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**The Digital Euro and the Future of Banking:  
Insights from a Comparative Analysis with the Digital Yuan**

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# Abstract

This bachelor's thesis conducts a detailed comparative analysis of China's Digital Yuan (e-CNY) and the European Digital Euro. Chapter 1 introduces central bank digital currencies (CBDCs) and global motivations for their development, highlighting differences in economic and governance contexts between China and the Eurozone. Chapter 2 systematically contrasts the two projects. It examines institutional models (China's centralized, state-driven approach vs. the EU's participatory, two-tier model) and technical features (e.g. programmability, offline capabilities). The thesis explores strategic objectives: China's focus on monetary control, inclusion, and RMB internationalization, versus Europe's aim to safeguard public money and maintain payment sovereignty. It reviews implementation: China's aggressive city pilots and provisional legal framework compared to the Eurozone's formal phased rollout and pending legislation. The case study of e-CNY finds that widespread private payment habits have limited adoption; even generous incentives (digital "red envelopes") produced only transient spikes. Surveys and data suggest Chinese consumers remain loyal to Alipay/WeChat for trust and convenience.

Chapter 3 interprets these findings as lessons for Europe and other CBDC efforts. It concludes that user-centric design, seamless integration, and clear benefits are essential for any CBDC to gain traction. The thesis ends with open questions about the Digital Euro's future impact, global CBDC coordination, and the evolving balance between public-sector currency and private fintech. In sum, the work underscores that while the Digital Yuan exemplifies a swift, centralized deployment, the Digital Euro may yield different outcomes due to Europe's emphasis on privacy, market-based innovation, and multilateral oversight. The conclusions are intentionally open-ended, inviting further research on cross-border effects and the dynamics of CBDC adoption in diverse political systems.

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# **1. Introduction to CBDCs and Global Context**

## **1.1 Definition and Role of CBDCs in the Financial System**

Central Bank Digital Currencies (CBDCs) are digital forms of central bank money that exist solely in electronic format and represent a liability of the issuing central bank. They are denominated in the national unit of account and are designed to function alongside cash and traditional forms of central bank money.

CBDCs generally exist in two forms: retail and wholesale. Retail CBDCs would be accessible to the general public, allowing households and firms to hold central bank money in electronic wallets. Wholesale CBDCs, in contrast, would be used only by banks and other financial institutions for large-value settlement, functioning as a new form of digital reserves. They can be implemented as either token-based systems (similar to digital coins, potentially using blockchain technology) or as account-based systems (maintained as ledger entries at the central bank). Either way, CBDCs are designed to perform the three traditional roles of money in an evolving payment landscape: a medium of exchange, a store of value, and a unit of account. This thesis specifically focuses on retail CBDCs, since they are most relevant for everyday payments and financial inclusion.

## **1.2 Global Drivers Behind CBDC Development**

The increasing interest in Central Bank Digital Currencies (CBDCs) is a response to major global changes that are altering how financial systems and monetary policies operate. While motivations might differ depending on institutional and economic contexts, several common factors drive countries towards the development of these new forms of public currency.

A first and increasingly urgent factor concerns the changing dynamics of the digital payments landscape. In several countries, payment infrastructures have come to rely heavily on private actors, including foreign technology providers. The European Central Bank has raised concerns about

strategic dependencies in this domain, particularly where domestic alternatives are limited or absent. In this context, CBDCs are being considered as instruments to strengthen public sector presence in digital payments and reduce long-term reliance on external platforms. The European Central Bank, for instance, has stressed the importance of safeguarding European sovereignty in retail payments, citing growing reliance on international providers such as Visa and Mastercard (European Central Bank, 2024).

In many developing economies, financial inclusion is regarded as a key driver of economic growth. CBDCs offer the potential to widen access to digital financial services without the need for traditional banking. According to the World Bank, approximately 1.4 billion adults remained unbanked globally as of 2021 (World Bank, 2022). By allowing users to hold and transfer money digitally through mobile devices, CBDCs could provide a low-cost entry point into the formal financial system, particularly in rural or underserved regions. Pilot projects in countries like Nigeria's eNaira and Jamaica's JAM-DEX illustrate both the promise and the limitations of this approach. While these projects achieved notable wallet creation through government incentives, active usage remained limited, underscoring that technological availability alone does not guarantee adoption (Morris & Campbell, 2024). Broader issues such as trust, digital literacy, and infrastructure continue to determine outcomes, suggesting that financial inclusion through CBDCs can only succeed when embedded within wider reforms of the financial ecosystem.

The resilience of payment systems represents another motivation. CBDCs can act as a strategic reserve in the event of major disruptions of private payment infrastructures, such as cyberattacks or outages. Additionally, CBDCs have the potential to enhance the effectiveness of international payments, an idea that has attracted worldwide attention due to the inefficiencies of traditional cross-border transfer systems, which are frequently slow, costly, and lack transparency.

Beyond payment-related objectives, several central banks are exploring the role of CBDCs in strengthening the transmission of monetary policy. In theory, the programmability and traceability of digital currencies could facilitate more direct and targeted policy interventions. The European Central Bank, for example, has ruled out interest-bearing CBDC designs in the initial implementation of the Digital Euro, citing concerns about financial stability and institutional mandates. However, these prospects are still at the conceptual stage and come with significant challenges (Springer, 2024).

Despite potential benefits, the development of CBDCs also raises significant risks. Among the most debated issues is that of bank disintermediation: if a significant number of deposits were to be transferred from commercial banks to Central Bank-issued digital wallets, traditional banks could face a liquidity shortage. This would negatively impact their ability to lend and could pose risks to overall financial stability. To mitigate this risk, Central Banks are evaluating the implementation of design mechanisms such as holding limits or tiered remuneration schemes (ECB, 2024b).

Privacy and data protection are also central to the CBDC debate. Since CBDCs could enable the collection of detailed transaction data, Central Banks must navigate the delicate balance between ensuring transparency for regulatory objectives and safeguarding individual privacy rights. These concerns are particularly sensitive in democratic settings, where data protection is both a legal and ethical issue; any perception of state overreach could undermine public trust. Balancing regulatory transparency with user privacy is likely to remain one of the most complex design challenges moving forward.

Ultimately, CBDCs reflect an attempt to balance innovation and stability. In the current stage, as many projects transition from research to experimentation, each Country's decision is inevitably influenced by technical feasibility and legal frameworks, institutional goals, and social expectations. Among the most significant cases are the Euro Area and China, whose projects, the Digital Euro and the e-CNY, are being developed under markedly different political, economic, and regulatory conditions.

### **1.3 Institutional, Political, and Economic Differences: Euro Area vs China**

The Euro Area and China have adopted markedly different approaches to central bank digital currencies (CBDCs), shaped by their unique institutional structures. The euro area is a monetary union comprised of over 20 democratic countries sharing a single currency and governed through a multi-layered system involving national governments, the European Commission, and the independent European Central Bank, which requires balancing diverse national interests and adhering to EU treaties. In contrast, China operates as a unitary state with a centrally determined

financial policy, allowing the People’s Bank of China to implement CBDC policies quickly and without the need to navigate competing jurisdictions (Hogan Lovells, 2024). The two regions also differ in their political and regulatory frameworks: every e-CNY transaction in China’s CBDC system is reported to the central bank, employing encrypted “managed anonymity”<sup>1</sup> for personal data, whereas the EU is designing the Digital Euro with stringent privacy safeguards, focusing on protecting user data and limiting government access to transaction records, reflecting Europe’s strong emphasis on individual privacy rights in payments policy. Economic structures further differentiate the two; the euro area represents a high-income, service-based economy accounting for about 11–12% of global GDP and covering roughly 340 million people, while China, though larger and more industrialized, maintains a financial system that is more state-directed. For instance, China’s five largest banks are majority government-owned, and the PBoC sets explicit maximum deposit and minimum lending rates. In the euro area, by contrast, banks are mainly privately owned, and interest rates and credit allocation are determined by market mechanisms (brookings.edu).

