

# Digital geographies of power: The scale of digital money infrastructures by **Letizia Chiappini and Valeria Ferrari**

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## Abstract

This paper examines the relationship between the scale, socio-political goals, and the technological design of digital money infrastructures. The backdrop is the digital currency industry that threatens to undermine institutions' monetary powers. Institutions are developing digital money infrastructures conceived as public utilities. Scattered geographically and scaled differently, the coexistence of digital currency within the EU raises the question about the role of money in a digitized society. Eleven in-depth interviews with key actors and three publicly funded projects that organize digital money infrastructures were compared in this study. Smaller scale and bottom-up governance implies higher attention to local problems and social dynamics. Links with institutions and top-down decision-making remain necessary to ensure long-lasting and scalable digital money infrastructures. The geographies of power are co-shaped for each project. This demonstrates a very complex interplay of sociopolitical goals, data as part of the digital monetary design, and its scale that varies across time and space.

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## 1. Introduction

“Money must exist before it can be turned into capital.” —  
David Harvey [1]

In a 2020 interview on the future of money and the role of the public sector, the president of the European Central Bank (ECB) Christine Lagarde declared: “Throughout history, the nature of money has evolved in response to socioeconomic changes. But the functions of money — as a means of exchange, a unit of account and a store of value — have remained the same for centuries.” Lagarde continued: “Digitalisation and technological advances are transforming all areas of society, accelerating the process of

dematerialization [...] But Central Bank money in digital form is still not available for retail payments. The Governing Council decided to explore the possibility of issuing of a digital Euro.” The President of the ECB describes the goal of the Digital Euro project and emphasizes the competition of private currencies and the risks they represent, the role of central banks and that of the public sector in safeguarding financial and monetary stability [2]. The landscape of digital money networks — either built or speculated — is extremely varied to date. Controlled by private technology providers or decentralized networks across the globe, digital money infrastructures challenge the traditional connection between state, money, and territory [3].

We investigate the development of digital money infrastructures as a public utility, as an attempt to contrast the ongoing tendency of global digital platforms to merge with and take control of payment and money infrastructures. Through 11 in-depth interviews involving three publicly-funded digital currency projects at the regional, local, and community levels, we analyze the alternative discourses and imaginaries that see money as a critical digital infrastructure to be shielded from corporations. The focus on digital payment infrastructures — proposed by this paper, and reflected by the initiatives of financial and political institutions in many places all over the world — becomes necessary, as it urges us to reflect on the modes of exploitation of financial data from both private and public actors, and the merging of payment networks with the platform economy (Langley and Layshon, 2021).

Currently, cryptocurrencies have presented one of the biggest threats to money as the domain of public institutions over the last decade. They have been issued and exchanged over permissionless, worldwide networks, and function without the legitimization and coordination of a centralized authority. There is no connection to a place or a clearly defined community. More commonly used digital payment networks are increasingly organized as data infrastructures following the incentive systems of data markets, largely controlled by technology companies and platforms (Ferrari, 2022). Technology companies seeking to capture financial data streams are not only entering the financial industry as payment intermediation services, they also become e-money issuers backing digital currencies that are native to their ecosystem (Prasad, 2021) [4]. Imaginaries bundled under the term ‘metaverse’ suggest that value and assets circulation in the digital realm will be “unlinked from the political and territorial structures of nationhood” (Swartz, 2020) and tied to digital platforms’ own ecosystems and incentives structures (Weiner, 2022).

Initiatives are being developed to build digital money infrastructures as a public utility, as well as re-establishing a link between money and institutionally defined places or communities. All of this is pinned to a digital payment and digital currency industry that threatens to undermine institutions’ ability to exercise their monetary power (Pistor, 2020). These key initiatives are based on the capacity of money to organize and define social relationships, and the need to advance socio-political considerations for the public interest in crucial infrastructures. However, the projects differ in scale and institutional underpinnings, and vary in terms of socio-political goals and technological design. Hence, examining the infrastructure leads to several important questions:

- first, about the embeddedness of socio-political goals in the design of the technologies that enable transaction flows;
- second, on the interests of the actors that build and govern money infrastructures (governance);
- third, on the modes of collection and uses of data; and,
- fourth, on the physical and virtual geographies that such infrastructures trace.

These questions — which are briefly explained and contextualized in [Section 2](#) — constitute the four analytical tools around which the findings of the interviews are systematized (*cf.*, [Section 4](#)). In [Section 3](#), the methodology describes the three use cases and shows how the four analytical tools are deployed in a transversal manner to study and compare the latter. After an exposition of the findings in [Section 4](#) both descriptive and analytical, [Section 5](#) provides limitations of the study and critical insights about tensions and contradictions in terms of how socio-political goals, governance, data use, and scale relate to each other in the analyzed use cases. [Section 6](#) concludes by advocating for further investigations on the places and scales of digital money infrastructures, and a recommendation for future research agendas in various fields.

