Data - Monies:

The platformization of currencies

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1. Introduction

Since Bitcoin launched in 2008, blockchain based technologies have been attracting an increasing number of developers, investors and adopters. As Bitcoin is increasingly recognized by institutions, governments and big industries as an alternative asset, its value is becoming socially accepted and recognized. While carrying its own trade-offs, in many cases Bitcoin's protocol is proving to be a viable alternative standard to the centralized regulation of state issued currencies. What I call the monetary infrastructure has historically been dominated by state-governmental actors and has proved resilient to privately-owned alternative currencies. Even though Neo-Liberal ideology has sought to deregulate public good infrastructure, until recently, the state's monopoly on the production of money, that is, what gets to count as money, has hardly been affected. Today, blockchain technologies are opening the gates for visions of currency that compete with the dominant state-centric model.

Smart-contract platforms represent a leap in this direction. They are blockchain infrastructures that not only handle users' transactions, they also allow for code to run on top of them as smart contracts. These are software that self-execute when certain conditions are met and are used to define any asset or agreement that can be expressed through code. Ethereum is the most used and capitalized platform for smart-contracts today. Ethereum is a decentralized platform that provides the blockchain infrastructure as a service: anyone can create their own currency (token) that runs on the Ethereum network by deploying a smart contract that regulates the monetary policies of the token. Assets or currencies defined by smart contracts leverage our understanding of money: these tokens are fully programmable and interoperable – their use cases can be affine to specific markets or platforms while they can be traded for any other token on the market. Currencies enabled by blockchains are fully digital and only represented by the transactional data that attributes them to someone – in this essay, these currencies are referred to as data-monies. Data-monies inherit the security of the underlying blockchain infrastructure: they digitize value into data – or to put it in other words – they make the resulting transactional information valuable.

This data is highly interoperable and 'platform ready' due to its programmability. At the same time it never abandons the financial framework that constitutes it. This new type of information – one that inherently carries value – expands the process of datafication perpetuated by platforms: data-monies can capture behavioral data that previously eluded consistent quantification. Moreover, data-monies crystallize the value extracted by platforms into a digital medium that can be integrated in the functioning of a platform in order to enhance its business model. Most platforms and decentralized applications (dAPPS) on the Ethereum ecosystem have issued their own tokens. These tokens are programmed to serve different purposes and are integrated with the protocol's functioning: they are designed to mediate interactions taking place on the platform while providing advantages for both the platform and its users.Furthermore, platforms that are not native to the Ethereum ecosystem are now working on issuing their own token. Facebook has been working on its 'Diem' token that runs on its own blockchain. Other platforms, such as Brave or Reddit, are instead issuing their own tokens as smart contracts on the Ethereum Network.

This essay argues that data-monies are the expression of a further step in the process of platformization. Data-Monies mediate communicative acts through transactions, the resulting data is 'platform-ready' and thus, further exacerbates data-extraction practices perpetuated by digital platforms. Data-monies can create new markets or make pre-existing ones more efficient, since they are fully programmable, their policies can be tailored to fit specific markets or mediate specific types of interocurses, enhancing the business model of a platform. Moreover, Data-monies represent an additional design layer for platforms to govern users behavior. Central Banks fiat currencies such as the Dollar or the Euro are a one-size-fits-all-transactions type of currency: markets have to adapt so as to fit their transactions to a standardized currency. Data-monies aim to provide *mediums of exchange* that can better fit the interactions taking place in a specific environment by means of transactions. For example Brave aims to disrupt the pre-existing market for digital advertisement by replacing the medium of exchange to all the transactions that constitutes it with a token designed to better suit the needs of all the market participants.

Data-monies are the symptom of the process of platformization affecting money transfers- or more in general, the monetary infrastructure. Data-monies are a means to crystallize the value extracted by platforms into digital assets. While this might sound liberating to some users – they might earn monetary rewards from the digital labor they commit to a platform – it is also appealing to the platforms themselves. The question is to evaluate if the advantages brought about to users by the adoption of platform specific tokens are fair or if they are overshadowed by the advantages they bring to platforms. In the latter case, data-monies are yet another tool to consolidate the pre-existing power relations established by the platform economy.

2. From Cowrie Shells to Digital Currencies

The exact circumstances that surround the invention of money have long been debated by anthropologists, archeologists, economists and philosophers. For its central role in the global capitalist economy, it is inextricably tied to conceptions of value, civilization, exchange, and history itself. Money is mainly defined through the use of two categories*: money of exchange* and *money of account.* The first refers to tangible media that holds socially agreed upon value such as precious metals, paper bills or cowrie shells. The second type does not crystallize value into a physical token, instead it combines records of debits and credits on a ledger, resulting in balances. Bank accounts are an example of *money of account*.

A popular narrative amongst economists is that monetary systems were created to advance the bartering trade system into a far more efficient arrangement. Bartering requires a double coincidence of wants for a trade to take place – an agreed-upon medium of exchange solves this problem (Case, Fair, Oster, 542). David Graeber disputes that money was created as a response to the inefficiency of barter – or that society ever relied on bartering systems to begin with. Graeber argues that money is rather a consequence of debt. As he has it, *money of account* was the first form of money that ever existed: when people began keeping track of what others owed them, ledger based monetary systems came about. On these bases, debt was later on quantified into a tangible *medium of exchange*. More specifically, it was quantified into precise units of value such as a standard 'gold coin' that guarantees weight and fineness as opposed to irregular metal ingots (Graeber, 35).

Whether money was created as a consequence of debt or of the barter system, its usefulness can be traced back to the necessity for a 'collective memory', a distributed record of all human intercourse (Hart, 6). Money as a *medium of exchange* can be seen as a technology that provides a distributed record of all the transactions, without the necessity to write them down on a ledger. Instead of tracking each transaction, individuals exchange a tangible media (currency) with an agreed upon value and supply: one's monetary possessions at any given time would equate to what their balance on the ledger would be. The 'memory bank' infrastructure includes not only circulating cash (*medium of exchange)*, it also includes worldwide money transferring systems based on ledgers (*money of account)*. Together, these operate to produce the infrastructure for money: a globally expansive ledger in which society finds a rhetorical, mathematical and imaginative expression (Maurer, 4).

In most states and monetary unions, the infrastructure is managed and overlooked by a central bank: an institution which is independent from political interference while being collaborative with the government and limited by legislative and executive bodies. Central banks have to guarantee safe and efficient payments, clearing, settlement and financial stability in a wider economy (committee on Payments and Market Infrastructures, 3), as well as providing a currency for the geopolitical area they are responsible for. These government backed currencies, such as the Euro or the Dollar, are called fiat-currencies and are made available to the citizens through commercial banks – the intermediary required for the public to access financial services. Thus, providing an efficient, robust and well-oiled infrastructure, alongside a stable economy and currency, is the central banks' goal.

As one of the efforts undertaken to achieve such an aim, currency as a *medium of exchange* has been progressively abstracted from the raw materials that once underscored the designation of monetary value. What classical economic theory calls exchange value evolved from imagining value as based on a commonly agreed material medium of exchange, eg. gold, to one that conceives of value as being mediated by state backed financial institutions. When, in 1971 Richard Nixon decoupled the US dollar from gold–what went down in history as the 'Nixon Shock–it marked the transition from a comparatively rigid monetary infrastructure, constrained as it was by the finite supply of precious metals, to a more flexible model that was arguably more amenable to political manipulation. Since 1971, the dollar's value has not been guaranteed by a reserve of gold or any other asset. Instead, it is determined by demand and offer against other worldwide currencies in an open market. Most nations followed suit and adopted the same model.

Alongside this radical shift, the process of the virtualization of value was accelerated by the development of electronic money, empowered by the progress of computation. Just as the systematic change emblematized by the Nixon Shock led to greater efficiency in media of exchange, so too has the growth of computing streamlined money of account currency systems. Credit cards have grown in popularity since the 1960s and since the mid-twentieth century, banks have been increasingly using digital ledgers and datasets to track currency transfers. More and more, money *is* digital information. By 1990 all the money transferred between central and commercial banks in the United States was electronic. Only ten years later, the majority of money existed only as data in banks' datasets. Nonetheless, up to this day, fiat currencies are still a hybrid model sustained both by physical and e-money.

E-money is defined by *A glossary of terms used in payments and settlement systems* as 'value stored electronically in a device such as a chip card or a hard drive in a personal computer'. E-money is a digital equivalent of a central bank's currency and can easily be redeemed for cash, for example by withdrawing money from an ATM. Digital currencies may apparently satisfy this definition; what distinguishes them from e-money is that they exist only in their digital form and do not reflect any tangible, material media. Moreover, digital currencies are not necessarily issued by any individual or institution and they are not necessarily issued in exchange of funds. Central Banks have not hidden their desire to implement digital currencies. Several banks have been working on such projects since 2017. The advantages of digital currencies are undeniable but, citing Powell's words when discussing the central bank's digital currency (CBDC), *It's more important to get it right rather than get it first*[1]

[1] https://www.reuters.com/article/us-usa-fed-powell-digitalcurrency-idUSKBN2741OI (Accessed on August 18, 2021)

(2021). Adopting digital currencies would have an undeniable impact on the current infrastructure which would need to be adapted to allow the central banks to successfully fulfil their role in the new environment. Given how entrenched the discourse of risk aversion is within the legacy monetary infrastructure, central banks approach any change that would bring about risks and costs with caution.

Data-monies, or cryptocurrencies, are a type of digital currency characterized by decentralized record of transactions and enabled by distributed ledger technologies (DLTs) such as blockchains. Data-monies exist exclusively as transactions on a distributed ledger. While this makes them a form of *money of account,* the distributed ledger provides the means for users to trade peer-to-peer, a crucial characteristic of money as *medium of exchange.* Since DLTs are native to the world-wide-web, data-monies can be understood as a cash-equivalent payment infrastructure for the internet. By paraphrasing a famous quote from Marshall McLuhan—*the medium is the message*—it could be said that in the case of data-monies *the transaction is the currency.* There is nothing that proves ownership of, for example, a Bitcoin, other than the ownership of the address to which the record of transactions (the blockchain) attributed the coins to. While the blockchain could provide an infrastructure for central banks' digital currency – it would enormously reduce costs of networking and verifying transactions (Gensler, 65:45) – the inherent decentralization runs counter to the logic of state-backed monetary oversight. In fact, some central banks have experimented with such a model but have yet to move beyond preliminary trials. Nonetheless, today the idea of implementing monetary infrastructures built on data-monies backed by central banks is gaining traction. This has been a reaction to the rise of privately owned data-monies which are pegged to, but not necessarily backed by, fiat currencies.