Despite these contextual contrasts, both the euro area and China converge on the broad objective of introducing a CBDC to ensure that payments remain efficient, reliable, and anchored in public trust.

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<sup>1</sup> Managed anonymity – is the PBoC’s model for the e-CNY, where low-value transactions retain user privacy, but higher-value payments are traceable by the central bank for regulatory oversight

## **2. Comparative Analysis: Digital Yuan vs Digital Euro**

### **2.1 Structural and Strategic Differences: Centralization vs Participatory Models**

#### **2.1.1 Governance and Institutional Control**

The design of China's Digital Yuan (e-CNY) exemplifies a centralized, state-led governance model. The People's Bank of China (PBOC) operates under close government oversight and is not independent from the state – it is guided by the State Council in setting policy. This structure enables a top-down approach with minimal institutional friction, allowing the PBOC to implement the Digital Yuan rapidly and decisively. The e-CNY initiative has been driven by the PBOC's strong mandate and the Chinese government's technological ambitions, coordinating efforts across state-owned banks and other institutions. In practice, the PBOC serves a dual role: it issues the digital currency and directly oversees its distribution through selected intermediaries, reinforcing state control over the payments infrastructure and data. By contrast, the European Central Bank (ECB) is embedded in a multi-level, democratic institutional framework. Developing a Digital Euro requires extensive collaboration among the ECB, national central banks of euro area countries, EU legislators, and private sector stakeholders, resulting in a more deliberative and consensus-based process. Public consultations, investigations, and legislative deliberation have preceded any launch decision in Europe. This participatory model means that the Digital Euro's design and governance are vetted for legal clarity, checks and balances, and alignment with diverse member state interests. The trade-off is a slower, more cautious progression, but one that prioritizes transparency, accountability, and broad legitimacy. In short, China's governance approach concentrates decision-making power within the central bank and government, whereas Europe's approach distributes influence across multiple institutions and stakeholders in a bid to balance innovation with democratic oversight.

### 2.1.2 Wallet Architecture and Distribution Model

The e-CNY uses a two-tier architecture that still preserves central control. The PBOC issues the Digital Yuan, while authorized intermediaries (the “operating institutions”) manage distribution to end-users. In practice, China’s large state-owned banks form the primary network of distributors, alongside two major online payment companies’ affiliate banks (WeBank for WeChat Pay and MyBank for Alipay). Users can download the official e-CNY wallet app or use interfaces provided by these banks to obtain and spend Digital Yuan. Notably, individuals do not even need a traditional bank account to open an e-CNY wallet, and small-scale wallets can be opened with simplified know-your-customer procedures. This design aims to broaden access, but all wallet providers operate under the PBOC’s oversight and technical standards. The result is an architecture where the central bank remains the ultimate authority, even as day-to-day customer services (wallet apps, customer support) are handled by state banks and approved payment firms. In the euro area’s model, the distribution of a Digital Euro is also conceived as two-tier, but with a more pronounced role for private-sector intermediaries. Supervised intermediaries such as banks and payment service providers (PSPs) would be the ones to distribute the Digital Euro to the public. Rather than the ECB offering retail accounts directly, individuals and businesses would access the Digital Euro through these intermediaries – for example, via their commercial bank’s app or a postal bank in countries where postal services offer financial services. Euro-area legislation is expected to mandate that major payment providers make the Digital Euro available, ensuring widespread reach. Under this scheme, the ECB would manage the core infrastructure and set the rules (through a scheme rulebook), while private intermediaries handle user onboarding, wallet provision, and everyday transactions. This architecture leverages the existing financial ecosystem: it minimizes disruption to banks (which remain central in payments) and encourages competition and innovation in front-end services. The key distinction is that China’s model relies on a controlled group of mostly state-aligned entities to propagate the CBDC, whereas Europe’s model entrusts a broad network of regulated private entities to connect users with the central bank’s digital money.

### 2.1.3 Technical Design Features (Privacy, Programmability, and Offline Use)

The Digital Yuan and Digital Euro diverge significantly in their treatment of privacy. The e-CNY follows a principle of “controllable anonymity,”<sup>2</sup> meaning that, while users have some privacy in individual transactions, the system is ultimately traceable by authorities (Hogan Lovells, 2023). In the Chinese model, personal identifying information is kept by the intermediaries (banks) in encrypted form, and each transaction is reported to the central bank, available for government scrutiny under defined conditions (Hogan Lovells, 2023). This approach is intended to prevent illicit activities and ensure the PBOC can monitor the money flow, but it raises concerns about surveillance. By design, the state’s insight into transaction data is much greater with e-CNY than with cash or fully decentralized cryptocurrencies. In contrast, the Digital Euro is being designed with a much stronger emphasis on data privacy and minimal disclosure. The ECB has adopted a “privacy by design” approach, aiming to protect user data beyond what private payment providers currently do. For offline Digital Euro payments, privacy would be almost absolute – only the payer and payee would know the details of the transaction. Such offline transactions would not be shared with any bank or central platform in real time. For online transactions, the system is planned so that the Eurosystem (ECB and national central banks) cannot directly see personal identities behind transactions. Measures like pseudonymized identifiers, cryptographic hashing, and segregated data handling are being explored to achieve this. Intermediaries would collect user information only to the extent necessary for compliance (e.g. anti-money laundering checks), and they would not be permitted to use personal data for other purposes without consent. The overarching goal is that a Digital Euro would offer citizens a level of privacy comparable to cash in everyday use, whereas China’s CBDC system centralizes financial data for regulatory oversight.

Another notable difference lies in the realm of programmability.<sup>3</sup> The PBOC has indicated that the e-CNY supports certain smart contract capabilities. For instance, the e-CNY could incorporate scripts to enable conditional payments or other complex payment logic, as long as these do not alter the fundamental nature of the currency. This means that in China, programmable features might be used to support things like automated payouts, coupons that only work at designated

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<sup>2</sup> Controllable anonymity – A principle used in e-CNY design that allows low-value transactions may be conducted with minimal identification, while higher-value or suspicious transactions are subject to full traceability by authorities.

<sup>3</sup> Programmability – The ability to embed automated rules or conditions into money itself (often via smart contracts), enabling transactions that execute based on pre-set criteria

merchants, or time-limited stimulus funds. Indeed, programmability in the e-CNY is seen as a way to foster innovation in retail payments and even to improve policy outcomes (for example, by ensuring aid money is spent on its intended purpose). In Europe, the concept of programmability has been approached much more cautiously. Top ECB officials have explicitly ruled out making the Digital Euro a “programmable money” that governments or the central bank could unilaterally control. As Fabio Panetta of the ECB put it, “the Digital Euro would never be programmable money” – the central bank will not set limits or conditions on where, when, or to whom people can spend their euros (CoinDesk, 2023). Central banks issue money as a neutral medium of exchange, not as vouchers with restricted uses, so the Digital Euro is intended to be as fungible and flexible as cash. Moreover, the Digital Euro will not be an interest-bearing instrument – it will carry a 0% interest rate, neither paying interest to holders nor imposing negative interest (MDPI, 2022). This design choice is meant to mirror the characteristics of physical cash and to avoid competing with commercial bank deposits. That said, the ECB is exploring how private intermediaries can offer programmable services on top of the Digital Euro. Rather than the money itself being restricted, users or businesses could decide to use programmable payment contracts. For example, a bank or fintech might provide a “conditional payment” service or escrow in Digital Euro, where funds are released only when certain conditions are met. Such value-added features would be built into apps by intermediaries using the Digital Euro infrastructure (ECB, 2024).

