosystem. By developing new payment solutions and services that leverage the digital euro, intermediaries can enhance the overall efficiency and convenience of digital payments. This can lead to the creation of innovative products additionally to basic digital euro services, listed in the Proposal for a Regulation on the establishment of the digital euro, that meet the evolving needs of consumers and businesses, driving growth and development in the financial sector.[19]

Furthermore, intermediaries will be instrumental in fostering interoperability between the digital euro and existing pay-

[15] Markus BRUNNERMEIER, Jean-Pierre LANDAU: The digital euro: policy implications and perspectives. European Parliament 2022

[16] https://www.ecb.europa.eu/euro/digital_euro/faqs/html/ecb.faq_ digital_euro.en.html

[17] Proposal for a Regulation on a establishement of the digital euro, source: EUR-Lex - 52023PC0369 - EN - EUR-Lex

[18] Fabio Panetta: Building on our strengths: the role of the public and private sectors in the digital euro ecosystem. ECB, 2022

[19] Piero Cipollone: The role of the digital euro in digital payments and finance. ECB, 2025

ment systems. They will be important in efforts to ensure that the digital euro can be seamlessly integrated with other forms of money, such as cash and commercial bank deposits. This interoperability is crucial for providing users with a flexible and versatile payment solution that can be used in various contexts.

The collaboration between the public and private sectors is essential for building a robust digital euro ecosystem. The ECB will provide the underlying infrastructure and regulatory framework, while intermediaries will leverage their expertise in distributing payment products and interacting with end users. This synergy will ensure that the Digital euro is accessible, secure, and efficient, meeting the needs of all stakeholders.

The intermediaries would play a vital role in the digital euro ecosystem by facilitating transactions, providing customer support, ensuring regulatory compliance, promoting innovation, and fostering interoperability. Their involvement is crucial for the successful implementation and adoption of the digital euro, helping to create a secure, efficient, and inclusive digital payment solution. On the other hand, the digital euro also offers the intermediaries an opportunity to provide new innovative products and features on top of the basic digital euro services.

Conclusion

Gold and silver coins are the past, banknotes the present, and digital euro is the future of money. There are several market failures in the current payments landscape in the euro area and digital euro is aimed to address them.

The digital euro does not aim to initiate or speed-up the trend of decline of cash and digitalisation of payments, it follows the trend and offers the public the opportunity to use public, sovereign money for their payment needs and insures an adequate monetary anchor in the digital world. It addresses the fragmentation of the electronic payments solutions in the euro area, which private solutions are slow or incapable of addressing in an adequate matter.

Stakeholder engagement is crucial for the successful implementation of the digital euro. Collaboration with stakeholders, including financial institutions, technology providers, and the public, is necessary to gather insights, build consensus, and address concerns. Engaging with stakeholders helps ensure that the digital euro meets the needs of all parties involved and fosters a sense of ownership and support for the initiative.

Members of the Eurosystem, the ECB and the NCBs have neither the means nor the appetite to venture into retail banking by opening digital euro accounts for the population and business. This is and remains the domain of commercial banks and this makes them crucial for the distribution and functioning of the digital euro. In the view of this partnership, the digital euro aims to use as many existing solutions and standards as possible in order to minimise costsand provides a framework for innovations that can be harvested by the PSPs.

The digital euro also addresses the digital exclusion of vulnerable groups, which is enhanced by the complexities of many digital payment solutions available today. Being a one single solution for all payment needs, seamlessly adapting to different use cases, and with an array of access solutions and a support system it really wishes to leave no one behind.

At the time of this writing, the work on the digital euro project is progressing according to the adopted timeline, the public light of this future of money is however still some years away and contingent on the decisions of the Governing Council of the ECB and adoption of the required EU legislation. In the view of the changing payments landscape and general geopolitical trends it is our hope that this process will soon come to a positive conclusion, enabling the ECB to bring the EU citizens the future of money.