Indeed, traditional platforms are increasingly interested in issuing their own data-money. Facebook has been trying to issue its own data money, the 'Diem', since 2019. The project has found strong resistance from central banks, legislators, the US senate and especially the Federal Reserve System. Diem is seen as a threat, not only in the context of US economics, where data-monies have been treated with suspicion until recently, but also as having the potential to send shockwaves around the worldwide banking system. Considering that around two billion people worldwide do not have access to banking services, while a third of them have a smartphone and access to Facebook, issuing a private currency at such a large scale could successfully 'bank the unbanked' – something that central banks and financial infrastructures in various developing countries have failed to achieve.

3. Blockchains: Networks for Secure Data Transfers

A blockchain is a distributed-ledger technology (DLT); it is composed of a series of ordered 'blocks' that are cryptographically hooked together to form a 'chain'. Each block can contain up to a certain amount of data. Once data is inscribed into the blockchain, it becomes immutable. As of today there are several competing blockchains and their functioning may vary based on their scope and architecture. Bitcoin's blockchain is one of the earliest and most known ones and it uses a Proof of Work (PoW) system to validate transactions. Ethereum, the second most capitalized after Bitcoin, was created a few years later and is based on a similar architecture. The most intuitive application of DLTs is that of handling a currency. Other use cases include logistics, the internet of things, land and property deeds, finance, healthcare, supply chain management and digital art and collectibles.(DuPont 117).

In a PoW system, the ledger database is distributed on a network of computers that perform the *mining* necessary to validate and record transactions. These machines, or *mining nodes*, compete with each other to be the first to compute (mine) the hash that identifies the next block of the chain. Once the next hash is calculated, one block is added to the chain and the mining nodes start computing the next one. Each block adds a fixed quantity of memory to the ledger, similarly to adding a new page to a ring notebook. Users who want to get their transaction inscribed in the blockchain have to broadcast it to the network and pay a fee to the miner who successfully generated the block in which their data is inscribed. On top of the fees, each new block begins with a reward to whoever mined the block: the first transaction of each block mints coins by transferring them to the address of the mining-node.

The incentive system is a crucial feature of the architecture of DLTs. The protocol rewards users with newly minted coins to incentivize participation in the mining network. Each individual user joining the network contributes to the overall robustness of the infrastructure. Bitcoin's protocol regulates the emission of newly minted coins according to a pre-established schedule: every four years the coins minted by the protocol at each block are cut in half. The protocol extracts value from the computational power that users provide and rewards them with the same currency guaranteed by the infrastructure they are maintaining. This achieves a decentralized infrastructure where contributors are doubly incentivized not to act maliciously, allowing the protocol to run without any centralized point of failure. Moreover, it guarantees security, immutability, accessibility and zero down-time. This architecture, while it might take different flavors for different blockchains, is what makes data-monies a peer-to-peer *medium of exchange* even though they are a ledger-based currency.

Infrastructures originate as socio-technical systems which are centrally designed and controlled, typically when new technologies are invented and developed (Plantin et al, 4). Bitcoin has been around since early 2009 and is increasingly showing infrastructural tendencies. At the time of writing, its battle-tested protocol has proved to be resilient to all known attack vectors. In a few years it went from fueling cypher-punk dreams to attracting retail investors, companies, financial institutions and even sovereign states, as it has recently become legal tender in El Salvador[2]. Infrastructures that stand the test of time to become embedded in societal life are 'learned as part of membership' in the communities or nations where they are adopted and require human labor to persist. (Bowker, Star 287).

Although the protocol for most data-monies is decentralized, their design is mainly determined by the active community that engages with the technology and the discussions around it. Blockchains require a plethora of actors to make them secure and accessible, including, but not limited to: *wallet designers, wallet providers, security architects, speculators, mining pool operators, engineers, investors, application developers, forum editors and writers, trolls, academics, regulators, and lawyers.* (Islam, Mäntymäki, Turunen, 4). Each blockchain can be understood as an actor-network assemblage that relies on several actors to function (Caliskan, 4). For Bitcoin and Ethereum, any changes to the protocol have to go through what is called an Improvement Proposal which is then scrutinized and peer-reviewed. If the improvement is considered beneficial and the active community approves it, it gets implemented. For the rest of the users these changes go unnoticed, for them the protocol is invisible until the network is congested or not working as expected.

Infrastructure studies elaborates the phenomenology of infrastructures by emphasizing the critical role they play for society. This approach highlights society's dependence on infrastructures, which tend to be so embedded in social practice that they are frequently taken for granted As a result of this, it is often only when they fail that infrastructures attract significant attention.When their

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[2] https://www.reuters.com/technology/bitcoin-become-legal-tender-el-salvador-sept-7-2021-06-25/ (Accessed on August 18, 2021)

ubiquity, reliability and durability are put to the test their breakdown has the potential to create chaos. (Plantin et al, 6, 6) It is hard to abstract an infrastructure from its surroundings: the right question is not 'what is infrastructure' but 'when is infrastructure' (Star, Ruhlder, 122). What electricity grids, transport networks and monetary infrastructures have is that they have all attained a critical mass of usage such that people have come to rely on them.

As an infrastructure 'travels the social spaces', users and developers may modify the new technologies and compete by providing alternatives (Plantin et al, 4). The infrastructure consolidates in different ways and thus, there is a need to link the heterogeneous established systems, that together make the infrastructure, into a network. These contact points are defined by Egyedi and Spirco (3) as *gateway*s that link the various devices and social apparatuses that sustain the infrastructure. Different DLTs are today reaching maturity and each of them offer different compromises of security, scalability and decentralization. Gateways are being built to move digital assets from one chain to another as well as to provide access to traditional financial institutions with services built on top of blockchain technologies.

The monetary policies of DLT's native coins are a combination of economics, cryptography and game-theory. All three of these dimensions need to be carefully balanced for the infrastructure to be sustainable: different blockchains may adopt different balances between these three dimensions, resulting in different trade-offs – the combination of these three dimensions is known as cryptonomics. The tradeoffs aim to find the best balance between security, scalability and decentralization – what is known as the blockchain trilemma: only two of these three can be achieved at once. Security and decentralization come at higher processing costs, leading to poor scalability; security in a scalable way leads to centralization, making the network vulnerable as it has a centralized attack vector; scalability and decentralization come with low security, since securing a decentralized network require too much effort, it has to be sacrificed to obtain scalability.[3]

Bitcoin's blockchain programming language is Bitcoin Script. Bitcoin Script is purposely designed to be compact, stack-based and Turing-incomplete[4]. In the case of bitcoin's blockchain, *the protocol serves the currency:* its goal is to maintain a secure infrastructure so as to guarantee the validity of the underlying digital asset. If it was possible to hack the protocol to counterfeit or double spend the data-monies, the infrastructure would immediately collapse. Since data-monies are information about transactions inscribed into a block and the validity of these is guaranteed by the security of the network itself, the usefulness of the blockchain can ultimately be traced back to the right to move data securely (Calsikan, 17).

Thus, if money is the record of all manner of relationships of credit and debt across time and space (Maurer, 111), the blockchain is an alternative infrastructure for the 'memory bank' – with its own trade-offs. There is no owner and no central authority overseeing the functioning of the protocol. Nor is there anyone who could independently intervene to modify it since it is distributed over the network. When dealing with such a protocol, the code is law and the law is code, effectively generating a *trustless infrastructure* that does not require any human intermediary. Data-monies are secured by protocols as circulating fiat cash is secured by central banks. The logic of protocol has a digitizing effect on monetary policy, transferring the control function of currency verification from institutions to virtual machines. Blockchain's protocols replicate the central bank's watermark in a virtual, decentralized architecture.

[3] https://medium.com/certik/the-blockchain-trilemma-decentralized-scalable-and-secure-e9d8c41a87b3 (Accessed on August 18, 2021)

[4] meaning it can not compute everything than a Turing machine can. For further readings on the subject: https://plato.stanford.edu/entries/turing-machine (Accessed on August 18, 2021)

4. Monetary Infrastructures

In the eighteenth century, Adam Smith argued that money, alongside property and markets, pre-existed political institutions establishing the foundations of human society. According to Smith, political institutions should not play any role in the regulation of monetary affairs and should rather focus their efforts on guaranteeing the soundness of a currency. Despite the efforts of neoliberal leaders, who sought to reduce the cost of public good infrastructures by increasing private competition through deregulation, the state's monopoly on the production of money has hardly been lessened. Alongside other infrastructures that invite a high level of state regulation, including various military, judicial, and bureaucratic technologies, the monetary infrastructure has historically been considered too important to be privatized.

Nonetheless, private money issuers are not a total anomaly in the history of money – even though they were not inspired by more recent neo-liberal ideals – these arrangements are referred to as *free banking systems*. Most notably Chinese merchant's Jiaozi in the 10th century; the Scottish free banking system between 1716 and 1845; and the three decades referred to as the *Free Banking Era,* from 1837 to 1864, a period in which the United States adopted such a system and any private entity could mint their own currency. These were seen as a threat to the sovereignty of the state, who feared that the impact of its monetary policies would vanish or diminish. The *Free Banking Era* ended as private currencies were first required to be backed by US dollars and later, taxed out of existence. (Gorton, Zhang, 36).

Today's monetary infrastructure – while being far from a fully deregulated infrastructure – is hybrid in nature. Monetary policies are managed by central banks in collaboration with governments# and actuated through commercial banks. Commercial banks can be seen as a 'franchise' to the central bank (Hockett & Omarova, 1147). Citizens cannot engage directly with central banks; financial services are accessible only through commercial banks. Central banks control the money supply by buying or selling assets, usually government securities, on the open market. When a security is bought, the selling bank's reserve balance is credited with newly minted money, with no legally cognizable obligation to its issuer. When it is sold the buying bank's reserve balance is diminished by that amount. (Ricks, 776). These securities carry low interest rates and in practice work as a 'loan' from central banks to commercial banks. This is referred to as *seigniorage* and is the main stream of revenue central banks provide to the state. Keeping it at a competitive rate is necessary to attract the private sector to partake in the market.