Both the e-CNY and the proposed Digital Euro recognize the importance of offline payments, but they integrate this feature differently. The Digital Yuan has demonstrated robust offline capabilities. For example, it supports dual offline transactions via technologies like near-field communication (NFC), which enable two devices to transfer value between e-CNY wallets even when neither device is connected to the internet. This means that two people can complete a Digital Yuan payment in an area with no network coverage, with the transfer recorded in the secure chips of their devices and synchronized with the central system once connectivity is restored. Such functionality is touted as useful for remote regions with poor infrastructure or in situations like natural disasters when communication networks might be down. It also aligns with China’s financial inclusion goals by allowing digital payments in a cash-like fashion for those who may not always have online access. The Digital Euro is similarly being designed with offline use in mind, but as of 2024, it remains in a testing phase for this feature. The ECB’s plan is to enable offline peer-to-peer payments through secure hardware elements in phones or possibly dedicated cards. An offline

Digital Euro would let users transact up to a certain value without immediate network verification, providing a level of resilience and privacy. Indeed, offline Digital Euro transactions are envisioned to have cash-like privacy, with no personal transaction data sent to any third party during the offline exchange. This could be achieved by storing a limited value on a secure chip and using cryptographic protocols to update balances between two offline wallets. However, implementing this on a large scale involves challenges in security (preventing double-spending while offline) and policy (deciding limits on offline wallet balances to manage risks). The Eurosystem has been prototyping solutions and consulting with industry on how to deploy an offline mode safely.

#### **2.1.4 Strategic Goals and Objectives**

A core motivation behind both the Digital Yuan and Digital Euro is the strengthening of monetary sovereignty, though the context differs. For China, the e-CNY is a tool to reinforce state control over the currency and payments within its borders: by introducing a central bank digital currency, the PBOC ensures that a significant share of digital payments can occur on public infrastructure under its oversight, rather than exclusively on private networks. This enhances the authorities' ability to monitor financial flows and reduces the risk of the central bank being sidelined by fintech companies. Indeed, the rise of Alipay and WeChat Pay – together accounting for over 90% of China's mobile payments in recent years – prompted policymakers to provide a state-backed alternative that keeps critical payment data within official reach (American Banker, 2019). The e-CNY also gives the government new levers to crack down on illicit finance and enforce monetary policy, as every unit of currency can be traced or even conditioned if necessary. In the Eurozone, the sovereignty concern has been more about maintaining public money's role and autonomy in the digital age. With cash usage declining across Europe and foreign tech firms and card schemes dominating digital payments, European officials grew concerned about digital sovereignty. A Digital Euro is seen as a way to ensure citizens have access to risk-free central bank money for digital payments, just as they do with cash for physical payments. By offering a euro CBDC, the ECB would safeguard the role of the euro as legal tender even if physical cash becomes less prevalent. It would also prevent the scenario of European payments being entirely dependent on non-European networks or a potential proliferation of unregulated private digital currencies. In short, the Digital Euro is intended to strengthen Europe's monetary sovereignty and strategic

autonomy by reducing reliance on external payment providers and keeping the means of payment under European control.

Some of the main reasons behind introducing digital currencies like the Digital Yuan and, to a lesser degree, the Digital Euro, are to make financial services accessible to more people and to simplify how payments are made. China's government has portrayed the e-CNY as a means to bring unbanked and underbanked populations into the formal digital payments system. Because an e-CNY wallet can be obtained with minimal bureaucracy (no full bank account needed for basic tiers) and can even work offline, it lowers barriers for people in rural areas or without access to traditional banking to participate in cashless transactions. The Digital Yuan's design also emphasizes low transaction costs: the PBOC does not charge fees to intermediaries or users for basic e-CNY services, and intermediaries are not charging users either. This zero-fee structure makes small everyday transactions economically viable and could spur greater usage, improving overall payment efficiency. The instantaneous settlement of e-CNY transactions (the transfer is final as soon as the payment is made) further enhances liquidity and efficiency in the payment system. From a broader perspective, the e-CNY might enable new fintech innovations (like smart-contract-based services) accessible to more of the population, which aligns with China's digital finance inclusion agenda. In Europe, financial inclusion is also a consideration: the ECB has noted that the Digital Euro should ensure "no one is left behind" in the move toward digital payments. While the Eurozone has high banking penetration, a Digital Euro could provide a state-guaranteed electronic payment method for those who either lack a bank account or prefer not to rely on fee-charging private services. The plan is for the basic usage of the Digital Euro to be free for individuals, making it a public good much like cash. Additionally, the Digital Euro could be designed to be user-friendly for people with disabilities or limited digital skills, widening accessibility. In terms of efficiency, a single Digital Euro accepted across all euro area countries would simplify transactions in the multi-national bloc, removing frictions that still exist in cross-border retail payments within the EU. It would work seamlessly with instant payment infrastructures and potentially make it easier for merchants to accept digital payments without relying on multiple providers. Both CBDC projects, therefore, aim to modernize payments and make them more inclusive.

The strategic international objectives mark another major point of divergence between the Digital Yuan and the Digital Euro. The e-CNY has a clear geopolitical and international finance motive,

as Chinese authorities have positioned the Digital Yuan as part of a broader strategy to internationalize the renminbi and decrease dependence on the US dollar in global trade and finance (Hogan Lovells, 2023). By being an early mover in CBDC development, China hopes to set standards and potentially offer its currency as a convenient medium for cross-border transactions, especially among countries in regions where China has significant trade links or influence. There have been pilot programs and discussions to use e-CNY for cross-border payments, such as tests involving the Hong Kong Monetary Authority and participation in the Bank for International Settlements' mBridge project for multi-CBDC interoperability.<sup>4</sup> The vision is that, in the long run, foreign firms or governments involved in Chinese trade or investment projects (for example, in the Belt and Road Initiative) might use the Digital Yuan directly, thereby expanding RMB usage internationally. However, significant challenges remain, including foreign trust in a Chinese state-operated currency and China's capital controls, which limit the renminbi's convertibility. In contrast, the Digital Euro's focus is largely domestic and regional; its *raison d'être* is not to challenge the dollar's dominance or push the euro into wider global circulation (the euro is already the second-most held reserve currency, and it's fully convertible). Instead, the international aspect of the Digital Euro is framed in terms of strategic autonomy and keeping Europe on par with technological developments. EU officials do note that having a Digital Euro would ensure the euro's relevance in an evolving global financial system where other major central banks may issue CBDCs. It could prevent a scenario where Europeans end up using foreign digital currencies (such as a Digital Dollar or Digital Yuan) due to a lack of a local alternative. Moreover, by taking a lead in the CBDC space, the EU seeks to uphold its currency's credibility and possibly influence global standards for digital money. That said, the ECB has been clear that in initial deployments, a Digital Euro would have usage constraints outside the euro area; it is primarily meant for Eurozone citizens and any expansion of the Digital Euro's role internationally would be carefully managed in cooperation with other jurisdictions.