## 2. Building digital money infrastructures as a public utility: Four analytical tools

As socio-material artifacts, infrastructures are studied as the concrete manifestation of hidden and explicit power dynamics, systems of exploitation, and processes of exclusion. Infrastructures shape, enable, and limit social, economic, and administrative practices; they embed affordances, politics of inclusion and exclusion, privileges, and discriminatory practices. They are simultaneously “objects,” such as railways, pipes, cables, and computer servers, and processes involving human interactions — networks of relationships among institutions, commercial actors, workers, and objects. Serving as a medium for monetary exchanges, government transfers, and trading, financial infrastructures are particularly crucial to political economies, administrative processes, law enforcement and, ultimately, the exercise of sovereignty. Traditional financial infrastructures are infrastructures for the transfer of value as captured by the official currency of the state [5].

The emergence of new types of infrastructures that materialize and circulate value offers an excellent case study that highlights how infrastructures produce and move political agency from public to private actors, from localized places to virtually traced geographies. It illustrates, furthermore, how the development of different technological networks reflects and reproduces different socio-political views and systems of governance, expanded at different social and geographical scales. These reflect, ultimately, on the way data is managed and extracted [6]. The present section illustrates how these aspects of digital infrastructures are addressed in the context of this study.

### 2.1. Socio-political goals

Throughout history, money has always played a central role in the affirmation and exertion of state power (Helleiner, 2003). It is the node at the intersection between the political and the economical; or better, it is the medium upon which public institutions act to maintain a separation between the two — that is, to safeguard stances of public policy from the purely quantitative calculation of capitalistic logics (Polanyi, 2001). Money, therefore, is not merely a neutral technology of quantification: it is a sign of the social ties that are the foundation of the *communitas* (Amato, 2016). Its institution depends on particular configurations of trust and power in a community; its introduction and circulation in the community have the material effect of abstracting social ties into symbolic, economic, institutional relationships (Redaelli, 2016). Several examples of community currencies demonstrate that money can be harnessed as a medium to strengthen social relations within a community, transforming capital production into social production (Marx, 1977). As a symbolic system based on trust, money — that is: the legitimized currencies, the recognized *signifier* of value — is the first thing that must be changed in order to change modes of production and the types of market that exist within the community (Nishibe, 2016).

When money circulates in a digital form, the digital infrastructures underpinning its creation and circulation become essential object of analysis. Inspecting money through the lens of ‘infrastructural power’ (Braun and Gabor, 2020) induce us to better investigate the only apparent technical and neutral functionality of the underlying technological underpinning. Intended both as material objects and as networks of relations, digital financial infrastructures are deeply political: their accessibility, geographical extensions, and conditions of use shape opportunities, outcomes, and affordances in individuals’ lives, and society at large. A critical approach to digital money infrastructures, therefore, starts from inquiring about the intentions and stated socio-political goals that are embedded in their architecture.

### 2.2. Governance

According to Bernards and Campbell-Verduyn [7], “Technology occupies a liminal space between ‘ideas’, and ‘material’ factors.” Control over financial flows is founded on the control over the databases and networks which allow information about money and identities to be stored and circulated. Hence,

discussions about the governance of money are necessarily a discussion about the governance of the technology underlying this information flow. How is the technology architecture distributing power? What is the role of public institutions, and what is the stake of private actors? If we look at how financial infrastructures are composed of commercial and institutional relations, cables, digital networks and devices, as well as built and controlled by multiple actors. Hence, the governance structure is understood as the set of more or less coordinated dynamics of social ordering which govern such actors, their relations, and the material components through which they operate. As such, governance comprises institutional norms (regulation; public administration; standard setting; etc.), but also social practices and activities of multiple stakeholders, including NGOs, technology companies, technology designers and community members (DeNardis and Musiani, 2016).

The three examples of digital currencies selected for this study are prime instances of how digital infrastructure can bring changes in society — by moving agency amongst institutional actors, enabling bottom-up forms of financial organization, or reinforcing the legacy of old, conservative institutions. We focus on the governance of infrastructures by questioning how each project comes into existence, who governs it, who proposes policy choices, and how such choices are reflected and enacted in technological design. Moreover, we address, for each project, questions of governance *through* infrastructure: the ways in which these money systems act on social orders, altering (or preserving) pre-existing configurations of power in both its geographical distribution and institutional crystallization.

### 2.3. Data

Questions about the governance of money are becoming questions about the spaces and rhythm of transaction flows. These transaction flows, mediated through digital platforms and APIs, are essentially data flows organized through digital infrastructures (Westermeier, 2020). The digitization of money provides opportunities for the material infrastructure underpinning financial transactions to fall within the reach of technology companies. The specter of big tech platforms' sovereignty (Pistor, 2020) pushes governments to develop data infrastructures within their domain of agency.

The Digital Euro is precisely a digital infrastructure the scope of which is to maintain the circulation of the Euro under the direct control of European central banks. Financial data is, in fact, key to public institutions for multiple purposes. It is essential to law enforcement, tax administration, and fraud detection; it is used by banks and insurers to optimally allocate risk. The administration of sanctions and financial censorship, antimoney laundering, and terrorist financing policies rely on the digital prints left by financial movements. Moreover, public institutions — regional, municipal institutions, or informal communities — can harness data analytics and technological design to influence individuals' economic behaviors, in ways that respond to predefined socio-political goals (Cristofari, 2021). If on one end of the spectrum, the control of financial data flows can bring sovereignty and political power into the hands of global technology companies, strengthening forms of technological colonialism. On the other, it can enable perfect surveillance and law enforcement, dramatically increasing the power of governments to interfere with individuals' economic and private transactions (Ávila, 2018).