Banking can be understood as the activity of money creation or augmentation – the infrastructure framing here is crucial because it establishes that these devices are part and parcel of a pre-existing regulatory model. The monopoly over money allows institutions to conduct monetary policies, such as increasing the supply or defining interest rates, based on the necessities imposed by macroeconomic conditions. Maintaining a stable economy directly correlates to the social stability of a country. Central banks and governments impose a monopoly on money as fiat currencies are the medium required to pay taxes and take loans. The forced adoption triggers enormous network effects, making these currencies effectively the unit of account within the political borders a given central bank is in charge of. The raw economics of money dictate that others will use it and exchange it; it becomes the unit of account, medium of exchange and store of value (Gensler, 8:20)

Cash and other forms of money as a *medium of exchange* are part of the 'memory bank' – they can be traded without intermediaries thanks to the assumption that a central bank is guaranteeing the currency. Cash is a pre-digital distributed network for information transferring, this information being a quantitative indicator of the value one has access to. The anti-counterfeit mechanisms employed by central banks on their physical tokens (typically coins and notes) is what allows users to exchange information securely and independently. Ultimately this is what DLT technologies are digitizing and gives purely electronic records a value independent of the flow of material tokens. The breakthrough and disruptive potential comes from the possibility of running a monetary infrastructure that does not require users to trust anyone but the protocol. Yuval Noah Harari once said that 'religion asks us to believe in something, money asks us to believe that other people believe in something' (210). We might add to this that in the blockchain age, data-monies ask us not to believe anybody.

When it comes to exerting control over monetary policies (or any other part of the protocol), data-monies' architectures do not allow much flexibility. Data-monies are programmable money, their variables are coded into their protocols and hardly modifiable. Nonetheless, alternative data-monies that could be more adequate to the needs of central banks are being explored by sovereign states. Moreover, Bitcoin is effectively becoming legal tender in Salvador as of September 2021. Whether these new compromises and adoptions are a viable solution for economies or not is a polarizing debate with strong advocates for both sides. Getting into that debate is beyond the scope of this essay. Nonetheless, it is undeniable that the DLT infrastructure is becoming convincing enough for an increasing number of actors to trust them as an alternative monetary infrastructure.

Even though the reorganization of the production of 'public goods' and the shift towards private provision of infrastructure is an important topic in the present policy debate (Burh, 6), the basic politics of fiat currency has barely evolved, and within its domain, the right to mint new money has remained the exclusive preserve of the state. Data-monies have triggered competition in the currency market by enabling a multitude of privately owned, or at least non-state owned, currencies – something that previously had been systematically suffocated and strictly regulated. The lack of centralized targets for attack and limited opportunities for fraud in the architecture of these protocols has left legislators displaced. The resilience of the infrastructure is proved by the recent Chinese ban on bitcoin miners, affecting almost 60% of the capacity of the network. Nonetheless, this was not enough to cause any major issues to the infrastructure. If anything, it resulted in more decentralization and robustness, as the major cluster of miners previously located in China is now leaving in favor of more welcoming countries.

The monetary 'memory infrastructure' is tied to social, political and symbolic conditions. Money is first and foremost a 'process' and not a 'thing' whether it is represented by data, paper or gold. Thus, it has to be framed within the symbolic valuations, social relations and political institutions of its time, as these are what maintains it. The existence of money implies *a priori* political and social realm (Caliskan, 2). As a metonym for the disruptive potential of digitalization and the open web generally, to date, data-monies have tended to oppose state-political influence over monetary policies. In the context of a neoliberal order in which states are increasingly subject to critique on the grounds of a lack of transparency and accessibility, data monies propose an alternative techno-economic model that sees the state dislodged from its traditional position as the ultimate decider of national financial policies.

If Bitcoin proved that a monetary infrastructure built on blockchain is viable, Ethereum is raising the stakes by offering solutions to overcome the limitations of Bitcoin. Its goal is to provide 'the world's programmable blockchain', a platform for a secure, interoperable, censorship resistant and more private internet experience (Ethereum Whitepaper, 1). Ethereum's programming language, Solidity, is Turing-complete and lends itself to the implementation of smart contracts. In its mobilization of the smart contract concept, the Ethereum Virtual Machine leverages the extra-monetary potential of DLT. Data-monies are the first money form that is created, in part and in varying degrees, by scientists or people who use scientific tools and competences without the necessary contribution of banks and states (Caliskan, 3).

5. Is Ethereum a Platform?

The rise of digital platforms has helped shape the internet into what is referred to as 'Web 2.0' – a space where access to services, content and communications is mediated by private companies who are able to extract value and generate profits in the process. Public good infrastructures have been deregulated and privatized to enhance competition, digital technologies bootstrapped the process. By capitalizing on the possibilities allowed by digitalization, platforms were able to compete with and then disrupt pre-existing markets and governmental or quasi-governmental monopoly infrastructures. At the same time, the rise of platform strategies in the computer industry made possible an 'infrastructuralization of platforms' (Plantin et al. , 21)

Until 29th of January 2021, Ethereum's homepage defined the project as 'a global, open-source platform for decentralized applications'. On the next day the welcoming message changed and the term *platform* was dropped from the homepage, which thereafter read as 'Ethereum is the community-run technology powering the cryptocurrency, ether (ETH) and thousands of decentralized applications.' Nonetheless, Ethereum's Whitepaper still defines Ethereum as 'A Next-Generation Smart Contract and Decentralized Application Platform'. This definition highlights the three main elements of Ethereum: *a next-generation platform,* for *smart contracts* and *decentralized applications* (dAPPs). To clarify this architecture, management and organization studies' approach to platforms provides a useful categorization. Baldwin and Woodward (3) define platforms as architectures composed of three key elements: core components with low variability (*a next-generation platform)*, complementary components with high variability (*smart contracts)*, and interfaces for modularity between core and complementary components (*decentralized applications).*

The core component with low variability, the 'next generation platform' is the blockchain architecture itself. While borrowing many elements from Bitcoin's protocols, Ethereum was specifically designed with the programmability of a greater range of smart contracts in mind. Ethereum's aim is to provide an interoperable and distributed platform on top of which other platforms can be built. Gillespie argues that when a company defines itself as a 'platform', it tries to elude responsibility for content by presenting itself as a supposedly neutral provider of an empty space where interaction can happen (Gillespie, 348). Indeed, Ethereum's founders presented the technology as a neutral, secure, decentralized and trustless network for data transfer, an image that has been cultivated by the Ethereum foundation ever since. Nonetheless, critics of the protocol insist that Ethereum's neutrality and the foundation's emphasis on decentralization is only a facade. After all, the active community of users, developers, early investors and miners do ultimately concentrate decision-making power over direction of the project. Like all language, code itself is always embedded in specific histories and material instantiations; it is always shaped by the interests and agendas of the various agencies that write, read and interact with it.

The second layer of the platform architecture, 'the complementary components with high variability', is represented by the smart contracts running on the blockchain. Smart contracts are software that self-execute when predetermined conditions are met – the classic analogy is that of a vending machine. The vending machine offers certain products for a fixed price and executes the trade once the customer satisfies the predetermined conditions. After the customer (i) selects an item and (ii) provides payment for the item, the vending machine outputs the selection. Vending machines cannot change any of the conditions by themselves, users cannot negotiate or ask for discounts. The idea behind smart contracts on Ethereum is to provide services in a decentralized manner without any intermediary who may exert control over the protocol. When dealing with smart contracts, as when dealing with the underlying blockchain protocol, *the code is law and the law is code*.

Smart contracts are used to define digital assets or any type of action or agreement that can be expressed through code. They are stored in the blockchain and thus have no down-time. Their functions can be called by any users or any other smart contract; this is done by broadcasting the required data to the network in the same way the transactions are broadcast. The wide spectrum of possibilities that smart contracts allow is still being explored, with decentralized finance being the most popular use case today. For example, Aave's smart contracts allow users to deposit their digital assets in the protocol and to borrow other assets against the ones deposited as collateral. On Aave anyone can anonymously and instantly loan any amount of data-monies, without needing a bank or any other intermediary – provided that they have deposited enough collateral to back their loan.

Blockchains can only host one 'native coin', as is the case for BTC in the Bitcoin blockchain or ETH in the Ethereum blockchain. Beyond the native coin, Ethereum can host any number of tokens running on top of its blockchain. Thanks to ERC-20 standard protocol for smart contracts, anyone can create a token by uploading the smart contract that defines the token on Ethereum's blockchain. At the current stage of development this is not practical on Bitcoin's blockchain. Smart contracts can be used to regulate how a token works and how users can interact with it. This is achieved by defining variables such as the max supply, trading fees, how they are rewarded, minted or burnt. These properties can be seen as the token's 'monetary policies' and are referred to as 'Tokenomics' (Token-Economics). Most decentralized applications, and many centralized platforms, are adopting their own token to serve different purposes within the platform. Tokens are becoming an irreplaceable cog in the functioning of many decentralized applications.

Finally, the last layer: the complementary components. This is represented by the interfaces – and sometimes particular smart contracts – managed by dAPPs to facilitate interactions with other smart contracts or users. When, for example, a user visits Uniswap.org, they can swap most ERC-20 tokens with any other token or with ETH. The user inputs what trade they want to accomplish and pays all the necessary fees. On behalf of the user, the dAPP then broadcasts to the network all the data required to execute the trade. Once the data gets inscribed into a block, the trade is executed – this may include calling several smart contracts' functions to complete the transaction. Nonetheless, most smart contracts can be accessed in various ways: alternative dAPPs may facilitate access to the same contracts. For example matcha.xyz is an alternative interface to access the same smart contracts Uniswap does. If savvy enough, a user could skip the dAPPs and communicate directly with the underlying smart contracts by broadcasting the required information to the network.

At its core layer, Ethereum is similar to Bitcoin and both can be understood as a multi-sided market for secure information transmission. On one side users need computational power to engage with the blockchain and its smart contracts; on the other side miners are willing to provide the computational power required to maintain a secure infrastructure and to inscribe what the users ask them to. Users need to pay the gas fees necessary to broadcast and compute the information they want to inscribe, miners collect most of the fees in exchange for their service, a portion of them get destroyed according to the protocol.

Similarly to other platforms, Ethereum generates new markets that bring about disruptive potential. Ethereum is designed to reduce dependency on intermediaries by decentralizing platform ownership; this is achieved by providing a common, decentralized and interoperable core-layer on which other platforms can be built. Consequently, the new paradigm threatens industries whose business models focus on generating revenue from mediating access to goods and services. This includes commercial banks, who mediate between savers and borrowers and between investors and financial services; it also includes digital platforms that profit from positioning themselves as the middlemen of a multi-sided market.