Both CBDC projects are catalysts for innovation and competition, but they embody different philosophies in doing so. The Digital Yuan's introduction injects a government-sponsored competitor into China's payments market, which had become a duopoly. By offering an alternative

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<sup>4</sup> mBridge – Short for Multiple CBDC Bridge, a collaborative project led by the BIS Innovation Hub and partners (including central banks of Hong Kong, Thailand, the UAE, and China) to explore interoperability and direct cross-border transactions between multiple CBDCs.

payment rail, the PBOC can indirectly force the incumbents (Alipay and WeChat Pay) to improve services and reduce fees due to competitive pressure, all under the premise of advancing the national interest. It also encourages fintech innovation under the umbrella of the state – for example, new apps or use cases can be developed that utilize e-CNY’s programmable features or its integration with smartphones and wearables, but these would unfold within a regulated, state-controlled environment. In other words, China’s CBDC can spur innovation from the top: the central bank provides new technological functionalities (like smart contracts, offline payments, hardware wallets), and private or public actors can build products around those. In Europe, the Digital Euro is envisioned as a platform that enables innovation from the market. By creating a common pan-European infrastructure and set of standards, the ECB aims to lower barriers to entry for payment service providers. A multitude of banks and fintech firms, both large and small, could offer their own Digital Euro wallets and payment services, all interoperable by design. This could break down the fragmentation where, presently, many domestic electronic payment solutions don’t work across borders. It also serves as a counterbalance to the market power of big global players by providing a public backbone that newcomers can leverage, and lastly, for merchants and consumers, this should mean more choice and better services. The ECB explicitly highlights that a Digital Euro would make the European payments landscape more competitive, as intermediaries can use the open infrastructure to create new products (for instance, integrating loyalty programs or “smart” payment features easily) (ECB, 2024). Additionally, by fostering a home-grown digital payments ecosystem, European authorities aim to stimulate their fintech sector and reduce the continent’s dependency on imported payment technologies.

## **2.2 Implementation Strategies and Regulatory Frameworks**

### **2.2.1 Pilot Phases and Legal Foundations**

China pursued an incremental pilot approach for the e-CNY, whereas the euro area adopted a formal multi-phase project plan. The PBoC began limited trials of the Digital Yuan in 2020 across selected cities (e.g. Shenzhen, Suzhou, Chengdu, Xiong’an), under tightly controlled conditions (Made in China Journal, 2023). This “learning by doing” strategy quickly expanded: by late 2022, the e-CNY pilot program had reached 29 cities in 17 provinces (JD Supra, 2023). China's

central bank, oversaw these deployments directly, reflecting the country's top-down approach to governance. However, the PBoC hasn't set a definitive launch date for the e-CNY nationwide, and the legal framework that would establish it as a formal currency is still under development. The Digital Yuan is treated as de facto legal tender issued by the PBoC (pegged 1:1 to the renminbi and paying no interest), but comprehensive legislation lags. Draft amendments to the People's Bank of China Law to formally recognize e-CNY as legal tender have been proposed but not yet enacted (JD Supra, 2023).

In contrast, the Digital Euro has followed a structured timeline and requires explicit legal approval before issuance. The ECB launched a two-year investigation phase (2021–2023) to study the design and distribution of a Digital Euro. Upon its conclusion, on 18 October 2023, the ECB's Governing Council formally decided to move into a preparation phase (initially set to last from late 2023 to 2025) (European Parliament, 2023). During this preparation phase, the ECB is finalizing a rulebook, prototyping technology, selecting private-sector partners, and testing how a Digital Euro could function within the Eurosystem (European Parliament, 2023). Only after this phase will the ECB decide whether to proceed to actual development and potential issuance. Importantly, any introduction of a Digital Euro must be supported by EU law. Unlike the e-CNY, which the PBoC could pilot under existing statutes, the Digital Euro's implementation is predicated on a clear legal mandate. In June 2023, the European Commission put forward a legislative proposal (the "Digital Euro package") to establish the legal basis for a Digital Euro, defining its characteristics and ensuring uniform rules across the euro area (European Commission, 2023). This proposal – which would formally make the Digital Euro a new form of central bank money alongside cash – is undergoing debate and approval by the EU Parliament and Council. The need for EU-wide legislation reflects the euro area's multi-state governance and emphasis on legal certainty. In sum, China's e-CNY pilots proceeded under PBoC guidance with gradual regulatory adaptation, whereas Europe's Digital Euro is following a predefined sequence of phases and awaiting a dedicated regulatory framework before any public rollout.

### **2.1.2 Current Status**

As a result of these differing approaches, the current status of the two CBDC initiatives diverges markedly. The e-CNY is already in widespread pilot use domestically, whereas the Digital Euro

remains in an exploratory stage with no public users yet. In China's case, years of pilot programs have led to substantial real-world circulation of the Digital Yuan in select regions. By the end of 2021, over 260 million individuals had registered e-CNY wallets, and by mid-2023 approximately CNY 16.5 billion (US\$2.25 billion) worth of Digital Yuan was in circulation (Helsinki, 2023). This makes China's pilot the world's largest CBDC experiment in both user base and value transacted. Urban pilots have integrated the e-CNY into everyday transactions – citizens in pilot cities can pay for public transportation, utility bills, and retail purchases using Digital Yuan, and in some locations, even government employees' salaries are disbursed in e-CNY (Made in China Journal, 2023). The Chinese government also gave the e-CNY symbolic international exposure during the Beijing 2022 Winter Olympics, where foreign athletes and visitors could use Digital Yuan to make payments. This high-profile showcase underscored the project's maturity and China's confidence in the currency's functionality. That said, the e-CNY still operates technically as a pilot; the PBoC has not announced a full nationwide launch, focusing instead on gradually expanding usage and use cases as trials prove successful (JD Supra, 2023).

Meanwhile, the Digital Euro is not yet available to the public, as it remains in a controlled testing and development phase. As of 2024–2025, no Digital Euro has been issued for general use – Europeans cannot hold or spend a Digital Euro at this time. Instead, the ECB and national central banks are conducting prototyping, simulations, and consultations to ensure the design meets policy objectives and user needs. The project is in an investigative/preparatory stage: for example, the ECB is working with select private-sector partners to test offline payment functionality and other technical features (as detailed in progress reports) (European Parliament, 2023). In parallel, there is extensive stakeholder engagement across Europe. The ECB has created forums to consult banks, payment service providers, merchants, and civil society on the Digital Euro's features and distribution, aiming to incorporate feedback and build public trust (ECB, 2024). Officials regularly update the European Parliament and national authorities on progress, and adjustments are being made in response to concerns. Because the Digital Euro has not moved beyond internal testing, its current status is essentially preparatory – the focus is on refining the concept and ironing out technical and legal details. In summary, the e-CNY is already operational on a large pilot scale with millions of users in China's cities, whereas the Digital Euro remains a prototype under development, with no public deployment yet and no firm date for issuance pending legislative and ECB decisions.

### 2.2.3 Role of Commercial Banks and the Private Sector

A further key difference between the two CBDC projects lies in the role of commercial banks and other private-sector intermediaries in their implementation. China's model grants limited autonomy to banks and fintech firms, keeping them on a short leash under the central bank's command, whereas the ECB's model envisions a more hands-off, two-tier partnership with banks and payment service providers for distributing the Digital Euro.

In China, the e-CNY is distributed through the two-tier system described above (Section 2.1.2), though in practice the PBoC retains close control over intermediaries. All the major state-owned banks are involved (such as ICBC, Bank of China, CCB, etc.), joined by a few private and online banks affiliated with China's big tech payment platforms (Made in China Journal, 2023). Crucially, these intermediaries do not operate with the independence that banks enjoy in conventional finance; instead, they act as extensions of the central bank. The PBoC closely guides and supervises their e-CNY operations, from wallet provision to KYC compliance, ensuring that the rollout aligns with state objectives. In practice, the Digital Yuan ecosystem is state-centric: even though users might obtain e-CNY through commercial bank apps or fintech channels, all transactions ultimately occur within a PBoC-controlled network. Private payment companies – notably Alipay and WeChat Pay – have been incorporated into the e-CNY system (their online banks, MYBank and WeBank, are among the distributors), but only in a subordinate capacity. They must integrate the Digital Yuan into their platforms on the PBoC's terms. This arrangement strengthens regulatory oversight over digital payments and limits the autonomy of tech firms: as analysts note, the e-CNY's design reduces the monopolistic hold that Alipay and WeChat Pay previously had on China's digital payments by shifting power and data visibility back to the central bank (Helsinki, 2023).