If the governance of money infrastructures is brought closer to the communities they are meant to serve, can data be used in ways that fit the values and goals of such communities? If digital infrastructures are built to serve the public good, how can financial data be managed in ways that respond to that goal? Starting from these questions, we inspect practices of data collection and use as they are revealing of the politics inscribed in digital infrastructures.

### 2.4. Scale

Both money and data are vehicles to deterritorialize — to shift political institutions to private actors, from communities and places to global colonizers (de Goede, 2020). In the form of money and capital, power moves across countries and flows through global networks “of variable geometry and dematerialized geography” [8]. A similar form of deterritorialization and reconfiguration of power relationships is

determined by the digitization of critical infrastructures. Digital technologies are simultaneously local and global, national and international (Bernards and Campbell-Verduyn, 2019); they connect geographically sparse “places” and create new virtual “localities,” dividing and rebounding communities, redefining the shape and the importance of borders. Digital infrastructures, therefore, are becoming a locus of contestation and coexistence between institutional actors, local communities, and global technology platforms as they allow to exert power in the form of data control (Pistor, 2020).

When money becomes digital, the challenge is to reconnect increasingly de-territorialized and de-institutionalized infrastructures to the places they are meant to serve. Digitization re-defines the meaning of ‘place’ and institutes localities without geographies [9]. The concept of ‘scale’ as “the representation of any area, as produced and defined by social process, from the smallest unit, the body, to the largest, the universe” [10] is the starting point for a much-needed reflection on digital currency, political power, and spatial dynamics. In this paper, we deploy the concept of scale to refer not merely to the geographical dimensions and boundaries of a digital currency, but also to the conditions for inclusion and exclusion which determine the reach and the scope of the currencies within and beyond territorial geographies. The dimension of scale here is helpful to frame considerations about governance, sociopolitical agenda, and technological architecture of financial infrastructures. Moreover, by pointing attention to the (virtual or physical) geographies and the communities in which money flows, the scale works as a thinking tool to criticize and imagine future possible configurations of money infrastructures in relation to the places they serve (Muellerleile, 2020).

### 3. Methodology and use cases’ description

The methodology of this paper consists of the administration of 11 in-depth interviews with key actors involved in the development and/or implementation of three digital currency projects [11]. The first project is the Digital Euro; the second is the REC (Real Economy Currency) is considered as Barcelona’s social currency; the third is Commoncoin. For each project, we have selected key experts such as project managers, computer engineers, hackers, or social adoption facilitators. We collected interviews between March 2021 and May 2022, respectively divided into four interviews for Digital Euro, five for REC, and two for Commoncoin. The similarity of the three use cases is the support of European institutions and the interplay between actors at various scales, namely an overlapping on who is promoting certain discourse under which these projects fall. We mainly look at the national scale of development of the projects, as well as at the links between European institutions and different national contexts in the governance arrangements.

<b>Table 1: Description of use cases and relevance.</b> Source: Authors.		
<b>Project — Scale — Status</b>	<b>Description — Relevance</b>	<b>Institutional underpinning — Purpose</b>
	The Digital Euro is currently in the investigation phase, the aim is the issuance of digital tokens which would serve as a digital	

<p>Digital Euro — Europe — Under investigation</p>	<p>version of the Euro banknotes. The Digital Euro would be issued by the European Central Banks in coordination with national central banks in the euro area, and it would be accessible to all European citizens and firms.</p> <p>It is relevant in terms of its use for retail payments (as opposed to wholesale payments) and as a complement to physical cash.</p>	<p>ECB National Central Banks — Retail</p>
<p>REC — Municipal — Active since 2021</p>	<p>The REC is a local digital currency created and managed by Novact (NGO) and the Barcelona City Council for the city of Barcelona. It is initially used to administer a form of universal basic income, and in the long run, it is meant to create a local exchange system that is complementary to the Euro, to strengthen associative networks.</p> <p>It is relevant in terms of facilitation the consumption of local goods and promoting sustainable supply chains.</p>	<p>Novact (NGO), EU Commission, Barcelona City Council — Retail and Welfare Administration</p>
	<p>Commoncoin is an experimental currency meant to work as an alternative currency for financing cooperative and anti-speculative processes amongst</p>	



<p>Commoncoin — Community/municipal — Partially active (Horizon 2020 time constrains)</p>	<p>artists and local communities. The cryptocurrency system is comprised of a digital currency and the Social Wallet API which both support the implementation of cooperative welfare practices within communities.</p> <p>It is relevant insofar, the project delivers these tools as a backbone infrastructure, leaving to groups and communities the possibility to implement the technology with a further definition of technical and governance features. It is a small-scale type of digital currency, mainly used in the urban communities of Macao in Milan, and the NDSM Treehouse in Amsterdam.</p>	<p>EU Commission Commonfare — Community administration and welfare</p>
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Hence, our three selected use cases are focused on crucial issues of digital currencies and are well-distributed in different social and temporal contexts. The fundamental differential factor to be taken into account is the scale at which these projects are meant to operate. Starting from this central concept and the consequent geographies of power arrangements, we analyze these use cases to reflect on the relationship between the scale of digital infrastructures, the socio-political goals that drive their construction, and their technological design. In the analyses of the main findings ([Section 4](#)), the developed four analytical tools (*cf.*, [Section 2](#)) are deployed to compare the three projects, that can be potentially used as an itemization for comparing other known digital infrastructure or platforms. By discussing tensions and contradictions in the following findings section a series of critical observations are synthesized putting the base for a final critical evaluation in the conclusion.