David McIntyre and Arati Srinivasan argue that platforms emerge as a response to the inefficiency of markets by disrupting and transforming them into platform-mediated networks, where the platform itself plays the key-role of the middleman (4). Even though Ethereum positions itself as the middleman for all the intercourses happening on the network, the revenue generated is not centralized in the hands of a company or bank, but is rather redistributed to its users: to miners via fees and to ETH holders through the burning mechanism. At each block the protocol takes a slice from the miner's fee, based on the gas-fees of the previous blocks, and destroys it. This mechanism sets a deflationary pressure on the supply of ETH, the size of the slice is determined by the network's gas fees at previous blocks: the more Ethereum is being used, the more ETH is being burnt. Thus, the revenue generated is redistributed to all ETH holders, not by giving them more ETH, as is the case for miners, but by reducing the total supply of ETH.

Digital platforms are something in between a market and an enterprise. Platforms act as markets as they select goods, manage information and establish prices for their services (Casilli, Posada, 2019, 3). They are a market as their main occupation is to match demand and offer as efficiently as possible – something that Ethereum achieves with the fee bidding system. They act as enterprises since the tools they use to match demand and offer are not limited to price adjustments. For example, they coordinate both sides through algorithmic matching which can be more or less convenient to one side or another based on the immediate needs of the multi-sided market. As a market, Ethereum makes efficient the costs of matchmaking through the intricate gas-bidding system – the price of gas depends on how much users are willing to bid. At the same time, Ethereum acts as an enterprise since the community around it actively develops the protocol to make it more efficient. Furthermore, the double nature of platforms is made explicit by ETH. The native coin functions as the currency of the platform, since it is required to access all services, while it also resembles a stock as it reflects the value of the network and the entire ecosystem built on top of it.

Instead of using a matchmaking algorithm, Ethereum and Bitcoin use a bidding system to match users and miners. The difference in the architecture of these two protocols is that in the case of Bitcoin, all non-miscellaneous transactions on the network have to do with transfers of BTC or applications related to BTC. Ethereum's network instead hosts various applications which rely on it to transfer information. When broadcasting transactions to the Ethereum network, they do not necessarily have to do with ETH itself but with one of the many applications available in the ecosystem. Even though these transactions may have nothing to do with user-to-user ETH transfers, they still require gas-fees to be paid for in ETH in order to inscribe and compute the transaction. Being able to extract value from an increasing variety of sources is a characteristic of platforms rather than infrastructures. The programmability, interoperability and modularity of platforms is what allows them to be dynamic in nature and expand their reach, something that infrastructures lack. Because of Ethereum's design, ETH extracts value from each and every operation happening on its blockchain.

Platforms are the product of the combination of several layers and third-party services that together compose the platform's ecosystem. This architecture governs and shapes interactions through design to extract value from user's behavior: data is rendered 'platform-ready' and consequently monetized. Moreover, platform's design choices aim to make them more attractive to users so as to enhance network effects (Srnicek 31-33) and to lock users within their ecosystems. Ethereum's protocol governs and shapes interaction within its ecosystem, forcing participants to interact through the gas bidding system. Where it differs from corporately governed platforms is that value is not extracted from the monetization of personal data, but rather from the fact that the data moving on the network is unfalsifiable.

The Ethereum ecosystem resembles platforms for applications such as Google's android play store and Apples app-store. In a similar fashion, Ethereum can be seen as an app-store for decentralized applications. App-stores such as Google's or Apple's require the user to log-in to download and access the apps. The users' login becomes a pass-partout for the ecosystem while at the same time it allows the app-store to gather profiling data about the user from each application they use: all the personal information users provide is centrally compiled and managed by the app-store providers. In the Ethereum ecosystem users can access every app by logging-in with their pseudo-anonymous Ethereum-address. Ethereum does not perform any collection of users personal data: the only data the network collects is the data related to the transactions on the network. Moreover, Ethereum does not require a specific operative system in order to access the dAPPS its ecosystem offers, most of the apps available in the ethereum ecosystem are accessible on the open-web through a browser.

Poell, Nieborg and van Dijck define digital platforms as '(re-)programmable digital infrastructures that facilitate and shape personalised interactions among end-users and complementors, organised through the systematic collection, algorithmic processing, monetisation, and circulation of data' (2019). Gillespie, on the other hand, argues that re-programmability is not a core aspect of platforms, but that what is most important is the seamless common ground for interaction they provide. "'Platforms' are 'platforms' not necessarily because they allow code to be written or run, but because they afford an opportunity to communicate, interact or sell." (Gillespie, 5).

As argued above, Ethereum is a digital infrastructure that facilitates interactions among users and miners by managing access to the blockchain, even though the interaction is not based on personal data but is instead shaped by the bidding system. Moreover, users on Ethereum are pseudo-anonymous and the network only records the data that is necessary to maintain the ledger – such as transactions or interaction with smart contracts. This data is collected and organized by the miners and if something is not on the blockchain, it did not happen. Moreover, the monetization of data is inherent to the Ethereum protocol itself. The data *is* the value that one has access to—not because the data is valuable in and of itself, but because the data is valuable once it is guaranteed by the network.

The high level of interoperability and re-programmability of Ethereum is manifest in the flourishing space of Decentralized Finance and epitomized by the term 'Money-legos', which is used to highlight the interoperability between all the financial applications running on top of Ethereum's protocol. Ethereum is not only platformizing the blockchain infrastructure and thus the issuance of money, it platformizes the blockchain's core-layer and provides a shared infrastructure for secure data transfer. This functions as a backbone for all other dAPPs running on top of it. Ethereum is more than a platform in and of itself and is rather a platform for platforms, a *meta-platform* or an infrastructure for platforms. Platforms that run on Ethereum, deploy their algorithm as a smart contract while they can rely on the security guaranteed by the core layer. Thus, making Ethereum *a platform for smart contract platforms*.

At the same time the platform architecture of Ethereum shows features of infrastructure as it becomes embedded in the background and is widely accessible, while connecting many independent third-party protocols within its network. Ethereum guarantees a robust and distributed network to transfer information within the world wide web. Extracting data and storing it in the blockchain, circulating, processing and ultimately monetizing it (the data guaranteed by the network are monetizable digital assets) are all features at the core of the protocol and its functioning. Ethereum provides an infrastructure for platforms, as it constitutes a standardized, transparent and reprogrammable layer for platform interoperability – while locking users within its ecosystem.

Defining platforms as reprogrammable digital infrastructures highlights the modular component of platforms – something upon which layers can be added and can be made interoperable with other platforms and services. The resulting architecture shapes the infrastructure to make interactions more efficient (facilitate) while also governing them by design (shaping). This brings advantages, not only for users and complementors, but also for the platform itself: interaction is quantified and made platform-ready to further monetize it as part of the process of platformization. These result in a powerful engine for a business model fueled by practices of systematic data collection, data processing and circulation – all of which aim to maximize the platform's revenue.

Ethereum platformizes the blockchain infrastructure and its application goes beyond keeping track of transactions. Ethereum's blockchain can host the core-layer of other platforms, which can rely on the security provided by the underlying infrastructure and run in a decentralized manner. Moreover, Ethereum can host tokens running on the blockchain: these tokens can benefit from the security of the infrastructure and are thus free from the burden of being programmed to be the incentive system that keeps the infrastructure running. This allows for a much wider design space allowing them to be engineered for specific aims. While some platforms are working on their own blockchain in order to deploy their own token, such as Facebook, other platforms, such as Brave or Reddit, are instead using the Ethereum network to issue their own token, respectively Basic Attention Tokens (BAT)[5] and Moons (MOON)[6]. This second layer is what makes Ethereum more than a platform and rather a platform-for-platforms or a meta-platform.

6. Digital Labor and Value Extraction

The scholarly debate around the extractive practices performed by platforms is still an open discussion. Understanding where platforms extract value from and how this is monetized is crucial to defining platforms and understanding their functioning. The term 'platform' is itself not very revealing about the business model in use or where the value is extracted from and how data is monetized. (Gillespie, 4). A symptom of this ambiguity is the rise of several frameworks, 'new economies', that try to define how value is extracted and from where. Frameworks such as Platform Capitalism, that defines platforms as quasi-monopoly service providers (Srnicek); Surveillance Capitalism, that focuses on the extraction of data perpetuated by platforms (Zuboff); Attention Economy, which highlights the extraction of attention as a commodity from users (Davenport, Beck); Emotion Economy, that sees the matchmaking capabilities of AI based on user's emotion as a drive for revenue (Joeler).

These various terms assist in the process of defining the ways in which value is extracted. Each platform's business model may appear akin to one or more of these frameworks, making comparability between platforms hard to achieve. To understand what a platform prioritizes in their business model is necessary to take into account the full network of participants and their distribution (Tilson, Lyytinen, Sørensen, 751). The interactions between these participants is what ultimately *fills* the platform, that can thus be understood as a 'set of relations that constantly needs to be performed'. These relations have friction which emerge between the users, whose goal is to have access to a service, and the platform's, whose goal is to maximize its profits (van Dijck, 26).

Platforms mediate users' access to services and are able to turn this mediated interaction into revenue. *Digital Labor* defines all human activity performed on the platform which produces value for the hosting platform. These practices include the creation or consumption of content, the gig economy, domestic labour, creative labour, cognitive labour, and platform labour (Gandini, 8) As pointed out by Gandini, the term *digital labor* is problematic, as it has become an empty signifier used as an umbrella term to define all sorts of digitally mediated forms of labor happening within the platform economy.

[5] https://www.bravebat.info/
[6] https://www.reddit.com/r/moons/comments/ovfj8p/moons_cryptocurrency_explained/

If initially *digital labor* was used to refer to a specific set of practices, the term grew to critique the exploitative relations that are performed within the platform economy. More recently, the term has developed to also include all forms of digitally mediated labor (Gandini 8). Nonetheless, the concept of digital labor pre-dates the concept of the platform economy and is closely entwined with our understanding of the world wide web. As Tiziana Terranova pointed out, the internet is fundamentally sustained by free cultural and technical labour as its users are in a continuous process of value production (33). Casilli and Posada argue that a platform's success is directly related to its ability to exploit this labour and extract value from users (2).