By contrast, the ECB's plan for a Digital Euro delegates a far more significant role to commercial banks and payment service providers (PSPs) as partners in distribution. The Digital Euro is planned as a two-tier public-private model where the central bank provides the monetary base, but private intermediaries handle retail-facing services. Under the Eurosystem's envisaged arrangement, individuals and businesses would hold Digital Euros in accounts or wallets managed by regulated intermediaries (such as banks, e-money institutions, and fintech payment providers), rather than directly with the central bank. These intermediaries would be responsible for onboarding users, providing digital wallet applications, processing payments, and customer support, much as they

currently do with bank deposits and electronic money. The ECB would maintain the core infrastructure and ledger to ensure the integrity of the currency, but it relies on the private sector's reach and expertise for day-to-day distribution of the Digital Euro. This two-tier architecture is explicitly designed to preserve the role of commercial banks in the financial system. European policymakers want to avoid disintermediating banks or causing major shifts in deposits, so the Digital Euro is conceived as a complement to cash and bank money, not a competitor. For example, the Digital Euro would pay no interest (just like cash) and may be subject to holding limits, so that consumers do not withdraw massive funds from commercial banks to hold in Digital Euros. Such safeguards aim to protect financial stability and ensure that banks remain pivotal in credit provision. In essence, the private sector's role is built into the Digital Euro's foundation: from technical development (some infrastructure will be built by selected private vendors) (European Parliament, 2023) to delivery of the currency to end users, the ECB is engaging commercial actors as indispensable stakeholders. This contrasts with the e-CNY approach, where private intermediaries have little independent influence. The euro area's model reflects a public-private partnership: the central bank retains control over issuance and overall rules, but implementation on the ground is a collaborative effort with commercial banks and payment firms. This two-tier, market-friendly strategy is a natural extension of Europe's existing financial structure and regulatory culture, and it underscores the participatory governance model of the Digital Euro in contrast to the state-driven deployment of the Digital Yuan.

## **2.3 The Case of China: Impact of the Digital Yuan**

### **2.3.1 Effects on Monetary Policy and Financial Flows**

The e-CNY (Digital Yuan) gives the People's Bank of China (PBOC) a new tool to influence the money supply and payment flows. In principle, the central bank can inject liquidity more directly into the economy via e-CNY distribution – for example, disbursing stimulus funds straight to citizens' digital wallets – rather than relying solely on bank lending. This direct channel means the Digital Yuan could enhance monetary policy transmission, allowing the PBOC to increase or decrease the money supply with immediate effect when needed. So far, the PBOC has kept e-CNY as a non-interest-bearing form of cash (M0) (Reuters, 2022), which limits its impact on interest

rates in the broader economy. However, if needed in the future, a programmable CBDC could even enable innovative policy measures (such as expiring money or interest-bearing wallets), underscoring why the e-CNY is viewed as a potential monetary policy instrument and not just a neutral payment medium.

Beyond domestic policy, international financial flows are a strategic consideration. China's government is leveraging the e-CNY to support renminbi internationalization and reduce reliance on U.S.-centric networks. Pilot programs have linked the Digital Yuan to cross-border payment projects (e.g. Project mBridge with partners like Hong Kong, Thailand, and the UAE) to enable near-instant, low-cost settlements between countries (Daily Sabah, 2023). Officials have also signaled plans to expand global use of e-CNY by establishing an international Digital Yuan clearing center in Shanghai. The broader goal is to bypass systems like SWIFT<sup>5</sup> and mitigate the risk of dollar-based sanctions by building an alternative payments ecosystem for trade (Reuters, 2023). While these ambitions are long-term, they highlight that the Digital Yuan is seen as a tool not only for domestic efficiency but for reshaping financial flows in line with geopolitical strategy. In summary, the e-CNY has introduced new possibilities for China's monetary policy execution and cross-border currency influence, though its full impact in these arenas will depend on how widely the Digital Yuan is adopted in practice.

### **2.3.2 Impact on the Banking System**

The rollout of the Digital Yuan has important implications for banks, even though it is designed to complement (not replace) the traditional banking sector. As said before, China adopted a two-tier model for e-CNY distribution: the PBOC issues Digital Yuan to commercial banks, which then provide it to users via digital wallets, this approach keeps banks in the loop, but widespread use of e-CNY could still disrupt banks' deposit base. If consumers and businesses shift a significant share of their funds from bank accounts into e-CNY wallets (which are essentially direct claims on the central bank), commercial banks could face a contraction in deposits. Unlike bank deposits, e-CNY balances do not pay interest, nor can banks use those funds for lending, thus, large-scale adoption might reduce the pool of cheap funds available to banks for loans and investments. Analysts warn

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<sup>5</sup> SWIFT - (Society for Worldwide Interbank Financial Telecommunication) is a global messaging network used by banks and financial institutions to securely transmit payment instructions and other financial information.

this disintermediation could force banks to compete harder for deposits – for instance, by raising interest rates on savings to retain customers – which in turn would raise banks’ funding costs and potentially make loans more expensive. In extreme scenarios, a shrinking deposit base might even challenge the fractional reserve model and liquidity ratios that banks manage (Paradigm Press, 2022).

So far, these risks remain largely theoretical because e-CNY usage is modest relative to China’s enormous banking system. The PBOC reports only around CNY13.6 billion e-CNY in circulation (roughly \$2 billion) by the end of 2022 (Forkast, 2023), a tiny fraction of the trillions of yuan in bank deposits. To maintain financial stability, authorities have imposed safeguards such as holding limits on e-CNY wallets (tiered caps on how much an individual can store). Such limits prevent an overnight flight of large deposits into digital cash and signal the central bank’s intent to avoid undermining commercial banks. In practice, because the Digital Yuan pays no interest, most citizens are unlikely to park life savings in it, mitigating immediate deposit outflow concerns. Commercial banks have also integrated e-CNY into their services, effectively treating it as digital cash that customers can load or unload from their bank accounts. In summary, the e-CNY has not yet materially altered bank balance sheets or lending capacity, thanks to its controlled rollout and design choices. However, banks are aware of the long-term implications: if a state digital currency grows popular, it could gradually shift how they manage liquidity and customer relationships. This is one reason Chinese policymakers emphasize that the Digital Yuan is meant to complement the existing financial system, not displace. The continued involvement of banks in e-CNY distribution and the PBOC’s cautious limits reflect an effort to harness innovation without triggering a banking sector upheaval.

### **2.3.3 State Control vs. Private Platforms**

A major impact of the Digital Yuan’s introduction is the rebalancing of power between the state and private fintech platforms in China’s payments realm. For years, digital payments in China have been dominated by two private tech giants – Ant Group’s Alipay and Tencent’s WeChat Pay – which together handle an estimated 94% of mobile transactions (Reuters, 2022). This duopoly not only gave these firms enormous market power, but also control over big data on consumer transactions. By launching the e-CNY, the Chinese state is effectively asserting greater control over

the digital payments infrastructure and the data it generates. In public, the PBOC has downplayed any direct competition, describing the e-CNY as a “backup” to existing payment apps rather than a replacement. Behind the scenes, however, the intent has been to curb the dominance of Alipay/WeChat Pay. Internal discussions revealed that officials see payments data as a strategic asset – “Big data is wealth. Whoever owns data thrives,” as one state bank executive involved in the rollout put it. He explained that Alipay and WeChat Pay “own an ocean of data,” and the e-CNY would help the government regain control of this valuable resource as part of a broader anti-trust campaign (Reuters, 2022). In other words, the Digital Yuan increases state oversight over payments, ensuring that the central bank (and by extension regulators) have direct visibility into at least a portion of retail transactions instead of that information residing exclusively in private databases.