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**4. Descriptive and analytical findings**

In this section, we summarize the findings of the interviews. For each of the use cases we identify and report the interviewee's responses regarding the four identified analytical categories: i) the stated socio-political goals which motivate the project; ii) the governance arrangements; iii) data collection and use, intended as architectural and design choices that make the digital infrastructure suitable to achieve those goals; these last (ii) and (iii) categories are comprising both institutional and technological underpinning); and, iv) the scale at which the project is meant to operate and the geographies of power.

<b>Table 2: Summary of main descriptive findings.</b>				
<b>Source: Authors.</b>				
<b>Project</b>	<b>Stated sociopolitical goal</b>	<b>Governance</b>	<b>Data use</b>	<b>Scale and geographies of power</b>
Digital Euro	Digital public money supply Financial stability Competition with foreign CBDCs and stablecoins	Publicly owned infrastructure; reliance on third party service providers for user interface	No intended use of data	Regional/global All citizens
REC	Stimulate local and circular economy Stimulate sustainable consumption Welfare administration	Governance shared between NGO and Municipality, with involvement of citizens and businesses	Use of data to optimize achievement of social goals  In-app gamification and incentive systems	Neighborhoods/city Recipients of welfare; Citizens.
Commoncoin	Enable communities' economic selforganization	Global backbone; implementation open to community specifications	Open to each community to define possible uses of data	Small scale communities.

#### ***4.1. The (stated) socio-political goals of digital money infrastructures***

[Table 2](#) summarized the findings based on the four analytical tools. Below, the findings are presented following the four proposed analytical tools, each project is discussed: Digital Euro, REC, and Commoncoin using those four categories.

The Digital Euro is proposed by the European Central Bank to counter the decline of physical cash, as well as maintain public access to digital money and align with digital platforms and blockchain architectures. It aims to address concerns about private entities dominating the digital money market, in which three main public-interest motivations are identified: first, ensuring access to digital money as a fundamental right for



all citizens. Second, protecting privacy in digital transactions by offering an alternative to commercial payment services. Last, safeguarding financial and monetary stability, especially as physical cash diminishes. While, implicitly, the initiative is driven by the need to compete with global Stablecoins [12] and foreign central bank digital currencies (CBDCs). As one of the interviewees suggest:

“The starting point is the concern that we and other central banks have with private market players taking a share of each run of money.” (Interviewee 4)

The European Central Bank (ECB) is a Frankfurt-based institution competent for the monetary policy of the European Union. Its main tasks are that of maintaining price stability, supervising banks, and guaranteeing financial integrity in the Euro area. In collaboration with Member States' central banks, the ECB is investigating the potential implementation of a so-called Digital Euro, conceived, and engineered to work as the digital version of Euro banknotes [13]. The reason for its adoption would mostly be that of responding to the need to ensure a public alternative to private forms of money.

However, there are other less explicit but nonetheless pressing reasons for the initiative. It is, according to the interviewees, commonly understood within their institution that the push to initiate the Digital Euro investigation phase came after Facebook announced its intention to issue a proprietary digital currency, Libra. Hence, it is the need to prepare for competition against global Stablecoins or foreign CBDCs such as the Digital Dollar and the Digital Yeun that forced the EU institutions to take action.

Conversely, REC [14] operates as a virtual alternative currency backed by the Euro, with a focus on promoting sustainable consumption and a circular economy, designed to support local businesses and strengthen the local economy. The flourishing of local economic activities also has the indirect effect of promoting physical social connections, generating social capital in the territory and strengthening urban inclusion. As a result, multinational supply chains also disperse expertise, as they move the purchase of specialized production outside of the territory.

“A local currency is an incentive to buy the local product. [...] In this way, it supports the development of the local economy. Because it changes, it generates resources for the local actors. And that improves their specialization.” (Interviewee 6)

REC encourages spending in specific businesses through economic incentives, provided through rewards, in the form of digital tokens (NFTs) which are given for sustainable choices and community solidarity. The ultimate goal is to counter capitalistic, globalized production models and empower local communities.

Lastly, Commoncoin aims to establish a universal basic income, manage common goods, develop alternative production ecosystems, and create a digital currency for the commons for the different communities involved [15]. It serves as a complementary line of credit to address shortcomings in the Euro system's support for basic needs. Commoncoin is viewed as a provocative tool challenging the mainstream financial ecosystem, emphasizing participatory economic models for welfare provisioning [16].