Fuchs and Sevignani argue that platforms monetize free digital labour into significant revenue. 'The dominant capital accumulation model of contemporary corporate Internet platforms is based on the exploitation of users' unpaid labour, who engage in the creation of content and the use of blogs, social networking sites, wikis, microblogs, content sharing sites for fun and in these activities create value that is at the heart of profit generation.' (Fuchs and Sevignani, 237). These scholars see in the exploitation of digital labor the main commodity source from which platforms are able to extract value. This school of thought finds its roots in the Marxist labour theory of value, which led to the theory of audience commodification by Smythe (1977). Smythe sees the audience of television as performing labor as they are subjected to commercials – the exposure to advertising and marketing represents a form of unpaid labor undertaken by viewers.

Nick Srnicek refuses this framework as he argues that the idea of digital labor being exploited is built on incorrect premises. The author argues that users are not subject to competitive pressures that pushes them to do more labor:

> In examining the activities of users online, it is hard to make the case that what they do is labour, properly speaking. Beyond the intuitive hesitation to think that messaging friends is labour, any idea of socially necessary labour time – the implicit standard against which production processes are set – is lacking. This means there are no competitive pressures for getting users to do more, even if there are pressures to get them to do more online. More broadly, if our online interactions are free labour, then these companies must be a significant boon to capitalism overall – a whole new landscape of exploited labour has been opened up. On the other hand, if this is not free labour, then these firms are parasitical on other value producing industries and global capitalism is in a more dire state. A quick glance at the stagnating global economy suggests that the latter is more likely. (Srnicek, 37).

Nick Srnicek argues that it is not the data itself that is valuable, as it carries no meaning and is not sold in bulk. Instead, he argues that value is generated by the insights platforms can obtain through processing the collected data. This processed information is what enhances platforms' business model: it allows them to target users with tailored advertisements or to make matchmaking algorithms more precise. More than the data itself, it is the platform's labor in managing these datasets that generates the value. Thus, according to Srnicek, the value is derived from the labour of organizing and making sense of the data. What ultimately is sold is the access to the information extracted from processed data, which is meaningful and precious, not the data itself. Similarly Ethereum value does not come from the data alone, but by the security of the network that ensures that the data is valuable.Advertisers are not paying for the data itself but rather for the work platforms have done on the data. Srnicek's position does not take into account that bulks of data are sold over the counter – by hackers and shady third parties as well as by the platforms themselves. Google, for example, has in the past sold to Mastercard private users emails regarding electronic transactions[7].

It is hard to argue that digital labour, being exploited or not, does not increase the overall

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[7] https://www.bloomberg.com/news/articles/2018-08-30/google-and-mastercard-cut-a-secret-ad-deal-to-track-retail-sales (Accessed on August 18, 2021)

value and attractiveness of a platform. Having an active user base of producers and consumers of content makes a platform alive and thus enhances network effects and user retention, which the platform ultimately translates into revenue. The commodification of users' activity and digitally mediated forms of unpaid work are at the core of the processes of platformization. Nonetheless, it is necessary to go beyond the diagnosis of labour being 'digitally mediated' – as this might prevent researchers from successfully unfolding the many ways in which the capital-labor relationship is enforced by digital platforms (Gandini, 377).

The commodification of users' activities is encouraged by the design of the platform, which governs how interactions can take place within the platform. This mediates users' interactions through a set of predefined quantifiable units that conduct users' activity and sustains the data-infrastructure on which platforms build their services. Moreover, this framework enables new unregulated markets in which platforms exploit forms of paid and unpaid work outside of regular employment. These fasil to guarantee fundamental rights such as paid leave, retirement, safety, and in some cases, the right to be paid for one's contribution (Casilli, Posada, 8).

When considering practices of value extraction, the main distinction between infrastructures and platforms is the reach of the respective extractive practices. Deregulating public good infrastructure leads to more competition and a more cost efficient provision of services. Nonetheless, the scope of an infrastructure is limited to a specific service. Platforms are not limited by the scope of a service and the digital scale economy supports expansions. Platforms aim to expand the variety of sources of extractable value by integrating a plethora of services – for this reason platforms are highly dynamic in nature. As platforms become quasi-monopolies or the backbone for a specific service, competition is hard to achieve. The role of the government is not anymore to run or oversee monopoly providers but quite the opposite: to break monopolies so as to increase competition while renouncing the responsibilities that come from providing the service. (Plantin et al, 12).

Ethereum's primary goal is not to provide a robust and secure currency in ETH (which it nonetheless does as much as BTC does) but rather to be a platform for others to build on top. Ethereum is designed to allow more value extraction possibilities than what Bitcoin does. Bitcoin's protocol works as a feedback loop which redundantly grows its network while absorbing computational power from the outside: the more contributors the protocol attracts, the stronger the network becomes. The more robust the network is, the more secure and socially accepted Bitcoin becomes and thus, its attractiveness increases. While Ethereum serves the same function, its applications go beyond being a closed loop infrastructure, mainly because of the extensive support for smart contracts. Each platform or application that relies on Ethereum's infrastructure is subject to value extraction by Ethereum and ETH is the currency that crystallizes the captured value.

To exemplify this it is useful to look at the Miner's Extractable Value (MEV)[8] in Ethereum. Bitcoin extracts value from the computational power provided to the network, which directly increases the protocol's robustness and thus, makes Bitcoin more secure, further incentivizing users to host nodes. Ethereum's blockchain functions in a similar way, while also allowing applications to run on top of it. All of the dAPPs are subject to the extraction of value by Ethereum, as their data and smart contracts exist within the network. Any kind of service that may benefit from a DLT has an incentive to use Ethereum (or another smart-contract platform) rather than their own blockchain.

As previously argued, miners aim to maximize their profit and thus, when determining which transactions to include in the next block, they naturally prioritize transactions that are more profitable for them – the ones that pay the most gwei (0.000000001 Ether) and require the least work. The possibility of picking which transactions are included next and the ability to determine their order within the block can be exploited by miners to maximize the value they are able to extract from the

[8] https://blog.chain.link/what-is-miner-extractable-value-mev/ (Accessed on August 18, 2021)

transactions happening on the network. Moreover, the bidding system itself ultimately maximizes the revenue miners are able to make at the expense of the users who are competing with each other to get their transactions inscribed.

Ethereum is hosting a variety of DeFi services, many of which have their own token-markets. Having a variety of simultaneous and parallel markets for the same assets enables plenty of arbitrage opportunities. An arbitrage opportunity happens when an asset is being sold at different prices in different markets: when a user spots an arbitrage opportunity they can buy the asset where it is cheaper and then sell it back where it is more expensive, making a profit in the process. Arbiters compensate the inefficiencies of the market and arbitrage opportunities are often considered as a tool to re-balance prices across the various market of the network

For example, if an arbiter finds that ETH is being sold at different prices on two different markets, they want to quickly buy the token in one place and sell it in another for a profit. The arbiter needs to broadcast the transactions and wants to pay more gwei than the average: the arbiter needs to front-run everyone else in order to successfully complete the arbitrage. If someone else closes the same trade before him, the original arbiter ends up with a losing trade. Once the opportunity is spotted, the required transactions are broadcasted to the 'mempool' – the place where all the transactions that are not yet inscribed but waiting to be picked by miners are stored – anyone can see the arbitrage opportunity waiting to be confirmed. Miners could steal the arbitrage opportunity by executing the same trade before they execute the one from the user. Even if this is not the case and the miner is not reorganizing the block to steal the arbitrage opportunity, other users might try to steal it.

If another user spots the arbitrage opportunity in the mempool, they might want to broadcast the same trade but with a higher gas-fee. If they can do so before the original transaction gets inscribed into the blockchain, they might be able to front-run the original arbiter and steal the trade. This leads to a bidding war where users keep on bidding higher gas in order to front-run each other. Every time the bid increases, the value that the trade would generate decreases as it is being eaten by gas fees. Thus, the revenue that the arbitrage opportunity would produce is ultimately absorbed by the miners.MEV exemplifies how Ethereum allows value extraction possibilities that go beyond ETH transactions and how miners have privileged access to extract value from the transactions happening in the network. The bigger the ecosystem grows the more MEV opportunities Ethereum will yield to its miners. Precisely because Ethereum shows more features of a platform rather than Bitcoin, where the value extraction is always related to BTC transactions–Ethereum expands its extractive practices beyond ETH transactions

7. Tokens as Platformized Currencies

The previous chapters argued that DLTs can be a viable alternative infrastructure for money. The analogy is evident when considering blockchain technologies as networks for secure data transfers and the monetary infrastructure as a 'memory bank of all human intercourse'. Bitcoin's protocol is proving that the architecture is viable, while Ethereum repurposes the infrastructure by applying platform-logic to the blockchain architecture. Ethereum makes the blockchain infrastructure into a service for third parties: the secure network for data transfer is available for anyone to build on. Ethereum's core-layer is an interoperable digital infrastructure, it is programmed to host services, platforms and dAPPs while guaranteeing the security of the network and sustaining Ethereum's financial model.

Smart contracts on Ethereum can reproduce the same affordances as 'web 2.0' platforms while bringing all the advantages of using a blockchain as a backbone: transparency, privacy, security, zero down-time and pseudo-anonymity. These characteristics are foundational to the new internet-experience pushed forward by Ethereum –what is referred to as 'web 3.0'[9]. Ethereum extracts value from each data-transaction that takes place in the network, which all require gas-fees to be paid for. The extracted value is crystallized into ETH and redistributed both to miners in the form of block-rewards and to all ETH holders, since at each block part of the fees are burned by the protocol depending on factors such as network usage and current gas price, thus reducing the circulating supply.

Even though the most flashy developments in the Ethereum ecosystem are currently oriented towards decentralized finance and Non-Fungible Tokens (NFTs), plenty of new applications are being developed. It does not come as a surprise that decentralized finance is the first application to find fertile ground in the network: handling a currency is the primary application of DLTs and all platforms within the network afford high levels of interoperability as they rely on the same core protocol for information transferring. Moreover, Ethereum is in the process of improving its scalability but for now gas fees are still relatively high and are not competitive for other applications such as gaming, social networks and streaming. Most of these kinds of activities happening on the network are, for now, of a speculative nature. It then comes naturally that the network first functions as an ecosystem for trust-less and decentralized financial services.

At the time of writing, Ethereum handles around 20-40 transactions per second[10] Provided that the layer-2 scalability upgrades are successfully introduced to Ethereum, the network would then be able to process around 100'000 transactions per second. For comparison, Visa and Mastercard handle around 24'000 transactions per second[11]. Once these scalability solutions are rolled out, some of which are being deployed at the time of writing, the network should be able to handle around 100'000 transactions per second[12], enabling support for applications that are more data-intensive.While it is early to say if all these platforms could benefit from having their own token, most platforms running on Ethereum are experiencing several benefits coming from the adoption of platform-specific tokens, such as enhanced network effects and user retention.