This shift toward state control aligns with China’s recent regulatory crackdowns on big tech. The e-CNY launch in 2020–2021 coincided with moves to rein in Alibaba/Ant Group and Tencent – from anti-monopoly fines to a halted IPO – signaling that financial stability and data security had become national priorities (Reuters, 2022). The Digital Yuan provides a state-run alternative network that could, over time, dilute the duopoly. For example, e-CNY uses standardized QR code payments interoperable across merchants, which could weaken the proprietary QR code ecosystems of WeChat Pay and Alipay (Bloomberg, 2022). Initially, the PBOC even restricted linking e-CNY wallets to those platforms, preferring users go through state bank apps. Over time, this stance softened – integration became necessary to reach users, as discussed below – but the overarching principle remains that China’s sovereign digital currency should bolster the government’s grip on the payments landscape. The result is a payments ecosystem where the state’s role is enhanced, providing a public-sector alternative to purely private payment rails and ensuring the government is not “locked out” of the digital finance loop in the long run.

### **2.3.4 Public Acceptance and Behavioral Shifts**

Despite the high-level goals and extensive pilots, Chinese citizens’ response to the Digital Yuan has been lukewarm so far. Consumers have largely stuck with what they know (Alipay and WeChat Pay) rather than switching to e-CNY for daily transactions. Empirical studies and usage data underscore this trend: even in pilot regions where authorities heavily promoted e-CNY (through

lotteries, subsidies, and merchant incentives), uptake was modest. Researchers find that individual users remain reluctant to abandon existing payment apps; the new digital RMB wallets saw only occasional use, while entrenched habits on WeChat/Alipay persisted. By 2023, the PBOC had reported 260 million individual e-CNY wallets created (Intereconomics, 2022) – a notable number, but still only a fraction of China’s 1+ billion mobile payment users. And the value in circulation (around CNY14 billion) was trivial next to the CNY trillions flowing through private platforms annually (Forkast, 2023). As one fintech expert observed, using e-CNY felt like managing “an extra bank account” with no added convenience or benefit, since Chinese users could already seamlessly pay and transfer money via familiar apps. The Digital Yuan has not offered a compelling unique selling point to lure people away from Alipay or WeChat, which provide reward programs, credit services, and a whole ecosystem of features. Additionally, some citizens express privacy concerns or uncertainty about the government’s visibility into e-CNY transactions. For users who value the semi-private nature of wallet payments (or at least the perception that their data is with a company and not directly with the state), this could be a psychological barrier to enthusiastic adoption.

To overcome public inertia, authorities have tried various incentives and integration strategies. During pilot programs, the government distributed millions of yuan in digital “red envelopes”<sup>6</sup> (free e-CNY packets) to citizens in cities like Shenzhen, Suzhou, and Shanghai to jump-start usage (Reuters, 2021). These giveaways successfully prompted people to download the e-CNY app and make a few test transactions. Regions with aggressive promotions saw higher wallet sign-ups and more frequent transactions during the campaign periods. However, sustaining usage proved difficult once the novelty and freebies wore off. Recognizing that convenience is king, the PBOC has since moved to embed e-CNY within Alipay and WeChat Pay rather than keep it entirely separate. By late 2022, users could send e-CNY through WeChat and Alipay interfaces, and those super-apps<sup>7</sup> began showing e-CNY as a payment option alongside cards and wallet balances. The logic is that Chinese consumers shouldn’t have to leave their favorite apps to use the Digital Yuan – instead, the e-CNY should ride on the rails of those platforms. This integration is

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<sup>6</sup> Red envelopes (hongbao) – A traditional Chinese practice of gifting money in red packets during holidays or special occasions. Digital “red envelopes” replicate this custom by allowing users to send monetary gifts electronically, often used in promotions or as festive digital gifts.

<sup>7</sup> Super-app – A mobile application offering a one-stop platform for many services (payments, messaging, shopping, etc.) within a single interface.

essentially a tactical compromise: the state gains a presence in the dominant apps, even as it aims to offer a third alternative. Early results show that while this has made it technically easier for people to use e-CNY, habits change slowly. Many Chinese are so accustomed to scanning a WeChat or Alipay QR code that which backend system (e-CNY vs bank account) funds the payment is almost irrelevant to them. Without a clear advantage to the consumer, e-CNY usage remains a small slice of total digital payments. Indeed, as of 2025, most Chinese users still prefer the established private platforms, and there is “little evidence of switching over” en masse to the Digital Yuan (Daily Sabah, 2023).

In terms of behavioral shifts, the Digital Yuan’s introduction has not dramatically altered China’s largely cashless society – at least not yet. If anything, it has reinforced some existing trends (like the decline of physical cash) by offering another cashless option. It has also sparked more public discussion about data privacy and financial surveillance, although average consumers appear more motivated by convenience than abstract privacy principles. One notable outcome is that the presence of e-CNY may be subtly nudging private providers to improve services or reduce fees to stay competitive, and it gives consumers a sense that there is a guaranteed public alternative if needed. But on a day-to-day basis, paying with e-CNY versus paying with Alipay feels almost the same for most people, meaning behavioral inertia is strong. The Chinese case thus illustrates that simply launching a CBDC, even with government backing, does not guarantee that people will use it unless it meaningfully outperforms or differentiates from existing solutions. Public adoption will probably depend on providing real user benefits, such as better security, universal acceptance, or specific use cases like government services, rather than just top-down mandates. The next section will delve deeper into these user adoption challenges, examining why Chinese citizens continue to favor WeChat Pay and Alipay and what lessons the e-CNY experience holds for driving consumer uptake.

## **2.4 The Role of Alipay and WeChat Pay**

Chinese consumers overwhelmingly favor Alipay and WeChat Pay for everyday transactions due to a combination of trust, convenience, and rich functionality. Surveys show that trust in these platforms is high, bolstered by strong government oversight, corporate reputation, and robust security measures. Users perceive these apps as safe and reliable, which reduces perceived risk and

encourages widespread adoption. Convenience is another decisive factor: Alipay and WeChat Pay are virtually ubiquitous, accepted by over 90% of merchants and used by nearly all smartphone owners in China (EconStor, 2022). The widespread use of these payment methods generates powerful network effects, since everyone from street vendors to hospitals accepts them, and consumers seldom find themselves needing another option. Over time, this convenience has turned paying by quickly scanning a QR code into a routine part of everyday life.

Beyond trust and ubiquity, Chinese users value the integrated features of these platforms: Alipay and WeChat bundle an entire ecosystem of services from shopping and utilities to credit and investments. Alipay, for instance, has consolidated an enormous range of financial services into one easy-to-use application – enabling instant payments, offering consumer credit and micro-loans, and even providing wealth management products – all within the same app. WeChat Pay similarly links to mini-programs for e-commerce, bill payments, taxi services, and more, so users can handle countless daily needs without leaving the app. This super-app design means greater functionality and seamless integration: sending money to a friend, splitting a restaurant bill in a group chat, booking travel, or investing spare cash can all happen in one place. Such integration drives user loyalty because the apps make themselves indispensable in everyday life.