“The provocation and challenge was to try to apply participatory economic models for welfare provisioning.” (Interviewee 11)

Ideologically, Commoncoin sees money as a common good enabling individual and collective flourishing, contrasting with capitalistic logic. The discourse around complementary currencies shared by the proponents of Commoncoin supports the idea that an ecosystem of small-scale currencies would provide more stability and granularity in responding to societal needs.

“Money is nothing but the possibility to do. It is the enabler of

biopolitical production.” (Interviewee 11)

There are certainly tensions and contradictions in the discourses proposed within these digital currency projects. Although their scales and institutional underpinnings are different, the aims are similar in terms of addressing various societal needs, including access to digital money as a right, local economic development, and the establishment of alternative economic and social systems. For instance, the ambition of a universal (and universalistic) scaling of the Digital Euro still needs to be managed by local players to adapt the infrastructure to local contexts (along with digital literacy of users, demographic differences, and so on). It is therefore difficult to overcome global competition along with the risks of private digital currencies which have influenced the initiation and discourses around these projects. The aim of universal scaling of the Digital Euro is still part of a rhetoric in which technology might be the panacea for complex societal problems.

#### **4.2. Governance of digital money infrastructures**

The Digital Euro, within the purview of the European System of Central Banks, is under investigation by the ECB, involving national central banks and various committees. Governance distribution between the ECB and national banks, especially concerning technological choices, remains undecided. The possibility of a distributed ledger system controlled by central banks or a federation of national CBDCs is being considered. The role of third-party service providers like Google Pay and Apple Pay in managing user interfaces for Digital Euro transactions is also being discussed.

“This CBDC can link to National Central Banks, and then every country has its own CBDC. We can have CBC NL, CBDC France, CBDC Belgium. [...] Or it could be the ECB running the CBDC.” (Interviewee 3)

Globally, there are dialogues about coordinating Central Bank Digital Currencies (CBDCs) through the Bank of International Settlement to facilitate international payments. Discussions are also open regarding the governance of Central Bank Digital Currencies at the global level. According to the interviewees, there are dialogues at the international level about how to manage the coordination (and competition) of CBDCs. The body that would take care of such coordination is the Bank of International Settlement, which would act as a global platform linking international CBDCs and enable international payments.

“If you have a Euro platform and a dollar platform, [...] then you can actually link the tool and then you would also facilitate international payments. [...] and if you have a platform approach, the whole thing becomes easier.” (Interviewee 2)

The REC project, aiming to establish a citizen currency, faces challenges in balancing institutional support and autonomy. Financed mainly by a European grant and partially by the Barcelona City Council, the project is supervised by the Council but governed by the NGO Novact. While the council’s involvement aids circulation, it also raises concerns about forced adoption by economically disadvantaged groups, potentially leading to discrimination. The City Council has, nevertheless, supervision and decision-making powers regarding the scope and terms of implementation of the project, *i.e.*, the duration of the project, the neighborhoods in which it circulates, the businesses in which it can be spent, etc.

“We believe in this REC system being like citizen currency. [...] it’s not a property, it’s not owned by the government. But we do need the support of the city council.” (Interviewee 7)

One of the future goals is that of creating a stable Association of Merchants, a body involving local businesses in the cocreation and coadministration of the REC infrastructure together with Novact and the

City Council.

“A very strong component is trying to involve the local actors in the design of the currency, in the development of it. Trying to get them involved in supporting it and also in making the best of it.” (Interviewee 6)

The project’s dependence on institutional support poses risks due to changes in political power. Novact emphasizes the need for self-sustainability to mitigate these issues. While supported by the administrative Area on ‘Social Rights, Global Justice, Feminism and LGBT’ of the Barcelona City Government, the project is not sustained by the Socialist Party in charge of economic policies. This leads to discontinuity in the development and use of the currency and lack of financial support for its functioning. Ideally, therefore, proponents of the currency advocate the need for the REC to be self-sustainable and independent from the political will of the Municipal Government. According to one of the interviewees:

“The negative side is that [...] there are changes in power [...] suddenly it can be situations in which the political support is not the same.” (Interviewee 6)

Maintaining control and ownership over the technology is considered a fundamental requisite for the success of the project; hence, the technologies are not outsourced, even if this choice implies a high spending of resources and the provision of slower, less efficient services and user experiences compared to mainstream digital services.

“I think that it’s really important to have your own technology, so you don’t depend from others on this. [...] And this is something that we can share, we can replicate, we can improve, and it’s ours and we don’t depend on others. Or at least we don’t depend on big companies, that would be a problem.” (Interviewee 7)

In contrast, the Commoncoin project seeks to empower individuals through open source and decentralized technologies. Proponents of the Commonfare platform talk about the need:

“We need to use subversive, bottom-up technological systems in order to break technocracy and bring the governance of the technology closer to those who are served by it.” (Interviewee 11)

“I think that nowadays institutions are technocratic by their own soul [...] to create technologies of liberation means to create technologies that release the power from the technocrats and give that to the people.” (Interviewee 10)

Therefore, transparency, auditability of code, legibility of coding language, and open source standards and principles, are fundamental features of the platform’s technological design.