Adopting platform-specific tokens is becoming the norm in the 'web 3.0', where most dAPPs natively host tokens integrated with their protocol. Nonetheless, mainstream 'web 2.0' platforms are growingly becoming interested in the adoption of tokens. Companies such as Facebook, Reddit, and Brave have introduced or are working on their own data monies. While some of these, such as Facebook, aim to create their own blockchain infrastructure to run their data-monies, other platforms, such as Reddit and Brave, chose not to create their own infrastructure but rather to issue their own ERC-20 tokens on the Ethereum network.

Coins such as BTC and ETH are tied to the needs of their blockchain infrastructure: they are programmed to be the incentive stream that keeps the infrastructure running in a decentralized manner. ERC-20 tokens are free from the burden of being the necessary incentive required to maintain the infrastructure secure and running – ETH is already fulfilling this role. The design space for ERC-20 tokens can thus be much wider: they can be engineered in order to make platforms more efficient at mediating a specific set of relations or a specific market. At the same time, tokens inherit all the qualities of the underlying blockchain infrastructure. Even though smart contracts are still subject to bugs, they can rely on the security guaranteed by the infrastructure.

Beyond defining Ethereum as a platform, it is useful to consider how the process of platformization is affecting currencies and how the resulting data-monies can enhance the functioning of the issuing platform. When considering ERC-20, the process of platformization becomes explicit,

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[9] www.ethdocs.org/en/latest/introduction/web3.html (Accessed on August 18, 2021)
[10] https://ethstats.net (Accessed on August 18, 2021)
[11] https://usa.visa.com/run-your-business/small-business-tools/retail.html (Accessed on August 18, 2021)
[12] https://twitter.com/VitalikButerin/status/1277961594958471168 (Accessed on August 18, 2021)

since they are fully programmable coins that leverage our understanding of what money can be or do. These tokens can be native to the functioning of a platform, or integrated on top of their protocol as an extra layer: in both cases they can be programmed to mediate a specific set of interactions.

The process of platformization is identified by Poell, Nieborg and van Dijck through three dimensions (3). The first being *data infrastructure*: digital platforms collect and process unprecedented quantities of data. This allows them to optimize their services while monetizing the data they collect and process. In the context of platforms, interactions are subject to datafication which makes the resulting information ‘platform ready’ and thus, monetizable. The second dimension concerns markets. The multi-sided market logic of platforms has disrupted many pre-existing markets. Platforms generate new markets and position themselves as the middleman of the new arrangement. Moreover, the platform economy leads to the creation of new ancillary markets rising as a consequence of the functioning of a platform. The third dimension identified is governance. Platforms exert governance by design: they shape user interaction so as to maximize their profit by conducting users behavior in ways that enhance data-extraction and profiling practices, thus reinforcing their business model.

In the next chapters different applications of data-monies are discussed in relation to the three dimensions identified in the process of platformization. This is done by considering the few of the applications platform-specific tokens have found. A token can be a Governance token: these tokens are akin to stocks of a platform and represent the ownership of a protocol. Users owning governance tokens can vote over protocol changes: this type of token crystallizes governance. Utility tokens bring about a specific use case: tokens can be a ‘reward system’ within a platform, being the medium necessary to unlock pay-walls to access a certain service or could provide users benefits for holding the tokens: this type of token crystallizes value from previously unrecognized commodities, such as Brave’s Basic Attention Token (BAT) which crystallizes users’ attention.

7.1 Data-Monies as Data-Infrastructure: a Novel Medium

The first dimension identified is the development of a *data infrastructures*, understood through the notion of *datafication:* digital platforms render into data, practices and processes that previously eluded quantification – including both data provided voluntarily by the users and meta-data about users’ behavior (Poell, Nieborg and van Dijck , 6). The process of datafication is enhanced by the interoperability of platforms, as it leads to more integration with services, apps and devices that share the data-collection practices with the platforms they are integrated with. Virtually every instance of human interaction is transformed into data and platform specific data-monies aid the process by capturing previously unquantifiable interactions through means of transactions.

Platforms compete by quantifying as many behaviors and as accurately as they can ‘such unrestrained thirst for new resources and fields of cognitive exploitation has driven a search for ever deeper layers of data that can be used to quantify the human psyche, conscious and unconscious, private and public, idiosyncratic and general’ (Crawford, Joeler, 19). Data-monies are an additional layer which assists the process of datafication as they provide a new kind of data, one that inherently has value. Because of this propriety, alongside their interoperability and the inherent financial framework, data-monies expand on the process of datafication as they are a medium able to capture human intercourse by means of transactions. Since the underlying network makes the data valuable, data-monies mediate communicative acts that are better represented by information that inherently carries a notion of value.

One could argue that transactional data is already available since third-parties for digital payments are not lacking in the digital market. Nonetheless, there are some reasons why these are not comparable. Payment processing companies are virtualizing a service, while data-monies are a financial framework which is native to the digital and the open web. The transactional information processed by payment processing companies is valuable as long as one can trust the company to guarantee a reliable service–data-monies are instead trustless by design. Data-monies are 'platform-ready' transactional information that can be integrated into platforms; they are a medium that renders into data and thus captures value from resources that were not previously capitalized efficiently.

Platforms integrating data-monies inherit a secure, and native to the digital, payment infrastructure. Even though the intuitive application is for them to be used as means for payment within a platform, they can be programmed to serve different purposes. Ethereum can be used as a means to settle payments while at the same time the coin is programmed to be gas that fuels operations on the ecosystem and the incentive that sustains the network. Brave has integrated BATs into the Twitter interface: now users are able to tip each other on Twitter, as long as they are using the Brave browser. Reddit MOONs are automatically awarded to r/cryptocurrencies subreddit users based on the upvotes they receive, MOONs can also be given as a tip.

Actions such as tipping a user's content is assimilable to 'liking' it, they both mediate the communicative act of showing appreciation. Nonetheless, the information they yield is not comparable. In the first case the communicative act is mediated by a transaction of value, the user who tips is economically committing to show their appreciation, 'likes' instead are not sustained by an inherent financial framework. Moreover, a tip also provides a measure or a valuation of the 'appreciation' the user wants to show, something that 'likes' do not afford. Data-monies expand the data-infrastructure as they are a type of data with inherent economic properties, able to mediate certain communicative acts in a more significant way as they carry a notion of value.

Furthermore, platforms are already imprinting the logic of economics into the predefined communicative acts, or 'tasks', used to quantify user's behaviour. 'Likes' and 'shares' have a 'double articulation' since they are not only the way in which users can express themselves, they are also the means of ranking and valuing the information (Langlois and Elmer, 3). Adding a financial framework to these 'tasks' makes the quantification more revealing. The 'double articulation' is identified by Jose Van Dijck in the opposing sets of performances that define platforms (59): on one side users want to use platforms to interact, communicate and express themselves, on the other side platforms conduct the behavior through predefined tasks that are functional to their business model.

When considering this friction in relation to the new medium provided by data-monies, the same problems arise. Even though it might sound fair and liberating to be paid for the free digital labour one is putting into a platform, the advantages have to be considered in relation to the new exploitative possibilities that data-monies allow for platforms. When a user tips someone to show appreciation for their content, they are revealing what they find valuable in the platform, what they would be ready to pay for and what type of content retains the user on the platform. Data-monies crystallize undetected and monetiziable resources or commodities by making explicit the transactional interactions that generate value to the platform.

If a platform's business model relies on serving users ads, attention is the commodity the platform capitalizes on and extracts value from. Knowing what brings that attention is key. Issuing a token programmed to capture behaviors through means of transactions, such as quantifying the attention a user provides to a platform and rewarding it with data-monies, crystallizes the value extracted into a digital asset that represents the attention provided. By doing so, the platform transforms attention into a fungible currency that can be traded, spent and most importantly priced.

7.2 Re-organization of Markets around Tokens

The second dimension identified as part of the process of platformization is the reorganization of economic relations around multi sided markets that aggregate transactions among end users and third party services (Poell, Nieborg, van Dijck, 7). Multi-sided markets are overseen by platforms who position themselves as the intermediaries that handle the matchmaking between the different sides. Classic examples of multi-sided markets mediated by digital platforms are app stores and consoles for video games (Rochet & Tirole, 1). These platforms efficiently connect users with developers, both sides are incentivized to participate in the multi-sided market as it becomes the quasi-monopoly market for the goods and services they offer. Platforms position themselves as intermediaries and charge fees from each transaction.

As argued in the previous chapter, data-monies bring about the potential to crystallize into currencies previously miss-priced commodities within the platform economy by mediating interactions through transactions. Thus, data-monies bring to light markets that, because of the lack of an appropriate medium, are implicit in or uncaptured by platform's business model. Moreover, the new markets generated by the adoption of a platform-specific token that mediates certain behaviours can benefit from the inherent financial network. This allows markets to handle and price these commodities quickly and efficiently, thanks to the automated settlements of agreements mechanism assured by smart contracts . Data-monies provide new possibilities for value-extraction as they give shape to markets for pricing and trading interactions or communicative acts that platforms were not yet efficiently capitalizing on.

Ethereum capitalizes by default on any type of transaction happening in the ecosystem, all the value is captured by the core-layer and is then redistributed to the network. Nonetheless, this does not correlate to the ability of a platform built on top of Ethereum to extract value from the data yielded by users who interact via the token. A centralized platform integrating a token that runs on a decentralized infrastructure does not make the platform less centralized and it does not threaten its status as a middle-man of a multi-sided market. On the contrary, it allows the platform to better mediate users' behavior and to make explicit previously unrecognized markets for those behaviors.

Decentralized finance aims to disrupt the current market for access to money and financial services – something that is today intermediated by commercial banks. Thousands of dAPPs reduce the traditional financial infrastructure into smaller operative units, all of which are seamlessly integrated with one another – they are 'money-legos'. Each of them captures the functioning of a different fragment of the financial infrastructure through smart contracts that regulate settlements and tokens programmed to mediate specific types of transactions. Moreover, tokens are programmed to be an incentive system for the users to engage with the platform – the more users use a platform the more they are rewarded.