Psychological and social factors reinforce this dominance. User experience and ease of use are optimized in these apps – registration is simple, transactions are fast, and even features like expense tracking or bill reminders are built-in. Features like WeChat’s digital red envelopes tap into cultural traditions and have made using the app enjoyable and socially engaging. Alipay uses gamified loyalty programs (for example, its Ant Forest initiative<sup>8</sup> and reward points) to encourage frequent use. These design elements create a sense of reward and community around the payment platforms. In sum, Chinese citizens stick with Alipay and WeChat Pay because they trust these private platforms and find them more convenient and feature-rich than any alternative. The result is a deeply entrenched user base, accustomed to frictionless mobile payments and reluctant to adopt new systems that do not clearly outperform the status quo.

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<sup>8</sup> Ant Forest - gamified feature of Alipay that encourages users to make environmentally friendly lifestyle choices, such as paying utility bills digitally or using public transport. Users earn “green points” that allow them to grow virtual trees in the app, which correspond to real trees planted by Ant Group in partnership with NGOs.

### 2.4.1 Competition with e-CNY and User Experience Challenges

The introduction of the e-CNY (Digital Yuan) faced an uphill battle in this context of mature private payment solutions. China's central bank launched e-CNY pilots with technical features that, on paper, were competitive – for example, the e-CNY supports offline payments and charges zero transaction fees to merchants. In practice, however, these advantages did not significantly sway consumers. The main obstacle was that users saw no compelling reason to switch: the Chinese public was already accustomed to using Alipay and WeChat Pay, and the Digital Yuan did not offer a clearly superior experience (Made in China Journal, 2023).

Several user experience challenges emerged during the e-CNY rollout. Initially, e-CNY required a standalone app and separate wallet, introducing friction that deterred uptake. Consumers had to download a new app, register, and manage a separate balance – steps that felt cumbersome when their familiar wallets already did everything they needed. The e-CNY app's interface and ecosystem were comparatively limited: for example, in early trials, it was mainly a basic payment tool without the rich menu of services and social features users enjoyed in WeChat Pay or Alipay. Moreover, while e-CNY is legally legal tender, merchants and consumers had already gathered around the private payment QR standards. Many businesses were slow to add e-CNY as a payment option, since virtually all customers could pay with existing methods. This lack of immediate merchant acceptance (despite government mandates) meant users saw little utility in holding e-CNY.

To overcome these issues, authorities and developers had to adapt the strategy. The People's Bank of China (PBoC) shifted to collaborate with the dominant platforms rather than compete in isolation. Notably, major banks and fintech companies were enlisted to distribute e-CNY: Alipay's and WeChat's affiliate online banks (MyBank and WeBank) integrated Digital Yuan wallets into their apps. By embedding e-CNY within Alipay and WeChat Pay, the government reduced the friction for users – they could access the Digital Yuan through interfaces they already knew, without needing to constantly switch apps. The PBoC also added popular features to the official e-CNY app to mirror the private apps' appeal. For example, it implemented an electronic red packet function, borrowing the festive money-gifting feature that had drawn millions to WeChat Pay, in order to “woo users”<sup>9</sup> and encourage e-CNY payments during the 2023 Lunar New Year

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<sup>9</sup> To woo users - refers to deliberate strategies aimed at attracting and persuading consumers to adopt a new product or service.

period<sup>10</sup> (Made in China Journal, 2023). These measures indicate that the e-CNY’s rollout team recognized the user experience gap and attempted to bridge it by making the Digital Yuan as accessible and engaging as established platforms.

Despite these efforts, competition with Alipay and WeChat Pay remained a serious challenge. The private apps continually innovate with superior interface design, loyalty rewards, and integration, keeping user satisfaction high. Consumers reported that e-CNY provided “no additional benefit” over existing methods, apart from its status as official currency. Some users also voiced concerns about privacy and surveillance with e-CNY, fearing greater government visibility into transactions – concerns they did not associate as strongly with private wallets. All these factors limited e-CNY’s appeal. By mid-2023, the Digital Yuan still accounted for only a tiny fraction of retail money in circulation (roughly 0.16% of China’s M0) (Made in China Journal, 2023; ESYA Centre, 2023), underscoring how modest its uptake was relative to the vast flow of payments through Alipay and WeChat Pay.

The e-CNY pilot revealed that a CBDC must at least match the ease of use, incentives, and integrations of private-sector apps to win over consumers in a highly digital market. Without a competitive user experience, most Chinese citizens saw little reason to change their payment habits.

## **2.5 Challenges and Shortcomings: User Resistance to e-CNY**

Despite the PBoC’s technological achievements and policy support, the e-CNY initiative has encountered significant challenges and shortfalls in practice. Foremost among these issues is the unclear value proposition for users. In a market already saturated with widely used private payment apps, the Digital Yuan did not offer ordinary consumers a better or novel experience than what was already available. Early adopters found that paying with e-CNY felt like managing “an extra bank account” with no added convenience or benefit, since they could already seamlessly pay and transfer money via Alipay or WeChat Pay. In other words, the e-CNY failed to present a compelling reason to switch away from well-entrenched services (Made in China Journal, 2023).

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<sup>10</sup> Lunar New Year - also known as the Spring Festival, is the most important traditional holiday in China. It is a peak period for consumer spending and monetary gifting, both offline and online

Another shortcoming lay in limited merchant traction. Even though e-CNY was legal tender, many merchants were initially slow to incorporate it as a payment option. The private platforms' QR code infrastructure and customer habits were so deeply established that businesses saw little incentive to promote the Digital Yuan. If a shopkeeper knows that nearly all customers will pay via existing methods, adding a new system offers minimal immediate benefit. This inertia meant that, in the early stages, consumers who might have been willing to try e-CNY often could not use it everywhere they shopped, further reducing its utility. Only after significant time and government pressure did the merchant acceptance network begin to expand, by which point momentum among users had already lagged.

Crucially, the push to drive user adoption revealed the extent of public resistance. Simply launching the CBDC with government backing proved insufficient to guarantee usage. Authorities resorted to extensive incentive campaigns to spark interest. Between 2020 and 2022, various local governments and the PBoC gave away free Digital Yuan through lotteries, coupons, and digital “red envelope” promotions. These programs distributed hundreds of millions of RMB in e-CNY to citizens as spending credits, successfully prompting millions of people to download the wallet app and experiment with the currency (ESYA Centre, 2023). In one notable case, the city of Suzhou issued 250,000 digital red packets (worth CNY50 million total) to residents during the Chinese New Year 2021 to spur e-CNY use (Reuters, 2021). While such initiatives led to short-term spikes in wallet registrations – by one estimate, over 260 million e-CNY wallets were registered by the end of 2021 (ESYA Centre, 2023) – they did not translate into sustained daily use. Once the promotional periods ended and the free funds were spent, most users reverted to their preferred payment apps. The incentive-driven approach thus achieved initial curiosity but fell short of changing long-term habits. It became clear that retention requires continuous value: unless e-CNY can offer ongoing rewards or unique features that private platforms lack, users have little motivation to permanently switch.

Issues of privacy and trust also dampened enthusiasm for e-CNY. Some citizens were worried about the degree of government visibility into their transactions, expressing concern that using the official digital currency might subject them to greater surveillance. In contrast, payments via Alipay and WeChat Pay were perceived as more private or at least shielded by a corporate intermediary between individuals and the state. This perception created a psychological barrier for a segment of

users who might otherwise have adopted the Digital Yuan. The PBoC’s principle of “controllable anonymity” (allowing some privacy for users while ensuring authorities can trace transactions under certain conditions) did not fully assuage such fears. By comparison, the lack of heavy-handed data collection was part of the comfort users felt with the incumbent platforms. Thus, where the e-CNY was intended to increase control and oversight in payments, that very strength became a public-relations weakness: it fueled suspicions about government monitoring, undermining the appeal for privacy-conscious consumers.