“We need to bring it closer to the people we need, on one side, to use free and open source and intelligible technologies, [...] and then, on the other side, to have a democratic process facilitated about the decisions.” (Interviewee 10)

They advocate for technologies that break technocracy and emphasize transparency and democratic

decision-making. Commoncoin's backbone infrastructure relies on blockchain technology, and communities can build their governance structures on top of it using the Social Wallet API. The platform prioritizes legibility, transparency, and selforganization to empower users.

#### **4.3. Digital money infrastructures and data use**

The Digital Euro, as discussed by experts, emphasizes the need for privacy to build trust among citizens. The use of blockchain for anonymous transactions is hindered by anti-money laundering (AML) rules, raising concerns about mass surveillance in a government-controlled, digital payment network. The discussion around the technological design of the Digital Euro has mostly evolved around the possibility of using blockchain to build self-sovereign technological solutions and allow anonymous transactions. However, AML rules prevent this by demanding digital transactions over a certain amount be linked to individuals' legal identity (Muldoon, 2022). The privacy issues and the threat of mass surveillance entailed by a digital payment network controlled by public institutions are so concerning that they, alone, might prevent the ECB from issuing the Digital Euro.

“The issue of privacy will be very high up on the agenda of the ECB in deciding whether or not to at all proceed with issuing a central bank digital money, because no solution that we will be able to come up with may meet a sufficient degree of approval.” (Interviewee 4)

According to the interviewed experts on the Digital Euro, privacy is fundamental to ensure citizens trust in the central bank digital currency; hence, the infrastructure needs to be built with the highest possible level of privacy protection, *i.e.*, as much confidentiality in the recording of transactions as allowed by anti-money laundering (AML) regulation.

In the REC project, a virtual social currency, data analysis focuses on aggregated levels to assess economic behavior changes and achieve project goals. The REC serves not only as a currency but also as a platform to strengthen community ties. Information sharing among participants, facilitated by a services environment, includes reviews, maps, and other functionalities.

“This service environment includes added functionalities such as review systems for customers and maps locating the shops involved in the network.” (Interviewee 5)

“Some people may be happier with the data belonging to somebody which is private, and not the government of the city.” (Interviewee 6)

Data control by a private organization (NGO Novact) alleviates citizen concerns compared to public administration. In particular, data is collected to calculate the rate at which the REC stays in circulation within the local economy — *i.e.*, the amount of RECs that are received from citizens by local businesses and reused by the latter to purchase more locally-produced goods or services, instead of being exchanged in Euro.

“The idea is not to control the citizens. [...] the only way we use the data is to analyze what happens with the flows of transactions, in aggregate [...] For research purposes, it's very good to have all this data. But it's never used for anything else.” (Interviewee 6)

“The REC is meant to work not merely as a currency, but as a platform aimed at strengthening the community. Hence, it is

organized as a ‘services environment’.” (Interviewee 5)

While the Commoncoin project relies mainly on open source blockchain technology for transparency and trust. While user identity and transactions remain pseudonymous, organizations can customize data collection based on community preferences. Developers prioritize complete confidentiality and anonymity but acknowledge potential benefits of data analytics for policy choices, rejecting data monetization in favor of the public good. The developers of Commoncoin are in favor of complete confidentiality and anonymity in the use of the platform:

“My background is for strong privacy. [...] And I think it should be peer to peer completely anonymous.” (Interviewee 11)

However, they recognize the potential benefits of data analytics for policy choices and for the technical organization of the incentive system. The project, in any case, stands against data monetization and any model that speculates on the use of data. Any eventual use of data must be directed to the realization of the public good.

#### ***4.4. Scale and geographical dimension***

On one hand, the Digital Euro aims to be a digital currency for the eurozone, with a focus on universal accessibility and inclusion. It acknowledges disparities in digitalization and socio-economic factors among member states. The goal is to provide user-friendly technology for people of all ages and conditions. There is also a consideration of allowing non-European citizens to open Digital Euro accounts to strengthen the Euro’s international role. The goals of uniform implementation of the Digital Euro within the European territory, and universal inclusion to the public digital currency, are to deliver user-friendly technologies that can be used by people of all ages, regardless of physical or mental conditions [17].

“The whole economy is increasingly digital, and that’s a very kind of so important for the public sector to make sure that nobody is left behind in a way.” (Interviewee 2)

Yet, the dematerialization of the euro and its restructuring through digital infrastructures entail new possible geographies and conditions of access. An object of complex political and economic considerations are the conditions of access (the ability to hold Digital Euros) in non-European countries. It is confirmed by all interviewees that one of the scopes of the Digital Euro is to strengthen the international role of the Euro and to make the Euro a global reserve currency. Hence, it is not excluded that non-European citizens will be able to open a Digital Euro account.

In terms of adoption, there needs to be a balance between the opposite eventualities of wide use on one side, and non-use on the other. The first, in fact, would go at the expense of the private market for digital payments, undermining the interests of commercial banks. The non-adoption of the Digital Euro, instead, would entail ECB’s loss of credibility and trustworthiness.