Brave aims to *repair the broken digital advertising market* (Brave, 1) through the adoption of BAT. Brave is a Browser application that stands for user's privacy and it offers an advertisement free browsing experience, since the platform is integrated with ad-blockers and tracker blockers. Brave does not charge anything for its service but it offers an optional program for users who want to economically sustain the platform. Users can choose to opt-in to the Brave reward system; once they do so they allow Brave to show them ads, in exchange Brave compensates users with BAT tokens based on how much attention they provide to the platform. Brave calculates the attention users provide to different websites using different metrics while profiling and targeting them with tailored ads. Nonetheless, Brave is programmed so that the user's personal information never leaves the device and no third party can access it, while it still enables the data to be used for the match-making necessities of the multi-sided digital advertising market.

Brave's white paper argues that the digital advertising market has become *inefficient* and *troubled* for all the parties involved. Advertisers are constantly facing fraud as the ads they pay for end up being partially consumed by fake traffic. The Association of National Advertises estimated that fake traffic combinedly cost over seven billions to advertisers in 2016 (6). Because of the opaque functioning of digital advertising platforms such as Google and Facebook and because of the myriad of third parties in between, advertisers can not easily assess the effectiveness of their ads. Moreover, not knowing where or when their ads are being broadcasted, is a threat for advertisers who risk losing control over their brands.

According to Brave, users are not in a better position. Their attention is constantly being exploited as they are bombarded with advertising. Having an exorbitant number of ads results in *electronic pollution* for users who consequently adopt ad-blockers or develop 'ad-blindness' by unconsciously learning to ignore all the ads they are exposed to and thus, reducing their effectiveness. Moreover, users' security and privacy are being threatened by maladvertisements, which are ads that try to lure users to shady web pages with the goal to infect them with malware. User's attention is mispriced when compared to the negative externalities imposed by the current digital advertising market and the exploitation of personal data perpetuated by platforms.

Finally, publishers see the revenue generated from renting ads slots dissolve as advertisers buy ads through a complex network of intermediaries, where around 73% of the digital ad revenue is absorbed by the market leader platforms Google and Facebook. Brave aims to simplify the multi-sided market for digital advertisement by cutting-off all the intermediaries (except Brave itself) and by fairly pricing the commodity it capitalizes, attention, through the BAT token. BAT is programmed to provide a more transparent relation between users, advertisers and publishers: advertisers pay publishers for ad slots with BATs – advertisers buy 'attention' while publishers receive it. Brave takes a cut from this payment and splits it up with users who joined the reward program.

Brave is still able to monetize users data through profiling practices, even though users' privacy is protected as their profiling information never leaves their devices. Users' attention is now valued as users are being paid based on the attention they provide. BAT forms a bond with users that proves that not only their data, attention and digital labor hold value, it also establishes that this value has been ignored and exploited by the middlemen year after year in the current industry model. At the same time advertisers gain access to more transparent analytics about the effectiveness of their ads, they have more control over where their ads are shown and thus over their brand. Moreover, they are spared from having to deal with the intricacies of the current digital advertising market. Publishers also gain from the new proposition as they do not see their profit being diminished by an opaque network of intermediaries that drains the attention-commodity value the publishers provide access to.

Brave creates a market for the attention commodity by crystallizing it into the BAT token and by then building around it a multi-sided market with a more direct and transparent relation with its participant. Monetizing attention becomes more efficient as the commodity is priced by the market as advertisers and publishers trade it. As exemplified by BAT, tokens can make explicit the value produced by forms of unpaid digital labor by mediating it through a transaction. This is made explicit by the rise of platforms that, similarly to Brave, pay users to use the platform. For example 'play-to-earn' business models, where users are paid as they spend time on a game, as a further step to enhance network effects similar to what has been achieved by 'free-to-play/pay-to-win' models.

Platform specific Tokens become an incentive mechanism within the platform that increase competition between users to produce more, play more or watch more. As discussed above, Nick Srnicek argues that digital labor is not being exploited since platforms do not induce competition in users– when this sort of incentive system is put in place, they do. As the commodity gets priced, a new market and the relative reward system are generated and fueled by competition. This assists the platform to attract and maintain a continuous stream of digital labor as users are *paid* to do so – even though the end goal is to maximize the platform's profit. A Platform can, for example, use a smart contract to mint new tokens to automatically reward users that are able to generate traffic for the platform through their content.

This becomes problematic when considering that the incentive system, even though not profitable enough for a western user to live off, can be a significant income for users based in developed countries where the cost of living is significantly lower. These users have much stronger incentives to keep on producing digital labor for western people to consume. Similarly to how other in-game digital currencies, such as gold in World of Warcraft or Runescape, are being 'farmed' by users from developing countries to be sold to people living in western countries. These ancillary markets create profits for users that use the platform, while the platform is not able to capture the value generated by them.

In order to extract value from this ancillary market, World of Warcraft tokenized the monthly subscription that users have to pay to play the game. Users can buy the token for real money and then sell it for in-game gold to other users, who prefer to pay their subscription with the in-game currency rather than using fiat currencies. By tokenizing the right to access the game service into a digital asset, World of Warcraft was able to capture the ancillary market for in-game currencies and generate more revenue. This token has nothing to do with the architecture of data-monies, since its application is limited to World of Warcraft and it does not have an inherent financial market sustaining and pricing it. Nonetheless it exemplifies how tokens can make explicit and capture ancillary markets of (centralized) platforms.

Other examples of markets ancillary to platforms are the ones for fake followers and fake interaction on social media, the digital advertising market of influencers who promote products on their profile or third party services who claim to boost a website's rank in the google search results. These services exist due to the way in which the platform functions. Nonetheless, the platform is not always able to capitalize on these ancillary markets as they may be incompatible with their business model – they may be counterproductive to the functioning of the platform. In some other cases, these markets can be integrated in the platform business model through the use of platform-specific tokens able to capture and crystallize that value.

The subreddit *r/cryptocurrencies* was one of the first ones to adopt an ERC-20 (MOONs) as a reward system distributed automatically to users according to how many 'upvotes' their content was receiving. This led to users quickly denaturing the subreddit in the hope of being rewarded the maximum amount of MOON that are redeemable each month. This practice is referred to as 'Moon Farming' and led users to be more active in order to get more tokens, to the point that moderators themselves in some cases exploited the mechanism by monopolizing thread creation and thus, concentrated upvotes and moon on their hand.

7.3 Governance Tokens and Governance over the Medium

The last dimension identified in the process of platformization is concerning platforms' governance over users behaviour. Platforms conduct users' behavior by using interfaces, algorithms and terms of services designed to shape interactions. Platforms constantly evolve the design of these instruments in order to maximize the users' behaviors they can profit from, while adjusting them to local rules and regulatory frameworks. These tools are used to enhance network effects, make behavioral data platform-ready, retain users and attract new ones (Poell, Nieborg, Dijck, 7). Adopting platform specific token extends the control platforms can exert over their users' behavior through incentive systems that rewards or punishes them. Jean-Christophe Plantin highlights the circularity of the relation as a loop where platforms' goal of extracting value from users determines the technical properties of the platform, which again shapes how communication is organized among users (8).

The implementation of platform-specific tokens results in an additional design layer for platforms to govern user behavior. Monetary incentives are already used by platforms to balance the match-making between different sides of the multi-sided market. Food delivery or car-sharing platforms use dynamic pricing to conduct user's choices so as to induce them to choose an alternative over another. At the same time, drivers and riders are also affected by the dynamic pricing of their salaries when they offer services through the platform. This helps stabilize supply and demand based on current market conditions so as to maintain the platform business model.

The earlier identified *friction* between users, who want to use a platform to express themselves, and platforms, who govern users behavior so as to extract more value from it, is also brought about by data-monies. Decentralized applications aim to reduce this friction by aligning the interest of individual users and the interest of the platform through incentive mechanisms. In the same way Ethereum miners are incentivized to maintain the infrastructure secure because by doing so they are guaranteeing the security of the same digital asset they are being paid with. Nonetheless, decentralized platforms and applications are not always successful at fully aligning individuals interests with the ones of the platform as a whole. An example of the misalignment is the Miner's Extractable Value: miners are incentivized to behave according to their own interests and not the ones of the ecosystem as a whole.

Moreover, decentralized applications are mostly administered through governance tokens that allow users to vote on the implementation of proposals coming from the community. The tokens encapsulate both governance, as they give users power over the protocol, and capital, as they are priced based on the utility of the platform and the utility of governance power over the platform. Since the functioning of these protocols is deeply integrated with the functioning of the tokens, and owning these currencies translates to owning the protocol, governance tokens are a resource that allows owners to vote on the shape of the protocol and thus, directly affecting the matter of the resource itself. The resource changes its shape according to the agendas of the owners of the resource.

In decentralized applications, governance tokens employ a different type of relation between users and platforms compared to centralized ones. Governance tokens are distributed to users as they use the platform and they represent voting power on administrative decisions over the protocol. In decentralized platforms the governance is thus in the hands of the community who can determine and shape the affordances of the platform. Nonetheless this carries some issues: when some actors, usually venture capitalists, own a huge portion of the governance tokens, they can heavily impact the voting process in favor of policies that better fit their agenda. The ecosystem is looking forward to new voting solutions, such as quadratic voting, to make the governance process more fair and provide a better alignment of the interests of the platform participants.

Adopting reward systems based on platform-specific tokens is common practice in DeFi, where incentives are used to encourage usage of a specific platform, or to encourage certain behaviours within the platform. Programs referred to as 'liquidity mining' are widely used to bootstrap platform adoption and enhance network effects. For example Matic is a sidechain and one of the scalability solutions for Ethereum: Matic relies on the security of Ethereum by using it as an execution layer to legitimate the transactions happening on Matic's sidechain. Matic is a platform for smart contracts and launched a program for liquidity mining providing token for 40 million dollars between april 2021 and June 2021. Even though the platform was already functioning before the liquidity mining program began, in this period of time the active addresses on the platform grew from around 150'000 to over 500' 000[13].

A notable example of network effects triggered by platform-specific token adoption is the

[13] https://studio.glassnode.com/metrics?a=MATIC&category=Addresses&m=addresses.Count (Accessed on August 18, 2021)

recent Vampire Attack perpetrated by Sushiswap against its competitor Uniswap. Sushiswap is a fork[14] of Uniswap which issued its own governance token SUSHI. Sushiswap began rewarding users who were using its protocol instead of Uniswap. The incentive system attracted a huge chunk of Uniswap's user base, since it provided the same service with added benefits: as the users moved to Sushiswap, the protocol absorbed over two billion dollars in digital assets that were previously deposited on Uniswap. It required weeks for Uniswap to recover from the Vampire Attack and it led the platform to also issue its own governance token to reward users. UNI tokens were airdropped (given for free) to everyone who has ever used the platform with around 170 tokens – which were then valued around 7 dollars each.