Internationally, these shortcomings of the e-CNY rollout have not gone unnoticed. Observers often cite China’s experience as a cautionary tale for other central banks considering retail CBDCs. The tepid uptake suggests that even a well-designed digital currency, launched by a powerful central bank, can struggle against established private-sector networks if it fails to deliver clear consumer benefits and build public trust. For instance, European policymakers have studied China’s case closely. The European Central Bank has emphasized the importance of compelling use cases and privacy protections in its plans for a Digital Euro, implicitly aiming to avoid the pitfalls encountered by e-CNY. More broadly, China’s difficulties highlight that technology and state authority alone cannot guarantee a new currency’s success in the everyday marketplace. User behavior, incentives, and perceptions play a decisive role.

In summary, the e-CNY project’s slow progress can be attributed to these structural and behavioral challenges: an insufficient value proposition vis-à-vis popular alternatives, a lack of rapid merchant buy-in, reliance on artificial incentives, and public skepticism around surveillance. These factors collectively constrained the Digital Yuan’s adoption, offering valuable lessons for other jurisdictions.

## **3. Lessons from the Digital Yuan for the Digital Euro**

### **3.1 Summary and reflections on the Chinese Digital Yuan**

#### **Experience**

Overall China’s Digital Yuan (e-CNY) experiment reveals a mixture of technical successes and stubborn obstacles. On the infrastructure side, the People’s Bank of China (PBOC) has achieved impressive integration: the e-CNY is accepted at large retail outlets and integrated into popular apps, and it uses a “unified QR code” system so that a merchant need only display one QR code to accept payments from any wallet app, including Alipay or WeChat Pay (Made in China Journal, 2023). State-owned banks, telecoms, and payment platforms have been enlisted to distribute and support the e-CNY. The government also deployed strong incentives to kickstart usage – for example, in 2020 Shenzhen authorities distributed 200 e-CNY (about US\$30) each into 50,000 residents’ wallets as vouchers for local shops (Hogan Lovells, 2023). The PBOC has additionally promoted programmability (smart-contract features that could enforce conditional spending, expiry dates, etc.) as a potential tool of economic policy (ADB, 2023). In sum, China’s approach has been a highly centralized, top-down rollout: technical compatibility was prioritized and users were induced to experiment through bonuses and integration with familiar services.

Despite these efforts, however, everyday adoption of the Digital Yuan has proven limited. By mid-2023 only about 16.5 billion yuan had circulated in e-CNY (with 120 million wallets opened) – a minuscule share of China’s base money supply (Il Sole 24 Ore, 2022). Surveys suggest that most citizens simply ignore it: a September 2024 poll found roughly 90% of Chinese respondents had neither seen nor used the digital RMB (Forbes, 2024). Crucially, user perceptions have lagged behind the rollout. Although authorities promote the e-CNY as a secure and state-backed currency, public trust remains weak. Studies report that privacy and surveillance concerns are paramount, with many respondents uneasy about government visibility into transactions (Hogan Lovells, 2023). Unlike cash, which guarantees anonymity, or commercial bank accounts, where data are held by intermediaries, the e-CNY makes every transaction traceable to the central bank. This design, intended to fight financial crime, has created skepticism, especially among consumers who value discretion. In practice, many users see little benefit in switching from already convenient

private payment systems. Even after signing up, often incentivized by lotteries and coupons, sustained use is low.

Another challenge has been balancing innovation with financial stability. The e-CNY allows peer-to-peer transfers without intermediaries, potentially reducing banks' role. Although a two-tier system was adopted to preserve bank involvement, analysts warn that any widespread shift into CBDC wallets could destabilize deposit bases and raise banks' funding costs (ADBI, 2023). Thus, while the e-CNY illustrates how a CBDC can expand payment infrastructure, it also demonstrates that success may unsettle existing financial equilibria.

Taken together, the Chinese case highlights key insights for Europe. Successful integration (like standardized QR codes) suggests that the Digital Euro should likewise work seamlessly with existing payment networks (Made in China Journal, 2023). China's aggressive use of incentives shows the difficulty of launching a new payment method without clear consumer benefits. Most importantly, China's modest uptake despite heavy promotion underscores that trust and privacy are decisive: even a central bank digital currency can languish if citizens fear surveillance or perceive no advantage. These lessons set the stage for the open questions Europe must now confront.

## **3.2 Open Questions for the Digital Euro**

Europe's policymakers now face a series of open-ended questions raised by these observations. First and foremost is trust. How can the Digital Euro win public confidence in a context where Europeans prize privacy and are wary of government surveillance? Unlike in China, where the central bank and state are broadly expected to control currency, European citizens may demand clear legal protections and privacy guarantees before adopting a Digital Euro. Will the ECB design the Digital Euro "cash-like" so that small offline transactions remain anonymous, while only larger transfers are traceable in limited circumstances? And how will the balance be struck between GDPR-style data protection and the authorities' need to prevent crime?

Second, the question of incentives and use cases looms large. The Chinese case suggests that ordinary users will not switch just because a Digital Euro exists; there must be compelling reasons. What incentives can the ECB offer (or mandate) to encourage shops, consumers, and businesses to use the Digital Euro? Will governments consider trials with "Digital Euro vouchers" or loyalty

rewards? And given Europe's diverse payments landscape, how will the Digital Euro interoperate across countries and platforms? Ensuring technical interoperability – for example, via standardized QR codes or wallet APIs – will be vital so that a person in Rome can pay a baker in Berlin with the same ease as a credit card.

The role of private-sector actors is another open issue. In China, the state leveraged big tech and banks to distribute the e-CNY, but it remains to be seen whether those partners fully cooperate or quietly hinder the CBDC if it threatens their business models. In Europe, banks and fintech firms currently profit from transaction fees and account services; will they develop attractive digital-euro products (wallet apps, value-added services) or lobby against features they dislike? How will regulators involve or limit big tech (which already provides many payment apps) in the digital-euro ecosystem? The answers to these questions will shape whether the Digital Euro strengthens the existing financial system or disrupts it.

Political authority is also at stake. How much power will the ECB (or EU legislatures) assume in governing money and payments? Europe's digital currency could become a tool of economic policy (for example, by enabling instant stimulus payments), so decisions about programmability and access will be inherently political. What limits should be placed on embedded programmability (e.g. emergency expirations, geo-fencing of spending) to prevent misuse of this new power? Finally, resistance to disintermediation must be managed. If consumers prefer holding Digital Euros to bank deposits, banks could lose funding; how will central banks address this risk (for instance, by paying no interest on CBDC or by reforming capital requirements)? And how might the Digital Euro itself affect monetary sovereignty and financial stability across the euro area?

These and other questions, about trust, privacy, incentives, interoperability, private partnerships, and institutional roles, currently lack definitive answers. They are the open research and policy questions to which Europe needs answers. The viability of a Digital Euro will ultimately hinge on how thoughtfully these open issues are resolved, and whether the lessons of the Digital Yuan help Europe forge a solution adapted to its own legal, economic, and cultural context.

In sum, the Digital Yuan experiment offers both cautionary tales and practical insights. It is clear that technological feasibility alone cannot guarantee success. Analyzing how we address key challenges, such as rebuilding public trust, establishing strong privacy governance, designing effective incentives, ensuring technical compatibility, defining the roles of private actors, and

mitigating disintermediation risks, will ultimately determine whether the Digital Euro becomes a practical alternative to cash or remains a well-meaning but unsuccessful project.

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