“If you introduce it and either it’s not used or it fails, then there’ll be a big problem for a central bank’s cred.”  
(Interviewee 1)

On the other hand, the REC is designed to circulate within communities, promoting local spending and strengthening social cohesion. The focus is on tailoring technology to specific social dynamics, conducting on-field activities, and expanding initially within neighborhoods. Education of the interested actors and continuous communication with businesses and users of the REC was deemed necessary for proper integration of the app with the social practices of each place. Physical proximity matters according to our interviewees:

“You need to reach the people in the neighborhood.”  
(Interviewee 9)

“Our digital infrastructures want to complement and help physical relations, not substitute them [...]: our project is based in the streets, in the actual relations.” (Interviewee 7)

To tailor the technology to specific social dynamics, paying attention to the specificities of single neighborhoods and parts of the city, the members of the REC projects conducted on-field dissemination and awareness activities. As it comes to expansion within the city, the priority is to attract upper and wealthy neighborhoods and incentivize the use of the currency from the part of wealthier people who could voluntarily support the social and environmental goals of the REC. This is done, for example, by linking the REC to specific sectors such as the cultural industry or charity organizations.

“We need to deploy the REC in some of the neighborhoods more involved in social movement with very strong capacity to deploy this kind of money, [...] the hipster neighborhoods.”  
(Interviewee 7)

It is also stated that there is a vision of scaling up city-wide and beyond, either horizontally through replication in different cities or vertically by integrating with the Digital Euro.

“I see two ways of scaling up with this. There’s replication, which is creating the same kind of thing elsewhere. [...] And the other [...] idea is to work with Central Bank Digital Currencies in a way that they can back complementary currencies, local currencies like the RECs.” (Interviewee 6)

Instead, Commoncoin envisions a global infrastructure detached from institutional powers, allowing communities to build their financial systems. It emphasizes a distributed approach, where local communities can manage their rules. Commoncoin creates a locality without geography whereas it recognizes that a community currency does not need to relate to a specific territory or have physical space as a connecting element.

“We also depend on global infrastructures and platforms but we need to tailor them to the local needs: the currency can work in the same way everywhere, but it has to be first managed at the node level in a geographically distributed way [...] in a way that local communities can still build their own rules.” (Interviewee 10)

While the blockchain-based network would need to be able to scale in order to support multiple currencies running across the globe, there is a view that the single applications of Commoncoin should not reach wide adoption. Independently from Horizon 2020 time constraints, the expansion of one currency beyond the interest of the single communities would be against the premises of Commonfare; rather, the proliferation of independent projects and the evolution of a varied ecosystem of currencies is seen as the most sustainable solution.

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## 5. Tensions and contradictions



In this study, three digital currency projects — the Digital Euro, REC, and Commoncoin — are examined, each sharing the underlying motivation that money should be treated as a common good, shielded from profit-oriented businesses. The Digital Euro, led by the ECB, envisions a top-down, universal digital infrastructure provided as a universal basic service, aiming for a European digital citizenship. However, it prioritizes neutrality, leaving local customization to social and economic players (van der Linden and Bollen, 2022).

The REC social currency aligns with ‘new municipalism’, seeking to address global issues through local focus. It aims to restore democratic control over the local economy through public-common partnerships but faces challenges in financial and political support, potentially relying on user fees if support wanes. The small-scale nature of the project may lead to demographic biases and hinder usability, by sustaining the idea that the municipality is a strategic site for giving power back to citizens [18].

Commoncoin departs from social democratic approaches, advocating bottom-up economic organization and collaborative culture. Despite its value as an imaginative resistance practice (van de Donk, *et al.*, 2004) the statement by the interviewees indicated that these initiatives were short-lived and experimental in nature. The brief duration and experimental nature of these initiatives, attributed to temporary Horizon 2020 funding, emphasize the need for stable resources, expertise, and enduring political commitment to the development of durable digital infrastructures. Hence, it indicates a strong dependence on stable resources, expertise, and a relatively strong network.

As a critical insight, we found that larger the digital infrastructure, the less visible are local socio-economic issues and priorities; blind to microeconomic dynamics and social relationships, supranational digital infrastructures are marked by a technocratic approach which hides important political considerations from public scrutiny. Smaller scale digital currency projects, instead, are meant to realize alternative economic models that respond with high granularity to the needs and values of different communities. However, smaller-scale projects that lack the support of administrative or political institutions find it difficult to ensure durability, as they may suffer from a lack of consistent resources investment.

Overall, the research underscores the diverse motivations, challenges, and outcomes associated with these digital currency projects. This might represent a limitation in the initial selection of the case studies due to the contingency and temporal development of each project. It has to be mentioned in the paper the network effects in relation to the scale of implementation are overlooked.

Finally, the use of blockchain or similar decentralized technologies in all the initiatives should at the very least be stated as a potential problem; the deployment of such technical component has only in limited cases been effective in devising a consistent solution for a properly diagnosed and delimited problem in the public sector (Bodó and Janssen, 2022). Consequently, it prompts us to view the use of blockchain by the three initiatives in the study as potentially problematic, indicating that these technologies may not provide a consistent solution for properly identified and bounded problems in the public sector.