When governance tokens are implemented through centralized applications, as for example through platforms that handle 'fan tokens', the user does not have power over administrative decisions. These tokens are not a productive use of governance: the governance itself is limited to miscellaneous choices. What users can vote upon is already *governed* by the platform itself and thus, users can only vote upon decisions from alternatives chosen and approved by the platform. Nonetheless, providing a medium to express (and capture) certain behaviours grants the platform new extractive possibilities, that are not tied to the value of the asset itself, but rather from governance over the asset.

Data-monies make explicit markets that were previously undetected or inefficiently quantified by the data infrastructure, thanks to the notion of value they carry. Adopting platform-specific tokens grants power to the platform, both in the case of centralized and decentralized platforms – the difference being that in the latter case the power is redistributed to its users. The power does not come from the value of the token itself, but rather from the access to control over the token's functioning. What allows for the value extraction to be maximized is not control over the asset's price, but control over how the medium and how the digital asset mediates certain behaviors.

Moreover, when considering decentralized applications, platforms or tokens, the governance over the protocol is not a relation that constantly needs to be performed but quite the opposite. Governance is only performed when voting is done on protocol improvements. Other than that, how the protocol functions is pre-determined and automated: at each block the network confirms that the protocol is still following the same rules, those rules do not need to be enforced because there is consensus about them. The goal is to automate consensus over the rules as much as possible, so that the protocol can keep on running efficiently: the governance is already embedded in the code.

8. Conclusions

Blockchain technologies allow for the creation of currencies that do not require any third party to verify transactions. These transactions are instead verified by the underlying protocol which is sustained in a decentralized manner by the users who provide the computational power required to manage the infrastructure in a secure way. Data-monies are digital and decentralized currencies, their architecture is that of a *money of account* even though they behave as a *medium of exchange.* Data-monies are valuable since the underlying infrastructure guarantees the security of the data transferred within the network: blockchains represent the right to move data securely. Data-monies are valuable because they exist within a blockchain, they encapsulate the value that emerges from the security of the network.

[14] Since dAPPs are open source the 'copy-past' of other platforms' code is common practice and a drive for innovation in the space. Productive forks of projects implement new functionalities.

When the monetary infrastructure is understood as a ‘memory bank’ of all human intercourse, the blockchain infrastructures can be a viable and secure alternative monetary standard: data-monies are a cash-equivalent native to the internet. DLTs allow for all transactions to be recorded in a distributed and non-falsifiable way. As data-monies adoption grows, their value is increasingly socially accepted and thus, they gain legitimacy and become an asset that can be traded and exchanged. Not only is the infrastructure efficient, people are beginning to acknowledge the value of the network and the digital assets sustained by it. Bitcoin is the most capitalized data-money on the market and is growingly becoming accepted by businesses, banks and even sovereign nation states. Bitcoin proved the infrastructure can work – with its own trade-offs.

Data-monies are programmable money as they are regulated by their protocol – would it be a blockchain or a smart contract. When dealing with these currencies, *the code is law and the law is code* – users have to trust that the protocol works as intended: there is no chance for negotiation. Ethereum leverages the possibilities allowed by data-monies and expands the idea of what is considered money thanks to its Turing-complete programming language and its compatibility with smart contracts. Native coins such as BTC and ETH are programmed to sustain the network and thus guarantee their own security and value. Their code regulates the monetary policies required to have a distributed network where every actor is incentivized not to act maliciously. This is achieved by balancing economics, cryptography and game-theory so as to align individual incentives to the incentives of the network as a whole.

Tokens running on top of blockchains thanks to smart contracts allow for more programmability as their design is not limited by the need of being the necessary incentive to run the infrastructure. These tokens are in their early days but are already finding various applications – decentralized finance being the most advanced at the time of writing. Platform specific tokens can be seen as a further step in the process of platformization as they enhance the functioning of the issuing platform. This is allowed by the meta-platform logic imprinted in the DLT architecture of Ethereum: the blockchain is provided as a service, while Ethereum extracts value from everything built on top of it.

Platformization takes place over three dimensions: data infrastructure, market re-organization and governance. Data-monies empower all of these dimensions and become yet another tool to reinforce the dynamics at play within the platform economy. Since they rely on a secure and guaranteed network the resulting data infrastructure produces information that is inherently valuable. Being able to have data that carries value allows platforms to capture and quantify behaviors that were previously undetected, since these behaviours require a new type of mediation to be captured – one that mediates behavior through means of economic transactions.

Platform specific tokens expand the process of datafication in various ways. First, data-monies make transactional data ‘platform-ready’, thus, they can be easily integrated within the functioning of a platform. Secondly, they mediate human behaviors through means of transactions, making the underlying data more valuable. Giving a user a ‘tip’ or a ‘like’, mediates the same type of interaction: both of them mediate the communicative acts of showing appreciation. Nonetheless, data-monies are more meaningful as they yield a type of data that is inherently valuable and requires the user to commit economically in order to express themselves. This has the potential to make explicit markets that previously eluded efficient quantification by monetizing its commodities. Moreover, thanks to the inherent financial framework of data monies, these commodities are quickly priced by the market. Thus, enabling trading of these resources and legitimizing the value of these commodities.

By doing so, platform specific tokens are able to reorganize markets around these resources. As shown in the example of Brave’s BAT, tokens can be programmed to make markets more efficient by capturing and mediating behaviours, such as ‘attention’, while allowing the inherent financial framework to price these assets. Moreover, reward systems can be implemented to recognize activities that previously were not understood as 'paid jobs', such as free digital labor. Implementing a reward system, being it user-to-user or platform-to-user, brings about competition to produce more within a platform. At the same time, it ensures that the platform has a consistent stream of users and content – as long as the incentives are worth it.

Thus, the platform has to recognize the value generated by these behaviours since the commodity from which the value is extracted is made explicit by the token. Recognizing digital labor and other communicative acts as a commodity triggers competitive pressures on users who are induced to produce or consume more. This goes against Srnicek's argument that digital labor is not being exploited since there is no competitive pressure by platforms over users to do more. When reward systems come into place, there is competition and thus, exploitation. Competition leads to more exploitation since the capacity to extract value does not come from controlling the content of the intercourse, but from governing the mediums that allow these interactions – in this case, data-monies.

Platform specific tokens used as a reward system crystallize the value generated by the activities happening on the platform – similarly to how ETH is able to crystallize the value generated by all the activities happening on the network, regardless of what type of activities these are. This also provides valuable data to the platform on what its users consider valuable within the platform and what they would pay for. Data-monies make explicit what is valuable in a platform and thus, enhance data-collection and user-profiling practices. Moreover, using a reward system also grants governance to the platform as the incentives are designed to induce users to behave in ways that are profitable for the platform.

The governance mechanism in decentralized platforms and applications have a different architecture when compared to centralized platforms. Nonetheless, the risk to consolidate exploitative power relations within the platform is still a reality. These governance tokens are something in between a stock and a currency: they are very liquid and can be quickly sold for any other asset, at the same time they provide voting power over the protocol. Users can vote on improvement proposals pushed forward by the community itself based on the number of tokens they own – apparently reverting the governance relation between platform and users: here, users are conducting the protocol's behavior.

This mechanism is showing huge limitations as the voting systems are at risk of being exploited by large stake holders of tokens. Even though alternative voting mechanisms are being developed, this governance system is common to most decentralized apps and is ultimately concentrating the power in the hands of few stakeholders and thus failing to achieve its purpose. When this happens, the result is not that different from the power relations that come into play in a centralized platform: only few users dictate how the protocol functions based on their agenda which is imposed on every other user. When instead a centralized platform adopts tokens to vote on issues, the governance is only a façade as the platform is already choosing what users can vote on.

Even though the platformization of currencies into data-monies is showing wide potential, it is still limited to some specific niches, mainly due to the high transactional costs they still require. Decentralized Finance is the main environment where these tokens are used – this is the first necessary step for token integration into other types of platforms. Before tokens can be widely adopted by platforms, a robust and efficient financial framework is required to allow users to trade their tokens with any other one, in a quick and cheap way. Moreover, having an underlying financial network is a requirement for non-financial applications to be interoperable as data-monies mediate interactions through transfers of value.

Furthermore, no platform for smart contract today is efficient enough to handle applications that require high traffic to be used, such as gaming or streaming – these might be supported only partially on blockchains. The consequence is that, for now, most applications using these tokens are of speculative nature. The speculation is tied to technological development as the narrative is that these architectures will be able to replace and disrupt the current exploitative arrangements of platforms and any other business model that intermediates access to services.

Nonetheless, centralized platforms and central banks are increasingly interested in adopting their own data-monies: the benefits that this technology can bring about are becoming more evident day by day and these actors need to capitalize on them or risk being left out. In such a competitive space as that of digital innovation, missing one technology might lead to the collapse of a platform against its competitors: absorbing new technologies as soon as possible is crucial. Moreover, central banks and governments sovereignty on money is being threatened as decentralized platforms such as Ethereum allows anybody to create their own data-monies, ready to compete in the market for currencies and without any centralized attack vector – especially problematic for these institutions are stable coins which are pegged to, but not backed by, fiat currencies.

Even though the adoption of tokens is seen as empowering to the users of the ‘web 3.0’ they bring about several risks such as reinforcing the pre-existing power relation within the platform economy – something that these decentralized landscapes try to disrupt. While platform specific tokens can bring about several advantages both for users and platforms, the incumbent risk is for them to become yet another tool to impose a few individuals' agenda over the platform’s users – would it be a centralized platform or a decentralized one with few large stakeholders of governance tokens.

Data-monies bring about undeniable advantages to each participant of the markets they are issued in. This essay considered the main implications that these tokens bring about when adopted by platforms. The integration comes naturally as the underlying architecture of data-monies is that of a platform and they are consistent with the process of platformization. Even though they are a powerful new medium that can bring several advantages to users, they should not be welcomed with blind enthusiasm. The advantages users are experiencing have to be considered in relation to the new exploitative opportunities data-monies enable to platforms. If platform-specific tokens are issued and designed with the goal of mediating and monetizing on behaviors that previously eluded efficient exploitation, then they reinforce the power relations already at play in the platform economy. If incentive systems become means of digital colonization and owning tokens the requirement to access platform services, then no data-money is worth being part of this.

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