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## 6. Conclusions

A comparison of the use cases selected for this study highlights how digital infrastructures have become the locus of contestation between commercial actors, institutional powers, and communities. Digital money infrastructures are built as public utilities at different scales and geographies. In some cases, they are shaped by institutional political agendas, in others, they serve as tools that empower to bottom-up initiatives.

The study examines digital infrastructures as contested spaces involving commercial actors, institutional powers, and communities. It focuses on three initiatives — the Digital Euro, REC, and Commoncoin — exploring their diverse scales and the emergence of different geographies of power. The three initiatives

analyzed — differ in terms of scale, intended not only as a territorial dimension but also as a virtual space determined by conditions of access and inclusion. The projects we have observed seek to build payment/money infrastructures connected to different geographical or digital localities and identified by political/economic considerations. Their identification translates into particular configurations of the technical underpinning of the digital infrastructure itself. Thus, the analysis underscores the intricate relationship between the socio-political goals, governance, data and technical design, and scale of digital infrastructures.

We found the issue of scale to be central to our analysis, as it directs attention to the types of localities (territorial and not) that digital money infrastructures create and co-shape geographies of power that can rapidly change over time due to their temporality and contingency. Multiple lenses should be deployed in tandem to better unfold the possible paths for reconnecting digital infrastructures with people and places. We conclude by advocating the need in future research agendas to further question the place, scale, and political goals of emerging digital money infrastructures. 

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## Notes

- [1](#) David Harvey, 1982. *The limits to capital*. Oxford: Blackwell, p. 95.
- [2](#) Extractions from the ECB interview and article on “The future of money — Innovating while retaining trust” by Christine Lagarde, 2020. See also: European Central Bank, 2020. “Report on a digital euro”.
- [3](#) It should be mentioned that, in the past few years, the cryptocurrencies networks and markets have been increasingly regulated by States through highly centralized services as exchanges.
- [4](#) This threat was evident in Facebook's announcement of issuing the Libra digital currency; as well as

Amazon Coins are available to purchase goods and services on Amazon's platform.

5. To specify that states are inclined to control value transfer infrastructures with substantial socioeconomic roles, such as those for the circulation of cigarettes, gold, gas, and essential raw materials.

6. On a related topic about the commercial uses of financial data from private financial intermediaries, and its legal implications, see Ferrari (2020).

7. Bernards and Campbell-Verduyn, 2019, p. 776.

8. Castells, 1996, p. 359.

9. We are aware that the use of the plural of 'geographies' is deployed concerning infrastructures and power. Hence, we refer to the scholarship of 'geography' within urban studies, as a field that examines the material and organizational structures of social settings, including the role of the State — and other mediating institutions — as well as the territorial and spatial dimensions of such structures.

10. Lefebvre, 1974, p. 90.

11. As a corroboration of the method deployed in this article, see Doria and Fantacci (2018).

12. Stablecoins are virtual currencies the value of which is asset-backed (in physical collateral or cryptoassets) or algorithmically controlled in order to avoid price fluctuations typical of non-fiat digital currencies. To specify, in our analysis of digital money infrastructures, the issue of national sovereignty is intertwined with that of digital sovereignty, intended as a country's ability to control and regulate its own digital infrastructure, networks, and services. The control of digital infrastructure — and thus digital sovereignty — is essential to national sovereignty, as it allows to ensure the protection of citizens' rights and interests. In the same way, linked to the concept of national sovereignty is that of 'monetary sovereignty', which refers to a country's ability to control its monetary policy and issue its own currency (including the ability to set its own interest rates, manage its money supply, and use its currency to support its domestic economy).

13. A Digital Euro would represent for citizens a viable alternative to commercial payment services whose business model is based on personal data exploitation. Finally, allowing a balance between private and public money supply (especially once physical cash disappears), the Digital Euro could be essential to safeguard financial and monetary stability. Central bank money is, in fact, a necessary backup and a last-resort source of stability when the private financial sector goes bankrupt (as happened in the 2008 financial crisis).

14. The REC complemented the B-MINCOME project, a project aimed at "combining guaranteed minimum income and active social policies in deprived urban areas" <https://uia-initiative.eu/en/uia-cities/barcelona>. Under this project, 25% of minimum income was assigned to the recipient in RECs rather than euros, through the dedicated mobile application created by Novact.

15. The exact goal of the currency depends, therefore, on the context in which it is implemented. Developers of the Commonfare platform would ideally sit with pilot communities to study ethnographically what would be the requirement of the technological infrastructure. The various pilot projects differ in objectives as they are tied to different stakeholders and target groups. In the Netherlands, NDSM Treehouse, the pilot project has been initiated by the municipality to support the cultural and artistic sector; in Italy, Macao and Santarcangelo festival it has been experimented in the context of independent art festivals and organizations. In all three cases, the digital currency allows local communities to provide incentives for artists, in the form of as a basic income of financial support for cultural events (Chiappini, 2022).

16. Commoncoin is a digital currency that runs and is governed through the Commonfare platform and is

used by members of the Commonfare pilot projects.

17. The investigators of the Digital Euro are aware of the huge differences among member states, and between cities and countryside, in terms of digitalization and socio-economic types of relationships.

18. Muldoon, 2022, p. 101.

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